



Welcome!

The purpose of this newsletter is to keep you informed about methods and resources that are available for use in your health evaluations.

What is in this Newsletter?

The following topics are included in this edition of the ATSDR Newsletter for Health Assessors. An index of all topics covered in previous newsletters has been added to the resource page for the Public Health Assessment Guidance Manual (PHAGM) under the heading of ATSDR Newsletter for Health Assessors.

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How to Use the Newly Revised Cancer Slope Factor (CSF) for Inorganic Arsenic

[U.S. Environmental Protection Agency \(EPA\) 2025 CSF for Arsenic](#)

The Integrated Risk Information System (IRIS) landing page for inorganic arsenic provides the following information about the newly revised CSF [EPA 2025]:

Oral slope factor: 32 per mg/kg-day

Extrapolation method: Bayesian hierarchical dose-response meta-analysis using the logistic-power model

Tumor site(s): urinary, respiratory

Tumor type(s): bladder cancer and lung cancer

Note: The CSF represents the combined risk of developing bladder and lung cancer. It was derived by combining the individual CSF of 17.6 per mg/kg-day (1.76×10^{-2} per $\mu\text{g}/\text{kg}\text{-day}$) for bladder cancer and 21.3 per mg/kg-day (2.13×10^{-2} per $\mu\text{g}/\text{kg}\text{-day}$) for lung cancer. See Sections 4.3.5, 4.3.6, and 4.7 of the IRIS Toxicological Review for more information.

¹ Agency for Toxic Substances and Disease Registry

² ATSDR's Partnership to Promote Local Efforts to Reduce Environmental Exposure

EPA points out the following: “These cancer slope factors are estimated from the risk estimates in the low-dose region (corresponding to $<0.2 \mu\text{g}/\text{kg}/\text{day}$ for bladder and lung cancer), which displays an approximately linear dose-response relationship.” Above $0.2 \mu\text{g}/\text{kg}/\text{day}$, the relationship becomes increasingly nonlinear, and risk estimates should not be obtained using the CSF. Instead, at higher doses, the polynomial equations should be used.

How to Present Cancer Risk Estimates in ATSDR Certified Documents

Because of the complexity of adding the polynomial equation to the Public Health Assessment Site Tool (PHAST), we will use a two-step process for estimating and reporting cancer risk from exposure to inorganic arsenic:

1. Use the PHAST exposure calculator as usual to generate cancer risk estimates for arsenic.
2. Use the following approaches when reporting the results in your document:
 - Cancer risk $\leq 6\text{E-}3$
 - Report the calculated cancer risk (e.g., $2\text{E-}3$) and discuss PHAST cancer risks as usual (according to PHAGM).
 - Cancer risk $> 6\text{E-}3$
 - Do not report exact PHAST cancer risks greater than $6\text{E-}3$.
 - Instead, report the cancer risk as $> 6\text{E-}3$ and provide a statement such as the following:
 - “ATSDR used the linear slope factor from IRIS to calculate cancer risk from arsenic exposure. The resulting cancer risk is greater than $6\text{E-}3$, which is a concern for increased cancer risk. EPA’s toxicological review [EPA 2025] states that the linear slope factor is not accurate at lifetime doses greater than $0.2 \mu\text{g}/\text{kg}/\text{day}$, which equates to a cancer risk of $6\text{E-}3$. Because the cancer risk is so high, the exact risk level is not needed to determine that the exposure is a concern.”
 - Note: Exposure from arsenic in the diet results in a cancer risk of approximately $1\text{E-}3$ [EPA 2025]. The site-related cancer risks are in addition to this background cancer risk. The cancer risk of $6\text{E-}3$ was derived by multiplying the CSF (0.032 per $\mu\text{g}/\text{kg}/\text{day}$) with the lifetime dose ($0.2 \mu\text{g}/\text{kg}/\text{day}$).

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Cancer Toxicity Value for Mutagens in the IRIS

EPA’s IRIS program is the primary source of cancer toxicity values, including CSFs and inhalation unit risks (IURs), that ATSDR uses to assess health risks from exposure to carcinogens. IRIS contains a note under most mutagens with a CSF or IUR for assessing cancer risk. The note reminds users to apply age-dependent adjustment factors (ADAFs), which more heavily weight early life exposure. The italicized text below is taken

from the section of the landing page for acrylamide in IRIS describing the IUR [EPA 2010]. This is how IRIS currently presents the IUR for most mutagens.

IUR: 1×10^{-4} per $\mu\text{g}/\text{m}^3$

Note: ADAF -- EPA has concluded that acrylamide is carcinogenic by a mutagenic mode of action.

ADAFs to the IUR is recommended in combination with appropriate exposure data when assessing risk associated with early-life exposure.

In the Comparison Values (CVs) and Health Guidelines module within ATSDR's PHAST, you will see 1×10^{-4} per $\mu\text{g}/\text{m}^3$ listed as the IUR for acrylamide. This IUR represents excess cancer risk over a lifetime for every increase of one $\mu\text{g}/\text{m}^3$ of acrylamide exposure for adults. PHAST automatically applies ADAFs when calculating cancer risk for scenarios involving early life exposure. When you see a note like the one above, it indicates that the IUR displayed is an adult-based value and should match the unit risk displayed in PHAST. When this unit risk is used to calculate cancer risk for scenarios involving children, the appropriate ADAF will be included in calculating the risk. As of January 2025, most unit risks for mutagens in IRIS are displayed similarly to acrylamide.

In August 2024, EPA updated its assessment for chromium (VI) and formaldehyde. Both chemicals are mutagens, and both have cancer toxicity values (an IUR for formaldehyde and an IUR and a CSF for chromium (VI)). The presentation of these three cancer toxicity values in IRIS looks different than most other mutagens. The italicized text below is taken from the IUR presented on the chromium (VI) landing page in IRIS (EPA 2024).

IUR: 0.018 per $\mu\text{g}/\text{m}^3$

Note: EPA has concluded that Cr(VI) is carcinogenic by a mutagenic mode of action. Thus, based on the EPA cancer guidelines (2005), the IUR addressing lifetime exposure includes application of ADAFs. The IUR is recommended for lifetime exposures. An adult-based cancer IUR of 0.011 per $\mu\text{g}/\text{m}^3$ is also provided. This adult-based cancer IUR can be used instead of the IUR when assessing cancer risk associated with exposure scenarios that don't include early life (< 16 years of age) or when other calculations by the user are necessary (e.g., when applying ADAFs to age-specific exposure estimates).

The lifetime IUR of 0.018 per $\mu\text{g}/\text{m}^3$ presented in IRIS on the landing page for chromium (VI) is derived from the adult-based IUR, with ADAFs averaged over a 70-year lifetime. Table 1 is a reproduction of Table 4-26 in the IRIS assessment and demonstrates how EPA used the adult-based IUR to derive the lifetime IUR. EPA calculated three age-specific IURs by multiplying the adult-based unit risk by the ADAF and the appropriate duration adjustment. They then summed these three age-specific values to derive the lifetime IUR.

The lifetime IUR allows risk assessors to easily calculate lifetime excess cancer risks using EPA's 70-year lifetime assumption. It will not calculate accurate cancer risks for any exposure scenario other than exposure to chromium (VI) for 70 years. Using the adult-based IUR of 0.011 per $\mu\text{g}/\text{m}^3$ and applying ADAFs for early-life exposure will calculate accurate cancer risks for any exposure scenario.

Table 1. Calculation of a lifetime IUR for a constant Cr(VI) exposure from ages 0-70 years, adjusted for potential early-life susceptibility.

Age Group	ADAF	Adult-based IUR (per $\mu\text{g}/\text{m}^3$)	Duration adjustment (years)	Age-specific IUR (per $\mu\text{g}/\text{m}^3$)
0-<2 yr	10	0.011	2/70	0.0031*
2-<16 yr	3	0.011	14/70	0.0066
16-70	1	0.011	54/70	0.0085
---	---	---	Birth to 70 (lifetime IUR)	0.018 [§]

*example: Age-specific IUR = $10 \times 0.011 \text{ per } \mu\text{g}/\text{m}^3 \times (2/70)$, [§] lifetime IUR = $0.0031 + 0.0066 + 0.0085 = 0.018$

PHAST has therefore adopted adult-based cancer toxicity values for chromium (VI) and formaldehyde. PHAST automatically applies ADAFs for mutagens when appropriate, including in the calculation of the Cancer Risk Environmental Guidelines and in the calculation of cancer risks for chromium (VI) and formaldehyde in exposure scenarios that include children.

The IRIS database displays most cancer toxicity values for mutagens as adult-based risks. However, EPA plans to change the IRIS database for all mutagens to display lifetime IUR and CSFs. This may result in CSFs and IURs for all mutagens appearing differently in PHAST than in IRIS. Carefully review the notes under CSFs and IURs in the IRIS database to understand if the values are lifetime or adult-based CSFs or IURs. Use adult-based values and apply ADAFs appropriately to calculate accurate cancer risks for exposure scenarios involving mutagens. The good news is that PHAST automatically does this for you.

Postscript: Vinyl chloride is another exception and requires an alternate method for calculating cancer risk that's different from the methods described previously. PHAST will be updated with the release of version 2.7 to include EPA's alternative method. Until then, please reach out to your associate director for science (ADS) or technical project officer (TPO) regarding cancer risk calculations for vinyl chloride.

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Update Your Public Health Documents with These New Health Guidelines

From January to July 2025, ATSDR has released eight toxicological profiles as final.

- Acrolein (107-02-8)
- Acrylonitrile (107-13-1)
- Carbon disulfide (75-15-0)
- Chloroethane (75-00-3)

- 1,2-Dichloroethene, cis and trans (156-59-2, 156-60-5)
- n-Hexane (110-54-3)
- Naphthalene, 1-methylnaphthalene, 2-methylnaphthalene (91-20-3, 90-12-0, 91-57-6)
- Vinyl acetate (108-05-4)

The provisional minimal risk levels (MRLs) in many of these profiles did not change. Those MRLs that changed are listed in Table 1. We also made small corrections in PHAST to a few MRLs and other guidelines that were entered incorrectly or needed clarification. In addition, EPA released updates to several chemicals resulting in changes to reference doses (RfDs), reference concentrations (RfCs), and cancer toxicity values.

It's easy to identify newly released toxicological profiles and MRLs by periodically checking ATSDR's [toxicological profiles website](#). On the same page, you can also sign up to receive a newsletter with updates about MRLs and tox profiles.

Update the Health Guidelines in Documents Being Developed

If you are currently working on a public health document with the chemicals listed in Table 1, you should review your screening process to see if any CVs changed because the health guideline or cancer toxicity value changed. Some health guidelines are now lower, which results in lower CVs, such as environmental media evaluation guides (EMEGs), RfD or RfC media evaluation guides (RMEGs), and cancer risk evaluation guides (CREGs).

If you had previously selected a chemical as a potential contaminant of concern and the health guideline or cancer toxicity value changed, you'll need to update your toxicological evaluation using the new MRL, RfD, RfC, CSF, or IUR.

Table 2. Summary of cancer and noncancer health guidelines and cancer toxicity values that changed from November 2024 to June 2025

Chemical	PHAST Data Field	Old Value	New Value	Date
Acrylonitrile	MRL Inhalation Intermediate	0.9 ppb	0.8 ppb	6/17/25
Arsenic*	IUR		0.0043 (µg/m ³) ⁻¹	7/17/25
Arsenic	CSF	1.5 per mkd	32 per mkd	1/15/25
Arsenic	RfD	3.E-4 mkd	6E-5 mkd	1/15/25
1-bromopropane	MRL Inhalation Acute	990 ppb	1,000 ppb	6/17/25
1-bromopropane	MRL Inhalation Intermediate	99 ppb	100 ppb	6/17/25
Chromium VI	MRL Inhalation Intermediate	None	0.005 µg/m ³	6/27/25
Chlorine	MRL Inhalation Acute	59 ppb	60 ppb	6/17/25
Chlorine	MRL Inhalation Chronic	0.052 ppb	0.05 ppb	6/17/25
Chromium VI (aerosol/mists)	RfC	0.008 µg/m ³	0.03 µg/m ³	1/7/25
Chromium (particulates)	RfC	0.1 µg/m ³	0.03 µg/m ³	1/7/25
Chromium VI	IUR	None	0.011 (µg/m ³) ⁻¹	12/20/24
Chromium VI	CSF	0.5 (mkd) ⁻¹	0.16 (mkd) ⁻¹	12/20/24

Chemical	PHAST Data Field	Old Value	New Value	Date
Fluoride [†]	RfD	None	0.06 mkd	6/24/2025
Fluorine	RfD	0.06 mkd	None	6/24/2025
Formaldehyde	IUR	1.3E-5 (µg/m ³) ⁻¹	6.4E-6 (µg/m ³) ⁻¹	11/25/24
Formaldehyde	RfC	None	5.7 ppb	11/21/24
Glutaraldehyde	MRL Inhalation Intermediate	0.029 ppb	0.03 ppb	6/17/25
PFHxS	RfD	None	4E-10 mkd	1/15/25
2,3,7,8-TCDD TEQ	MRL Oral Chronic	1E-9 mkd	4E-10 mkd	11/13/24
2,3,7,8-TCDD TEQ	MRL Oral Intermediate	2E-8 mkd	None	11/13/24
2,3,7,8-TCDD	MRL Oral Chronic	1E-9 mkd	4E-10 mkd	11/13/24
2,3,7,8-TCDD	MRL Oral intermediate	2E-8 mkd	None	11/13/24

ppb = parts per billion; mkd = mg/kg/day; µg/m³ = micrograms per cubic meter; MRL = minimal risk level; RfD = reference dose; RfC = reference concentration; CSF = cancer slope factor; IUR = inhalation unit risk; TCDD = tetrachlorodibenzo-p-dioxin; TEQ = toxic equivalence; PFHxS = Perfluorohexane sulfonic acid; VI = hexavalent

*The 1995 arsenic IUR was removed from PHAST on January 15, 2025, but replaced on July 17, 2025, after EPA clarified that the original IUR is still current.

[†]ATSDR removed EPA's RfD from fluorine (7782-41-4) and applied it to fluoride (16984-48-8) because the RfD applies to the fluoride ion and not to gaseous fluorine.

Checking for Health Guideline Updates

The PHAST team plans to email health assessors when there are important changes to PHAST that might affect your evaluation, such as new MRLs, RfDs, and RfCs. Another way to check for changes in health guidelines and cancer toxicity values is to click "Contaminant Updates" on the [PHAST homepage](#). ATSDR health assessors, ATSDR partners, and others involved with the PHA process can gain access by contacting phast@cdc.gov. You can then open a Microsoft Excel file that will show recent updates to the PHAST database, including changes to health guidelines and cancer toxicity values. The file will show the old and new values and provide information about other changes to PHAST.

If health guidelines or cancer toxicity values change while your document is being developed or while it's in clearance, you will need to update your document with the new value. If you have questions, talk to your ADS office or TPO.

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Importing Portable Document Format (PDF) Tables into Excel

Frequently, data required for a public health assessment or similar documents are made available only as PDF files, which can make data analysis cumbersome. However, Excel offers a convenient way to extract the data from more recent PDFs. You can import any table, text, object, etc., from the PDF that Excel identifies as a table.

First, save a local copy of the PDF to your computer (not the cloud). The steps below align with those shown in Figure 1.

1. Select the data tab on the ribbon in a blank Excel workbook
2. Click “Get Data” on the far left to open a dropdown menu
3. Select the “From File” option
4. Select “From PDF”

This will open a new file browser window where you select the desired PDF. You should save a local copy of the PDF to your computer (e.g., to the desktop, not the cloud) to avoid lengthier times in the next step. Note: once a PDF is selected, the “Open” button will change to “Import,” and a new window will open (Figure 2).

Excel will allow for any table, text, object, etc. that it identifies as a table to be imported, which is displayed on the left side of the new Navigator window that opens. Often, Excel identifies more tables than are present in the PDF. When you select a table to import, check the preview on the right side of the Navigator window to ensure it is the correct information. Clicking the “Load” button will open the selected information into an Excel table with headers that you can use to quickly filter data. You can extract multiple tables at one time, but that process is too advanced to describe in this newsletter.

This approach is a good way to convert a PDF with contaminant names, concentrations, and data qualifiers. Once the data is in an Excel format, you’ll be able to analyze it more easily.

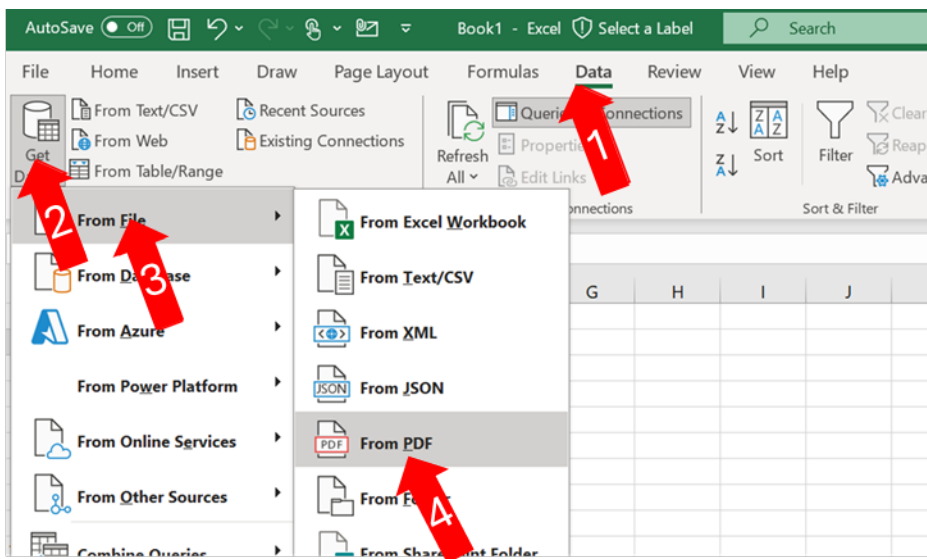


Figure 1. Screenshot showing how to extract a table from a PDF in Excel.

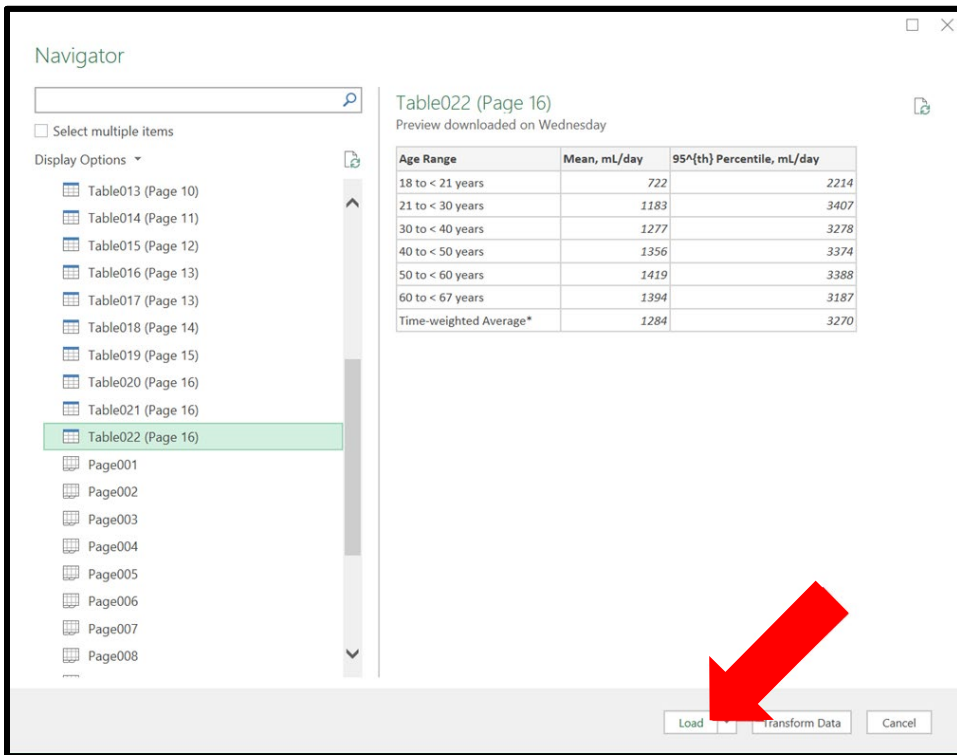


Figure 2. Screenshot showing the data import navigator tool.

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508 Tips and Tricks: Complex Tables Refresher

ATSDR documents that are posted online need to be 508-compliant. This newsletter features a series of articles about common issues in making your public health documents 508-compliant. In this edition of 508 Tips and Tricks, we're taking another look at complex tables—still one of the most frequently flagged issues by the 508-review team.

Below is an example of a complex table that is not 508-compliant.

Contaminant	Property Identifier	Number of Samples	Comparison Value (CV) (ppm)	Concentration Range		Number of Samples exceeding CV
				Minimum (ppm)	Maximum (ppm)	
Soil						
Arsenic	1	85	16	2	67	10
Hexavalent Chromium	1	74	0.22	0.73	5	74
Lead	1	12		4	124	
Surface Water						
Arsenic	1	12	0.000016	0.13	3	12
Hexavalent Chromium	1	15	0.000024	0.7	7	15

Contaminant	Property Identifier	Number of Samples	Comparison Value (CV) (ppm)	Concentration Range		Number of Samples exceeding CV
				Minimum (ppm)	Maximum (ppm)	
Lead	1	12		0.3	10	
Groundwater						
Arsenic	1	10	0.000016	0.000007	2	3
Hexavalent Chromium	1	0.000024	0.000024	0.001	3.5	10
Lead	1	10		1.2	67	

There are a few reasons why the table above is not 508 compliant:

1. The table does not have a title.
2. In the first row, the concentration range is presented in merged cells and has a separate section header.
3. The table contains merged cells and separate sections in the body of the table identifying soil, surface water, and groundwater.
4. The table contains blank cells.

To make the table 508-compliant and less complex, we converted it into three separate tables with titles. We changed the complex column header for concentration range. We removed all merged cells and the nested row header for soil, surface water, and groundwater, and we filled in any empty cells using a dash. Here are a few additional things to keep in mind to avoid complex tables and to create 508-compliant tables:

- Do not use tabs or spaces to create a table-like structure.
- Do not use an image of a table.
- Create a table using the “insert table” function in Microsoft Word or Excel.
- Structure a table so that there is a logical reading order and clear relationships between headers and data in the table.
- Avoid nested row headers, complex column headers, merging or splitting of cells, and patterned backgrounds in tables.
 - Nested row headers: row headers that are grouped within other row headers, creating multiple levels of hierarchy.
 - Complex column headers: column headers that span multiple rows or columns, often using merged cells.
- Do not leave empty cells but rather add “N/A” or a symbol such as a dash. Define symbols in a footnote immediately beneath the table.
- Ensure data tables identify all row and column headers.
- Add a table number and title above the table to briefly describe the purpose of the table. Do not place the table number and caption as a row in the table.

Table 1. Soil Samples by Property

Contaminant	Property Identifier	Number of Samples	Comparison Value (CV) (ppm)	Maximum Concentration (ppm)	Minimum Concentration (ppm)	Number of samples exceeding CV
Arsenic	1	85	16	2	67	10
Hexavalent Chromium	1	74	0.22	0.73	5	74
Lead	1	12	-	4	124	-

Dashes (-) indicate no data are available.

Table 2. Surface Water Samples by Property

Contaminant	Property Identifier	Number of Samples	Comparison Value (CV) (ppm)	Maximum Concentration (ppm)	Minimum Concentration (ppm)	Number of samples exceeding CV
Arsenic	1	12	0.000016	0.13	3	12
Hexavalent Chromium	1	15	0.000024	0.7	7	15
Lead	1	12	-	0.3	10	-

Dashes (-) indicate no data are available.

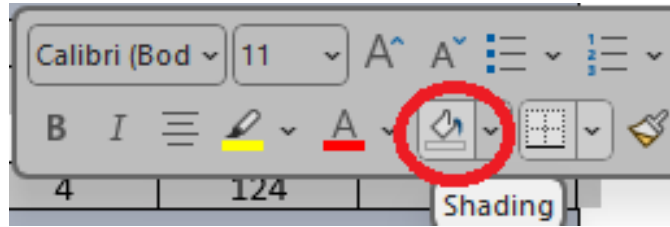
Table 3. Groundwater Samples by Property

Contaminant	Property Identifier	Number of Samples	Comparison Value (CV) (ppm)	Maximum Concentration (ppm)	Minimum Concentration (ppm)	Number of samples exceeding CV
Arsenic	1	10	0.000016	0.000007	2	3
Hexavalent Chromium	1	10	0.000024	0.7	7	15
Lead	1	10	-	1.2	67	-

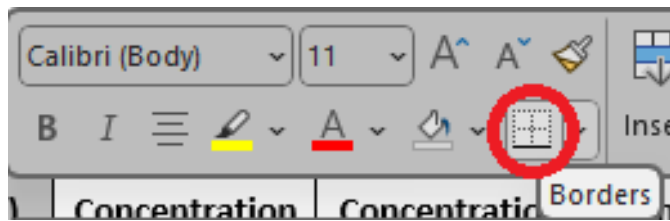
Dashes (-) indicate no data are available.

Some other things to keep in mind when creating tables for your documents:

- Table shading can enhance visual appeal, but it's often unnecessary and may cause complications during a 508 compliance review. If you decide to use shading, do so sparingly, and be sure the colors meet 508 contrast standards.



- When using color, be mindful of 508 compliance standards. Certain shades—like faded tones, oranges, reds, and greens—can be difficult for people with low vision to perceive. To meet Section 508 requirements, all colors should maintain a contrast ratio of at least 4.5:1, as recommended by the CDC. When in doubt, opt for darker colors and use tools like a color contrast analyzer to verify compliance.
- Avoid customizing table borders excessively. Modifying table borders in Word may cause formatting issues during PDF conversion, leading to unexpected visual or 508 compliance problems.



When you submit your document to the Office of Communication for 508 compliance review, you should also submit a separate document listing the alt text for figures, equations, and a summary of the tables that provides a brief description of the data. Keeping tables simple not only streamlines the 508-review process, but it also saves you time and effort when preparing documents for web posting.

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