



Welcome!

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

What is in this Newsletter?

This edition of the *ATSDR Newsletter for Health Assessors* includes the following topics:

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An index of all topics covered in previous newsletters has been added to the Public Health Assessment Site Tool (PHAST) resources page under the heading of ATSDR Health Assessor Newsletter.

Describing Health Effects of Lead in Children

Health assessors should consider using the information below in their public health documents, particularly the text describing health effects in children from lead exposure. For more information, visit CDC's [Childhood Lead Poisoning Prevention Program](#). Another useful document is CDC's [Recommended Terminology When Discussing Children's Blood Lead Levels](#).

Protecting children from exposure to lead is important to their lifelong good health. No safe blood lead level in children has been identified. Even low levels of lead in blood have been shown to negatively affect a child's health. Exposure to lead can seriously harm a child's health and cause well-documented harmful effects such as the following:

- Damage to the brain and nervous system
- Slowed growth and development
- Learning and behavior problems
- Hearing and speech problems

Exposure to lead can result in lower intelligence scores (IQ), decreased ability to pay attention, and underperformance in school [CDC 2022].

Lead exposure in children is often difficult to see. Most children have no obvious immediate symptoms. If there's suspicion that a child might have been exposed to lead, parents should talk to their child's healthcare provider about getting a blood lead test. Healthcare providers and most local health departments can test for lead in the blood. Many private insurance policies cover the cost of testing for lead in the blood. The cost of blood lead testing for children enrolled in Medicaid is covered by the Centers for Medicare & Medicaid Services.

The health effects from lead exposure are more harmful to children less than 6 years of age because their bodies are still developing and growing rapidly. Young children are more likely to be exposed to lead than are older children because they tend to put their hands or other objects that might be contaminated with lead dust into their mouths. The goal at ATSDR is to raise awareness about the harmful effects of lead, particularly in children; identify sources of lead exposure in the environment; and reduce exposure to lead as much as possible.

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Finding Video Training Materials About the Public Health Assessment Process

The resources page in the Public Health Assessment Site Tool (PHAST) has been revamped to highlight the video training materials developed by ATSDR that are available for the public health assessment (PHA) process. You can access the training material from the PHAST home screen by clicking on the "Resources" module.

What follows is a description of the available training.

Training videos about the PHA process are easily located by searching "webinar" on the PHAST resources page.

PHAST Training Videos

On the PHAST resources page, under “PHAST Training,” you’ll find an index and links to PHAST training materials, such as the following:

- Index to PHAST training
- Intro to PHAST: CV Screen, Water/Soil/Food Calculators, Data Import webinar (May 2017 v1.0)
- CV & Health Guideline Database and SVI CVs webinar (March 2019 v1.3)
- Surface Water Pathway webinar (June 2019 v1.4)
- Air Pathway webinar (April 2022 v2.0)
- SHOWER Model Exposure Calculator webinar (June 2022 v2.1)

These 1-hour videos demonstrate how to use all of the features in PHAST, from conducting contaminant screens using comparison values to calculating drinking water and soil ingestion doses. Videos are also available on the information provided in the comparison value (CV) and health guideline (HG) module, such as ATSDR-derived CV values, minimal risk levels (MRLs), and reference doses (RfDs). Some chemicals have a brief description of the health effects associated with the principal study used to derive the MRLs. More recent training videos demonstrate the use of the air module and how to incorporate shower model results into PHAST to calculate hazard quotients and cancer risk.

We are in the process of reviewing and updating the initial training videos created in 2017 and 2019.

PHA Training Videos

On the PHAST resources page, in the Health Assessment Resources section, you’ll find more training videos, webinars, and modules under “PHA Training”:

- PHA training (PHAT) webinars
- Determining health effects using benchmark dose modeling and trichloropropane as an example
- Recent PHA training webinar series (2022)
- Online PHA training modules

ATSDR subject matter experts (SMEs) present the nine PHAT webinars. The webinars cover the online PHA training modules, which introduce new health assessors to the PHA process. In these 1-hour videos, ATSDR staff members share their experiences for different aspects of the PHA process.

Webinar 1: ATSDR’s mission, PHA process, and gathering site information and data

- Webinar 2: Evaluation of exposure pathways at sites
- Webinar 3: Selection of appropriate sampling data for the health assessment
- Webinar 4: PHA data screening analysis
- Webinar 5: Estimating exposure concentrations and exposure units
- Webinar 6: Exposure calculations
- Webinar 7: Toxicological evaluation
- Webinar 8: Clear writing of environmental health information
- Webinar 9: Engaging the community

The webinar about determining health effects using a benchmark dose model gives an overview of the modelling approach and terms. The webinar includes an example using trichloropropane that explains how to determine possible health effects based on site-specific doses.

The “Recent PHA Training Webinar Series (2022)” link provides access to seven videos on select topics that were released in 2022. These trainings, which are also listed elsewhere on the PHAST resource page, are provided here for easy access to the most recent training. The videos cover the following topics:

- PHAST air pathway
- Web-based PHAGM (Public Health Assessment Training Manual)
- Exposure point concentration (EPC) guidance for non-discrete sampling
- Guidance for calculating benzo(a)pyrene equivalents for cancer evaluations of PAH
- SHOWER model v3.0
- EPC tool
- PHAST SHOWER model exposure calculator

And finally, there’s a link to the online PHA training modules. These modules are designed to introduce new health assessors to the PHA process.

[Shower Model Resources](#)

On the PHAST resource page, in the SHOWER model guidance section, you’ll find a training video titled “SHOWER Model v3.0 Webinar,” which demonstrates how to run the SHOWER model. You’ll also find a training video titled “PHAST v2.1 SHOWER Model Exposure Calculator Webinar.” This training video shows how to load the results from SHOWER model v3.0 into the SHOWER module in PHAST to calculate hazard quotients and cancer risk. This section also includes supporting documents for the SHOWER model, such as the user’s guide and the SHOWER model technical document.

[PHAGM, PAH, and EPC Resources](#)

Several more training videos are available in the PHAST resources page. They include a video in the PHAGM section titled “PHAGM Webinar (May 2022),” which provides an overview of the online PHA Guidance Manual. Another training video, “Guidance for Calculating Benzo(a)pyrene Equivalents for Cancer Evaluations of PAHs,” is under the PAH section. Several other webinars are available in the exposure point concentration section. These include the “EPC Tool Webinar (June 2022),” the “EPC Guidance for Non-

discrete Sampling Webinar (April 2022),” and the “EPC guidance for Discrete Sampling Webinar (2019).” Remember, all the training videos can be easily located by searching “webinar” in the PHAST resource page.

PHA Training Modules

The PHA training (PHAT) modules are not located on the PHAST resource page but rather have a separate ATSDR website at <https://www.atsdr.cdc.gov/training/pha-training-section1.html>. A link to the online PHA training modules is provided in the PHAST resources page under PHA training.

The PHA training modules, which are self-paced, provide health assessors with basic information to conduct PHAs. The PHA training consists of eight modules based on a realistic environmental health case study, problem-solving exercises, and comprehensive resources and references to conduct PHAs.

Here’s what you’ll learn:

- In Modules 1–3 you will learn what ATSDR is, its PHA method, and how to gather and document site information and data.
- In Module 4 you will learn to evaluate the exposure pathways for contaminants at hazardous waste sites.
- In Module 5 you will learn how to select sampling data that are appropriate for the PHA.
- In Module 6 you will learn the basics of the screening analysis used in the PHA process.
- In Module 7 you will learn how to conduct a health effects evaluation to closely examine potential contaminants of concern.
- In Module 8 you will learn how to write and communicate environmental health information in clear language.
- Module 9, titled “Putting It All Together,” is under development.

The nine PHAT webinars described previously are designed to complement the online training you get from the eight PHA training modules currently available. We encourage you to search the PHAST resource page using “webinar” to easily locate the training videos described in this article.

ATSDR staff are currently working on a website that will house all the training and guidance materials so that it is easier to identify and access the training you want. The website will be available in late 2023.

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How to Document Subject Matter Expert Reviews in eClearance

Before public health documents are submitted to eClearance, ATSDR and APPLETREE authors have the option of sending their documents to an SME for review on a specific topic. If a SME review is conducted, these reviews need to be documented in eClearance so that future reviewers are aware of SME comments and how authors handled those comments. What follows are the steps that authors should take:

1. Before the document is placed into eClearance, health assessors can send the document to a SME for their review, if a SME review is desired or needed.
2. SMEs are encouraged to label their comments as L1 (required change), L2 (needs discussion), or L3 (optional). An explanation of the level designations is available on page 16 in [NCEH/ATSDR Policy and Procedure](#).
3. Using track changes, authors should respond to each SME comment and make changes in the document as appropriate. If authors disagree with an L1 comment from a SME, the health assessor should work with the SME to resolve the issue and document that in their response.
4. After the document is revised after the SME review, authors can share the revised document with the SME, but a second review by the SME is optional.
5. When the document is submitted to eClearance, authors should include in the supporting information tab a track changes document with the SME comments and the author's response.

Contributing author: David Mellard (dam7@cdc.gov), OCDAPS

508 Tips and Tricks: Alternative Text for Images

Because ATSDR documents that go on the internet need to be 508 compliant, the health assessor newsletter will have a series of articles about making our documents 508 compliant. These are common issues we run across as documents are reviewed for 508 compliance.

For this edition of 508 tips and tricks, we are discussing alternative text (alt text) for images. As mentioned in our previous 508 tips and tricks, when you submit your document to the Office of Science for 508 review, you should also submit a separate document listing the alt text for images, figures, equations, and a summary for the tables that provides a brief description of the data. Supplying the alt text in a separate document allows the 508 compliance team to properly incorporate the alt text into the final PDF.

Here are some things to keep in mind when producing alt text for images:

- Alt text should be less than 120 characters, including spaces.
- Do not use the phrases “image of...” or “graphic of...” to describe the image.
- Be accurate in the description. Alt text represents an image in situations where the image can't be seen or displayed (e.g., for screen-reader users, search engines).
- Every non-decorative image requires alt text for 508 compliance.
- Leave the alt text field empty for decorative images. Check the “Image is Decorative” box.
- Do not use the title above the image as alt text.
- Supply the alt text in a separate Word document.

Below is an example of an image that could be used in a document:

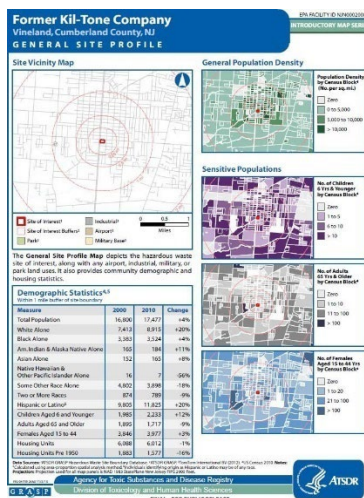


Figure 1. Former Kil-Tone Superfund site general site demographics

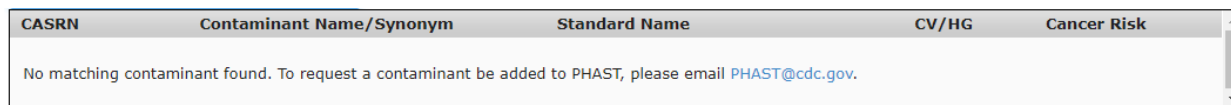
Here are examples of the alt text and caption for the above image:

- Alt text: Site map of former Kil-Tone site displaying demographic statistics, population density, and sensitive populations.
- Caption: Former Kil-Tone Superfund site general site demographics.

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How to Request New Contaminants in PHAST

Contaminant names or Chemical Abstracts Service Registry Numbers (CASRN) that are not in PHAST will display the following message when typed into a contaminant/CASRN search box in any module in PHAST:



When a PHAST user receives this message and believes the contaminant should be in PHAST, they can email PHAST@cdc.gov to request that the contaminant be added. The PHAST inbox manager will confirm the contaminant is not in PHAST. An associate director of science (ADS) at ATSDR will then review the request and decide if the contaminant should be added to PHAST.

If the ADS agrees the contaminant should be added, the requestor will receive an Excel file titled “New Chemical Request Template.xlsx.” Filling out the Excel file will expedite the addition of the chemical in PHAST by providing the PHAST team with all the contaminant properties needed for the media-specific screening and exposure calculator modules to function correctly.

The Excel file contains a “Read Me” tab with instructions, an “Entry Sheet” tab where users can fill in contaminant properties, and a “Field Sources” tab that instructs users where to look up each contaminant property in the “Entry Sheet” tab. The “Field Sources” tab often contains up to three potential data sources for each contaminant property. Users should consult the primary source first, and only move on to the secondary source if the contaminant property is unavailable in the primary source. Tertiary sources should only be used when the contaminant property is not available elsewhere. Users should enter the source of each property in the appropriate column in the “Entry Sheet” tab.

The process for adding a contaminant to PHAST can take several weeks and depends upon the available physical and chemical properties for the contaminant.

The following example demonstrates how a user would look up and enter vapor pressure for ethyl tert-butyl ether (ETBE; CASRN 637-92-3). The vapor pressure field has three potential data sources listed in the “Field Sources” tab. Each source is linked from the Excel file:

Field Name	Notes	Abbreviation	Units	Primary Source	Notes	Secondary Source	Notes	Tertiary Source
Vapor pressure	Use precise values (not rounded)	VP	mm Hg	EPA Regional Screening Levels	Column H of the Chemical Specific Parameters Table	ATSDR Tox Profile	See Physical and Chemical Properties Table.	PubMed

Because EPA’s Regional Screening Levels (RSL) chemical-specific parameters table is the primary source, the user would click the link to EPA’s RSL tables (see <https://www.epa.gov/risk/regional-screening-levels-rsls>). They would then scroll to the XLS link to the “Chemical Specific Parameters” table and download the Excel file:

Other Tables	PDF	XLS
Chemical Specific Parameters	PDF	XLS
Subchronic Toxicity Values	PDF	XLS
Default Values and Definitions	PDF	XLS

The Excel file lists a vapor pressure for the contaminant of interest:

Contaminant		s	
Analyte	CAS No.	VP (mmHg)	VP Ref
Ethyl Tertiary Butyl Ether (ETBE)	637-92-3	1.2E+02	EPI

Users should copy and paste the value in the “VP (mmHG)” cell into the vapor pressure cell of the “Entry Sheet” tab and enter “EPA RSL” as the source. (Using copy and paste is preferred to typing values from RSL tables because the value displayed in the RSL Excel file shows a rounded value but the actual value in the cell could have more significant figures.) The vapor pressure fields in the “Entry Sheet” tab should appear as pictured below:

Vapor pressure	
Prompts the calculation of SVI-soil gas CVs.	source of VP
124	EPA RSL

There’s no need to consult the secondary or tertiary source because vapor pressure for the contaminant was available in the primary source. If users are unable to find a contaminant property or need clarification for specific fields, they can email PHAST@cdc.gov for additional assistance or instructions.

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New Showering Comparison Values Available in PHAST

ATSDR historically used drinking water comparison values (CVs) to screen tap water to evaluate residents’ exposures to household drinking water. We now also have shower CVs that can be used to screen household water for exposures where residents are showering and bathing in household water. Shower CVs, which are contaminant concentrations in water, are available for inhalation exposures and for dermal exposures.

Inhalation and dermal shower CVs are contaminant concentrations in water that can be used to screen contaminants in water to select potential contaminants of concern. When inhalation or dermal shower CVs are exceeded, health assessors should select the contaminant for further evaluation and run the Shower and Household Water-use Exposure (SHOWER) model for the potential contaminants of concern. They will use the results to evaluate the risk of harmful effects for residential scenarios where residents are showering or bathing in household water.

Using PHAST to Screen Contaminants

Screening contaminants for the drinking water and showering pathways can be done easily using the water CV screening module in PHAST. When you come to the water CV screen page (shown below), the radio buttons for the drinking water and showering scenario will be selected by default. This means that PHAST will screen the contaminant using the drinking water and the showering CVs.

- If residents are showering in the water but not drinking it, you can un-select the drinking water radio button.

- If residents are drinking the water but not showering in it, you can un-select the showering radio button.

Public Health Assessment Site Tool (PHAST)

Home Site Info & Data CV Screen Exposure Calculator CVs & Health Guidelines Resources My Saved Results

Water Soil/Sediment Air Soil Vapor Intrusion

CV Screen: Water

Choose Contaminant:

Screen for: Drinking Water Showering and Household Water-Use

Contaminant/CASRN

Search for contaminant

Contains Begins With Exact

Concentration

Enter concentration

Unit

- Select a unit -

Compare Add Another Contaminant

Health assessors will enter the contaminant name, concentration, and unit as they normally would. If they are using the default setting (i.e., both radio buttons selected), clicking “compare” will generate two sets of tables. The first set of tables will show results using the drinking water CVs. Screenshot 1 shows the results for screening benzene at 100 ppb for the drinking water pathway.

These results have not changed from the previous way you screened using drinking water CVs. If you want PHAST to calculate doses for the drinking water pathway, you can click “Continue to Exposure Calculator.”

Screenshot 1. Screenshot from PHAST showing the results from running a drinking water CV screen for benzene at 100 ppb.

Results: Drinking Water

ATSDR Screening Values

Contaminant Name / CASRN	Conc	Unit	Above or Equal to Rec ATSDR CV?	Above or Equal to Other CV?	Above or Equal to MCL?	CREG	Chronic EMEG Child	Chronic EMEG Adult	Int EMEG Child	Int EMEG Adult	RMEG Child	RMEG Adult	Acute EMEG Child	Acute EMEG Adult	MCL
Benzene 71-43-2	100	ppb	Yes [1]	Yes [2]	Yes [5]	0.44 [1]	3.5 [2]	13 [2]	NA	NA	28 [2]	100 [2]	NA	NA	5 [5]

- [1] Recommended ATSDR CV met or exceeded.
- [2] Additional ATSDR CV met or exceeded.
- [5] MCL met or exceeded.

Show all

Select Contaminant(s) for Further Evaluation

Contaminant Name	Exposure Medium	Maximum Site Conc	Unit	ATSDR Recommended CV	ATSDR CV Type	Selected for Further Evaluation	Select for Exposure Calculator	Notes
Benzene	Water	100	ppb	0.44	CREG	Yes	<input checked="" type="checkbox"/>	

Continue to Exposure Calculator

The next set of tables shows the results for screening the contaminant against the inhalation and dermal CVs. You'll notice that this table has two rows for each contaminant. One row shows the screening results for the inhalation pathway while the other row shows the results for the dermal pathway. Remember, the inhalation and dermal CVs are concentrations in water.

Screenshot 2. Screenshot from PHAST showing results from running an inhalation and dermal CV screen for benzene at 100 ppb.

Results: Showering and Household Water-Use

ATSDR Screening Values

Contaminant Name / CASRN	Conc	Unit	Pathway	Above or Equal to Rec ATSDR CV?	Above or Equal to Other CV?	CREG	Chronic EMEG Child	Chronic EMEG Adult	Int EMEG Child	Int EMEG Adult	RMEG Child	RMEG Adult	Acute EMEG Child	Acute EMEG Adult
Benzene 71-43-2	100	ppb	Inhalation	Yes [1]	Yes [2]	0.17 [1]	13 [2]	13 [2]	26 [2]	26 [2]	41 [2]	41 [2]	39 [3]	39 [3]
Benzene 71-43-2	100	ppb	Dermal	Yes [1]	Yes [2]	5.6 [1]	86 [2]	170	NA	NA	690	1,300	NA	NA

[1] Recommended ATSDR CV for the pathway met or exceeded.
 [2] Additional ATSDR CV met or exceeded.
 [3] Acute ATSDR CV met or exceeded.

Show More

Contaminant(s) for Further Evaluation in SHOWER Model

Please use the SHOWER Model to evaluate exposure for contaminants that have "Yes" in the "Recommended for Further Evaluation" column.

Contaminant Name	Exposure Medium	Maximum Site Conc	Unit	ATSDR Recommended CV	ATSDR CV Type	Pathway for Recommended CV	Recommended for Further Evaluation	Notes
Benzene	Shower	100	ppb	0.17	CREG	Inhalation	Yes	

Download All CVs

Download Recommended CV

Save to PHAST

One difference between the showering/dermal CV results and the drinking water CV results is that you cannot continue to the exposure calculator from the shower/dermal CV results. If the shower or dermal CV is exceeded, you'll need to run the SHOWER model using the EPC concentration and import the shower model results into PHAST. PHAST will then calculate hazard quotients and cancer risks. The process for running the shower model, exporting the results to a text file, and importing the text file into PHAST is covered in detail in these two training videos available on CDC YouTube:

[ATSDR Shower and Household Water Use Exposure \(SHOWER\) Model v3.0 Webinar - YouTube](#)

[ATSDR PHAST SHOWER Model Exposure Calculator Webinar - YouTube](#).

Links to these training videos are also provided on the PHAST resources page.

Finding Shower and Dermal CVs

Along with the drinking water CVs, the shower and dermal CVs are now available in PHAST through the CVs and Health Guidelines module. After clicking the CVs and Health Guidelines module, enter the contaminant name in the "search for contaminant" box and select the contaminant. Click "view contaminant information." This will bring up the health guidelines screen. Click on "water CVs" to see the shower and dermal CVs.

The screenshot below shows the various water CV types that are available for benzene and highlights the recommended CV for drinking water and the recommended CV for showering. Remember, the shower CV is a concentration in water (not air).

Screenshot 3. PHAST CVs and Health Guidelines Module showing drinking water, inhalation, and dermal CVs.

Public Health Assessment Site Tool (PHAST)

Home Site Info & Data CV Screen Exposure Calculator CVs & Health Guidelines Resources My Saved Results

CVs and Health Guidelines

Modify

Benzene

CASRN: 71-43-2 Date Last Updated: 8/21/2020

Health Guidelines Water CVs Soil CVs Air CVs SVI CVs Contaminant Info

ATSDR Drinking Water CVs (ppb)

Group	Chronic			Intermediate	Acute
	CREG	EMEG	RMEG	EMEG	EMEG
Child	0.44 *	3.5	28		
Adult		13	100		

* Recommended ATSDR CV

Additional Drinking Water Screening Values (ppb)

Group	Chronic			
	EPA MCL	EPA TT	EPA MCLG	EPA LTHA
Child/Adult	5		0	3

ATSDR SHOWER CVs (for Shower and Household Water-Use Exposures) - Inhalation (ppb)

Group	Chronic			Intermediate	Acute
	CREG	EMEG	RMEG	EMEG	EMEG
Child/Adult	0.17 *	13	41	26	39

ATSDR SHOWER CVs (for Shower and Household Water-Use Exposures) - Dermal (ppb)

Group	Chronic			Intermediate	Acute
	CREG	EMEG	RMEG	EMEG	EMEG
Child	5.6	86	690		
Adult		170	1,300		

* Recommended ATSDR CV

For benzene, the recommended shower CV of 0.17 ppb in water is slightly lower than the drinking water CV of 0.44 ppb. When residents are drinking and showering in benzene-contaminated water, you will use 0.17 ppb to select benzene as a potential contaminant of concern. In scenarios where people are drinking the water but not showering in it, you will use the drinking water CV of 0.44 ppb to screen for benzene.

In the next newsletter, we'll provide some interesting insights by comparing the drinking water, inhalation, and dermal CVs. If you have questions about the screening process, send an email to PHAST@cdc.gov.

Contributing author: David Mellard (dam7@cdc.gov), OCDAPS

Using Non-ATSDR Vapor Intrusion Screening Levels

ATSDR conducts screening as a quick mechanism for identifying contaminants that do and do not require further evaluation at a site. For vapor intrusion sites, ATSDR has soil vapor intrusion comparison values (SVI CVs) to determine if a source of volatile or semi-volatile chemicals beneath the ground surface is present at concentrations that are high enough to warrant further evaluation of indoor air from vapor intrusion. This article discusses how non-ATSDR vapor intrusion screening levels for subslab soil gas, near-source soil gas, and groundwater may also be used in health assessments.

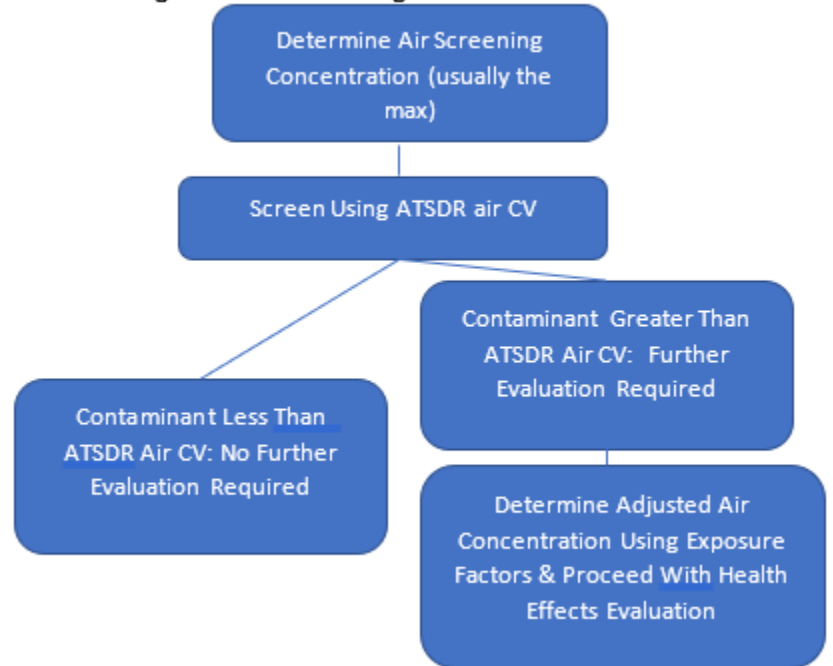
ATSDR generated values for vapor intrusion should be called soil vapor intrusion comparison values or SVI CVs. ATSDR has SVI CVs for groundwater in ppb and for subslab and near-source soil gas in $\mu\text{g}/\text{m}^3$ and ppb in air. When vapor intrusion values are used from other sources, such as Environmental Protection Agency (EPA) vapor intrusion screening levels (VISLs), they should be called non-ATSDR screening levels.

ATSDR's vapor intrusion screening process — Health assessors compare maximum-detected concentrations to the recommended SVI CV or to associate director of science (ADS)-approved non-ATSDR screening levels to select contaminants for further evaluation. EPA and state environmental regulatory programs often have their own VI screening levels for residential and commercial scenarios. EPA calls their values vapor intrusion screening levels or VISLs. ATSDR's Public Health Assessment Guidance Manual (PHAGM) states that non-ATSDR screening levels may be used for screening if 1) they are lower than ATSDR's recommended CV or 2) ATSDR does not have a CV for the contaminant and the non-ATSDR screening level is found to be adequately protective of public health by the ADS. Using non-ATSDR screening levels is optional.

Screening of vapor intrusion data are described in the following sections. Data from indoor air samples collected in cold and hot weather are screened and used to make health conclusions (Figure 1). Subslab soil gas, near-source soil gas, and groundwater (subsurface) data are screened and used to characterize the source (vapor intrusion or indoor or outdoor sources) and fate and transport of the contamination (Figure 2). While sites with cold and hot weather indoor air data may be used to make health conclusions, sites without subsurface data do not have a well-characterized vapor intrusion pathway. Subsurface data gaps must be acknowledged as a limitation to the health assessment, including stronger emphasis in cases where no hazard was found but a subsurface source likely remains (a potential false negative health conclusion). Subsurface data are key lines of evidence in determining source attribution.

Using exposure factors and measured indoor air data — ATSDR does not adjust any of its CVs using exposure factors in any media. ATSDR’s process is to screen each air concentration (usually the maximum) using the ATSDR air CV. A contaminant concentration less than the ATSDR air CV requires no further evaluation. When a contaminant concentration is greater than the ATSDR air CV, determine the adjusted air concentration by applying exposure factors to the measured air concentration (at the point of exposure) and proceed with the health effects evaluation (Figure 1).

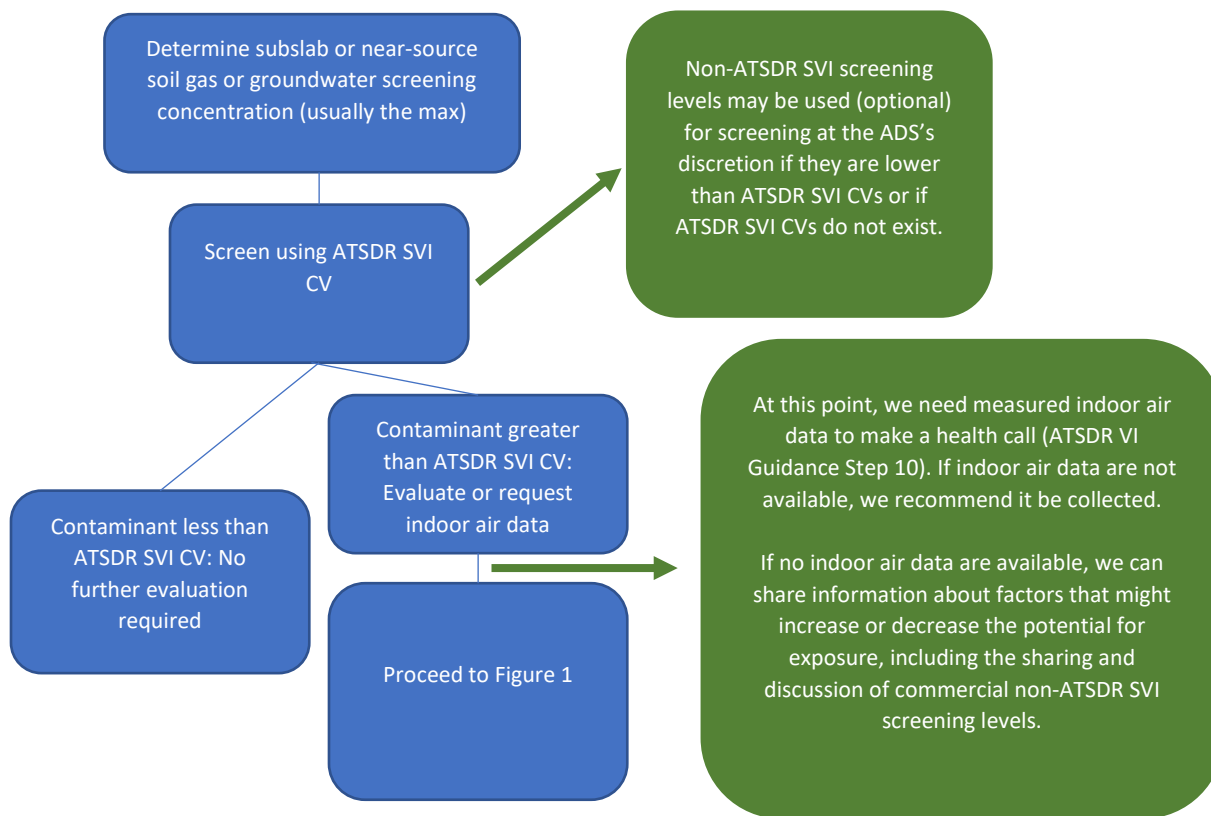
Figure 1. Air Screening and Health Effects Evaluation.



Discussing commercial non-ATSDR SVI screening levels in health assessments — After contaminants have been selected using ATSDR’s SVI CVs or acceptable alternative screening levels, further evaluation can account for specific scenarios, such as exposures at businesses. Commercial non-ATSDR SVI screening levels may be discussed within health assessment documents. Such discussion provides valuable perspectives on the potential for health effects from VI-related exposures. Commercial non-ATSDR SVI screening levels incorporate commercial exposure factors. When indoor air data are not available, sharing information on factors that decrease exposures is important for accuracy and for decreasing the stress from perceived environmental burden within communities.

Using ATSDR SVI CVs and Non-ATSDR SVI Screening Levels — Figure 2 presents the overall process for using ATSDR SVI CVs and considering non-ATSDR SVI screening levels. ATSDR’s process is to screen the maximum concentration using the ATSDR SVI CV. Non-ATSDR SVI screening levels may be used (optional) for screening with ADS approval if they are lower than ATSDR SVI CVs or if ATSDR SVI CVs do not exist. A contaminant concentration less than the ATSDR SVI CV requires no further evaluation. When a contaminant concentration is greater than the ATSDR SVI CV, evaluate or request indoor air data. At this point, we need measured indoor air data to make a health call (ATSDR SVI Guidance Step 10) [ATSDR 2016]. If indoor air data are not available, we recommend indoor air samples be collected to proceed to the steps in Figure 1. Also, we can share information about factors that might increase or decrease the potential for exposure, including sharing and discussing commercial non-ATSDR SVI screening levels.

Figure 2. ATSDR’s Process for Using ATSDR SVI CVs and Non-ATSDR SVI Screening Levels for Nonresidential Sites



Example — Consider this example of how to apply the ATSDR SVI process while considering commercial non-ATSDR screening levels at a site with a commercial building:

ATSDR’s recommended groundwater SVI CV for trichloroethylene is 0.52 µg/L. EPA’s commercial VISL is 7.43 µg/L. If TCE is present at 6 µg/L in the groundwater, the contaminant screens in with ATSDR’s SVI CV and requires evaluation of indoor air measurements to determine if indoor air exposures might harm people’s health. If the indoor air measurements are not available, the health assessor cannot determine whether indoor air exposures might potentially harm people’s health. Note, however, that ATSDR’s SVI CV assumes 24-hour continuous exposure over a lifetime. For this site, the potential for exposure from vapor intrusion is decreased by the reduced time workers and visitors are present in contrast with constant exposure used to derive ATSDR’s SVI CV. The EPA VISL assumes occupants of a commercial building are only present 250 days/year and 8 hours/day for 25 years during a 70-year lifespan. The EPA VISL is based on the same toxicity criteria for cancer risk as ATSDR’s SVI CV. Because the TCE concentration in groundwater at the site is less than the EPA VISL, the likelihood of indoor air contamination presenting a health hazard to the commercial building occupants with similar exposure factors is low. However, indoor air measurements are necessary for ATSDR to confirm that a health hazard is not occurring.

The summary section of the document would contain language such as the following:

Conclusion: ATSDR [and *insert state health department name, if applicable*] cannot determine if breathing indoor air in the commercial building(s) at the site might harm peoples' health due to lack of indoor air sampling data.

Basis for Conclusion: Trichloroethylene exceeded ATSDR's SVI CV for groundwater and requires further testing and evaluation to determine how much of the contaminant is in indoor air that people are breathing. The groundwater TCE concentration is less than EPA's VISL, which assumes people are only exposed for 250 days per year, 8 hours per day over 25 years, indicating that the likelihood for exposures and potential health effects is low. However, ATSDR needs indoor air measurements to confirm the actual levels in the building(s) are not a concern.

Next Steps: Collect indoor air samples in cold and hot weather, preferably with subslab gas and outdoor air, which assist in determining the source of contamination (vapor intrusion or indoor or outdoor sources). Collecting data on indicators, tracers, and surrogates¹ is also recommended to determine if the building conditions are active or dormant for vapor intrusion at the time of sampling.

Any non-ATSDR commercial screening levels presented in the document must be based on sound toxicological criteria and exposure factors relevant to the site.

Working with partners — Different approaches can put health assessors in a delicate situation where ATSDR guidance, which is advisory, differs from regulatory rule requirements. In the absence of a definitive health call, health assessors may share that potential risks would be higher if non-ATSDR screening values were exceeded than if they were lower. In cases when SVI CVs are exceeded, health assessors are encouraged to work with the site manager to see if their agency is able to conduct follow-up indoor air sampling for health assessment purposes. If the regulatory group is unable or chooses not to conduct the follow-up sampling, health assessors might not be able to determine whether exposures at the site might harm people's health. In such cases, health assessors may wish to explain the differences between ATSDR public health assessments and EPA risk assessments and why sometimes our criteria and conclusions are different (https://www.atsdr.cdc.gov/pha-guidance/understanding_the_pha_process/pha_factors.html). Contact your office ADS for assistance if needed.

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References

[CDC] Centers for Disease Control and Prevention. 2022. Health effects of lead exposure. Atlanta [accessed 2023 February 1]. Available from: <https://www.cdc.gov/nceh/lead/prevention/health-effects.htm>.

¹ https://iavi.rti.org/assets/docs/Temp_Measurement_Fact_Sheet_int.pdf
https://iavi.rti.org/assets/docs/Pressure_Measurement_Fact_Sheet_Int.pdf
https://iavi.rti.org/assets/docs/Radon_methods_fact_sheet_int.pdf

[ATSDR] Agency for Toxic Substances and Disease Registry. 2016. ATSDR's guidance for evaluating vapor intrusion pathways. Atlanta [accessed 2023 February 1]. Available from: <https://www.atsdr.cdc.gov/pha-guidance/resources/ATSDR-SVI-Guidance-508.pdf>.