

# A Risk-based Screening Approach for Air Toxics Monitoring Data Sets



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# Good Morning!

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- What is “risk-based screening?”
- Why is it needed?
- How does it work?
- Where can I get more information?



# What is “Risk-based Screening”?

- **A process of applying a set of risk-based criteria to a monitoring data set to determine which chemicals may be of sufficient concern to be considered for additional analysis (or immediate action)**
- **A good screening approach will be:**
  - Relatively simple and straightforward
  - Simplicity counterbalanced with reasonably conservative inputs/assumptions
  - Decision criteria are also reasonably conservative

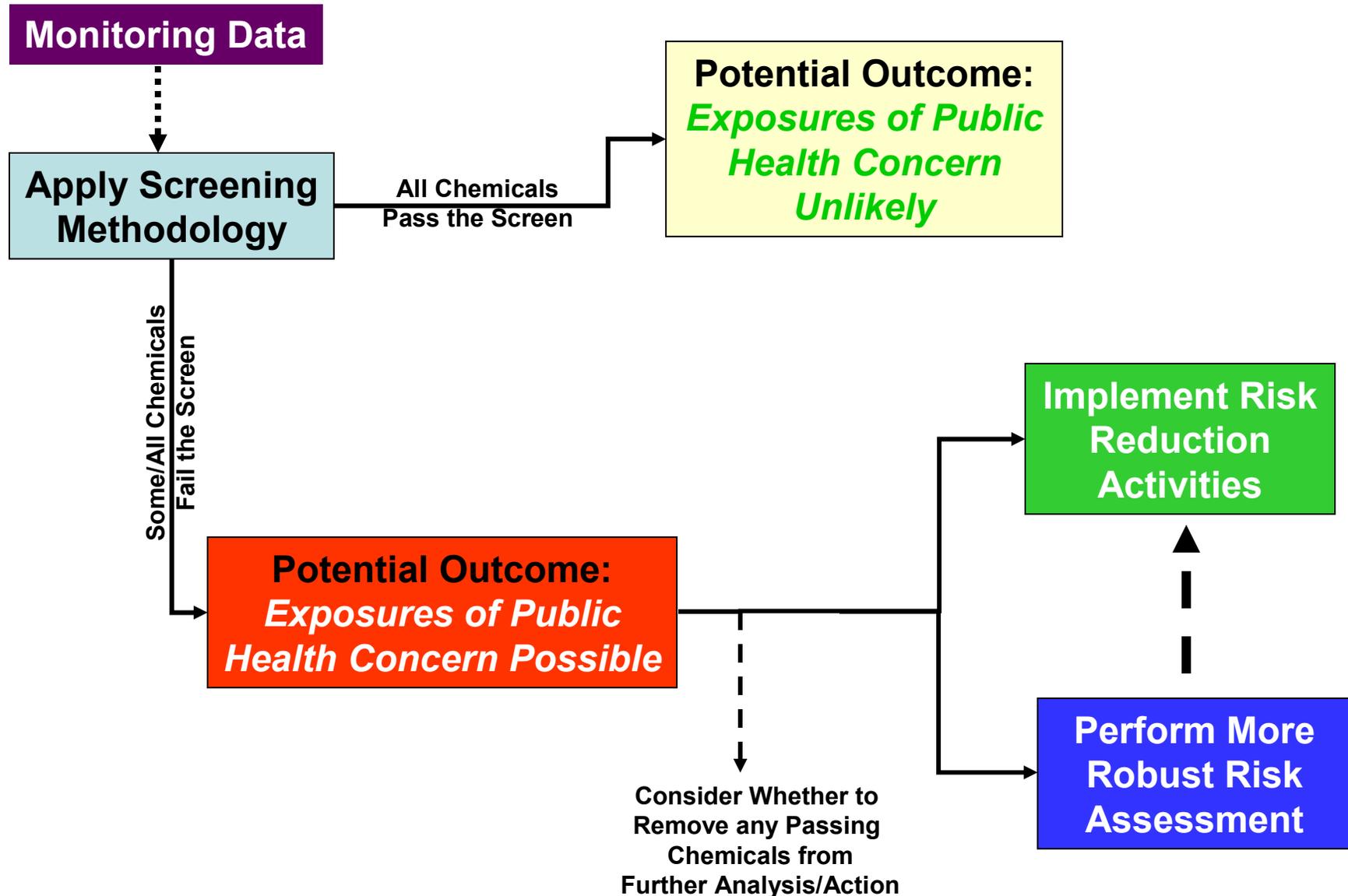


# Why do this? What's the benefit?

- State, local, and tribal (SLT) air agencies have a lot of historical air toxics monitoring data
- They want to know “Are the data indicative of exposures of potential public health concern?”
- Risk assessment expertise (for many) is still developing
- They need, and this approach provides, a straightforward method for screening their monitoring data



# How does it work?



# Is there guidance on how to do this?

Region 4's Seven-step process to quickly and efficiently screen large monitoring data sets

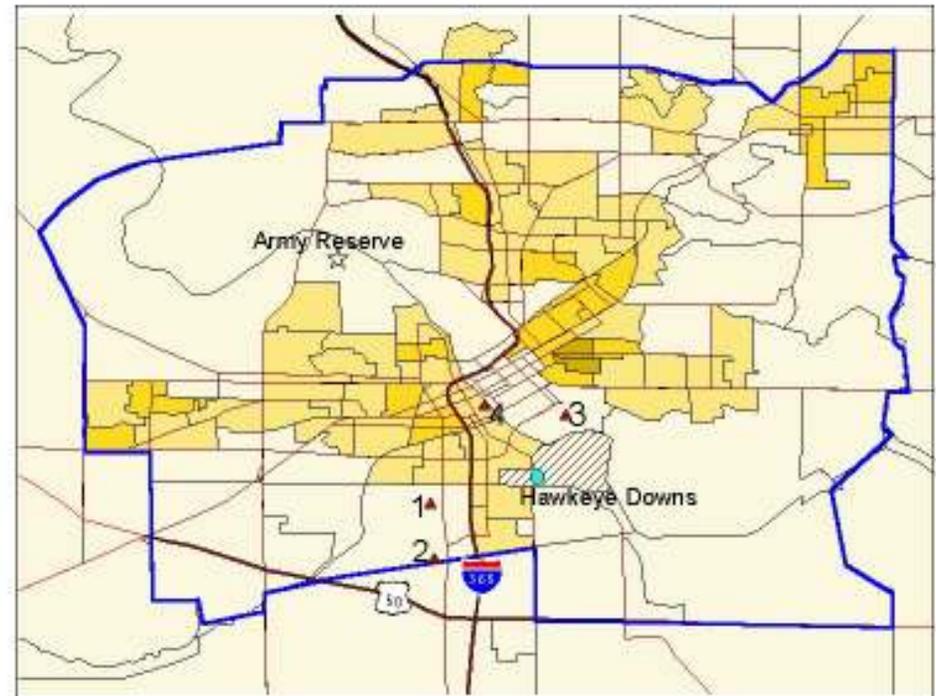
1. Identify the monitoring data sets to be screened
2. Evaluate quantity/quality of data
3. Develop statistical summary of detected data
4. Screen against chronic and acute screening levels (App. A & B)
5. Identify relevant ancillary data
6. Evaluate uncertainties
7. Write-up results



# Example

- **The Hawkeye Downs community has concerns about local air quality**
- **VOC and carbonyls being sampled at two locations**
  - Every 6 days for a year
  - 6 months of data currently available (30 samples)
- **Risk assessment to be performed on full year data sets**
- **Stakeholder group wants to screen first 6-months of data to**
  - Get a preliminary idea of potential risk drivers
  - Take immediate action on overt problems

Population Density for Ag County, USA  
(US Census - 2000)



Hypothetical data for illustration purposes only

# Statistical Summary for Detected Chemicals Hawkeye Downs Monitor

Detected Chemical (CAS #)	Frequency of Detection	MDL (ug/m3)	Range of Detections (ug/m3)
Acetaldehyde (75-07-0)	15/30	0.016	0.04 - 0.35
Methylene Chloride (75-09-2)	25/29	0.045	0.9 – 4.5
Benzene (71-43-2)	29/29	0.014	0.2 – 2.2
Vinyl Chloride (75-01-4)	20/29	0.024	0.03 – 0.08

# Chronic Screening Values (Appendix A)

Appendix A Chronic Inhalation Screening Values Based on OAQPS Toxicity Table 1 <a href="http://www.epa.gov/ttn/atw/toxsource/summary.html">www.epa.gov/ttn/atw/toxsource/summary.html</a> (2/28/05)		Noncancer at HQ = 0.1	Cancer at 1 x 10 <sup>-6</sup> Risk Level	FINAL SCREENING VALUE
		ug/m <sup>3</sup>	ug/m <sup>3</sup>	ug/m <sup>3</sup>
Acetaldehyde	75-07-0	9.E-01	4.5E-01	<b>4.5E-01</b>
Acetamide	60-35-5		5.E-02	<b>5.E-02</b>
Acetonitrile	75-05-8	6.E+00		<b>6.E+00</b>
Acetophenone	98-86-2			<b>No Value</b>
Acrolein	107-02-8	2.E-03		<b>2.E-03</b>
Acrylamide	79-06-1	7.E-02	7.7E-04	<b>7.7E-04</b>
Acrylic acid	79-10-7	1.E-01		<b>1.E-01</b>
Acrylonitrile	107-13-1	2.E-01	1.5E-02	<b>1.5E-02</b>
Allyl chloride	107-05-1	1.E-01	2.E-01	<b>1.E-01</b>
Aniline	62-53-3	1.E-01	6.3E-01	<b>1.E-01</b>
Antimony compounds (1)	Various	2.E-02		<b>2.E-02</b>
Arsenic compounds	7440-38-2	3.E-03	2.3E-04	<b>2.3E-04</b>
Arsine	7784-42-1	5.E-03		<b>5.E-03</b>
<b>Benzene</b>	<b>71-43-2</b>	<b>3.E+00</b>	<b>1.3E-01</b>	<b>1.3E-01</b>
Benzidine	92-87-5	1.E+00	1.5E-05	<b>1.5E-05</b>

## Chronic Exposure

Continuous exposure, or multiple exposures, occurring over an extended period of time or a significant fraction of the animal's or the individual's lifetime.



# Acute Screening Values (Appendix B)

Acute Dose-Response Values for Screening Risk Assessments (From OAQPS Toxicity Table 2; 6/02/2005)	AEGL-1 (1- h)	AEGL-1 (8-h)	AEGL-2 (1-h)	AEGL-2 (8-h)	ERPG -1	ERPG -2	MRL	REL	IDLH/10	TEEL-0	TEEL-1
CHEMICAL NAME	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3	mg/m3
Acetaldehyde					18	360			360		
Acetamide										25	75
Acetonitrile	22 p	22 p	390 p	170 p					84		
Acetophenone										10	30
2-Acetylaminofluorene										0.25	0.75
Acrolein	0.069 i	0.069 i	0.23 i	0.23 i	0.23	1.1	0.00011	0.00019	0.46		

## Acute Exposure

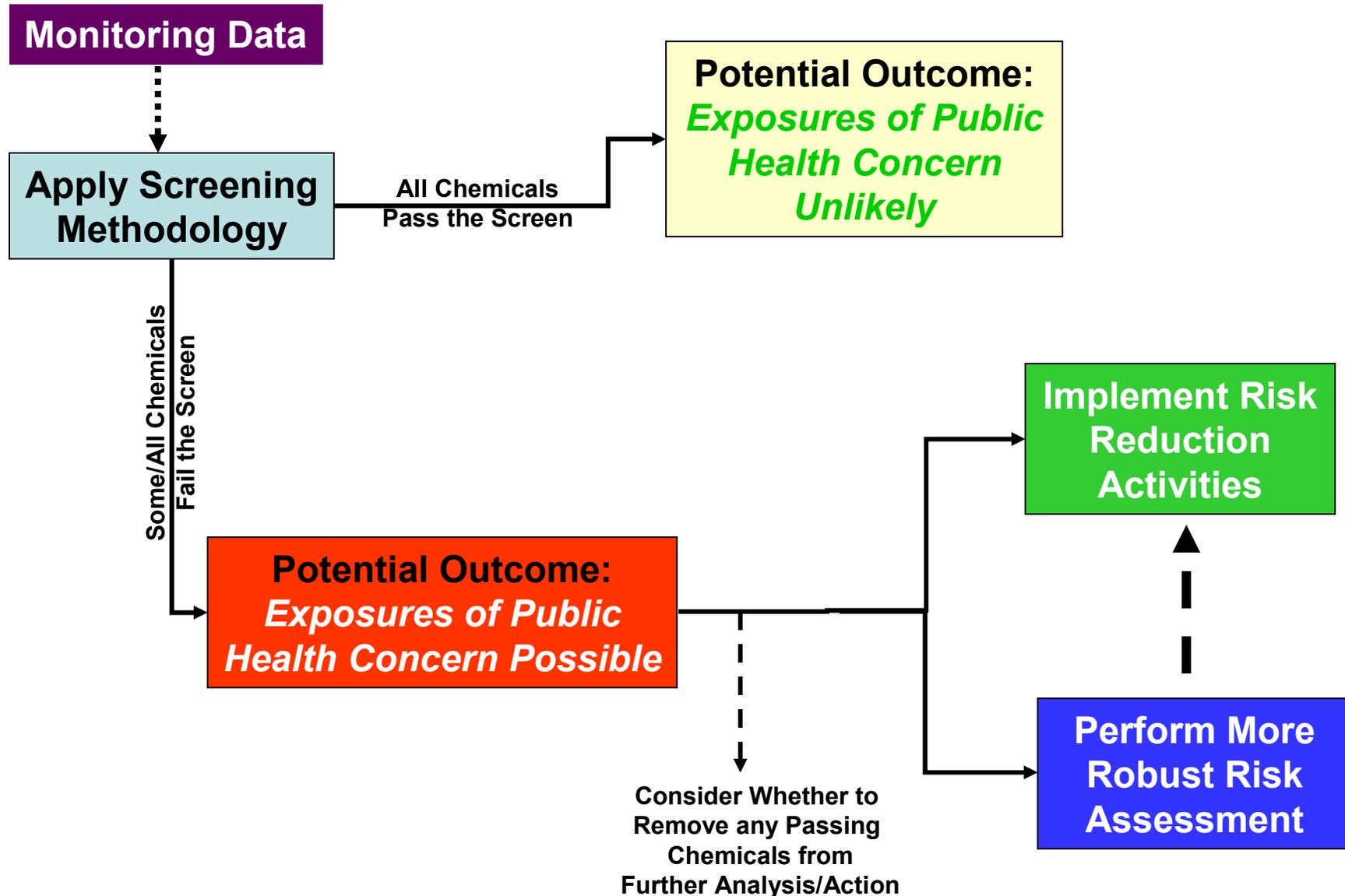
One dose (or exposure) or multiple doses (or exposures) occurring within a short time relative to the life of a person or other organism (e.g., approximately 24 hours or less for humans).



## Statistical Summary for Detected Chemicals Hawkeye Downs Monitor

Detected Chemical	Max Detected Concentration (ug/m <sup>3</sup> )	Chronic Screening Value from App. A (ug/m <sup>3</sup> )	Acute Screening Value from App. B (ug/m <sup>3</sup> )	Max > Chronic? (% Detections Exceeding)	Max > Acute? (% Detections Exceeding)
Acetaldehyde	0.35	0.45	N/A	No	N/A
Methylene Chloride	4.5	2.1	Various (see Guidance - Appendix B)	Yes (60% detections exceed)	No
Benzene	2.2	0.13	Various (see Guidance - Appendix B)	Yes (100% detections exceed)	No
Vinyl Chloride	0.08	0.11	N/A	No	N/A

# How does it work?

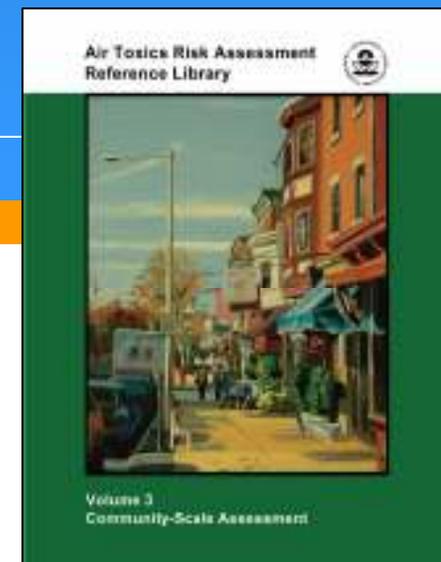
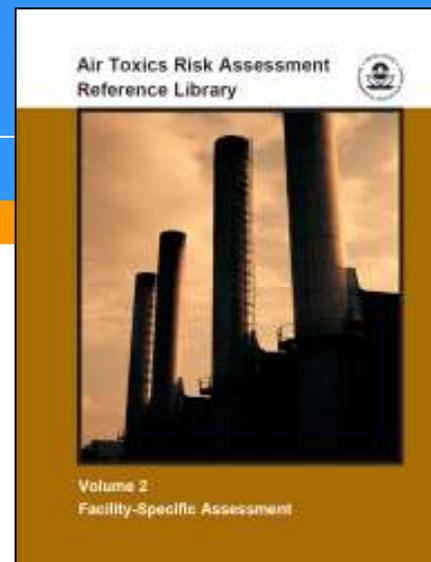
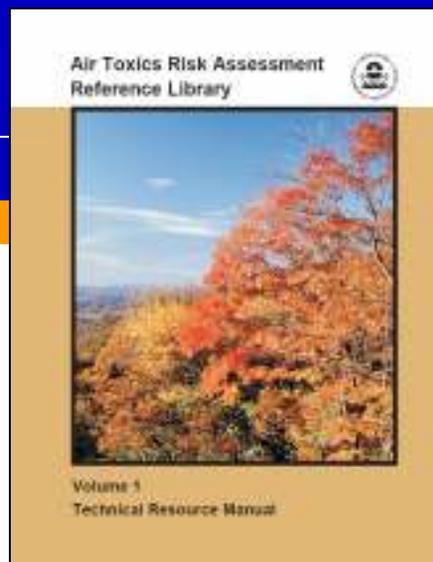


# New Risk Assessment Guidance from EPA

Available at: [http://www.epa.gov/ttn/fera/risk\\_atra\\_main.html](http://www.epa.gov/ttn/fera/risk_atra_main.html)



EPA's new *Air Toxics Risk Assessment (ATRA) Reference Library* describes the basics of exposure assessment, toxicity evaluation, and risk characterization (chronic and acute) for toxic pollutants released to the air from stationary, mobile, and other types of sources. The library covers both human and ecological assessment for individual sources of pollution as well as the combined impact of multiple sources. This guidance is amenable to a variety of purposes, including assessments conducted under the air toxics provisions of the Clean Air Act, analysis of combined multisource risks at the community level, and as a supplement to other Agency guidance (e.g., as an aid to Superfund risk assessors evaluating the air exposure pathway).



**Thanks for your attention!**



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**<http://www.epa.gov/region4/air/airtoxic/index.htm>**