Why is it so hard to get a simple answer about risk? Risk assessors put many pieces together to try to see the whole picture. Asking “Am I at risk?” is really asking:

“If I am exposed to a certain concentration of a hazardous toxin, and my body gets a dose of it, what is the probability that I will be susceptible to a severe effect?”

Many of these “pieces of the risk puzzle” involve a standard to which you can compare your own situation. As each comparison goes up or down, so does the level of risk.

Hazard / Toxicity: How toxic?
Compare the Reference Dose (RfD) for your toxin to the RfD for other similar toxins. The most toxic contaminants will have the lowest RfD.

The RfD for Aroclor-1254 is 30 times smaller than the RfD for cyanide. So Aroclor-1254 is 30 times more toxic than cyanide!

Concentration: How much? What levels?
Compare test results to a comparison value or legal limit. Was it under or over the limit? How much?

The TCE levels in well #5 were more than 10 times the legal limit!

Exposure Type: How does it get in me?
Research how easily the toxin gets into the body in different ways: Touching, eating, breathing, drinking.

The factory is closed, but winds keep blowing factory dust towards my house. I wonder if it’s in the ground water too...

Exposure Time: How often? For how long?
Longer exposure means more risk. You can be at risk from acute exposures (intense, for a short time) or chronic exposures (light, over a long time).

The air is bad where I work... but how long am I exposed? Hmm... 40 hours a week, 52 weeks per year, minus vacation and holidays...

Dose / Body Burden: How much did get in me?
Dose is the amount of toxin absorbed per kilogram body mass; compare to Reference Dose (RfD) for that toxin. Body burden is the concentration of a toxin in body fluids or tissue, as determined by medical tests; compare to public health guidelines.

There’s lead paint in my house, so I get my kid tested. The CDC says that over 10µg/dL is unsafe. Fortunately, his levels were less than 1 µg/dL.
To explore all topics below, see: "A First Look at Health Studies"

**Health Effect or Outcome:** *What could happen to me?*
Different toxins and exposures may have different effects: Cancer, asthma, reproductive, immunity, etc.  
[ATSDR ToxFAQs]

It says here: some PCBs can cause skin lesions, immunity problems, liver damage, and even liver cancer.

**Probability:** *What percent get sick? With what?*
Compare your risk factors with other cases of similar exposures and outcomes: How many were affected?  
[EPA IRIS Summary]

In this study, kids who were exposed to high levels of pesticides were twice as likely to show symptoms of ADHD as kids with low exposure.

**Susceptibility:** *Am I more at risk than others?*
The probability of some effects varies with factors like age, weight, sex, reproductive stage, diet, smoking, combinations with other toxins, and family history.  
[ATSDR ToxFAQs]

My family has a history of breast cancer, and I already have diabetes. I’m probably more susceptible to this toxin than most people.

**Uncertainty:** *Is this the key concern?*
We’re surrounded by toxins. It’s hard to prove a health problem comes from just one thing.

The asphalt plant makes my asthma terrible!  
Are you sure it’s the plant, not the highway? Or your sister’s smoking?

---

**Statistics for Action Activities:**  sfa.terc.edu/materials/activities.html
Activities for each component of risk that can help you explore that component in greater depth.

**Statistics for Action Data:**  sfa.terc.edu/data/public.html

ATSDR ToxFAQs and ATSDR Toxicological Profiles: ToxFAQs are an alphabetical list of toxins, each with a short, simple description of where it’s found, how it can harm people, and any relevant regulations. Toxicological profiles are similar but with much more technical and medical detail.

EPA Standards: Maximum Contaminant Levels (MCLs) in drinking water, soil screening levels, air quality standards. Also, check your state’s environmental department; they may have stricter standards.

EPA IRIS (Integrated Risk Information System) Summary: Summaries about risk from specific toxins, like Reference Dose (RfD), Reference Concentration (RfC), Cancer Slope Factor, Unit Risk Factor.

CDC WONDER: Wide-ranging Online Data for Epidemiologic Research. Data about disease and mortality by county. Your state public health department may have data on a town-to-town levels.