American Chemistry Council

Understanding Chemical Safety:
Hazard, Risk & Exposure

Every day, we may be exposed to hazards and risks that could impact our safety.

● A hazard is anything that has the potential to cause harm. ● A risk is the likelihood that a hazard will cause harm.

To illustrate the difference between hazard and risk, consider water, gasoline and driving. They are all examples of everyday substances/activities that can be hazards based on their potential to cause harm. The potential of harm associated with each of these hazards is elevated when coupled with risky actions.

Hazard		Risk	
	Water		Swimming somewhere it is not permitted
	Gasoline		Lighting a match near gasoline
	Driving		Texting while driving

The Mere Presence of a Chemical Ingredient in a Product Doesn't Automatically Mean It Will Cause Harm

Any substance can be toxic — including water and oxygen — if too much of it is ingested or absorbed into the body. To determine a chemical substance's safety, researchers and experts primarily rely on two key categories of information:

1. The potency, or hazardous nature of the chemical; and
2. The degree of exposure to the chemical.

That's a Lot of Toothpaste

Frequently, the exposure to chemicals in everday consumer products is very minimal. For example, one 4-6 ounces tube of toothpaste contains about 152 milligrams of sodium flouride. A person weighing 160 pounds would have to eat 33 tubes of toothpaste at once to experience toxic effects from sodium flouride.

Understanding Chemical Hazards Requires Sound and Validated Research

So, how do scientists determine what sorts of exposures have the potential to cause harm?

- Rigorous scientific research — including experimental studies and epidemiology studies — is the basis for sound decision-making on the use, safety and development of chemicals.
- Research studies need to be reviewed, validated and replicated by other peer scientists to determine their accuracy.

Removing or substituting a chemical in a product merely because it is "suspected" of being harmful, without the benefit of a complete risk assessment, could create more risk than it prevents.

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