

The Commonsense Guide to
Everyday Poisons

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Everyday Poisons

How to live with the products you love
(and what to do when accidents happen)

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The information in this book is not intended or implied to be a substitute for professional medical advice, diagnosis or treatment. All content, including text, graphics, images and information, contained in this book is for information purposes only.

Recipes and DIY suggestions are based on commonly shared, publicly available information. These recipes and suggestions have not been tested by the author or publisher and no guarantee is given or implied regarding safety or efficacy.

You are encouraged to confirm information in this book with other sources such as your regional poison control center (800-222-1222), and to review all information regarding any medical condition or treatment with your healthcare provider.

NEVER DISREGARD PROFESSIONAL MEDICAL ADVICE OR DELAY SEEKING MEDICAL TREATMENT BECAUSE OF SOMETHING YOU HAVE READ IN THIS BOOK.

Illustrations by Pablo Martinez

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This book is dedicated to all the hardworking SPIs, CSPIs and PIPs who spend their days and nights answering phones, solving problems and saving lives, and most especially to the staff of the Oregon Poison Center.

May all your exposures be silica gels!

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What are Everyday Poisons?

**All things are poison and nothing is without poison.
Only the dose makes a thing not a poison.**

- Paracelsus

You live with a killer!

Dihydrogen monoxide (DHMO), also known as hydroxylic acid, is ubiquitous despite its dangers. Although the government promises to regulate DHMO and limit its destructive potential, it is often powerless to do so, and thousands of lives are lost every year.

DHMO can cause symptoms ranging from mild eye irritation to death. Prolonged exposure causes visible changes to the skin. At certain temperatures it causes severe and sometimes irreparable tissue damage, and inhaling it can cause respiratory and cardiac arrest. Excessive ingestion can cause brain swelling, leading to vomiting, confusion, seizures, coma and death.

DHMO is in your food and drink, in your medications and cosmetics, in the very air you breathe. You soak in it, your children play in it. In fact, DHMO is essential to your life and a lack of it is also fatal.

With the chemical formula H₂O, or two hydrogen atoms for every one of oxygen, we can call DHMO hydrogen hydroxide, oxidane or any number of other names, but mostly we just call it water. We can't live without it, but even clean, uncontaminated water can be toxic when misused.

The dose makes the poison

Every substance you encounter in your daily life, no matter how beneficial or necessary for health, can be poisonous if you ingest, inhale or absorb enough of it.

But the opposite is also true: Any substance can be non-toxic or minimally toxic. It all depends on the amount, duration and route of exposure.

Modern household products are generally designed to be very low toxicity, but they are poisons in the same way that everything on earth is a poison.

And also not a poison.

Why a Commonsense Guide?

Nothing in life is to be feared, it is only to be understood.
Now is the time to understand more, so that we may fear less.

- Marie Curie

Even though the products we buy have been largely formulated with safety in mind, we are constantly bombarded with warnings about **toxins** and **hidden dangers**.

These scary messages cause a low level of fear and anxiety that skyrockets when a product you rely on ends up in a mouth or eye where it doesn't belong.

My years at poison control convinced me a book was needed to help parents and others think rationally about common household products, and to confidently and effectively manage accidental exposures. This requires knowing what's in your products and how they work.

When the unexpected happens

When your child bites into a glow stick or you mistake super glue for eye drops, the first thing you want to know is what to do and how much to worry. For each product you'll find that information right at the top of the page.

Then you'll find more in-depth information and, often, ideas for homemade or less-toxic alternatives. You can make your own diaper ointment, sidewalk chalk or toothpaste, dry flowers with silica gel and make decorative air freshener with the water-absorbing beads found in disposable diapers.

Of course, almost every household product will have ingredients someone considers unsafe. The information provided here has been gleaned from decades of research and experience, and is meant to help you with the kind of real-life exposures that can happen in any home.

You won't find much about environmental toxicity, special sensitivities or possible long-term effects of chronic exposures, but you will find out what to do on Halloween when the cat whiskers your daughter super-glued to her cheeks won't come off.

You know: Commonsense, everyday stuff.

What about chemicals?

By convention sweet is sweet, bitter is bitter, hot is hot, cold is cold, color is color. But in reality there are atoms and the void.

- Democritus

The word “**chemical**” is sometimes used as an epithet, to describe something that is man-made, toxic and dangerous.

However, chemistry is the study of matter, and **every single thing that has mass is by definition a chemical**. Water (H₂O) is a chemical. So is oxygen (O₂). So is sea salt (sodium chloride, NaCl).

Kale’s chemical components include 3-indoyl-methyl-glucosinolate, glucobrassicinapin and N-methyl-phenethylamine, among many others. The expression “**chemical free**” has no meaning at all.

About pronounceability

Rather than being a sign of danger, a chemical’s complex name simply means it’s been studied and we know a lot about it.

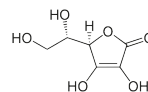
The International Union of Pure and Applied Chemistry (IUPAC) has standardized the nomenclature, or naming system, of chemicals to make the names universally understood.

Those long chemical names with lots of numbers, hyphens and prefixes follow

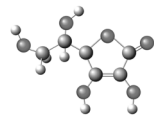
specific rules and conventions that allow them to convey a great deal of information. Every atom of a molecule is accounted for, as is its location and relation to the other atoms.

For example, can you pronounce this: **(5R)-5-[(1S)-1,2-Dihydroxyethyl]-3,4-dihydroxy-2(5H)-furanone**?

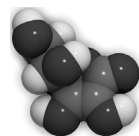
In most cases it’s easier to just call it **vitamin C**. But the IUPAC name tells us everything we need to know to visualize it like this:



Like this:



Or even like this:



You can watch a fun Crash Course video on chemical nomenclature at:

youtu.be/U7wavimfNFE

Stuff parents say . . .

I don’t know how he got it open. It has a child-proof cap.

By law, prescription medications and many other potentially harmful products must be sold in packaging that is **child-resistant**. There is no such thing as child-proof!

Keep in mind that child-resistant packaging is supposed to be difficult for a child to open, but it is not allowed to impede access for older adults or people with disabilities.

The most you can hope for is that child-resistant packaging will slow your child down long enough for you to intervene, but even that isn’t guaranteed. Once a child learns to open a child-resistant package, they are unlikely to ever forget.

I don’t know how she got it. It was up really high.

Children are natural explorers, and some are more adventurous than others. For these children, the very fact you are trying to keep something away from them means it must be interesting, and putting it up high just challenges them to find a way to reach it. It’s safer to keep medications in a toolbox or tackle box that can be padlocked; cleaning supplies and other large items can go in a locking file cabinet.

The label says it’s non-toxic—is it?

Some products have to meet set requirements to be labeled non-toxic, others don’t. Art supplies, for example, are well-regulated and if you see an AP label you know the product is non-toxic.

All products sold in the US have a general obligation to be safe, or to carry appropriate warnings if they are not.

Of course, that doesn’t mean dangerous products are never sold; sometimes they are, and enforcement of safety standards is ongoing. But the emphasis is on identifying products that are harmful rather than the ones that are not. That leaves us with few standards for non-toxic labelling.

If a product is labeled “non-toxic” but lacks certification, it means according to the manufacturer it doesn’t contain anything that is known to cause harm with reasonably proper use.

I looked it up on the internet, and now I’m totally freaked out.

Please, please, please call poison control first, before going to the internet. Believe it or not, you will read things there that are not true.

I feel like a terrible parent.

You *should* feel like a terrible parent if you intentionally give your child something you know is harmful, or if you know your child is in danger and do nothing. Otherwise, you should realize it's a child's job to explore her environment, forgive yourself for being human, and plan to do better in the future.

I haven't done anything yet. I didn't know what to do.

You can be ready for accidents if you plan ahead. Read up on managing ingestions, eye exposures and skin exposures now, so you'll know what to do when something happens. If all else fails, remember this number: 800-222-1222.

I made him puke.

Although that seemed like a good idea at the time, it wasn't. Now and then someone gets lucky and forced vomiting brings up the sought-after item, but whereas the item itself probably wasn't harmful to start with, that invasive maneuver was both traumatic and dangerous.

The American Academy of Pediatrics issued a policy statement almost 15 years ago against forced vomiting, recommending parents call poison control (800-222-1222) instead.

Should I make him puke? (Or: Should I get some ipecac?)

No.

I tried to rinse her eyes/mouth, but she wouldn't let me.

Parenting is hard work, and sometimes it isn't fun. If your child is in pain and you can't manage irrigation at home, you'll have to go to the emergency room.

So what should I watch for (after being told exposure is not toxic)?

You should watch for normal behavior and lack of symptoms. Call poison control or your health care provider if you see something else.

Do we need to go to the emergency room?

Here's the bottom line: You're the parent, and you have the right to seek medical care for your child whenever you feel it's needed, no matter what anyone else tells you. Whether you need to go is another matter.

In most cases if your child appears fine, the ER won't be needed. In these cases, the choice is yours. Sometimes, though, you must go in no matter what (eg, ingestion of button batteries, multiple magnets and some drugs). You can always rely on poison control or your health care provider to help figure this out.

I got scared because the label said to call poison control.

Poison control is always there to help, and you should always call with any poison-related questions or concerns. This helpful suggestion on the label doesn't mean the product is dangerous.

We're really careful at home, but the home we're visiting isn't child-proofed.

When you're visiting folks who don't have young children—even if they did once upon a time—you should assume the house isn't child-proofed and keep your little ones within sight. It wouldn't be impolite to ask if there are any medications or other potentially harmful things within reach, though, and to ask to have them put away while you're there.

I only turned my back for a minute.

That's all it takes.

I know he is telling me the truth, because he doesn't lie.

Children don't really understand the difference between truth and make-believe before they are 5 or 6 years old, so we consider young children "unreliable historians" rather than liars.

I know she is telling me the truth, because she is really, really smart.

Your child may be quite intelligent, but that doesn't mean she won't go through the same developmental stages as any other child.

He knows he isn't supposed to.

Before about the age of 6 children have very little ability to internalize rules. Your toddler or preschooler may behave well when you're paying attention, because your presence helps him remember what he is and isn't supposed to do.

But left unattended he is likely to go where his curiosity takes him, and your rules won't follow along. It's important to remember this is normal for his age and doesn't mean he's being disobedient.

You can't rely on your young child to police herself and it isn't fair to punish her when she eats those delicious vitamins that look and taste like candy, even though you told her not to. You just have to pay attention, keep reminding her of the rules and know that somewhere around first grade she'll develop the ability to remind herself.

Poisoning First Aid

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Ingestions & Oral Exposures

What to do

1 Wipe or rinse the mouth First wipe any residue, such as ointment or pill fragments, from the mouth.

Adults and children four years and older can swish plain water around in the mouth and spit it out. For younger children, rinse the mouth with a dripping wet washcloth.

What to expect

Most household products are harmless when **tasted**, although some may **irritate** the mouth.

When **swallowed**, some irritate the throat or stomach and may cause **gagging**, a **burning** sensation or **vomiting**. This may be brief but in some cases will require medical care.

2 Drink plain water or another mild liquid An adult should drink about **8 ounces**, and a child about **4 ounces**.

You are trying to rinse the throat and dilute anything that made it to the stomach, not flush it out.

Drinking too much too quickly can cause nausea or other discomfort. If a child refuses an offer of fluids, a **popsicle** or **ice cream** may also work.

3 In some cases medical treatment may be needed, so check product listings here and call **poison control** at **(800) 222-1222** for personal advice that is specific to your situation.

Make this call **before going to the internet**, as what you read there may not apply to you.

Warning

Call **911** instead of the poison center for loss of consciousness or trouble breathing or swallowing.

Home treatments that are not used

Ipecac

Parents were once advised to have ipecac on hand for poisoning emergencies. Derived from a plant in the same family as coffee, ipecac irritates the stomach and causes vomiting.

Ipecac is no longer used because vomiting is not an effective way to remove a potential poison from the stomach. In fact, ipecac causes vomiting that may be more dangerous than whatever was originally ingested and can interfere with effective treatment.

Ipecac can also be abused by those with eating disorders. Chronic ipecac abuse can cause serious—even fatal—damage to the heart. If you still have ipecac in your medicine cabinet, you should discard it now.

Forced vomiting

Never put your finger down a child's throat to make them vomit. It's not helpful or necessary and your child will truly be in danger if you injure the delicate tissue at the back of the throat. This kind of injury can cause the airway to bleed and swell, making it hard for the child to breathe.

Foreign bodies

Objects that remain whole when swallowed and as they pass through the GI tract are called foreign bodies.

Most foreign bodies pass uneventfully (even sharp ones) but any abdominal pain or change in appetite or bowel movements after ingestion of a foreign body should be medically evaluated.

There are a few foreign bodies that require medical attention even if there are no symptoms, including disc batteries, magnets (if more than one is swallowed) and anything that contains lead.

Always check with poison control (800-222-1222) or your health care provider if you have any questions about these or any other foreign bodies.

Activated charcoal

Activated charcoal is regular charcoal that has been crushed into small particles and treated to make the particles porous, like tiny sponges, so they can **adsorb** toxins. This means some (but not all) substances will stick to the charcoal particles and be carried out of the body.

The activated charcoal used in emergency rooms is a very fine powder that is mixed with liquid to the consistency of a smoothie. Used this way, activated charcoal can prevent **some** potential poisons from being absorbed into the body. The amount of charcoal given, and the way it is given, depends on the patient and is not without risk; it is meant to be used under medical supervision.

Activated charcoal tablets

Activated charcoal tablets are sold over the counter and may be helpful for treating diet-related intestinal discomfort, but they are **not for emergency use** and should not be given as a home treatment for poisoning.

Poisoning First Aid

Eye Exposures

What to do

1 Irrigate At home irrigation is done most effectively in the shower. Run any temperature water you find comfortable and stand facing the water, letting it hit your forehead and run over your face.

It isn't necessary to hold your eyes open, just keep blinking as the water runs over them.

If a shower is not available, use another source of clean, running water. For example, if you are outside and all you have nearby is a garden hose, use it. As long as the water is clean, don't delay irrigation while looking for a better source.

If the exposure is to one eye and you have to use a faucet, turn your head so the affected eye is lower than the unaffected eye. This will keep the contaminant from running into the unaffected eye.

2 If your child won't tolerate the shower Run a bath of plain water (no bubble bath) and make a game of it with lots of splashing and pouring. As with the shower, the child just needs to blink while the water runs over her face. It may be helpful to have another child in the tub.

3 How long to do it You usually want to irrigate for at least 15 minutes, although for caustic substances (like degreasers or toilet bowl cleaners) you may need to continue for 30 minutes. Setting a timer or having someone else watch the time for you will help make sure you irrigate long enough.

4 If you are wearing contact lenses remove them before or during irrigation and discard them.

After irrigating

Tap water can be hard on the eyes and after irrigation they will likely feel a little dry and irritated. Let them rest for another 15 minutes to return to normal. You may find it helpful to lay down, close your eyes and lay a cool washcloth over them.

Don't use medicated drops after an eye exposure. They can irritate your eyes even more and make it hard to determine whether you need medical care.

What's normal

Your eyes may be pink and a little puffy after irrigating them, and your vision may be slightly hazy for a short time.

What's not normal

Pain, any vision change that doesn't clear up quickly, or feeling like there is sand or an eyelash in your eye. These suggest injury to the cornea and require immediate medical attention. Failing to get treatment for an eye injury may lead to permanent vision loss.

Don't ask a small child if her eyes hurt. Let her return to normal activities and watch for signs of irritation such as excessive blinking, watering or rubbing. If irrigation doesn't clear these up, or if you are not able to perform a thorough irrigation, your child will need medical attention.

Getting medical care

If medical care is needed, it is usually best to go to an emergency room. A thorough eye exam requires a slit lamp, which is a kind of upright microscope used to look closely for injuries. Emergency rooms always have slit lamps but most doctor's offices and urgent care clinics don't.

For a minor corneal abrasion you will likely be sent home with an antibiotic ointment, a pain reliever and instructions to follow up with an ophthalmologist. If you have a severe injury, they will try to bring in a specialist to see you right away.

Skin Exposures

What to do

1 Washing with soap and water is the most important treatment for every skin exposure.

For irritating or corrosive substances the initial gentle washing should be followed by irrigation with copious amounts of running water.

Soaking the affected area in still water may prolong the exposure rather than removing the substance from the skin.

What to expect

This is highly variable and depends on the product, but most household products have mild effects, if any.

Getting medical care

Generally speaking, medical care is needed for skin exposures that result in injury or pain, especially if the face, hands or genitals are involved.

There are a few products that have special risks or need specific treatment, but always begin irrigation before looking the product up in this book or calling poison control for further advice.

2 Don't try to neutralize an acid by adding baking soda, or an alkali by adding vinegar.

Neutralization is a powerful chemical reaction that breaks molecular bonds and releases energy in the form of heat; this can be more damaging than the original exposure.

The proper treatment for these exposures is irrigation with copious amounts of water. Begin irrigation immediately and call poison control for advice on what to do next.

3 How long to do it Most skin exposures only need a simple wash and rinse, but some (eg, drain openers) may need longer irrigation and some (eg, super glue, jalapeno peppers) may need more than just washing.

Check the page for each product to find out if this applies, or call poison control for specific recommendations.

Inhalation Exposures

What to do

1 Fresh air Move away from the inhalant. If the exposure occurs inside, go outside. Do not go back in if you are coughing or having trouble breathing. If it is safe to enter or remain, open all door and windows. Placing a fan in an open window or door, turned so it is blowing outward, will pull fumes out of the room.

2 Breathing steam is not a substitute for medical care but can be very soothing for mild airway irritation. Stand in or next to a hot shower, or pour boiling water into a bowl and breathe in the steam.

3 Medical care is needed for respiratory symptoms that don't resolve with first aid measures, or if rescue meds or other usual measures don't ease symptoms of asthma or COPD that have been triggered by the exposure.

Aspiration

Aspiration occurs when something that is swallowed "goes down the wrong pipe," entering the airway instead of the stomach. This is usually followed by a spasm of involuntary, reflexive coughing.

Any kind of aspiration can cause significant illness, but aspiration of a **hydrocarbon** such as **gasoline** (p. 98) or **mineral oil** (p. 38) is especially dangerous.

Suspected aspiration **requires medical evaluation** even if the person seems fine after the coughing stops, as more severe symptoms may develop hours later.

Inhalant abuse

Many common household products can be abused. In addition to short-term effects like slurred speech and impaired judgment, chronic abuse of inhalants can lead to violent behavior, hearing loss, brain damage and death.

Many of those who succumb to what is known as **sudden sniffing death syndrome** (SSDS) are abusing inhalants for the very first time.

Inhalant abuse—or suspected abuse—is life-threatening, and intervention is urgently needed.

Product Listings

Toxicity terms

Anything can be toxic or not, depending on the route, length and amount of exposure. Individual differences matter, too; something that causes no problems for one person may be quite dangerous for another.

These terms are used in this book as general guidelines, not as a guarantee of safety or toxicity.

- » **Not toxic** No symptoms are expected from any kind of exposure.
- » **Minimally toxic** May cause minor symptoms that can be managed at home.
- » **Toxic** At least some exposures may cause significant symptoms, and medical care may be needed.
- » **Highly toxic** While some very limited exposures may be managed at home, many exposures will require medical care.
- » **Extremely toxic** Significant exposures may cause life-altering injury or death.

Acne treatments

How toxic: Not toxic to minimally toxic

Mouth

May dry or irritate



Rinse mouth

Skin

May be irritating
with regular use



Wash affected area

Eyes

May be irritating



Irrigate

Inhalation

Not expected

What to expect

All acne treatments can be irritating to skin even when used as directed, and they may irritate eyes and mouth.

In products designed for use on skin the concentration of active ingredients are too small to be toxic when ingested.

Common ingredients

Topical acne treatments are designed to control bacteria, clear clogged follicles and encourage growth of healthy skin cells.

Benzoyl peroxide kills *P. acnes*, a bacterium that feeds on skin oils and causes inflammation in pores. Its drying effects may help clear oil and dead skin cells from pores as well. Over-the-counter products contain from 2.5% to 10% benzoyl peroxide; higher concentrations are no more more effective against acne but are more likely to irritate skin. Benzoyl peroxide also has bleaching properties and can discolor fabrics.

Retinoids encourage shedding of dead skin cells and growth of healthy new cells, helping to keep pores unclogged. They are chemically related to vitamin A and are also used in anti-aging products. Opinions differ as to whether retinoids increase risk of sunburn, but the products can be inactivated by sun exposure. Some retinoids should not be used with benzoyl peroxide as it can counteract them.

Salicylic acid, a chemical cousin of aspirin, helps clear out pore-clogging dead skin cells and also reduces inflammation. It may be listed as **beta hydroxy acid** on some labels.

Alpha hydroxy acids include glycolic, lactic and citric acids, which were originally derived from sugar, milk and fruit, respectively; they can all be produced synthetically as well. They are effective exfoliants that slough off dead skin cells from the surface of skin and stimulate the growth of new cells. They are used in high concentrations in chemical peels.

Sulfur may be the least effective treatment on the list but it is considered the kindest to skin and the least likely to cause irritation. It clears away excess oil, exfoliates dead skin cells and has antibacterial properties. It is usually found in combination with other acne products.

About acne

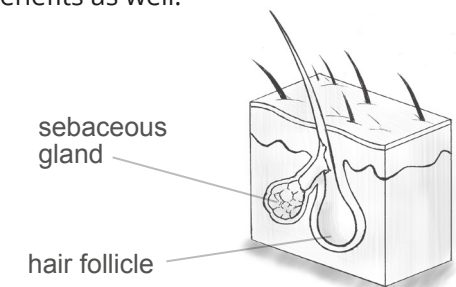
There are different kinds of acne, but most over-the-counter products are intended for the kind that strikes in adolescence. Hormonal changes cause the sebaceous glands to secrete excessive amounts of oily **sebum** into hair follicles.

Sebum can become trapped in pores, mixing with dead skin cells and providing a feeding ground for bacteria known as **Propionibacterium acnes** (*P. acnes*). *P. acnes* is always present on the skin but grows more rapidly as puberty approaches.

It is believed the redness, swelling and pus associated with acne is caused by infection with *P. acnes*, but recent studies suggest at least some acne is caused by inflammation unrelated to *P. acnes*. The treatment of acne is likely to evolve over time as we learn more about its causes.

Diet & acne

Current research suggests that **high-glycemic-index foods** that cause a rapid increase in blood sugar may contribute to acne. It is believed the frequent bursts of insulin needed to counter spikes in blood sugar cause inflammation and hormonal changes that make acne worse. Limiting high-glycemic-index foods in the diet is thought to have a number of other health benefits as well.



Make your own topical acne treatment

Tea tree oil

Tea tree oil (p. 168) has antimicrobial and anti-inflammatory properties and is as effective as benzoyl peroxide in treating acne. It may take longer to work but it is also less irritating.

Pure tea tree oil is very strong and should be diluted before use. Add a few drops to water and swab on with a cotton ball, or add to a clay mask, moisturizer or unmedicated face wash.

Green tea

Green tea has anti-inflammatory and anti-oxidant properties and may be helpful both taken by mouth and applied directly to the skin. The active components of green tea degrade quickly and it should be used as soon as possible after brewing.

Aspirin

Aspirin can be crushed, mixed with water and applied directly to a problem spot. Use of aspirin by any route is not recommended for children or teens with recent viral illness.

A&D ointment

How toxic: Not toxic

Mouth <i>Not toxic</i> ▼ Rinse mouth	Skin <i>Not toxic</i> ▼ Wash affected area	Eyes <i>May be irritating</i> ▼ Irrigate	Inhalation <i>Not expected</i>
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What to expect

A&D ointments contain very small amounts of vitamins and are not toxic when ingested, but a child could gag and vomit if they object to the oily texture.

Large ingestions, which are unlikely, may have a mild laxative effect because the ointment has an oily base.

Common ingredients

The benefits of A&D ointments are due to their base oils rather than vitamin content, which is minimal.

Vitamins A and D in the diet are essential to good health. Because they are fat soluble they can accumulate in body tissues, but it isn't possible to get enough of either vitamin from A&D ointment to be toxic.

Petrolatum is another name for petroleum jelly (p. 152) and is the active ingredient in most A&D ointments. The petrolatum forms a barrier that protects skin from irritants so it can heal.

Mineral oil is a petroleum distillate traditionally used in baby oil (p. 38). Food grade mineral oil is sometimes taken by mouth as an emollient laxative, which lubricates the GI tract so stool moves more smoothly.

Light mineral oil is a less dense form of mineral oil that is otherwise the same as far as use and toxicity.

Lanolin (p. 124) is a wax secreted by the sebaceous glands of sheep to help condition and protect their skin and wool. Lanolin doesn't form an effective barrier like petrolatum, but it's closer in composition to our natural oils and does a better job of softening and moisturizing.

Cod liver oil is taken from the livers of cod, fish of the genus *Gadus* found in the Atlantic and Pacific oceans. Cod feed near the ocean floor and while their livers are oily their flesh is not; fish oil supplements are made from other kinds of fish.

Cod liver oil for consumption is obtained by steaming or crushing the livers, breaking open cell walls so the oil is released. Oil from livers that were simply allowed to rot was once used commercially for lamp oil, paint and other applications.

Cod liver oil is added to ointments because it contains vitamins A and D, but you will find it listed on the label as an inactive ingredient because the amount of those vitamins is so low as to be literally immeasurable.

Microcrystalline waxes are petroleum derivatives that are used to bind the other ingredients. Their tiny crystals form a flexible lattice that holds oil tightly within it, keeping ointment ingredients from separating. The waxes also give the ointment a firmer consistency and help it stick to skin. Food grade microcrystalline waxes are used in numerous foods, cosmetics and pharmaceuticals.

Light liquid paraffin is another kind of mineral oil that creates a barrier to protect skin. It's also used as a lubricant in ointments for dry eyes.

Getting A&D out of hair

Pat in cornstarch until the ointment is well-absorbed, then wash with a clarifying shampoo or degreasing hand dishwashing liquid (Dawn® is the standard).

It may take repeated shampooing to get A&D ointment out of a child's hair. Sleeping on a towel between washings helps absorb the oil and protect bedding.

Getting A&D out of fabric

Gently scrape off as much ointment as possible with a spoon or dull knife. Dab the stain with a cotton ball soaked in rubbing alcohol (p. 156), then blot with paper towels. Repeat as necessary. When you can't see any more ointment on the fabric, wash the spot with degreasing hand dishwashing liquid (Dawn® again) and rinse well. Launder as usual.

Make your own vitamin ointment or cream

Petroleum jelly (p. 152) is the primary ingredient of most A&D ointments, and while it contains no vitamins, you can apply it directly to skin to form a protective barrier. The same is true of mineral oil and lanolin.

Vitamins A and D are beneficial to skin, but the amounts found in A&D ointments is probably too low to provide any real benefit. You can add vitamins to your homemade ointments and creams, but keep in mind that vitamins in liquid form are going to include other ingredients—like glycerin, natural and synthetic oils and fats, preservatives and flavoring agents—that you may be trying to avoid.

Cod liver oil capsules and most liquid oils will have other ingredients added, but it is possible to find it in a form that is virtually pure. Cod liver oil will turn rancid over time; if you add it to a homemade mixture the resulting product should be stored according to the instructions on the cod liver oil label.

Shea butter contains vitamins A and E. It is sold in both raw and refined forms; the raw form will have a higher nutritional content. Recipes for shea butter creams abound, most starting with equal parts shea butter and coconut oil.

Air fresheners

How toxic: Not toxic to minimally toxic, but toxic when abused

Mouth <i>May be irritating</i> ▼ Rinse mouth	Skin <i>Not toxic</i> ▼ Wash affected area	Eyes <i>May be irritating</i> ▼ Irrigate	Inhalation <i>Toxic when abused</i> ▼ See page 19
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What to expect

A child may be attracted to an air freshener, especially if it smells like food, but it only takes a taste to realize their mistake.

Mild oral irritation is possible but confusion over why it smells so good and tastes so bad is more likely.

Common ingredients

The products most likely to be involved in accidental exposures are liquids for plug-in devices and diffuser reeds, especially when they smell like cinnamon, vanilla or other dessert ingredients.

Fragrances are the primary ingredients of air fresheners. Some are derived directly from natural sources, but the only way to be sure a product smells exactly the way you expect every time you use it is to synthesize fragrances in a lab. Natural materials such as flowers and leaves are analyzed for their molecular composition, then the needed molecules are built and mixed to recreate the original scent.

Essential oils could be toxic in large ingestions, but they don't taste as good as they smell and more than a taste is highly unlikely. Aspiration, while unlikely to occur, would require medical evaluation (see page 19 for more information on aspiration).

Neutralizers either bind with odor molecules or alter them in some other way so they don't fit into olfactory receptors.

Cyclodextrins are donut-shaped starch molecules that trap other molecules in their holes. They are used as carriers in medications, cosmetics and foods, but in air fresheners they capture odor molecules.

Sanitizers kill bacteria, both for hygienic reasons and because bacteria are tiny odor factories; they take in molecules that don't stink and repackage them into molecules that do. Common sanitizers are alcohols like **triethylene glycol** and cationic surfactants like **benzalkonium chloride**.

Propellants are gases kept under pressure in aerosol cans that launch fragrances, deodorizers and sanitizers into the air when the button is pressed. Propellants are usually petroleum products like propane and butane and are very dangerous when intentionally inhaled.

Air fresheners and the brain

We are able to smell things when they **volatilize**, or give off molecules that float in the air. We breathe in those molecules and they bind to olfactory receptors in the nasal cavity that connect directly to the brain. (Read more on page 151.)

Signals from odor receptors are distributed rapidly to different parts of the brain, provoking memories and emotions even before conscious thought.

What's the difference?

Air fresheners are designed to emit molecules that we find pleasurable, like ripe fruit, warm cookies and sweet flowers.

Neutralizers capture or deactivate molecules we would rather not detect, like stale cigarette smoke and rotting food.

Sanitizers kill bacteria that through normal metabolism release molecules we find unpleasant, like thiols metabolized from sweat.

Make your own air freshener

Deodorizing spray

1 ounce unflavored vodka or gin
 6 ounces distilled water
 Essential oil(s)

» Mix in spray bottle and use as needed.

Coffee

Freshly ground beans or used grounds

» Place in an open dish, jar or can to adsorb odors in refrigerator, microwave or room. Pack into a sock or other fabric pouch to absorb odors in cooler or lunch box.

Reed diffuser

Neutral oil to fill container (safflower and sweet almond oil are often recommended)

OR distilled water to fill container
 Dash of rubbing alcohol or plain vodka
 Essential oil(s)

Reeds purchased from craft store, or bamboo skewers

» Mix oil or water, alcohol and essential oils and pour into a ceramic container with a small neck. Insert diffuser reeds or bamboo skewers that are twice as long as the container is tall. Reed diffusers are more porous and will work better with oil-based mixtures. Flip the reeds or skewers every few days or as the exposed portion dries out.



Ammonia

How toxic: Minimally toxic to toxic

Mouth

May be irritating



Rinse mouth

Skin

May be irritating



Wash affected area

Eyes

Likely to be irritating



Copious irrigation
for 30 minutes

Inhalation

Fumes may be
irritating



Fresh air

What to expect

Household ammonia is very dilute and rarely causes serious injury, but its fumes can be very irritating to eyes, nose and throat. When ingested it can burn mucous membranes, but its strong smell and taste make anything more than a sip unlikely.

Ammonia splashed in the eyes can cause serious injury and medical evaluation after irrigation is almost always advised. Any exposure to highly concentrated (28%–30%) ammonia is likely to require medical attention.

Warning

Never mix **ammonia** with **bleach**, as the resulting **chloramine gas** is a strong respiratory irritant. See page 43 for more information.

Common ingredients

The product label may say it contains ammonium hydroxide, which just means ammonia in water.

Ammonia is useful as a household cleaner because it is alkaline enough to turn fats and oils into soap, a process known as **saponification** (see page 162). Household ammonia is between 90% and 98% water, which helps to rinse away saponified soil.

Unfortunately the fats under our skin can also be saponified by strongly alkaline substances. Household ammonia isn't expected to cause this kind of injury, but it can still be destructive to eyes and to delicate mucous membranes in the mouth and throat.

- **Surfactants** may be added to increase cleaning power.
- **Fragrance** is sometimes added to make ammonia's pungent odor less noticeable.
- **Highly concentrated (28%–30%) ammonia** is a specialty product that has scientific, industrial and craft applications and has to be handled with great care, using personal protection gear like heavy gloves, face masks and respirators.
- This kind of ammonia has no place in a household setting.

Other uses & kinds of ammonia

Baker's ammonia (ammonium carbonate) was used as a leavening agent hundreds of years before baking soda and baking powder came on the market. It was once derived from deer antlers and known as **hartshorn**, but now it's made by combining ammonia and carbon dioxide.

Like other leavening agents, baker's ammonia vaporizes during baking, creating tiny air pockets to expand the dough. It's only used in cookies and crackers like **Speculoos** that are thin enough for all the ammonia gas to escape and that benefit from an extra-crispy texture. Baker's ammonia can be substituted 1:1 for baking soda or powder in any cookie recipe, but using baking soda or powder in a recipe calling for baker's ammonia will result in a heavier, less crisp cookie.

Smelling salts (ammonium carbonate) have such a noxious odor and irritating effect that inhaling them results in a sharp intake of breath, increasing alertness. Once popular as a **lady reviver** for Victorian women prone to fainting spells, smelling salts are still available in capsule form for first aid kits. They are also used as a performance enhancer by weight lifters and other athletes. Smelling salts should never be used on someone with a head injury, as the temporary boost in alertness may cover up a medical emergency.

Salmiak is black licorice made with **ammonium chloride**, which combines the salty chloride flavor with the kick of ammonia. It's popular in northern Germany and Scandinavia. There are other varieties of candy made with ammonium chloride, as well as salmiak-flavored vodkas.

- **Ammonia fuming** is the process of placing wood in an enclosed space with highly concentrated liquid ammonia. The ammonia reacts with tannins in the wood, causing it to darken. The longer the exposure, the darker the wood. Fuming enhances wood grain without obscuring it and the darkened effect is permanent. After fuming the wood can be varnished or oiled.

- Ammonia fuming was popular during the Arts and Crafts movement of the late 19th and early 20th centuries. Because fuming essentially speeds up a process that would occur naturally over a much longer period of time, it's considered by some to be a more authentic, natural way to color wood than staining or painting.

Ammonia in the body

- Ammonia is composed of nitrogen and hydrogen. Nitrogen is needed to build amino acids, protein, DNA and chlorophyll, and so is critical to every form of life.

- Almost 80% of the air we breathe is nitrogen, but we can't use it in that form. Bacteria in soil convert nitrogen absorbed from the air (and from fertilizers, page 84) to a form that can be taken up by plants, which we can then eat.

- Every cell in our body needs nitrogen to function, but it eventually becomes a waste product and is excreted from cells in the form of ammonia. Ammonia is then converted in the liver to urea and is excreted in urine (p. 176).

- Excessive ammonia is neurotoxic, and diseases of the liver or kidneys can cause ammonia to build up in the brain with severe consequences.