Environmental Toxins and ALS: Understanding Everyday Exposures and Protecting a Vulnerable Nervous System

A Comprehensive Research and Educational Paper on Environmental Toxins, Exposure Reduction, and Practical Strategies for People Living with Amyotrophic Lateral Sclerosis (ALS)

Introduction

Living with Amyotrophic Lateral Sclerosis (ALS) requires an awareness of the body that most people never have to develop. Everyday activities that others take for granted can become more complicated when the nervous system is compromised by a progressive neurological disease. Nutrition, physical activity, breathing, sleep, medication, and environmental surroundings all deserve greater consideration.

One area that warrants particular attention is environmental exposure to toxins.

We live in an environment containing thousands of synthetic and naturally occurring chemicals. They are present in the air we breathe, the water we drink, the food we eat, the products we use to clean our homes, the materials used to manufacture our furniture, and the soil in which our food is grown. Some exposures are unavoidable, while others can be substantially reduced through informed decisions.

For someone living with ALS, minimizing unnecessary environmental exposures is a reasonable component of a broader strategy for protecting health and supporting quality of life.

> **Important Distinction:** Reducing exposure to environmental toxins is not an established treatment or cure for ALS, and there is currently no conclusive evidence that eliminating particular household or environmental chemicals will stop ALS progression. Research has identified associations between certain environmental exposures and ALS risk, but associations do not necessarily establish causation. Nor do they establish that removing an exposure after diagnosis will change the course of the disease.

Nevertheless, reducing avoidable exposure makes practical sense. A person whose respiratory muscles, mobility, swallowing, and general physical resilience may already be compromised has good reason to avoid unnecessary pollutants, respiratory irritants, and potentially harmful chemicals.

The objective should not be to create an impossible toxin-free existence. It should be to make the living environment cleaner, safer, and less chemically burdensome wherever reasonably possible.

This paper examines common environmental toxins, their potential neurological significance, the ways people encounter them, and practical steps for reducing exposure without creating unnecessary stress, expense, or physical demands.

1. Understanding Environmental Toxins

An environmental toxin is a substance that can cause biological harm when a person is exposed to a sufficient amount through inhalation, ingestion, or absorption through the skin.

The word toxin is often used broadly, but there are important distinctions:

- **Heavy metals:** Naturally occurring elements that can become harmful at elevated concentrations or through particular forms of exposure.
- **Pesticides:** Chemicals designed to kill or control insects, weeds, fungi, rodents, and other unwanted organisms.
- **Industrial chemicals:** Substances used in manufacturing, processing, cleaning, construction, and other commercial activities.
- **Air pollutants:** Gases, particles, fumes, and combustion byproducts that enter the respiratory system.
- **Endocrine-disrupting chemicals:** Substances that may interfere with normal hormonal signaling.
- **Persistent organic pollutants:** Chemicals that resist environmental breakdown and may accumulate in soil, water, wildlife, and human tissue.
- **Biological contaminants:** Mold, bacterial toxins, and certain naturally occurring compounds produced by microorganisms.

Not every chemical is dangerous at every exposure level. Risk depends on several variables:

1. The identity and toxicity of the substance.
2. The amount of exposure.
3. The duration and frequency of exposure.
4. The route through which it enters the body.
5. The individual's ability to absorb, metabolize, and eliminate it.
6. Other environmental and biological factors that may influence its effects.

This is particularly important when discussing ALS. It would be scientifically inaccurate to suggest that every environmental chemical threatens motor neurons or that every person with ALS is unusually sensitive to all toxins.

However, ALS can make certain consequences of environmental exposure more serious. For example, respiratory irritants may be especially troublesome when respiratory muscle strength is reduced. Strong chemical odors may trigger coughing or breathing discomfort. Food contamination, unsafe drinking water, and avoidable infections may create additional health burdens.

The practical objective is to reduce meaningful exposure rather than become fearful of every chemical encountered in modern life.

2. What Does Scientific Research Say About Environmental Toxins and ALS?

Researchers have investigated environmental exposures for decades in an effort to understand why some people develop ALS while others do not.

The disease is complex. Genetic susceptibility, aging, cellular processes, and potentially environmental influences may interact. Most ALS cases do not have one clearly identifiable cause.

An umbrella review published in 2025 examined existing research on environmental risk factors, protective factors, and biomarkers associated with ALS. It found associations involving several exposures, including pesticides, farming occupations, metals, and other environmental factors. However, the quality and consistency of evidence varied considerably.

The ALS Association identifies several categories that researchers continue to investigate:

- Pesticides, herbicides, and insecticides.
- Heavy metals, including lead, manganese, mercury, zinc, and copper.
- Industrial solvents.
- Formaldehyde and other industrial chemicals.
- Beta-methylamino-L-alanine (BMAA), a compound associated with certain cyanobacteria.

A particularly important distinction is the difference between two questions:

- **Question one:** Can certain environmental exposures increase the probability of developing ALS?
- **Question two:** Can eliminating those exposures after someone has developed ALS slow disease progression?

These are not the same question. Research investigating the first question does not automatically establish an answer to the second. At present, there is insufficient clinical evidence to conclude that environmental toxin avoidance slows ALS progression.

Nevertheless, avoiding ongoing exposure to known harmful substances remains a sensible preventive-health measure.

3. Common Environmental Toxins and Where They Are Found

3.1 Pesticides, Herbicides, and Insecticides

Pesticides are among the most frequently investigated environmental exposure categories in ALS research. They are used extensively in agriculture, landscaping, residential pest control, commercial buildings, and food production.

There are several major categories:

- **Herbicides:** Used to eliminate unwanted vegetation. Examples include glyphosate and 2,4-D.
- **Insecticides:** Used to control insects. Examples include organophosphates, pyrethroids, and carbamates.
- **Fungicides:** Used to control fungal growth on crops, plants, and other surfaces.
- **Rodenticides:** Used to control mice, rats, and other rodents.

Where exposure occurs

- Conventionally grown agricultural products.
- Farms and agricultural communities.
- Residential lawn treatments.
- Golf courses and landscaped properties.
- Household bug sprays.
- Pest-control treatments.
- Contaminated soil and dust.
- Work clothing brought home by agricultural workers.

Some pesticides can affect the nervous system through mechanisms involving neurotransmission. Others have different biological targets. Their toxicity varies substantially.

ALS research has identified associations between occupational pesticide exposure and disease risk. A 2026 systematic review and meta-analysis reported an association between occupational pesticide exposure and increased ALS risk, although the authors also identified limitations involving study design, exposure measurement, and differences between studies.

Practical ways to reduce exposure

1. Avoid personally applying pesticides whenever possible.
2. Use nonchemical pest-control measures when practical.
3. Avoid walking through recently treated lawns until the product label's reentry instructions permit it.
4. Ask landscaping companies what chemicals they use.
5. Request notification before residential pesticide applications.

6. Keep windows closed during nearby spraying when appropriate.
7. Wash produce thoroughly under running water.
8. Remove outer leaves from leafy vegetables when appropriate.
9. Peel produce when practical, recognizing that this can also remove nutrients.
10. Wash hands after gardening or handling potentially contaminated soil.
11. Remove shoes before entering the home.
12. Wash work clothing separately when it may have significant pesticide contamination.

It is important not to assume that organic food is completely pesticide-free or that conventional food is inherently unsafe. Organic farming also permits certain pesticides. Washing produce and maintaining a varied diet are practical measures regardless of how food is grown.

3.2 Heavy Metals

Heavy metals and related elements are naturally present in the environment. Some are essential nutrients at appropriate levels but harmful at excessive levels. Others have no established nutritional requirement.

The most commonly discussed substances include:

Lead

Potential sources include:

- Older paint and household dust.
- Contaminated drinking water.
- Some plumbing materials.
- Industrial sites.
- Certain imported pottery and consumer products.
- Battery manufacturing and recycling.
- Welding, soldering, and metalworking.

Lead can damage the nervous system, kidneys, and other organs. Older homes are an important consideration because lead-based paint was widely used before restrictions were introduced in the United States.

Practical precautions:

- Have older homes assessed for lead hazards when appropriate.
- Do not sand, scrape, or disturb suspected lead paint yourself.
- Use qualified lead-safe contractors.
- Use certified lead-reduction filters when water testing indicates a problem.
- Wash hands before eating.
- Wet-clean floors and window surfaces rather than dry sweeping contaminated dust.
- Avoid bringing occupational lead dust home on clothing or footwear.

Mercury

Potential sources include:

- Certain fish and seafood.
- Industrial emissions.
- Coal combustion.
- Some contaminated waterways.
- Certain occupational environments.

Mercury toxicity depends heavily on its chemical form. Methylmercury, which can accumulate in fish, is particularly important because it can affect the nervous system.

Practical precautions:

- Follow FDA and EPA fish-consumption recommendations.
- Choose lower-mercury seafood.
- Pay attention to local fish-consumption advisories.
- Avoid handling mercury-containing spills without professional guidance.

Fish should not automatically be eliminated from the diet. Seafood provides valuable protein and nutrients. The objective is informed selection.

Arsenic

Arsenic occurs naturally in some groundwater and may also result from industrial contamination.

Potential sources include:

- Private wells.
- Contaminated groundwater.
- Some agricultural soils.
- Certain industrial operations.
- Some rice and rice-based products.

Practical precautions:

- Test private well water for arsenic.
- Use an appropriate certified treatment system if contamination is found.
- Vary grain choices rather than relying exclusively on rice.
- Follow local water-quality advisories.

Cadmium

Cadmium exposure may occur through:

- Tobacco smoke.
- Industrial emissions.
- Certain contaminated foods.
- Battery manufacturing and recycling.
- Occupational metal exposure.

Avoiding tobacco smoke and occupational dust is particularly worthwhile.

Manganese

Manganese is an essential nutrient, but excessive exposure can be neurotoxic. Potential sources include contaminated drinking water, industrial dust, welding fumes, and certain occupational environments. The important principle is that essential minerals should not be eliminated from the diet. The goal is to avoid excessive exposure.

3.3 Industrial Solvents and Volatile Organic Compounds (VOCs)

Volatile organic compounds are chemicals that can evaporate into the air at ordinary indoor temperatures. They are found in numerous household and commercial products.

Examples include:

- Benzene.
- Formaldehyde.
- Toluene.
- Xylene.
- Methylene chloride.
- Certain paint solvents.
- Adhesives and glues.
- Paint strippers.
- Degreasers.
- Some cleaning products.

- Fragrances and air fresheners.

Some VOCs cause eye, nose, and throat irritation. Depending on the compound and exposure level, others can affect the nervous system, liver, kidneys, or other organs. Formaldehyde deserves particular attention because it can be released from certain building materials, pressed-wood furniture, adhesives, and other household products.

Practical ways to reduce exposure

1. Choose low-emission or low-VOC paints and building materials.
2. Avoid unnecessary use of paint thinners and solvent-based products.
3. Use fragrance-free cleaning products where possible.
4. Avoid aerosol products when a liquid or other lower-emission alternative is available.
5. Ventilate during and after painting or renovation.
6. Do not use gasoline, solvents, or industrial cleaners inside living spaces.
7. Store chemicals in their original containers.
8. Avoid mixing household cleaning products.
9. Ask contractors to use lower-emission materials.
10. Allow new furniture and building materials to air out in a well-ventilated space when feasible.

A particularly important precaution is to avoid combining bleach with ammonia, acids, vinegar, or other incompatible cleaning products. Dangerous gases can be produced.

For someone with ALS-related breathing weakness, it is especially sensible to have someone else handle painting, strong cleaning chemicals, and other activities that produce concentrated fumes.

3.4 Air Pollution and Particulate Matter

Air pollution is a major environmental health concern. The respiratory system is the first point of contact for many airborne contaminants.



Figure 1: Monitoring outdoor air quality and ventilating indoor spaces when outdoor air is clean helps protect respiratory comfort.

Important pollutants include:

- Fine particulate matter (PM2.5).
- Larger inhalable particles (PM10).
- Nitrogen dioxide.
- Sulfur dioxide.
- Ground-level ozone.
- Carbon monoxide.
- Diesel exhaust.
- Industrial emissions.
- Smoke from fires and combustion.

Fine particulate matter is particularly concerning because small particles can travel deep into the respiratory tract. For someone living with ALS, air quality deserves special attention because respiratory muscle weakness can reduce the ability to cough effectively and clear respiratory secretions.

Air pollution is not proven to accelerate ALS progression, but avoiding substantial exposure is a reasonable respiratory-health precaution.

Practical ways to reduce exposure

- Check the Air Quality Index (AQI).
- Keep windows closed when outdoor pollution is elevated.
- Use a properly sized HEPA air purifier in frequently occupied rooms.
- Replace HVAC filters according to the manufacturer's instructions.
- Avoid indoor smoking.
- Avoid burning candles and incense frequently.
- Minimize wood-burning fireplace use.
- Avoid idling vehicles near entrances and windows.
- Avoid outdoor exertion when air quality is poor.
- Use properly maintained kitchen exhaust ventilation when cooking.
- Consider a portable air cleaner in the bedroom.

HEPA filters remove airborne particles, but they do not automatically remove gases or VOCs. Activated carbon filtration may help with certain gases and odors, depending on the amount and design of the filter. An air purifier should not be viewed as a substitute for addressing the pollution source.

3.5 Mold, Mildew, and Mycotoxins

Mold grows in damp environments and can become a significant indoor air-quality problem.

Common locations include:

- Basements.
- Bathrooms.
- Kitchens.
- Leaking roofs.
- Window frames.
- HVAC systems.
- Areas affected by flooding.
- Damp carpeting and drywall.

Some molds produce compounds called mycotoxins. However, finding ordinary household mold does not establish that dangerous mycotoxin exposure is occurring. The strongest established reasons to address indoor mold are respiratory irritation, allergic reactions, and asthma-related effects. For a person with ALS, respiratory comfort is particularly important.

Practical precautions

1. Repair water leaks promptly.
2. Keep indoor humidity reasonably controlled, generally around 30–50%.
3. Use bathroom and kitchen exhaust fans.
4. Dry water-damaged materials quickly.
5. Remove materials that cannot be adequately cleaned and dried.
6. Address persistent condensation.
7. Have substantial mold contamination professionally assessed and remediated.
8. Avoid personally disturbing large mold-contaminated areas.

People with respiratory weakness should not be assigned mold-removal work. Disturbing contaminated materials can release substantial quantities of spores and dust.

It is also important to avoid expensive commercial mycotoxin testing without a medically justified reason. Testing for mold in a building and testing a person's body for mycotoxins are different matters, and the latter is not a reliable routine method of diagnosing environmental illness.

3.6 Plastics, BPA, Phthalates, and PFAS

Modern life involves extensive contact with plastics and synthetic materials. Some of the chemicals used in manufacturing these products have attracted attention because of their potential effects on human health. Three important categories are bisphenols, phthalates, and PFAS.



Figure 2: Replacing scratched plastic containers with glass food storage and stainless-steel cookware reduces chemical contact with hot food.

Bisphenols (including BPA)

Bisphenol A (BPA) has been used in certain plastics and epoxy resins. It has been studied for its potential endocrine-disrupting properties. Possible exposure sources include some food and beverage containers, certain can linings, older plastic products, and some thermal-paper receipts.

Phthalates

Phthalates are a family of chemicals used in certain plastics to improve flexibility. They may also occur in fragrances and personal-care products. Potential exposure sources include flexible plastic materials, vinyl flooring, some food-contact materials, fragranced personal-care products, and certain household furnishings.

PFAS (per- and polyfluoroalkyl substances)

PFAS are a large family of synthetic chemicals sometimes called forever chemicals because many break down very slowly in the environment. Potential sources include certain drinking-water supplies, some grease-resistant food packaging, certain stain-resistant textiles, some water-resistant materials, certain industrial processes, and some firefighting foams.

Some PFAS have been associated with adverse health effects, although the effects vary by compound and exposure level. Research into neurological consequences, including possible relationships with neurodegenerative disease, remains incomplete.

Practical exposure-reduction measures

- Use glass or stainless-steel food-storage containers when convenient.
- Avoid heating food in plastic containers unless they are specifically designed for that use.
- Transfer hot food into glass or ceramic containers.
- Replace badly scratched or deteriorating food containers.
- Consider stainless-steel or cast-iron cookware as alternatives to damaged nonstick cookware.
- Avoid unnecessary contact between hot food and plastic.
- Check drinking-water quality if PFAS contamination is a concern.
- Consider an appropriately certified water filter if testing identifies contamination.
- Reduce unnecessary use of heavily fragranced products.

There is no need to throw away every plastic item in the home. Replacing products gradually, beginning with those used for hot food and beverages, is a more reasonable approach.

3.7 Drinking-Water Contaminants

Water is essential to every biological process. It supports circulation, digestion, temperature regulation, kidney function, and cellular metabolism. However, drinking water can contain contaminants depending on its source, treatment, plumbing, and surrounding environment.



Figure 3: Certified water filtration matched to local water-quality reports or well-testing results helps ensure safe daily hydration.

Potential contaminants include: Lead, Arsenic, Nitrates, PFAS, certain pesticides, industrial chemicals, microorganisms, and disinfection byproducts.

People receiving water from public systems can obtain annual Consumer Confidence Reports from their water utility. Those using private wells should arrange appropriate testing because private wells are not regulated under the same federal drinking-water requirements as public systems.

Practical precautions

1. Obtain the annual water-quality report from the local utility.
2. Test private wells periodically and when local conditions warrant.
3. Use certified filters appropriate for the specific contaminant.
4. Replace filter cartridges according to manufacturer instructions.
5. Avoid assuming that all water filters remove all contaminants.
6. Do not rely on boiling water to remove chemical contaminants. Boiling can concentrate certain contaminants as water evaporates.
7. If lead is suspected, obtain appropriate testing and use certified lead-reduction measures.

For someone with ALS, adequate hydration is important, but swallowing difficulties may require changes in liquid consistency. Hydration recommendations should be coordinated with the speech-language pathologist and clinical care team.

3.8 Combustion Products and Household Smoke

Many household activities produce airborne chemicals through combustion. Examples include gas stoves, wood-burning fireplaces, tobacco products, cigarettes and cigars, incense, candles, charcoal grills, gas-powered equipment, and vehicle exhaust.

Combustion can release carbon monoxide, nitrogen dioxide, fine particles, and other harmful compounds. Carbon monoxide is particularly dangerous because it is colorless and odorless. Exposure can cause headache, dizziness, confusion, nausea, and potentially fatal poisoning.

Practical precautions

- Install working carbon monoxide detectors.
- Maintain fuel-burning appliances.
- Have gas appliances inspected when appropriate.
- Use kitchen exhaust ventilation that vents outdoors when possible.
- Avoid smoking indoors.
- Avoid operating generators, grills, or fuel-burning equipment inside garages or homes.
- Keep vehicles outside rather than running them in enclosed spaces.
- Minimize indoor burning of candles and incense.

For someone with ALS, eliminating indoor tobacco smoke and minimizing combustion-related pollution are especially sensible respiratory-protection measures.

3.9 BMAA and Cyanobacteria

Beta-methylamino-L-alanine, commonly known as BMAA, is an amino acid-like compound produced by certain cyanobacteria and other organisms. Cyanobacteria are commonly called blue-green algae. They can proliferate in freshwater and marine environments under certain conditions.

BMAA has attracted attention in ALS research, particularly because of historical investigations into neurological disease among the Chamorro population of Guam. Researchers have investigated whether exposure to BMAA through contaminated water, food chains, or other environmental pathways could contribute to neurological disease. However, the extent of BMAA's contribution to human ALS remains unresolved. Its presence, biological effects, and relationship to ALS are still subjects of scientific investigation.

Practical precautions

- Do not drink water from lakes or ponds experiencing harmful algal blooms.
- Follow local public-health warnings.
- Avoid collecting or eating fish and shellfish from waters under relevant contamination advisories.
- Keep pets away from suspicious water blooms.
- Do not assume that boiling contaminated water makes it safe.

- Follow local guidance concerning recreation and water use.

This is an example of an exposure that can be avoided through ordinary environmental awareness without requiring expensive testing or major lifestyle changes.

3.10 Personal-Care Products, Fragrances, and Household Chemicals

Many people use dozens of personal-care and household products throughout the day, including shampoo, conditioner, body wash, deodorant, hair products, perfumes, lotions, cosmetics, laundry detergents, fabric softeners, air fresheners, and cleaning sprays.



Figure 4: Simplifying daily routines with fragrance-free, non-aerosol personal-care and cleaning products reduces indoor chemical irritation.

Some products contain fragrances, preservatives, solvents, and other substances that can cause skin irritation, allergic reactions, or respiratory discomfort in susceptible individuals. It is important not to assume that a product is dangerous merely because it contains synthetic ingredients. Likewise, the terms natural and organic do not guarantee safety.

For someone with ALS, simplifying the products used in the home can be beneficial for several practical reasons: fewer strong odors, less aerosol exposure, reduced skin irritation, less complicated cleaning routines, and fewer unnecessary chemical applications.

A sensible household approach

Choose fragrance-free rather than simply unscented products when possible, because unscented products may still contain masking fragrances. Consider replacing multiple specialized cleaners with a small number of effective products. Avoid unnecessary disinfectants and sprays when ordinary cleaning is sufficient.

4. Why Environmental Exposure Deserves Special Attention When Living With ALS

The reason to be more deliberate about environmental exposure is not that ALS automatically makes every chemical more toxic. It is that ALS can reduce the body's ability to tolerate certain additional physical stresses.

4.1 Respiratory Vulnerability

The respiratory muscles play a critical role in breathing, coughing, and clearing mucus. As ALS affects the diaphragm and other respiratory muscles, breathing can become less efficient. Cough strength may decline, making it harder to clear secretions.

This creates a practical reason to minimize exposure to smoke, dust, aerosols, chemical fumes, strong fragrances, mold-contaminated materials, and outdoor air pollution. An otherwise healthy individual may tolerate a short exposure to a cleaning product without significant consequences. Someone with compromised respiratory function may experience greater discomfort or difficulty recovering from respiratory irritation. This is why ventilation, air filtration, and avoiding unnecessary chemical fumes deserve priority.

4.2 Reduced Physical Reserve

ALS can affect mobility, muscle strength, swallowing, and the ability to perform ordinary activities. A person with reduced physical reserve may have more difficulty recovering from additional health problems. Avoidable environmental exposures can contribute to irritation, headaches, respiratory symptoms, or other health problems that interfere with daily functioning. Protecting physical reserve means preventing unnecessary burdens wherever possible.

4.3 Swallowing and Digestive Considerations

Some individuals with ALS develop dysphagia, or difficulty swallowing. This can make hydration and adequate nutrition more challenging. Foodborne illness, contaminated water, and gastrointestinal irritation can become additional complications. Careful food preparation, clean drinking water, appropriate food storage, and attention to swallowing safety are therefore important.

4.4 Infection and Respiratory Complications

ALS does not automatically mean that a person is immunocompromised. However, respiratory weakness can make respiratory infections more consequential. Reducing exposure to smoke, dust, and mold, maintaining appropriate indoor air quality, and following recommended infection-prevention practices are sensible steps. The objective is to preserve respiratory comfort and avoid preventable complications.

5. Other Exposures Worth Considering

5.1 Tobacco Smoke and Secondhand Smoke

Tobacco smoke contains thousands of chemical compounds, including substances known to be carcinogenic and harmful to the cardiovascular and respiratory systems. For someone with ALS, avoiding tobacco smoke is particularly important because of its effects on respiratory health.

Avoid: Indoor cigarette and cigar smoke, secondhand smoke, smoke-filled environments, and residual tobacco contamination on furniture, clothing, and household surfaces.

5.2 Radon

Radon is a naturally occurring radioactive gas produced by the breakdown of uranium in soil and rock. It can enter homes through foundations, cracks, sump openings, and other pathways. Radon is an established cause of lung cancer. It is not an established cause of ALS, but it deserves attention as an important household environmental hazard.

Practical measures: Test the home for radon, pay particular attention to basements and lower levels, use an EPA-recommended mitigation professional if elevated levels are found, and retest after mitigation. Radon testing is relatively straightforward and is one of the more worthwhile environmental assessments for homeowners.

5.3 Cleaning Chemicals and Disinfectants

Frequent exposure to strong cleaning chemicals can irritate the respiratory system. Examples include chlorine bleach, ammonia-based cleaners, strong degreasers, oven cleaners, drain cleaners, disinfectant sprays, and solvent-based cleaners.

The goal is not to eliminate household cleanliness. It is to avoid unnecessary chemical intensity. A practical approach is to use the least hazardous effective product, follow the label, avoid aerosolization, and allow adequate ventilation.

5.4 Occupational and Hobby-Related Exposures

Some of the most significant environmental exposures occur outside the home, including welding, metal fabrication, auto repair, construction, painting, furniture refinishing, industrial manufacturing, agricultural work, battery recycling, mining, solvent-based crafts, and certain woodworking activities.

These activities can produce concentrated exposure to metals, dust, solvents, fumes, and other chemicals. For individuals with ALS who continue working or participating in hobbies, it may be worthwhile to have someone else perform particularly hazardous tasks. A history of occupational exposure should be discussed with a physician, especially if exposure is ongoing.

6. A Practical Strategy for Reducing Environmental Toxins at Home

Reducing environmental exposure does not require turning a home into a laboratory or spending thousands of dollars on specialized equipment. A systematic approach is more effective. The following priorities focus on exposures that can be meaningfully addressed.

6.1 Make the Bedroom a Cleaner-Air Environment

The bedroom deserves special attention because people spend a substantial portion of their time sleeping. Consider:



Figure 5: A properly sized HEPA air purifier, clean bedding, and fragrance-free laundry care help maintain a restful, low-irritant sleeping environment.

- A properly sized HEPA air purifier.
- Fragrance-free laundry detergent.
- Regular washing of bedding.
- Dust reduction.
- Clean HVAC filters.
- Avoiding candles and incense.
- Keeping pets off bedding if allergies are an issue.
- Addressing moisture and mold.
- Avoiding strong chemical cleaning before bedtime.

For someone using nighttime noninvasive ventilation, the sleeping environment is especially important. Ventilation equipment, masks, and associated components should be maintained and cleaned according to the manufacturer's and respiratory team's instructions.

6.2 Improve Indoor Air Quality

Indoor air can contain pollutants from cooking, cleaning, furnishings, building materials, combustion, and outdoor air infiltration. A reasonable indoor-air strategy includes:

1. Use HEPA filtration in frequently occupied rooms.
2. Replace heating and cooling filters regularly.
3. Ventilate when outdoor air quality is good.
4. Use an exhaust fan when cooking.
5. Avoid smoking indoors.
6. Avoid unnecessary air fresheners.
7. Keep dust under control.
8. Repair water leaks.
9. Maintain appropriate humidity.
10. Avoid excessive use of aerosol products.

Air filtration should be viewed as a useful supporting measure, not a replacement for eliminating pollution sources.

6.3 Choose Household Products Carefully

Instead of purchasing dozens of specialty products, simplify. Look for fragrance-free laundry detergent, mild dishwashing products, lower-emission paints, simple cleaning products, products with clearly disclosed ingredients, non-aerosol alternatives, and appropriate protective equipment for unavoidable chemical work.

Avoid products marketed with exaggerated promises about being completely chemical-free. Water, air, food, and even the human body consist of chemicals. The important distinction is whether a substance presents a meaningful hazard at the level of exposure involved.

6.4 Make Food Preparation a Priority

Food is one of the most frequent ways people encounter environmental contaminants. Practical steps include:



Figure 6: Washing fresh produce thoroughly and maintaining a varied, nutrient-dense diet supports overall health without unnecessary dietary restriction.

- Wash fruits and vegetables under running water.
- Remove damaged or contaminated outer leaves.
- Vary the types of produce consumed.
- Vary grain choices.
- Follow seafood advisories.
- Store food properly.
- Avoid unnecessary contact between hot food and plastic.
- Maintain clean food-preparation surfaces.
- Wash hands before preparing meals.

A particularly important consideration in ALS is that nutritional needs must not be sacrificed in the pursuit of toxin avoidance. Maintaining adequate calories, protein, hydration, and overall nutrition is essential. Restrictive diets that remove large categories of nutritious foods can be counterproductive. For seafood, the FDA provides guidance identifying fish with lower and higher mercury levels; salmon, sardines, cod, shrimp, and trout are among its lower-mercury choices.

6.5 Evaluate Drinking Water

Water testing should be based on the source and potential contamination. For people using municipal water: review the annual water-quality report, investigate local contamination notices, and consider targeted testing when there is a specific concern. For people using private wells: arrange testing through an appropriate certified laboratory, consider testing for arsenic, lead, nitrates, bacteria, and locally relevant contaminants, and use treatment equipment designed for the contaminant actually detected.

A reverse-osmosis system, activated-carbon filter, and sediment filter do not all perform the same function. The right equipment depends on the water-quality results.

6.6 Be Selective About Landscaping and Pest Control

A person with ALS should not have to participate in routine chemical applications around the property. Consider hiring pest-control professionals who use integrated pest management, asking for advance notice of pesticide applications, avoiding recently treated lawns, using physical barriers and traps where appropriate, choosing lower-exposure landscaping practices, and avoiding unnecessary herbicide use. Integrated pest management emphasizes prevention, monitoring, and physical or biological controls before relying on chemical treatments.

6.7 Reduce Dust

Dust can contain a mixture of soil particles, fibers, pollen, combustion particles, household debris, and contaminants from indoor materials. Dust reduction is particularly relevant when someone has difficulty coughing effectively. Useful measures include damp dusting, wet mopping, HEPA-filtered vacuuming, regular cleaning of frequently used surfaces, removing shoes at the entrance, keeping HVAC systems maintained, and avoiding dry sweeping of potentially contaminated materials. Whenever possible, household members or caregivers should handle demanding cleaning activities.

7. Understanding the Five Main Routes of Exposure

Environmental chemicals enter the body through different pathways. Understanding these pathways helps determine which protective measures are appropriate.

Exposure Route	Common Examples	Practical Protection
Inhalation	Smoke, dust, fumes, VOCs, pesticides	Ventilation, source control, appropriate filtration
Ingestion	Contaminated food, water, soil	Food washing, water testing, safe storage
Skin absorption	Solvents, pesticides, industrial chemicals	Appropriate gloves, clothing, handwashing
Eye contact	Sprays, fumes, chemical splashes	Avoid aerosols, use appropriate eye protection
Accidental transfer	Contaminated shoes, clothing, surfaces	Remove shoes, wash hands, separate work clothing

One of the most effective ways to reduce environmental exposure is to interrupt the pathway before a substance enters the body. For example, removing shoes at the entrance can prevent outdoor soil, lawn chemicals, and other contaminants from being tracked throughout the home. Likewise, having someone else perform a painting project can eliminate the need for a person with ALS to spend hours around paint fumes. These are relatively simple measures that can make a meaningful difference in exposure.

8. Testing: What Should a Person With ALS Consider?

There is a difference between testing the environment and testing the individual. Both can be useful in appropriate circumstances, but indiscriminate testing is not necessarily beneficial.

Environmental testing

Depending on circumstances, reasonable assessments may include home radon testing, private-well water testing, lead assessment in older homes, mold and moisture inspections when water damage exists, indoor air-quality assessment when a specific problem is suspected, and occupational exposure assessments when ongoing hazards exist. These tests investigate identifiable environmental concerns.

Medical testing

Medical testing should be based on a credible exposure history and clinical symptoms. Depending on the circumstances, a physician may consider blood lead testing, blood or urine mercury testing, arsenic testing, other targeted toxicology testing, or occupational medicine consultation. The choice of test matters because different chemicals require different testing methods and collection procedures. For example, blood and urine testing may be appropriate for different forms and exposure periods of certain metals. Hair mineral analysis and commercial panels claiming to identify dozens of hidden toxins are not reliable substitutes for validated clinical testing.

Why indiscriminate testing can be harmful

An abnormal laboratory result does not automatically establish poisoning, explain ALS, or demonstrate that a substance is causing ongoing neurological damage. Unnecessary testing can create anxiety, generate misleading results, and lead to expensive treatments without established benefit. The better approach is to identify a plausible exposure, determine whether testing is medically appropriate, and interpret results with a qualified professional.

9. The Danger of Commercial Detoxification Programs

The desire to remove toxins from the body is understandable, particularly when dealing with a neurological disease. However, the word detox is frequently used in ways that have little relationship to established toxicology. There is no scientifically established detoxification program that has been demonstrated to reverse ALS or stop its progression.

Commercial detoxification products and programs may include juice cleanses, extended fasting, extreme dietary restrictions, unsupervised supplements, colon cleansing, chelation therapy, sauna-based detoxification, high-dose vitamins and minerals, and unvalidated intravenous treatments. These approaches should not be assumed to be safe.

9.1 Chelation Therapy

Chelation is a legitimate medical treatment for certain documented cases of heavy-metal poisoning. It uses specific medications to bind certain metals so that they can be eliminated from the body. However, chelation is not a general-purpose detoxification treatment. Without a documented indication, it can cause serious problems, including depletion of essential minerals, kidney injury, electrolyte disturbances, medication interactions, and other potentially serious complications. There is no established evidence that routine chelation treats ALS.

9.2 Fasting and Extreme Cleansing

People with ALS can be vulnerable to weight loss and inadequate nutritional intake. Extended fasting, juice-only diets, or restrictive cleansing programs can make it harder to maintain sufficient calories and protein. Maintaining nutrition is a central part of ALS care. For this reason, a toxin-avoidance strategy should never become a reason to underfeed the body.

9.3 Supplements Marketed as Detoxifiers

Some supplements claim to remove heavy metals, cleanse the liver, or eliminate accumulated environmental chemicals. These claims deserve skepticism. Some products contain excessive amounts of minerals or vitamins. Others may interact with medications or contain contaminants themselves. A supplement should be evaluated based on its ingredients, evidence, quality, and potential risks—not simply its marketing claims.

The distinction worth remembering is this: preventing additional exposure is different from attempting to extract substances from the body. Preventing an avoidable exposure is often straightforward. Attempting to remove substances already present in the body is a medical undertaking that requires an actual diagnosis and appropriate treatment.

10. The Liver, Kidneys, and the Body's Natural Defense Systems

The human body has sophisticated systems for processing and eliminating many substances encountered in everyday life:

- **The liver:** Transforms many chemicals into forms that can be used, metabolized, or eliminated.
- **The kidneys:** Filter blood and eliminate numerous waste products and substances through urine.
- **The gastrointestinal system:** Helps eliminate substances through bowel movements.
- **The lungs:** Eliminate carbon dioxide and certain volatile substances.
- **The skin:** Provides a protective barrier and plays a limited role in eliminating certain substances through sweat.

These systems work together, but their capacity is not unlimited. Some chemicals persist in the body, while others are eliminated relatively quickly. The best way to support these normal processes is not to subject the body to aggressive detoxification programs. Instead, maintain the basics: adequate nutrition, appropriate hydration, sufficient calories, regular bowel function, appropriate medical care, avoidance of tobacco and unnecessary chemical exposures, and proper management of existing medical conditions. In ALS, these fundamentals are particularly important because maintaining body weight, hydration, and nutritional status can become increasingly challenging.

11. Establishing an Environmental Protection Plan for Someone With ALS

The most effective strategy is to prioritize the exposures that are both potentially harmful and reasonably easy to control. Trying to eliminate every possible environmental contaminant would be unrealistic. It could also create unnecessary anxiety and financial expense. A better approach is to establish priorities.

Priority One: Protect the respiratory environment

- Avoid cigarette smoke and secondhand smoke.
- Avoid unnecessary chemical fumes.
- Minimize exposure to dust.
- Use appropriate HEPA air filtration.
- Address mold and moisture.
- Monitor outdoor air quality.
- Maintain HVAC equipment.
- Avoid aerosol cleaning products.

Priority Two: Protect food and water quality

- Wash fresh produce.
- Choose a variety of whole foods.
- Avoid unnecessary heating of food in plastic.
- Test private well water.
- Use appropriate water filtration when contamination is identified.
- Follow fish-consumption advisories.
- Maintain adequate nutrition and hydration.

Priority Three: Reduce chemical exposure in the home

- Choose fragrance-free household products.
- Avoid unnecessary pesticides.
- Use lower-emission building materials.
- Store chemicals safely.
- Avoid unnecessary solvents and aerosol sprays.

- Have someone else handle demanding chemical applications.

Priority Four: Identify significant existing hazards

- Test for radon.
- Investigate lead hazards in older homes.
- Evaluate documented water contamination.
- Address occupational exposure.
- Investigate persistent mold or water damage.
- Seek medical evaluation for credible heavy-metal or chemical exposure.

Priority Five: Avoid unnecessary detoxification practices

- Do not fast to eliminate toxins.
- Do not undertake unsupervised chelation.
- Avoid extreme dietary restrictions.
- Be skeptical of commercial detoxification claims.
- Do not discontinue prescribed ALS treatments.
- Discuss supplements and alternative treatments with the ALS healthcare team.

12. A Practical 30-Day Environmental Improvement Program

Environmental improvements do not need to happen all at once. In fact, a gradual approach is often more appropriate for someone living with ALS. The following plan is designed to minimize physical effort and unnecessary expense. Have caregivers or family members handle physically demanding tasks.

Done	30-Day Environmental Protection Checklist
Week 1 — Assess the environment	
☐	Check the home's drinking-water source and available water-quality report
☐	Check indoor and outdoor air-quality conditions
☐	Identify smoke, chemical odors, dust, or moisture problems
☐	Check whether the home has been tested for radon
☐	Identify any known pesticide or industrial exposures
Week 2 — Improve indoor air	
☐	Set up appropriate HEPA filtration in the bedroom
☐	Replace HVAC filters if needed

Done	30-Day Environmental Protection Checklist
☐	Remove unnecessary air fresheners and aerosol products
☐	Establish fragrance-free cleaning and laundry routines
☐	Address any water leaks or suspected mold
Week 3 — Improve food and water practices	
☐	Establish a routine for washing produce
☐	Review food-storage containers and heating practices
☐	Review seafood choices and local fish advisories
☐	Test private well water if applicable
☐	Make sure exposure precautions do not compromise calorie or protein intake
Week 4 — Reduce ongoing exposures	
☐	Review lawn and pest-control practices
☐	Identify household chemicals that can be replaced or avoided
☐	Review occupational or hobby-related exposures
☐	Discuss any credible exposure concerns with the ALS medical team
☐	Create a sustainable household maintenance routine

13. The Most Important Principle: Reduce Exposure Without Creating Fear

There is a danger in becoming so concerned about environmental toxins that ordinary life becomes dominated by avoiding them. That is not the objective.

A person living with ALS already faces enough challenges. Environmental protection should simplify life, not make it more complicated. It should not create a situation where every meal becomes a source of anxiety, every household product becomes suspicious, or every trip outside becomes a perceived threat.

The objective is to make reasonable improvements that can be maintained over time. If a person can reduce exposure to unnecessary pesticides, avoid smoke, improve indoor air quality, drink appropriately tested water, minimize harsh cleaning chemicals, and eliminate identifiable environmental hazards, those are worthwhile accomplishments. They do not require a complete lifestyle transformation. They require awareness, consistency, and reasonable decision-making.

14. Conclusion: Environmental Responsibility as Part of Living With ALS

ALS is a complicated neurological disease. Its causes, biological mechanisms, and progression remain areas of active scientific investigation. Environmental exposures are one area researchers continue to examine. Pesticides, metals, industrial chemicals, air pollutants, and other substances have been investigated for possible relationships with ALS. Some epidemiological studies have identified associations, but the evidence does not establish that any one environmental toxin explains an individual's disease. Nor does it establish that avoiding these substances after diagnosis will stop or reverse ALS.

That distinction should never discourage sensible environmental protection.

The body deserves an environment that does not impose unnecessary burdens. When someone is living with a serious neurological condition, preserving respiratory comfort, maintaining nutrition, protecting general health, and avoiding preventable complications become especially important.

There is a meaningful difference between accepting that we cannot control everything in our environment and deciding that we should not control anything. We cannot eliminate every chemical from modern life. We cannot guarantee that the food we eat, the water we drink, or the air we breathe contains absolutely no contaminants.

But we can make informed choices. We can choose not to spray unnecessary chemicals around our homes. We can avoid breathing smoke and harsh fumes. We can improve the air in our bedrooms. We can investigate questionable water supplies. We can avoid bringing pesticides and industrial dust into our living spaces. We can select household products more carefully.

These are practical decisions that place some control back into our hands. For someone living with ALS, that sense of personal responsibility can be valuable in itself. The objective is not to fight every environmental molecule. It is to remove unnecessary obstacles, protect what remains healthy, and create the best possible conditions for living. We may not be able to control the disease, but we can take responsibility for many of the conditions in which we live with it.

15. Scientific References and Further Reading

The following sources provide a foundation for the scientific and practical information discussed in this paper.

1. **ALS Association — ALS Risk Factors.** Discussion of environmental exposures, pesticides, metals, solvents, and BMAA. *ALS Association: Risk Factors*.
2. **Environmental Risk Factors, Protective Factors, and Biomarkers for Amyotrophic Lateral Sclerosis: An Umbrella Review (2025).** Examination of evidence across existing environmental ALS studies.
3. **Systematic and State-of-the-Science Review of the Role of Environmental Factors in ALS (2022).** Review of 258 studies examining potential environmental associations.

4. **Occupational Exposure to Pesticides and ALS Risk: Systematic Review and Meta-analysis (2026).** Investigation of occupational pesticide exposure and ALS risk.
5. **CDC — Exposure to Ambient Air Toxicants and the Risk of ALS (2024).** Research investigating associations between air toxicants and ALS. *CDC research summary*.
6. **Case-Control Study of Environmental Toxins and ALS Risk (2024).** Investigation of persistent pesticides, occupational exposures, and heavy metals.
7. **EPA — PFAS in Private Wells.** Information about PFAS contamination and appropriate exposure-reduction measures. *EPA guidance*.
8. **FDA — Advice About Eating Fish.** Guidance about mercury levels in seafood and informed food selection. *FDA fish-consumption guidance*.
9. **FDA Mercury in Food.** Information about mercury exposure through food and seafood. *FDA mercury information*.
10. **ALS/MND Environmental Toxicants Compass.** Discussion of environmental exposures, testing limitations, and the distinction between avoiding exposure and unproven detoxification treatments.

Medical Disclaimer: This paper is intended for educational purposes and is not a substitute for individualized medical advice. Environmental testing, changes in diet, filtration systems, supplements, and treatment of suspected toxic exposures should be discussed with appropriate healthcare or environmental professionals. People with ALS should not delay established medical care or compromise nutritional intake in pursuit of toxin avoidance.

Editorial Note for the Book: This subject belongs within the environmental-protection component of *The 15-Year Plateau*. Its central message should be that toxin avoidance is one of several practical lifestyle considerations that a person can evaluate and implement. It should not be presented as a proven ALS treatment or as an explanation for the author's unusually long period of disease stability. The strength of this chapter is its emphasis on informed personal responsibility, common-sense prevention, and reducing avoidable environmental burdens.