

Simple Steps to Protect Your Family from Toxins in Our Everyday World

Presented by: Dr. Maida Galvez, a pediatrician and the Director of the Mount Sinai Pediatric Environmental Health Specialty Unit (PEHSU) and Rhonda Sherwood, Vice Chairman of the Mount Sinai Children's Environmental Health Center.

The greatest threats to the health of children growing up today in the United States are no longer infectious diseases such as polio, chicken pox, mumps, cholera or malaria. Increasingly they are chronic diseases such as autism spectrum disorders, attention deficit hyperactivity disorder, asthma, obesity, diabetes and pediatric cancers—and these are on the rise.

80,000 chemicals have been created since WW II and of them 2,800 are high production volume (HPV) chemicals whose production exceeds 1 million pounds a year. Fewer than 20% of these HPV chemicals have been tested for their possible toxicity to children.

The presentation provided an overview of the latest science and provided simple steps for ways to minimize exposure to toxins in everyday life. In the absence of federal regulations or guidelines, Dr. Galvez and Ms. Sherwood advise taking a precautionary approach and looking for safer alternatives.

Q. Why are Children more vulnerable to environmental exposures?

A. Children are not small adults.

- Children may have disproportionate exposures to environmental toxins because pound-for-pound, they consume more food, water, and breathe more air.
- Children have unique, age appropriate behaviors - in particular, hand-to-mouth behaviors.
- Children may be less able than adults to expel certain toxins.
- Children are undergoing rapid growth and development and have windows of vulnerability in which the course of development can be permanently changed by environmental toxins.
- Because children have more future years of life than adults, they have more time to develop chronic diseases caused by multiple exposures.

Simple Steps:

Wash Your Hands. Use soap (antibacterial-free) and warm water. Anti-bacterial products may encourage the creation of bacteria that are resistant to antibiotics.

Wet dust and Wet mop your home. Leave Your Shoes at the Door. These are easy ways to reduce chemicals in your home and your bodies!

Lead

No level of lead is safe. If you live in a home that was built pre-1980, you may have lead paint. If renovating your home, only wet sand painted areas and be sure your children leave during the process. All children should have a blood test for lead when they are 1 and 2 years of age.

Mercury

Eat Fish, But Chose Wisely. Children under six, as well as women who are pregnant or planning to become pregnant, are the most vulnerable to methylmercury's harmful effects. High levels of methylmercury can be found in ahi or bigeye tuna, tilefish, swordfish, shark, king mackerel, and fish caught in any waters that are subject to a mercury advisory.

Plastics: Researchers are concerned about plastics because phthalates and BPA act in ways similar to hormones naturally found in our body.

Look for BPA-free and PVC-free stickers or labels.

Check recycling numbers:

Safer numbers are 5, 4, 1, and 2.

Avoid numbers 3, 6 and 7.

Code #3 indicates PVC or vinyl and can contain phthalates.

Code #6 indicates polystyrene foam and can release styrene.

Code #7 indicates "other" plastics, which includes polycarbonate.

Not all code #7 plastics bottles contain polycarbonate, but those that do leach Bisphenol-A (BPA).

Remember: "5, 4, 1, 2, all the rest are bad for you!"

Do not put plastics in the microwave or dishwasher. The heat can increase leaching of chemicals out of the plastic into food and beverages. Do not microwave or heat plastic cling wraps.

Use glass, stainless steel or metal free ceramic containers when possible.

Personal Care Products: "Fragrance" can be a catch-all word for a product's that may contain phthalates or other chemical preservatives. Check ingredient lists and look for botanically based fragrance.

Avoid the Green Guide's "Dirty Dozen."

"Fragrance," antibacterials, formaldehyde, hydroquinone, mercury/lead, parabens, phenylenediamine, coal tar colors, diethanolamine, 1,4 dioxane, nanoparticles, and petroleum distillates.

Cleaning Products

Homemade Cleaners can be less toxic. The safest cleaners are plain old water, baking soda, lemon juice and vinegar.

Pesticides

Avoid pesticides inside and outside of your home. Pesticides are harmful to humans and animals when used on your lawn, trees and the flower beds. Use integrated pest management (IPM) in your home, live with a few dandelions and appreciate the look of a natural lawn.

Wash Your Fruits and Veggies. Buy local and reduce your carbon footprint!

Go Organic When You Can! Fruits and Vegetables with the highest pesticide risk per serving (in order high to low): peaches, apples, sweet bell peppers, celery, nectarines, strawberries, and cherries.



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Raising Healthy Children



Dr. Landrigan's Summer Suggestions

School's out for summer! The warm months of summer are upon us and your kids are now spending more time playing outside. Dr. Landrigan recommends several tips on how they can have fun and stay safe. In short:

- **Choose organic or local fruits and veggies when you can!**
- **Let the dandelions grow—avoid pesticides on your lawn.**
- **Don't forget the "broad spectrum" sunscreen and a hat—a little sun can go a long way**
- **Eat fish, choose wisely.**
- **Look for PVC-free beach and pool toys.**

As always, it is essential that your kids learn to keep their hands clean (with soap and warm water) in order to protect their health and reduce environmental exposures.

Pesticides and Your Family

Although pesticides are developed to specifically prevent or destroy pests including weeds, insects, bacteria and rodents, most are also toxic to species beyond those originally targeted. When humans are exposed to pesticides, unintended health effects can occur, ranging from damage to the brain, immune and endocrine system disruptions, injury to reproductive organs, birth defects and cancer.¹ Recent studies have also suggested a link between parental exposure to pesticides and brain cancer in children.²

Growing awareness of the health effects associated with pesticides has led to reductions in their use. Still, large quantities of these chemicals still enter the environment every day. In the five boroughs of New York City alone, 270,337 gallons of pesticide were applied in 2005. Westchester and Suffolk counties applied 578,551 and 255,723 gallons, respectively.³

While there is no way to completely eliminate exposure to the pesticides used in the world around us, there are several simple ways to reduce your family's exposure to these potentially harmful chemicals.

¹ Landrigan PJ, Luz C. Pesticides. In: Lippman M, ed. *Environmental Toxicants, Third Edition*. John Wiley and Sons, Inc.; 2009; Chapter 24

² Shim YK, Mlynarek SP, van Wijngaarden E. Parental Exposure to Polychlorinated Biphenyls and Organochlorine Pesticides and Risk of Childhood Leukemia *Environ Health Perspect*. 2009;117(6):1002-1006.

³ New York State Department of Environmental Conservation. Final 2005 PRL Annual Report – Figure 2 Text. New York State Department of Environmental Conservation. <http://www.dec.ny.gov/chemical/37851.html>. Accessed June 22, 2009.

Fruit and Vegetables – Fruits and vegetables are excellent sources of nutrients and a wonderful summer snack for children; however, they can also contain large levels of pesticides. Here are some suggestions on ways to cut back on the pesticides your family is exposed to through produce:

- Thanks to an increase in demand in recent years, most stores and markets now offer **USDA Certified Organic** produce. Buying organic is your best bet to assure that your produce is chemical-free.
- **Local** produce should be favored – If organic produce is unavailable or exorbitantly priced, there are still ways to reduce the amount of chemicals in the food you purchase. Food that must be transported large distances is often picked unripe, chemically ripened and loaded with preservatives for trip to its final destination.
- Buy produce known to contain **fewer pesticides** –not all produce is created equal.

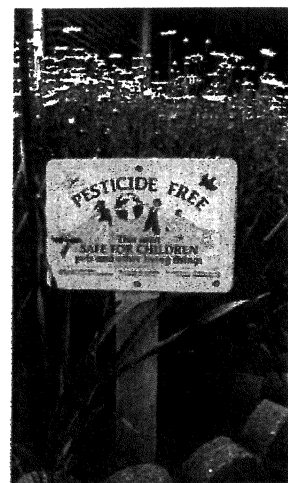


According to the Environmental Working Group, produce known to contain the highest pesticide risk per serving are (from high to low): peaches, apples, sweet bell peppers, celery, nectarines, strawberries, cherries, kale, lettuce, grapes (imported), carrots and pears. If there are no organic options for the produce with the highest pesticide levels, then choose from the list of cleaner alternatives. Those that are cleanest (lowest in pesticide risk per serving), include: onions, avocados, sweet corn (frozen), pineapples, mangos, asparagus, sweet peas (frozen), kiwi, cabbage, eggplant, papaya, watermelon, broccoli, tomatoes and sweet potatoes.⁴

- **Wash all produce under running water** – Running water has an abrasive effect that soaking does not have and will remove most surface waxes and pesticide residues, along with dirt and bacteria. Peeling fruits and vegetables also removes surface residues. (Remember that some nutrients may be lost in peeling.)

Lawn Care – Lawns can be a major source of pesticide exposure. Preventing children from playing on lawns where pesticides have been applied will greatly reduce their exposure to these potentially dangerous chemicals.

- Look for **signs** – Multiple states, including New York and Connecticut, have enacted policies requiring the posting of signs indicating that pesticides have been used.⁵ Keeping children out of areas where pesticides have been freshly applied will limit their exposure to the hazardous chemicals.
- Alter your **own lawn care** – There are ways to achieve a healthy, green lawn without the use of pesticides. Some effective methods of healthy lawn care include setting your lawn mower blade to its



⁴ Environmental Working Group. *Shopper's Guide to Pesticides*. Environmental Working Group. <http://www.foodnews.org/fulllist.php>. Accessed June 25, 2009.

⁵ Beyond Pesticides. *Tools for Change*. Beyond Pesticides.

<http://www.beyondpesticides.org/lawn/activist/index.htm>. Accessed June 25th, 2009

highest setting, leaving the grass clippings on your lawn, and planting grass known to grow natively in your area.⁶

Removing Pests from Your Home

While pesticides represent a threat to your family, some unwanted pests can also pose threats by carrying diseases into your home. **Integrated pest management (IPM)** provides an effective, safe alternative to the use of insecticides, preventing the use of dangerous chemicals where your family lives. IPM relies on the use of nonchemical approaches to pest control including blocking pests' access to homes by sealing cracks and crevices, by removing their basic survival needs including air, moisture and food, and by using the safest traps and gels discreetly, in locations not easily accessible to children.⁷

A Quick Word on Ticks

Ticks are known to carry Lyme disease, which can be transmitted to humans who are bitten by these pests. The best way to protect your children from ticks is to have them wear long pants when outside and to do nightly checks before they go to bed. Ticks are very small, about the size of the period at the end of this sentence, so be sure to check your children carefully. If a child is playing outside frequently, it is a good idea to use an insect repellent containing DEET on exposed skin. While DEET is not risk free, the risks from using child-strength DEET products as instructed by the manufacturer are much less severe than those of Lyme disease.

One closing note: it makes no sense to heavily spray your lawn with pesticides. The combination of long pants, daily checks and the judicious use of DEET are the best approach to keeping Lyme-carrying ticks at bay.

Protecting Children from Sun Exposure

Solar radiation is hazardous for children. Rates of skin cancer in the United States have been rising steadily over the past three decades, and are closely associated with exposure to ultraviolet (UV) radiation, one source of which is the sun. Blistering sunburns in childhood and adolescence are especially



dangerous and are strongly associated with increased risk of skin cancer. Blond or red-haired and blue-eyed children, who often have lighter complexions, are at a higher risk for solar injury, because their skin contains smaller quantities of the protective pigment, melanin, than children with darker complexions.

The two most effective ways to protect children from excessive solar radiation (1) sunscreen or sunblock and (2) sun-protective clothing.

⁶ Landrigan PJ, Needleman HL, Landrigan M. *Raising Healthy Children in a Toxic World*. Rodale Press; 2002.

⁷ Brenner, BL, et al. 2003. Integrated Pest Management in an Urban Community: A Successful Partnership for Prevention. *Environ Health Perspect.* 2003;111(13):1649-1653.

Sunscreens and Sunblocks

When selecting sunscreens to use on your child, be sure to choose one that is SPF 15 or higher, is labeled "broad spectrum" and contains titanium dioxide, zinc oxide, avobenzone and mexoryl to ensure UVA and UVB protection. Sunscreen should be applied 30 minutes before going outdoors and should be re-applied every two hours, especially if your child is playing in the water. Be sure to use sun protection even on cloudy days; the sun's rays can penetrate cloud cover.

What is SPF?

Sunscreens are rated by their SPF – Sun Protective Factor. SPF measures the amount of time it takes for sun-exposed skin to redden. If you normally burn in 10 minutes, a sunscreen with SPF 15 would protect you 15 times as long, or 150 minutes, assuming you don't sweat or get wet. But that equation changes at SPF's above 30. A sunscreen with SPF 50 blocks only about 1.3 percent more UVB rays than SPF 30, according to the Environmental Working Group. Using SPF 15 should be sufficient, as long as you are sure to reapply within the proper amount of time.

Sun Protective Clothing

While sunscreen should be applied to all exposed skin, certain items of clothing can provide just as high quality protection from the sun. When choosing items of clothing for sun protection, look for hats with wide brims all the way around; these are very effective in protecting the ears, nose and back of the neck. Look for tightly woven and dark fabrics over items that are pale or pastel-colored. The highest protection from the sun is afforded from fabrics containing the highest UPF ratings.

What is UPF?

Items of clothing are rated according to their UPF - Ultraviolet Protection Factor. The UPF rating indicates how much of the sun's UV radiation is absorbed. A fabric with a rating of 50 will allow only 1/50th (2%) of the sun's UV rays (both UVA and UVB) to pass through, blocking the remaining 98%. To be deemed sun-protective, clothing must have a UPF of more than 30 and undergo 40 simulated launderings, be exposed to the equivalent of 2 years of light and be tested with chlorinated water if it is intended for swimsuits.

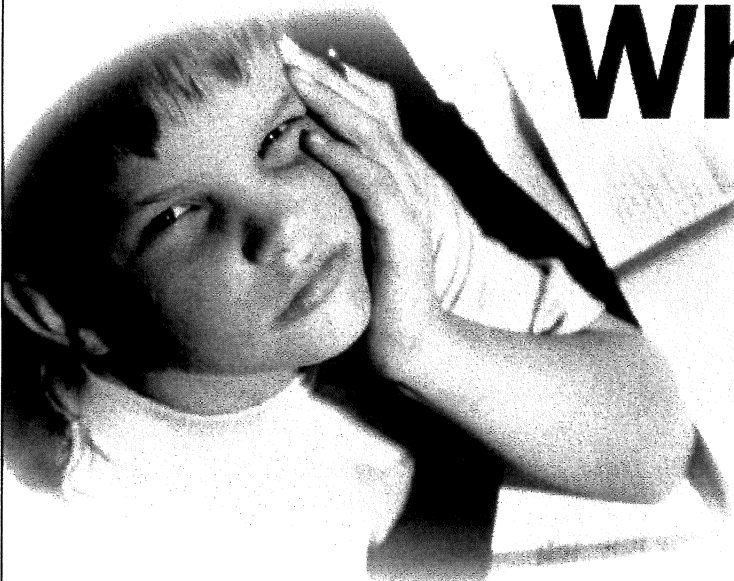
Even if a piece of clothing has a good UPF, what you do while wearing it can make a difference. If the fabric gets stretched, it will lose some of its protective ability, because the fabric becomes thinner and more transparent to light. And once it gets wet, sun-protective clothing can lose up to 50 percent of its UPF. According to the Skin Cancer Foundation, a dry long-sleeved, white cotton T-shirt's UPF is 7, but after it gets wet, it provides a UPF of only 3. At the opposite end of the spectrum, a long-sleeved dark denim shirt has a UPF of 1,700, which amounts to a complete sun block.

Sunscreen and Bug Repellent

One final note on sunscreen; it is strongly recommended that you don't use a product which combines a sunscreen with an insect repellent containing the compound DEET. DEET is a very effective chemical used in many insect repellents, it does not need to be reapplied as often as sunscreen should, and if too much is applied it can have adverse health effects.

Johnny can't read, sit still, or stop hitting the neighbor's kid.

Why?



Toxic chemicals can cause learning disabilities.

We are physicians and scientists. We are deeply troubled that an estimated twelve million American kids suffer from developmental, learning, or behavioral disabilities. Attention deficit disorder affects three to six percent of our schoolchildren.

These disabilities are caused by a complex interplay of genetic, environmental, and social factors. Evidence reviewed by the National Academy of Sciences indicates that toxic chemicals contribute to these problems. Environmental factors take on great importance because they can be prevented.

What We Know

Studies show that lead, mercury, industrial chemicals, and certain pesticides cross the placenta and enter the brain of the developing fetus where they can cause learning and behavioral disabilities. This is true in young animals – and in young children.

Exposures to organophosphate pesticides during pregnancy can result in abnormally low brain weight

and developmental impairment in offspring. A Duke University study conducted on rodents found that hyper-activity and brain cell death can be caused by small exposures to the widely used organophosphate pesticide Dursban. That study led to the ban on the production and sale of Dursban. But similar-acting pesticides are still on the market.

A University of Arizona study found that children exposed to a combination of pesticides before birth and through breast milk exhibited less stamina, and poorer memory and coordination, than other kids.

Mercury released by coal-fired power plants contaminates waterways and accumulates in fish. Many thousands of the pregnant women in America who eat fish consume enough mercury to potentially harm their children's neurological development. Some states warn that children should not eat more than a can of tuna per week; based on EPA guidelines, a twenty-pound child may exceed a level considered safe for the most sensitive populations with just 1.3 ounces.

Though PCBs have been banned, residual PCBs still do much damage. Children whose mothers ate Great

Lakes fish contaminated with PCBs showed lowered IQs and shortened attention spans. And these effects on intelligence and behavior have been shown to persist throughout childhood. A Dutch study confirmed that increased maternal levels of PCBs can impair cognition in infants. Young monkeys exposed to PCBs at low levels show learning disabilities and hyperactivity.

What We Can Do

There is much that parents can do to protect their children, beginning with the elimination of many pesticides both outside and in the home. And the choice of a wise diet. There are more suggestions on our website, www.cehcenter.org.

But we must do more. We have enough scientific evidence to phase out those chemicals known to harm children's behavior and development. If a medicine caused these problems in kids, we'd ban it.

We don't allow food or drugs to be sold before being shown to be safe. Yet there are thousands of chemicals on the market that affect human biology and have never been tested. Most importantly, we must demand that new chemicals be tested for safety before being allowed on the market. We do not have a system that does that now.





More kids are getting brain cancer. Why?

Toxic chemicals appear linked to rising rates of some cancers.

As scientists and physicians, we've seen a drop in the death rates of many adult and childhood cancers because of earlier detection and better treatment. But we are also seeing a disturbing rise in the reported *incidence* of cancer among young children and adolescents, especially brain cancer, testicular cancer, and acute lymphocytic leukemia. In fact, after injuries and violence, cancer is the leading cause of death in our children.

The increase in childhood cancers may be explained in part by better detection or better access to medical care. But evidence suggests the rise in these childhood cancers, as well as in cancers like non-Hodgkin's lymphoma and multiple myeloma among adults, may also be partially explained by exposure to chemicals in the environment, chemicals found in many products, from paints and pesticides to dark-colored hair dyes.

What We Know

Pound for pound, kids are exposed to more toxic chemicals in food, air, and water than adults, because children breathe twice as much air, eat three to

four times more food, and drink as much as two to seven times more water. Recent epidemiologic studies have shown that as children's exposures to home and garden pesticides increase, so does their risk of non-Hodgkin's lymphoma, brain cancer, and leukemia. Yet, right now, you can go to your hardware store and buy lawn pesticides, paint thinner and weed killers, all containing toxic chemicals linked to these diseases.

In both children and adults, the incidence rate for non-Hodgkin's lymphoma has increased thirty percent since 1950. The disease has been linked to industrial chemicals, chemicals found in agricultural, home, and garden pesticides, as well as dark hair dyes.

Studies have shown that Vietnam veterans and chemical workers exposed to Agent Orange, a phenoxy herbicide, are especially at risk for non-Hodgkin's lymphoma. American farmers who use phenoxy herbicides have an increased risk of the cancer. A Swedish study showed that among the general population, the risk of non-Hodgkin's lymphoma rises with increased exposure to these herbicides. And, a study in Southern California found that children of parents who use home pesticides have seven times the risk of non-Hodgkin's lymphoma. Multiple myeloma, a bone marrow cancer,

is also associated with toxic chemicals. Its incidence has tripled since 1950. Farmers are especially at risk: a recent analysis of thirty-two studies worldwide showed "consistent, positive findings" of an association between farming and multiple myeloma.

What We Can Do

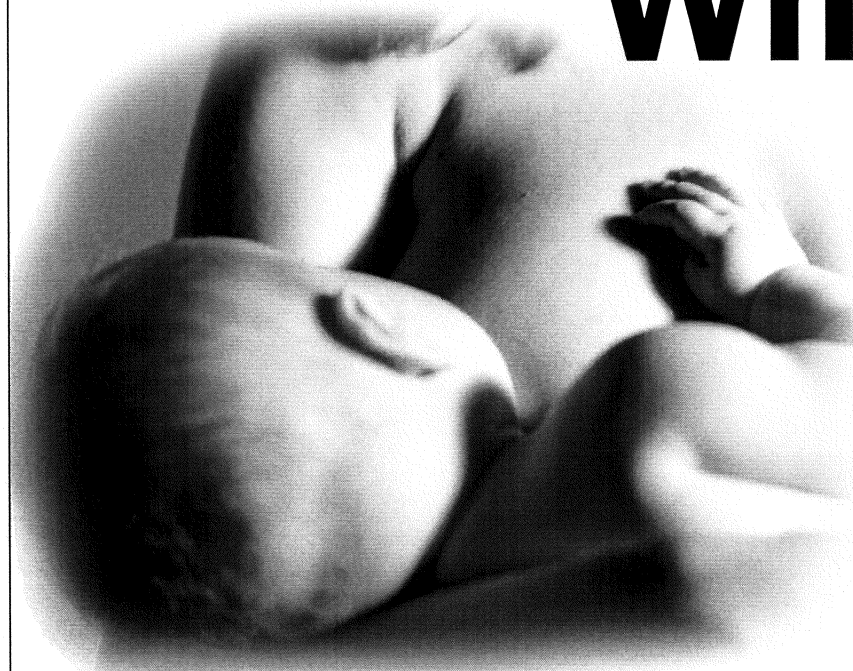
There is much that parents can do to protect their children from carcinogenic chemicals, beginning with the elimination of many pesticides both outside and in the home. And, of course, the cessation of smoking. There are more suggestions on our website, www.cehcenter.org.

But more needs to be done. As a society, we've done much to protect people, especially children, from the toxic chemicals in cigarettes. But too many toxic chemicals are being marketed without adequate testing. We should demand that new chemicals undergo the same rigorous testing as medicines before being allowed on the market. And we should phase out those chemicals linked with a wide range of health problems from neurological impairment to cancer in children.

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Our most precious natural resource is being threatened. Why?



Toxic chemicals are being passed on to infants in breast milk.

We've never created a product with the effectiveness of breast milk. Breast milk is a unique source of nourishment and protection against disease. But the chemical industry has created a myriad of toxic synthetic chemicals that ultimately collect in breast milk and are passed to infants. Some of these chemicals can pose risks to the health and neurological development of our children.

As pediatricians and scientists, we are convinced that breast milk is still the best choice for mother and child. However, we see disturbing evidence that in the future, breast milk may not be as effective as it once was in guarding children against disease. Unless classes of chemicals that accumulate in breast milk are phased out, we believe the health risks to our children could increase.

What We Know

From DDT's first appearance in the 1950s to PCBs in the 1960s to pesticides on sale today, persistent

organic chemicals find their way into the fatty tissue of women's breasts. And they stay there for years until passed to infants during breast-feeding.

Today's breast milk still contains toxic remnants of DDT, passed from grandmother to mother to child. Though DDT has been banned, today's persistent organic pollutants accumulate in a similar way. A breast-fed infant can absorb in one year thirty to ninety percent of the maximum recommended lifetime dose of dioxin, a chemical known to be both hormonally-active and carcinogenic. Other toxic chemicals – heptachlor, chlordane, mirex, dieldrin, aldrin, benzene, and chloroform – are also finding their way into breast milk. So are perchloroethylene, the main chemical used to dry clean clothes, and polybrominated flame retardants. We know that during gestation and in the early months after birth, an infant's brain is particularly susceptible to harm from toxic chemicals. We don't know what the minimum safe levels of exposure are. It may be that no exposure is safe.

Although there is only limited research on how chemicals in breast milk affect children, the available facts are disturbing. A North Carolina study

of 800 nursing mothers showed that as PCB levels in breast milk increase, children have poorer motor coordination. Even more disturbing, several studies in the Netherlands show that as levels of PCBs in breast milk increased, infants had more immune impairment, evidence that toxic pollutants in breast milk can negate the milk's immunologic benefits.

There is some good news as well: a Swedish study showed that as government efforts severely limited maternal exposure to PCBs and other toxic chemicals, the levels of these chemicals in breast milk decreased.

What We Can Do

Pregnant women and those who are nursing should limit their exposure to pesticides, lead, and mercury. Fish species known to be contaminated by mercury and PCBs should be avoided. Dry cleaning should be aired out before it is brought into the house. Nursing mothers should choose a wise diet. There are more suggestions on our website.

But more needs to be done. We must phase out chemicals that pose a risk to our health, especially to our children's health, beginning with the toxic chemicals which have been detected in breast milk. We should demand that new chemicals undergo the same rigorous testing as medicines before allowed on the market. There can be no more important public health mission than ensuring the safety of mother's milk.

A summary of the supporting scientific evidence, and a list of scientific endorsers, can be found at www.childenvironment.org.



**Center for
Children's Health
and the
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MEDICINE

Pesticides could become the ultimate male contraceptive. Why?

Sperm defects, sex reversals and other abnormalities.

Something is happening to the reproductive system of the males of many species. It's happening to male birds of prey around the Great Lakes and male alligators in Florida. To male harbor seals in the Netherlands and male polar bears in the Arctic. And to boys and men throughout the industrialized world.

Scientists have amassed a great deal of evidence linking reproductive system abnormalities, reduced sperm motility, sperm defects, sex reversals and altered sex ratios with exposure to an array of synthetic chemicals known as endocrine disruptors. These include pesticides and certain industrial chemicals like dioxin, PCBs, and phthalates, as well as arsenic, lead, and mercury. Some of these chemicals "mimic" estrogen; others interfere with testosterone and some block the thyroid function.

As physicians and scientists, we are concerned that despite the growing scientific evidence, these chemicals are still on the market.

What We Know

Medical studies have indicated that the sperm counts of males in America and Europe have decreased over the last fifty years. Despite gaps in the data, sperm counts have clearly declined in many places and are inexplicably low in others. The most sophisticated analysis, published in *Environmental Health Perspectives*, the journal of the National Institute of Environmental Health Sciences, indicates the decline may be as great as forty percent.

We know that some chemical workers exposed to endocrine-disrupting pesticides have been made temporarily, and in some cases, permanently sterile.

Dioxin, produced in the incineration of trash containing polyvinyl chloride plastic and chlorine-treated paper, has been shown to be responsible for birth defects and other reproductive problems in birds of prey around the Great Lakes. Dioxin is extremely toxic, and exposure as low as 25 parts per trillion causes feminizing effects in animals. A dioxin accident in Seveso, Italy, was followed by a decrease in the number of boys being born. The ratio of boys to girls is also decreasing in the U.S., Canada, and Denmark. A Danish study found a link between endocrine disruptors and the increasing incidence of undescended testicles in boys.

Endocrine disruptors affect women as well. Several animal studies link small exposures to dioxin with endometriosis.

What We Can Do

Parents should limit their children's exposure to pesticides, both outside and in the home. Organically produced foods should be purchased whenever

possible. And care should be taken to see that no fish from contaminated waters are consumed. There are more suggestions on our website, www.cehcenter.org.

But we must do more. Though not the sole cause, it's clear that exposures to endocrine disruptors can be contributors to reproductive problems in both animals and humans. Some synthetic chemicals already shown to adversely affect animals and humans are still being sold today. And other chemicals in the same chemical families have not been tested. Wouldn't we all be better off if chemicals had to be tested for safety before they were put on the market? Certainly males would be better off.

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Chemicals combine in our bodies, but are rarely tested that way.

Why?



Multiple exposures pose unknown risks.

A good pharmacist will alert you that a newly-prescribed medicine may adversely interact with some other medicine you're already taking. That is, two medications that are individually benign can cause problems in combination. Careful studies have been undertaken to identify those drug interactions.

But when it comes to toxic chemicals in everyday products, there is surprisingly little information available about how they behave in combination. How, for example, are our bodies affected when the chemicals in paint thinners interact with those in dark hair dyes, or when we are exposed to one pesticide on a fruit, and another from our neighbor's lawn?

What We Know

Here is an analogy: Compared with non-smokers, cigarette smokers have ten times the risk of contracting lung cancer. We also know that workers exposed to asbestos have five times the lung cancer risk compared with those never exposed. You might think,

therefore, that smokers exposed to asbestos would have 15 times the risk of getting lung cancer. In fact, they face 55 times the risk. A powerful interaction.

We know that the tissue of nearly every human on earth contains detectable levels of a range of chemicals called persistent organic pollutants or POPs. We find POPs in pesticides, industrial chemicals, indeed in a broad range of products introduced over the past sixty years. We know that occupational exposure to PCBs, dioxin, and other POPs has been linked to several cancers and to a broad range of reproductive problems, including birth defects in offspring. Clinical and epidemiological studies suggest that non-occupational exposures to POPs at much lower levels may also cause significant harm, especially to developing fetal organs. And the little we know of exposure to a multiplicity of these chemicals should cause concern.

Dutch scientists have documented that when PCBs, at a non-toxic level, are mixed with dioxin, at a level that produced only minor liver damage, the combination produced 400 times the damage of the dioxin alone.

A study at Tufts University tested the effects of 10 pesticides which mimicked estrogen in the body. At low levels, none of the pesticides alone had an effect on human tissue. But in various combinations, there was a strong estrogen-mimicking effect ... even at low levels.

In a study at the University of Wisconsin, mice showed no effect when exposed to atrazine or aldicarb, two pesticides commonly found in drinking water in the Midwest. When mice were exposed to both chemicals, as humans often are, the combination produced immune system impairment.

What We Can Do

Parents should limit their children's exposure to pesticides, both in and outside the home. Organically produced foods should be purchased whenever possible. The use of paints, solvents, and cleaning products containing toxic and volatile chemicals should be limited. There are more suggestions on our website.

But we must do more. Of the thousands of synthetic chemicals on the market, relatively few have been tested for safety. And even fewer have been tested in combination with other chemicals. For our health, for our children's health, such testing should be in place for all chemicals.

Mount Sinai Children's Environmental Health Center

She's the test subject for thousands of toxic chemicals. **Why?**

Industry falsely discredits current animal testing.

In previous ads in this series, we physicians and scientists have presented a body of scientific evidence linking toxic chemicals to a wide range of health problems in humans, from learning disabilities and brain injury in children to certain cancers in both children and adults.

We have emphasized that these health problems are preventable. We have stressed that thorough pre-market testing of chemicals is a critical component of disease prevention.

There is a well-established and respected FDA approval process that a company must follow before it can market a chemical as a medicine. That process includes testing at various doses on animals. Only if the medicine is shown to be safe for animals is it approved for tests on humans.

America's pharmaceutical industry acknowledges, indeed embraces, these animal testing regimes for medicines. At the same time, however, certain segments of the chemical industry are making false claims about similar pre-market testing for chemicals other than medications.

They claim that testing has little value "because at a high enough dose all chemicals cause cancer." That's not true. The National Cancer Institute and the National Toxicology Program find that only 5-10% of commercial chemicals cause cancer at any dose. The industry also claims that animal testing bears little connection to human risk. That's not true either – the Human Genome Project has shown that laboratory animals and humans have very great genetic similarity and share very similar endocrine, immune and nervous systems.

The industry claims that testing has little value unless it involves tens of thousands of animals at low dose levels. Not true – the National Toxicology Program has developed sophisticated

technologies for testing chemicals at a range of doses in small numbers of animals and then predicting human risk.

Inaccurate and false as all these claims are, they have found a certain audience in government and the press. These claims have paralyzed the regulatory process. They are preventing whole classes of chemicals from being properly tested. And that puts everybody's health at risk, especially the health of our children.

What We Know

- Every known human carcinogen causes cancer in animals.
- Every chemical known to cause brain damage in humans causes damage to the brain and nervous system in animals.
- Every chemical known to interfere with reproductive function in humans interferes with reproduction in animals.
- Almost every known cause of birth defects in humans also causes birth defects in animals.
- And, with few exceptions, when toxic chemicals harm animals, they almost always cause similar harm in humans.



What We Can Do

Parents should limit their children's exposure to synthetic chemicals. They should minimize use of pesticides outside and inside the house. They should choose safe cleaning products. Wherever possible, they should purchase organically produced food. Fish from contaminated waters should be avoided. There are more suggestions at www.cehcenter.org.

We must do more. The evidence is incontrovertible. We must move quickly to phase out those toxic chemicals that are known to pose a danger to human health. And we must institute a system of regulation that tests new synthetic chemicals and proves them safe before they are allowed to be sold, before our children are exposed. Isn't that the system you thought we already had?

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