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IF IT'S RISKY, ARE YOU OUTRAGED?

When the average person tries to understand a scientific report, he or she can get easily confused or misunderstood by the information. One of the problems is that scientists and non-scientists use the word "risk" differently. To scientists, risk means probability — expected annual mortality — and they try to quantify any danger in an objective, statistical terms. To the average person, who is looking for a simple, cut-and-dried answer, risk means the actual threat plus what is called the "outrage factor." The outrage factor explains why some people insist in fearing risks they really don't need to worry about. Sometimes it is just that they are afraid of something, and they want to kill them, according to Peter Sandman, director of the Environmental Communciation Research Program at Rutgers University. If outrage is high, they tend to overestimate a hazard.

Here are some of the factors that contribute to public outrage and influence perceptions of scientific reports:

1. **Involuntary risk.** People are much more likely to accept a risk that they voluntarily choose. Most environmental risks are involuntary and, therefore, extremely objectionable.

2. **Artificial risk.** A risk such as radon found naturally in the soil is regarded with less fear and outrage than radon linked to a landfill contamination. Part of the difference is that natural radon provides no enemy to get angry at.

3. **Memorable incidents.** When the media make an incident memorable, the perception of risk increases.

4. **Dread.** Some risks, such as AIDS and cancer, create more dread than others. It is the greater the dread, the greater the perception of risk.

5. **Exotic sources.** If the source of a risk seems exotic, it will also seem more dangerous.

Unknowns risks. The more uncertain the risk, the greater the outrage. For instance, any risk linked to cancer will have a high outrage quotient because of cancer's untraceable origin.

Control by the individual. Eighty-five percent of the American public consider themselves better-than-average drivers. As long as they control the car, they feel safer. This is true of all risks. If people have some control over a situation, they feel safer.

Unfairness. People are outraged when they suffer the risks but do not receive the benefits. If you live close to a waste facility and the profits from that facility leave the community, you feel outrage.

Impact on the weak. Certain risks are perceived as more than risks — they are evils. When a risk is considered morally wrong, ugly or un-American, the argument will backfire. For example, police do not always catch child molesters, but they never argue that an occasional molested child is an acceptable risk.

Impact on the weak. Outrage increases when the weak — such as children — are the most vulnerable to a particular risk.

Barbara K. Sandman is the director of the Environmental Communication Research Program at Rutgers University. (Adapted from "Food Safety Today," University of Illinois at Urbana-Champaign Cooperative Extension Service, 1991.)
GREAT LAKES FISH: Why the Concern?

Whether people buy fish at the market or enjoy fishing and eating their catch, many are concerned about toxic substances in fish. Although contaminants have been found in fish from various bodies of water, including rivers, streams, and oceans, Great Lakes fish have received much of the publicity in the past two decades.

Are Great Lakes fish safe to eat? It’s a deceptively simple question, but there is no simple answer. For now, each would-be fish consumer must make his/her own decisions, taking into account the following information about contaminants in the Great Lakes:

- Various factors about the fish, including its overall nutritional value, the species, the size and where it spends most of its time; how much fish the person eats and how often; the individual’s susceptibility to potential toxic substances, e.g., a pregnant woman or a small child; and her/his perception of risk.

Michigan Sea Grant Extension, in cooperation with the Michigan Agricultural Experiment Station, the MSU Pesticide Research Center and the Institute for Environmental Toxicology, is developing information to help Michigan residents make their decisions.

**Toxic Substances in Fish**

At least 400 synthetic organic chemical compounds have been identified in the Great Lakes ecosystem. Many of these chemicals have been banned or severely restricted because of their persistence in the environment and their potential impact on the health of aquatic organisms and humans eating them.

Most species of Great Lakes fish do not have contaminant problems. However, certain organic chemical compounds accumulate in the fatty tissues of aquatic organisms. Fish also absorb toxic compounds directly from the water through their gills.

**Contaminants and Human Health**

It is impossible to tell by looking at a fish whether it contains chemical contaminants. This can be determined only by using sophisticated analytical techniques and equipment.

The effects of contaminated fish on human health are likewise hard to predict. They depend on the following factors, each of which is difficult to control:

- the total amount ingested; and the time.
- Contaminants or eat such fish throughout their life span are likely to be at greatest risk. Also, certain groups of people may be at greater risk than others. Pregnant women, nursing mothers and women who may have children someday are at risk primarily because of their offspring; who are more sensitive to exposure to even the smallest amounts of chemicals. At least one study, however, has shown that children born to fish-eating mothers suffered no observable adverse consequences. The growth and development of children under age 16 may also be affected.

People who eat large quantities of fish with the greatest concentrations of contaminants or eat such fish throughout their life span are likely to be at greatest risk. Also, certain groups of people may be at greater risk than others. Pregnant women, nursing mothers and women who may have children sometime are at risk primarily because of their offspring, who are more sensitive to exposure to even the smallest amounts of chemicals. At least one study, however, has shown that children born to fish-eating mothers suffered no observable adverse consequences. The growth and development of children under age 16 may also be affected.

**Fish Consumption Advisories**

The answer to the question “Are Great Lakes fish safe to eat?” involves both public policy and personal perceptions. When so many people like to eat Great Lakes fish and because of the presence of contaminants in some species, the government and state agencies responsibility for protecting the food supply and public health have been challenged. Assessing the impact of Great Lakes fish on human health and taking appropriate precautions. Public officials analyze contaminants in skin-on fillet samples of Great Lakes fish, study the health of people who eat fish and issue advisories on consuming sport-caught fish.

The Great Lakes states try to coordinate their fish analysis techniques and advisories to minimize public confusion that has resulted from hearing differing announcements from the various jurisdictions.

The advisories are designed to provide a clear margin of safety, not to draw a clear borderline between “safe” and “unsafe.” They describe the locations where the fish are caught, the species and sizes of fish and appropriate consumption precautions.

In addition, Michigan applies federal guidelines to Great Lakes fish caught commercially and sold in the state. Even with the precautions exercised by federal and state agencies, controversy over the long-term consumption of Great Lakes fish continues. Some people feel that no amount of toxic substances in Great Lakes fish should be tolerated and that people should eat little or no Great Lakes fish. Others believe that the long-term consumption of Great Lakes fish produces neither proven acute, immediate harm nor demonstrable long-term problems and that no consumption advisories are necessary. Still others believe that any potential risk is far surpassed by the known benefits of eating fish. And some people are still puzzled and confused.

**The Research-Based Approach**

Through the years, various scientists have worked to discover the true impact on human health from eating Great Lakes fish and to learn what factors are most important in reducing human exposure to contaminants in Great Lakes fish.

In a recent study of chinook salmon from Lake Michigan showed the following:

- Skinned, trimmed fillets contained an average of less than 1 part per million (ppm) of PCBs, considerably below 2 ppm, the amount considered safe and used by federal and state authorities in developing fish consumption advisories.

(2) The larger and heavier the chinook salmon, the greater the concentration of PCBs. Of the 81 fish collected, only one very large fish exceeded the 2 ppm level.

Once and for all with a simple “yes or no.” As long as the question and concern remain, Extension will help people deal with it.

**FOOD SAFETY NEWS** is a publication of the Michigan State University Cooperative Extension Service.

**The development and publication of FOOD SAFETY NEWS has been supported with funding from the Michigan Department of Agriculture and Natural Resources in collaboration with the Food Safety Task Force, MSU Cooperative Extension Service, East Lansing.

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BUY, COOK & EAT FISH SAFELY

TEACHING KIDS THE ABCs OF SAFE FOOD HANDLING

 Ensuring that the fish you buy and eat is as safe as possible, follow these recommended guidelines:

- Think twice before you eat raw fish. You can never be absolutely sure the fish doesn’t harbor parasites or high levels of bacteria.
- Use your nose. Fishsmell like the sea but have no strong odor. Freshwater fish in good condition sometimes smell like cucumbers. Strong odors usually indicate spoilage.
- Keep an eye out for displays featuring cooked and raw fish or seafood next to each other. There’s a potential health hazard from cross-contamination — the transfer of bacteria from raw to cooked products. Buying anything from this kind of display can be risky.

When buying whole fish, look for bright, clear, bulging eyes. Cloudy, sunken, discolored or slime-covered eyes often signal fish that is beginning to spoil. The skin of freshly caught fish is covered with a translucent mucus that looks like a bit of varnish. The color is vivid and bright. Avoid fish that is dried out or gaping — the muscle fibers are beginning to pull apart. That’s a sign of over-the-hill fish.

Many kids learn about basic food safety in fourth grade, yet they aren’t provided much information on the issues surrounding food handling and tips for handling food safely, Andrews said.

- Note how the fish is displayed and look for clues that the temperature may be too high. Fish that are piled high, displayed in open cases or sitting under hot lights are perfect places for bacteria to grow. If fish fillets are displayed inside separate pans surrounded by ice, that’s usually a sign the retailer is paying some attention to quality. Wooly fish should be displayed under ice.

The survey also showed that 85 percent of the parents thought that their children didn’t bring leftovers home at all,” Andrews said.

The project will use persons from the families how to make the adaptations in food handling skills. This education component will provide innovative and interesting ways for children to learn about proper food handling.

When buying steaks or fillets, look for moist flesh that still has a translucent sheen. Watch out for flesh that is dried out or gaping — the muscle fibers are beginning to pull apart. That’s a sign of over-the-hill fish.

The survey showed some contrasts on the food handling practices of MSU student families who come to the United States from other countries and cultures. Carol Ann Sawyer, associate professor of food systems management, said that this project is designed to assist international student families with their food handling practices while in the United States.

The project will not only teach these families how to make the adaptation to safe food practices here, but it will also provide the researchers the opportunity to better understand safe food handling practices of many cultures.

There are some cultures that are not familiar with typical American food buying, handling, storage and cooking techniques. If someone has never operated an electric oven before, he or she may not know how to safely cook food in it,” she said. “We’ll try to learn about their customs and teach them what they need to know about safe food handling here.”

The project will use persons from the same culture to provide in-home assistance and recommendations. Some of the findings from the research will also become part of the educational materials developed for the children’s program.

- Use your nose. Fish smell like the sea but have no strong odor. Freshwater fish in good condition sometimes smell like cucumbers. Strong odors usually indicate spoilage.
- Once you buy fish, refrigerate it quickly. At home, store it in the coldest part of your refrigerator, keep it in the original wrapper and use it fast — within a day.

If you’re concerned about quality, look for evidence that fish has been frozen and then thawed. Look for chunks of ice floating in the fish liquid — a clue that the fish had been frozen. There’s nothing wrong with frozen fish that’s been thawed, but if you unknowingly refreeze it, its texture and flavor will suffer. It’s probably better to buy frozen fish instead.

A s family lifestyles change, more children are assuming responsibility for preparing their own food. Between 24 million and 81 million cases of food-borne illness are estimated annually, so it’s obviously important to educate children on simple ways to prevent these illnesses. Michigan State University recently launched a safe food handling and preparation project that project coordinators hope will improve the health status of children as well as their families by improving their knowledge of and skills in safe food handling. The project is focused on teaching children about the knowledge and practices of approximately 10,800 third-grade children, some of their families, teachers, food service workers in schools, and medical and health care support personnel, said June Youatt, associate professor of family and child ecology. Andrews indicated that these families how to make the adaptations in food handling skills. This education component will provide innovative and interesting ways for children to learn about proper food handling.

In addition to the software program that will be piloted with 500 students in May, packets of information will be distributed to the students, with exercises in food handling that they will practice at home with their parents. The same information will be relayed to parents through Cooperative Extension Service bulletins. Although the pilot program will reach a limited number of children, the program’s goal is to reach culturally diverse children across the state and to become a part of the Michigan Model for Comprehensive School Health Education, said June Youatt, associate professor of family and child ecology. Andrews believes that the program will not only reach the children, but make an impact on their families as well.

Another discrepancy the survey found was in hand washing practices, which are key to safe food handling. A large number of children in the study said that they never washed their hands before meals. About 98 percent of parents said that they always washed their hands and assumed that their children did, too.

- When buying whole fish, look for bright, clear, bulging eyes. Cloudy, sunken, discolored or slime-covered eyes often signal fish that is beginning to spoil.
- When buying steaks or fillets, look for moist flesh that still has a translucent sheen. Watch out for flesh that is dried out or gaping — the muscle fibers are beginning to pull apart.
- That’s a sign of over-the-hill fish.

More than 85 percent of these illnesses are estimated to occur in the home, so it's obviously important to educate children on simple ways to prevent these illnesses. Michigan State University recently launched a safe food handling and preparation project that project coordinators hope will improve the health status of children as well as their families by improving their knowledge of and skills in safe food handling. The project will use persons from the families how to make the adaptations in food handling skills. This education component will provide innovative and interesting ways for children to learn about proper food handling.

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The project will use persons from the same culture to provide in-home assistance and recommendations. Some of the findings from the research will also become part of the educational materials developed for the children’s program.
FOR SOME, FOOD POISONING IS A SPECIAL CONCERN

Are you pregnant? Do you have diabetes? Do you have children less than 1 year old? Are you diabetic? Do you suffer from chronic liver or kidney disease, or cancer? Are you an alcoholic?

If you answered "yes" to any of these questions, you may need to be particularly concerned about the risk of illness or infection caused by bacteria in food.

Most food safety experts would agree that health hazards associated with chemical toxins in food are miniscule when compared with the potential harm from bacterial food-borne illnesses.

"The Centers for Disease Control estimates that 9,000 people a year die from microbial food poisoning of one type or another," said Robert Hollingworth, director of the Pesticide Research Center at MSU. "Everyone in the U.S. population has had some reaction to some microbial agent at some time or another, whether they know it or not. Usually it causes only discomfort for a few hours, but there can be long-term consequences as well.

For those individuals who are "immunocompromised"—meaning they have weakened immune systems—the consequences of microbial food poisoning should be of particular concern.

Food-borne infection is caused by bacteria in food. Salmonella, Campylobacter, Listeria, and Staphylococcus aureus may all survive in food. If eaten, they may continue to grow in the food and produce toxins that can be fatal.

"How severely the toxins or bacteria affect various individuals depends on a number of factors, including the genetic makeup of the organism, the amount of the toxin or organism ingested, and a person's age, physical condition and general state of health.

Children under the age of 5 and older people have weakened immune systems and cannot fight harmful bacteria with the same vigor as older children and adults.

In addition, anyone with diabetes, chronic liver or kidney disease, or cancer people taking steroids or undergoing chemotherapy, and alcoholics are at greater risk of illness or death from a food-borne illness because of their weakened immune systems.

"Most food-borne illnesses result from eating raw, mishandled or improperly prepared food. About 1 in 10,000 raw eggs, for example, carries the Salmonella enteritidis organism, which could lead to salmonellosis.

"Therefore, if you are in a particularly vulnerable group, choose well-cooked scrambled eggs over sunny-side-up, and avoid foods made with raw eggs, such as hollandaise sauce and homemade holiday eggnog. Other foods commonly associated with food-borne illness are fish, shellfish, poultry, meat and egg salads, pork, processed meats, meats, pies, cream deccets and fillings, sandwich fillings and raw produce.

These foods may be contaminated anywhere between the time they are slaughtered and harvested and the time they reach the dinner table. Poor handling of food by shippers, restaurateurs or food stores or consumers may introduce bacteria and other organisms into the food supply that endanger the lives of those at high risk of food-borne illness.

Fortunately, thoroughly cooking food readily destroys most of the toxins that survive at refrigerator and freezer temperatures.

Tips for safe food handling:

\[\text{Keep cooking surfaces and utensils clean.}\]

\[\text{Refrigerate foods promptly after meals or cooking.}\]

\[\text{Thaw frozen foods in the refrigerator.}\]

\[\text{Discard discolored or foul-smelling leftovers.}\]

\[\text{Use only pasteurized milk and milk products.}\]

"Another thing people can do is break their leftovers into small portions and store them in shallow containers," Andrews said. "If you put a lot of hot food into a big, bulky container, it can't get out quick enough so the food remains at temperatures where bacteria can quickly reproduce."

"Dining out can be risky for immunocompromised individuals if they don't know what precautions to take."

"In restaurants, food should be served piping hot," Andrews said. "Send it back if it isn't. All meat, poultry, fish and egg products should be well cooked. Eggs should not be runny, meat should not be pink and fish should flake easily."

"Avoid raw meat, poultry and seafood (especially oysters and clams), raw milk and raw milk products in restaurants, Andrews advises."

"Most people have the defense mechanisms that help protect them against food-borne diseases. Though they may experience occasional discomfort or discomfort from eating contaminat ed food, the illness is usually short-lived. But for these individuals who have weak or underdeveloped immune systems, bacteria in food could mean severe illness or even death."

"These people are not different from others. It's just the overall health of the rest of us that they'll become severely ill. So while you and I can be pretty careful most of the time, these people need to be very careful all of the time."

HOTLINEs

\[\text{Meat and Poultry Hotline}\]

The Meat and Poultry Hotline handles questions about food storage, age, handling of meat and poultry, egg safety, safe handling of eggs, safety, ready-to-eat food products, marinated meats, processed meats, meat, poultry, and egg products labeling, and other issues.

1-800-353-4555

8 a.m. to 2 p.m. EST

The National Pesticide Telecommunications Network

The National Pesticide Telecommunication Network deals with a wide range of pesticide information, including the effect of pesticides on food safety.

1-800-856-7737

Operates 24 hours a day

Every day of the year

Michigan Poison Control Center

Bogdett Regional Poison Center

1-800-323-7272

SPRING 1992
How Safe Is My Food?

Is the food you buy for your family safe? If you listen to the reports in the news, you might wonder. Studies show that a large number of consumers do not think that meat and dairy products are safe, and their greatest concerns are about the drugs used to treat or prevent animal diseases.

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FOOD SAFETY
ON THOSE SPECIAL OCCASIONS

Picnics, potlucks, office parties, graduations, showers, church functions — the list of social occasions that involve food is endless. Whether you're taking food to an event or serving it to people who come to your home, safe food handling will reduce the possibility that someone will contract a food-borne illness.

Keeping foods safe and wholesome is not difficult, but it does require some planning. Remember to keep hot foods hot — 140 degrees F or higher. And keep cold foods cold — 40 degrees or lower. Limit the possibility of cross-contamination of foods — transfer of bacteria from raw food to cooked food or raw food that won't be cooked — by washing cutting boards, utensils and hands frequently. Raw meat, dairy and egg products and their juices should never come into contact with cooked foods or raw foods to be eaten raw.

When serving perishable foods such as meat, fish, shellfish, poultry, milk and eggs, prepare several small serving containers of dips ahead of time and store them in the refrigerator. Foods that contain uncooked eggs, such as Caesar salad or uncooked homemade ice cream or eggnog, may contain salmonella bacteria (organisms that cause food-borne illness). Steak tartare, oysters on the half-shell and sushi (raw fish) may be popular, but they are also raw perishable foods that should be solidly frozen. Frozen foods should be kept no more than 5 days in a refrigerator. Adopt the restaurant industry motto: "When in doubt, throw it out!"

If the power goes off, keep the refrigerator door closed except to add ice. Cook perishable foods within a few hours or, if the power outage was only in your home, move the food to a neighbor's refrigerator.

FREEZER FACTS

- Keep the freezer at 0 degrees F or colder.
- Label and date all frozen foods so you can use them while the quality is good. Foods that are stored for longer than recommended times will be safe but may not be palatable.
- If the power goes off, keep the freezer closed except to add dry ice. Foods that still contain ice crystals can be safely refrozen. Thawed but still cold meats, poultry, fish or shellfish should be checked for off-odors. If none are present, cook the foods and eat them or freeze/refreeze the cooked food.

STAY CLEAN, STAY WELL

- Wash hands with soap and hot water for at least 20 seconds before handling raw meat, poultry, fish or shellfish, and after touching animals or using the bathroom or changing diapers.
- Wash hands, counters, equipment and surfaces after handling raw meat, poultry, fish or shellfish. Rinse with a dilute chlorine bleach solution (1 tsp. per quart of water).
T YOUR RISK OF ILLNESS

If you have a diarrheal illness, don't prepare foods at home/work.

Wear disposable plastic gloves while preparing foods if you have an infectious cut or burn on your hand.

Roast meats or poultry at oven temperatures of 300 degrees F or above. Do not cook without a constant heat source.

Stuff meat or poultry just before cooking and cook in one continuous cooking or cleaning session. Do not leave marinate. Do not reuse it.

Serve cooked foods on clean plates with clean utensils. For example, don't put grilled chicken back on the plate that held raw chicken, and don't eat with a fork or knife that was used on raw food.

If outdoor temperatures are above 90 degrees F, hold cooked foods no more than an hour without heat or refrigeration. At cooler temperatures, hold no longer than two hours.

Hold hot foods at 140 degrees F or higher.

Chill leftover foods quickly and immediately after the meal. Serve meat from stuffing or gravy to cool. Use shallow containers for quick cooling.

Don't taste old leftovers to determine if it's safe. Discard outdated, unsafe or questionable leftovers in the garbage disposal or in tightly wrapped bags that will not attract animals.

The microwave oven is not a mine safety. Discard outdated, unsafe or questionable containers, plastic bags, vacuum-packed containers — the choices are almost endless.

One of the most well received new types of packaging is the plastic shelf-stable container, according to T. Downes, MSU packaging professor. Small plastic tubs of pasta, stews and soups, for example, are increasingly finding their way into American lunch bags. Pop the container into a microwave or boil at work or at home. If you have a hot lunch with no storage, preparation or clean-up problems.

Shell-stable plastic bags offer soups and entrees with the same convenience. The bags are heated in the microwave or boiled in water. Unlike their frozen counterparts, these plastic bags come in cardboard containers that can be stored on the pantry shelf until needed.

"Food shipped and heated in similar kinds of shelf-stable containers formed the basis for much of the menu served to our service men and women in Operation Desert Storm," Downes noted.

How safe are these new packaging alternatives?

"These products are safe," Downes said. "They're as safe as canned food, and the same precautions should be followed for them as for canned food." In other words, don't consume the food if the package is bulging or has been punctured or torn, he advised. Once the seal has been broken, the product becomes vulnerable to bacterial contamination, just like a canned product.

What about the storage life of these products? Downes recommended eating canned and packaged food within a year of purchase, though it's likely these products could be stored longer than that.

"The issue here isn't food safety," said Downes, who noted that in 1961 he ate hamburger packaged in 1944 for the armed forces, with no adverse effects. "The product remains safe if the seal is intact, but the quality can deteriorate.

Many of these new packaging processes use cooking methods that give you a product closer to fresh than the traditional canning process does. Downes pointed out. So even if color, flavor or texture does deteriorate over time, the quality may still be better than that of some canned products.

Though plastic shelf-stable packaging has been well received, some other new packaging methods haven't been as widely accepted in the United States. Aseptic packaging — vacuum-sealed, sterilized liquids in small cardboard boxes — has been well accepted for juices and juice-flavored drinks but not for milk. Downes said.

Because the United States has a very efficient cold chain, the cost of transporting, storing and displaying cold packaged products is not as high here as in some other countries. Americans also usually have ample refrigerator space and can indulge their preference for cold, pasteurized milk rather than sterilized milk, which has a cooked flavor to some palates.

Downes maintained that aseptically packaged milks still have a place. You can't beat the convenience of the product when camping or for a back-up when you suddenly run out of milk for your breakfast cereal, he said.

With aseptic packaging, the safety issues are the same: don't drink the product if the package is swollen or punctured. And once you've opened it, you have to consume it or, as with fresh milk, refrigerate it or it will spoil.

A third type of new package can be found in the refrigerator section of your grocery store. Meats and various entrees — either raw or cooked — are packaged in a modified atmosphere of a different mixture of oxygen, nitrogen and carbon dioxide. In some European countries, this type of packaging has become very popular, but it has had lower acceptance in the United States.

The key to food safety is to make sure the product is held at refrigerator temperature during transporting, storing and displaying. The United States has a cold chain that is not as cold or frozen products is not as high as that of some canned products. Americans prefer seeing, possibly because vacuum-packed meat is purple. Americans prefer seeing, possibly because vacuum-packed meat is purple. Americans prefer seeing, possibly because vacuum-packed meat is purple. Americans prefer seeing, possibly because vacuum-packed meat is purple.

As meat is exposed to oxygen, it begins to turn first red, then brown," Downes said. "Because of our preference for red, we are buying meat that is packaged in a wrap that allows oxygen and spoilage microorganisms to grow."

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Toxins are everywhere in our environment. Often they can't be seen, touched or tasted, and they rarely interrupt our routine, though we are exposed to them all day long. But what are toxins, and where are they, and why have they generated so much concern in recent years?

By definition, a toxin is a poisonous substance produced by a living organism—usually a bacterium, fungus or plant—that can be harmful to other organisms, including humans. These poisons have always existed in nature, as well as in our food supply.

Another category of toxins is those introduced into the environment through some other means, perhaps through application of pesticides to crops or as chemical byproducts of industry. For example, most of the petroleum-based products such as PCBs and PCBS since the 1940s, when chemical companies began producing and using them for everything from fire retardants to pesticides.

"Naturally occurring toxins are typically a natural part of the plant and have always been there," said Sandra Andrews, Extension specialist and assistant professor of food science and human nutrition at MSU. "Other environmental contaminants such as PCBs, dioxins and polybrominated biphenyls have gotten into the environment through some other mechanism and we don't want them to be there. There are similar concerns about both types of toxins, but how and why they are in the environment are different and should not be confused.

It was the inert, long-lasting qualities of some highly chlorinated chemical compounds that first made them attractive industrially. But when they and the byproducts from their synthesis were found to be lethal to humans and animals, the government halted their use and production. But even after their withdrawal, some toxins continue to exist in the environment and cause a number of deaths.

"It's all a matter of viewpoint," said Robert Hollingworth, director of the Pesticide Research Center at MSU. "Some people believe that natural can mean safer, but to the toxicologists it doesn't make any difference. We make a field in exactly the same way that a plant or mushroom makes. A field of crop plants is a chemical factory run by nature."

"When shopping for food, Hollingworth advises consumers to remember that 'natural' doesn't always mean better."

"The word 'natural' has marketing magic, but it is exceedingly dangerous if it is misapplied," Hollingworth explained. "There is a true cachet and value in saying something is natural, but it may have nothing to do with minimizing the risk that comes from the toxic materials."

"Many scientists believe that naturally occurring toxins are likely to be greater contributing factors to long-term illness in humans than manmade contaminants," Hollingworth said.

"Some natural chemicals are exceedingly toxic and have the ability to cause such things as birth defects and cancer."

Hollingworth said some natural pesticides occur in higher concentrations than would ever be allowed in a synthetic pesticide. If duplicated in the lab and submitted for commercial approval, the substances would never pass inspection by regulatory agencies.

"These natural toxins often serve as models, however, on which toxicologists formulate synthetic pesticides and herbicides."

"We get some of our best ideas from naturally occurring materials," he said. "For example, pyrethroids, which are commonly used synthetic insecticides based on naturally occurring pyrethrin, a toxic material with insecticidal properties found in certain types of chrysanthemums."

"Natural toxins are present in plants as a defense mechanism, Andrews explained."

"A plant can't get up and run," she said. "By making itself toxic, a plant can wage its own chemical warfare against fungi, insects, weeds and grazing animals."

Andrews said some foods with toxins are of particular concern to consumers. "Solamine, for example, is a substance in potatoes that the vegetable produces as it gets old or is exposed to light," Andrews said. "So we tell people to avoid potatoes that are old, greening or spongy. And definitely don't eat the eyes because they contain a high concentration of solamine.

"Toxic amounts of solanine, Andrews said, can seriously affect the nervous system and have caused a number of deaths.

"Moldy foods, especially grains and nuts, can be poisonous, because they may contain harmful aflatoxins, which have been shown to cause cancer in some animals."

"Finally, individuals who pick wild mushrooms should harvest only those they can positively identify as safe. Many poisonous varieties have the potential to kill."

"Some dangerous varieties very closely resemble mushrooms that are safe to eat," Andrews said. "So don't go mushroom hunting if you don't know what you're picking."

"Not all toxins are equally toxic at equal doses. Andrews said that most toxic substances are present in such minute quantities that they never pose a threat. That is why animal tests to determine the potential dangers of toxins in the diet should be examined critically."

"Doses given in animal studies where something is found to be a carcino-gen [cancer causing] are usually very high," she explained. "To mimic a lifetime consumption of a substance in a very short time, researchers administer extremely large doses. Then the findings are extrapolated to humans."

Andrews pointed out that even common and useful substances in food, such as salt, fat and some vitamins, can become toxic if eaten in large enough quantities. Fat, for example, is a necessary component for human life and basic metabolic processes. But in excessive amounts over time, fat can contribute to heart disease.

"In the case of an essential nutrient such as sodium, you need a minimum amount or you'll die," Andrews said. "Then there is a maximum amount that will cause death. That it occurs naturally doesn't mean it is OK."

"It's all a matter of viewpoint," Hollingworth said. "Some people have a soft, fuzzy picture of Mother Nature that reminds them of their grandmother. Other people see her as red in tooth and claw. I tend to agree with the latter view. She demands our respect and concern, but she's a pretty good poisoner and we need to be watchful."
A

make recycled plastic soda bottles with PET (polycarbonate) that is under the FDA-reviewed process for recycling plastic containers for food use. Paper towels and paper plates made from recycled products should not be used when cooking food in the microwave because the heat from microwaving might cause migration of materials in the recycled product to the food.

In addition to safety concerns about the containers we cook with, there are also some potential food safety problems related to the cooking method. For all its good points, a microwave cooks food unevenly. This creates hot and cold spots in foods being heated or cooked. The cook should take steps to ensure thorough cooking of perishable foods such as meat, poultry, fish and eggs. Food that is not completely cooked may harbor bacteria that could cause food poisoning.

Here are some common questions asked about microwaving:

Q: How do you cook meat long enough in the microwave to prevent potential food-borne illness without drying it out?
A: Because microwaving can leave cold spots in food, it is very important to cook meat and poultry thoroughly. However, cooking too long will cause the meat to get dry and tough. To ensure safe, tender meat and poultry, try the following:

- Arrange pieces of meat uniformly and cover the dish. Steam that builds up under the cover will help kill the bacteria and cook the meat uniformly. You can use a glass or microwave cover or plastic wrap.
- Interrupt the cooking several times to move the food around in the dish. If your microwave does not have a turntable, interrupt the cooking several times to rotate the entire dish a quarter turn.
- Ground meat should be stirred frequently during cooking.
- Use a thermometer to be sure the meat has reached the desired temperature.

Q: Can baby food be heated in a microwave?
A: Because microwaves heat unevenly, some portions of the baby food may be tepid while others are scalding hot, and the baby's mouth could be burned. For this reason, it is not advisable to heat baby food in the microwave. If you're in a situation where you have to use a microwave, use the following precautions:

- Stir food and shake liquids thoroughly before testing for temperature.
- Always test the temperature for formula and food before offering it to the baby.

Q: How do you heat bottles in the microwave, remove the caps and nippl

A: Don't use the same jar for heating and leftover storage container. You could cook all of the chicken and then freeze some of the cooked chicken. If you don't want to do that, thaw the chicken in the refrigerator, remove the desired number of pieces as soon as you can, and then reheat the extra pieces.

Q: A casserole was completely thawed and then left at room temperature for several hours. Is it safe to eat if it's reheated in the microwave?
A: If the casserole was left at room temperature for more than two hours, it is not advisable to eat it. Bacteria multiply rapidly at room temperature. Reheating it in the microwave will kill some but not all bacteria responsible for causing food-borne illness. Some bacteria produce heat-stable toxins that cannot be destroyed with normal heating.
Hunting season invariably brings questions about the safety and/or desirability of eating venison that has spent many hours draped across the roof rack of a pickup truck, or many days — or even weeks — hanging from the rafters in the garage.

1. **Sodium erythorbate** is an antioxidant used in hot dogs to control color and flavor changes caused by reactions with oxygen. It does not come from earthworms. The rumor probably started because the first syllable of the second word sounds like “earth” and the last syllable sounds like “hat.” The fact that hot dogs are long, skinny and red doesn’t help matters, either!

2. Lasagna left out all night should be discarded. The rule of thumb is 2 hours at room temperature for highly perishable protein foods.

3. Acidifying tomatoes by adding lemon juice or citric acid is strongly recommended to make sure that the finished product is acidic enough to prevent the growth of the organism that causes botulism. No tests have been done to establish a safe time for pressure canning unacidified tomatoes. Any processing times for unacidified tomatoes that would be established would probably be very lengthy, resulting in a poor quality product.

4. Lead in crystal could be especially hazardous to pregnant women or children. They should avoid even occasional use. There is no test exists when acidic or alcoholic foods and beverages are stored in lead crystal. Significant quantities of lead can migrate from the glass into the food.

5. The Extension Service does not recommend using recycled products or products not intended for use with food in direct contact with food.

6. If you’re going to buy a gallon of olives, you’d better have plans for using them up within a couple weeks of opening the jar. They don’t freeze well and can’t be canned, so plan on splitting a container with friends. Olives completely submerged in their brine will keep for up to two weeks in the refrigerator, so decide how many olives you can eat in that time and work back to figure out how many heads you are going to need to share with.

7. Venison and other wild game should be handled as carefully as you handle fresh meat from the grocery store. More information on wild game and safe handling of the holiday turkey is available at your county Extension office.

8. Eating raw or slightly cooked eggs is not recommended, especially for high risk groups — infants, pregnant women, people in ill health and elderly persons. Avoid recipes for uncooked frostings that include fresh eggs; try making egg nog with a pasteurized egg substitute.

9. To keep potatoes from turning black during cooking, try adding a little cream of tartar to the cooking water.

10. **Aluminum cookware** is cheap and cooks well, and suspicion of a possible connection with Alzheimer’s disease has now been discounted. Storing acidic foods such as fruits, pickles and fermented foods in aluminum containers, however, is not recommended because aluminum could leach into the food.

11. **Cheap vanilla extract** bought in Mexico may be contaminated with coumarin, a substance related to certain blood thinning agents. Extension advises against bringing back or using cheap vanilla from Mexico.

12. **Salmonella** in eggs and egg products is a bigger issue than we have space to handle here. Your local Cooperative Extension Service home economist has information. Extension is listed under “county government” in your telephone book.
**IS IT SAFE TO BARBECUE?**

We used to slap steaks and chicken on the grill without giving a thought to the safety of the cooking procedure, but those days may be gone forever. Today’s consumers are questioning the safety aspects of everything related to the foods they eat, from growing and packaging to cooking. Many people are questioning past grilling practices and wondering if grilling is safe.

There may be some cause for concern. Grilled fatty meats are suspected of increasing the risk of cancer. When the meat is cooked over high heat, fat drips onto the heating element—coals, wood, gas flames or electric coils—and forms potentially carcinogenic chemicals that are deposited on the meat by the rising smoke. Such substances form whenever the meat is cooked until charred—even to some extent when meat is broiled or pan-fried, especially if it’s cooked until well done. This doesn’t mean that you should never eat barbecued meat. Just don’t eat it every day, and take the following steps to reduce the risks:

- Pick low-fat meats, or at least trim all visible fat before grilling.
- Wrap meat in foil to protect it from the smoke.
- Don’t place the heat source directly beneath the meat. For instance, put the coals slightly to the side so that fat doesn’t drip on them.
- To reduce grilling time, particularly for thick cuts, partially precook the meat first (by microwaving or boiling), then finish it on the grill.
- Place aluminum foil or a metal pan between the meat and the coals to catch the dripping fat.
- If dripping fat creates a lot of smoke, briefly remove the meat or reduce the heat.
- Scrape off charred parts of meat.
- Don’t use mesquite—this soft wood burns very hot.

(Source: University of California, Berkeley, Wellness Newsletter, June 1990.)

**FOOD SENSITIVITIES ARE COMMON; TRUE FOOD ALLERGIES ARE NOT**

Fred develops an upset stomach, gas and diarrhea if he consumes dairy products.

Dorothy can’t eat fish or other foods cooked in the same oil with fish, or even be around where fish is being cooked.

She becomes deathly ill—her throat swells shut and she can’t breathe.

Fred has a true food allergy— an adverse reaction to food caused by an overreaction of the immune system.

Dorothy has a food sensitivity, probably lactose intolerance, the inability to digest milk sugar.

Dorothy is among the 1 to 2 percent of the population who suffer from true food allergies. Fish and shellfish, milk, eggs, tree nuts, peanuts, soybeans and wheat are the foods that most often set off allergic reactions. These may range from mildly uncomfortable to life threatening.

Food sensitivities are defined as any abnormal or noticeable response to food. They are commonly caused by metabolic deficiencies, toxins or disease. Some people, for example, experience mild to severe problems because they cannot metabolize tyramine, which is an amino acid. Lactose intolerance is probably the most common food sensitivity. Others include excess bloating or gas from beans or tofu, and mild to severe reactions to sulfites.

Though true food allergies can develop at any time, they most commonly develop during infancy and childhood. Some 4 to 6 percent of infants have some form of food allergy, but many outgrow them later in childhood.

An allergy develops after exposure to a food, such as milk, eggs or peanut butter. After that, it takes only a small amount of the food to set off an allergic reaction. Reactions may include itching, rashes or hives, abdominal pain, nausea, vomiting or diarrhea. More severe reactions may include asthma attacks, swelling of the throat or a sudden drop in blood pressure. If blood pressure falls, the person can go into a potentially fatal shock reaction.

Because true food allergies can be life threatening, anyone who suspects he or she has a food allergy should consult with a physician. Medical attention is important to distinguish possible allergies from other conditions that may cause similar symptoms.

If you find you have a food allergy, the treatment involves removing the culprit from the diet. Trying to diagnose yourself may result in failure to eliminate the allergic food and progressively more severe allergic reactions with each exposure. The reverse can be true, too: you may needlessly eliminate a perfectly good food from your diet. If you’re allergic to lobster, for instance, avoidance is a fairly simple process. An allergy to dairy products, wheat or eggs, however, can be a bit trickier.

It will definitely mean much careful reading of labels to avoid allergenic ingredients in prepared foods, as well as less eating out and more cooking at home “from scratch” using cookbooks and recipes developed specifically for allergy sufferers.

Fortunately for most people, foods such as wheat, milk and fish are highly nutritious foods that are integral parts of a balanced diet.

For people with life-threatening allergies to these foods, however, the risks outweigh the benefits.