Pesticides and You

News from Beyond Pesticides: Protecting Health and the Environment with Science, Policy & Action

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Taking Toxics Out of Health Care

An examination of the Maryland health care sector's shift away from toxic pesticide use

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Taking Toxics Out of the Health Care Sector

Health care facilities should be safe places, free of toxic pesticides. This issue of *Pesticides and You* shows us that they can be! However, people utilizing places of healing, whether they are hospitals or elder care facilities, are especially vulnerable to pesticides. The U.S. Environmental Protection Agency's (EPA) risk assessment calculations simply ignore those at high risk due to illness or aging.

We've known this. So, several years ago, Beyond Pesticides partnered with Health Care Without Harm to write a landmark report entitled *Healthy Hospitals: Controlling Pests Without Harmful Pesticides* in which we documented the hazards of pesticides typically used in hospitals and examples of institutions that have adopted safer practices. Now, partnering with the Maryland Pesticide Network, we have written a new report, based on our experiences working on-the-ground with health care facilities in the Baltimore area.

In this issue of PAY, excerpts from the report, *Taking Toxics Out of Maryland's Health Care Sector: Transition to Green Pest Management Practices to Protect Health and the Environment*, describe an important breakthrough in the health care sector in Maryland which puts places of healing and nurturing in the forefront of "green" facility management practices. While pest management is one piece of the larger definition of environmentally sensitive practices that include product choice, energy use, disposal practices and more, it is a large and critical piece that directly affects the health of patients, visitors and staff —affecting their exposure to toxic chemicals in the indoor and outdoor environment.

Leading the Health Care Sector

Taking Toxics Out of Maryland's Health Care Sector is a good news report. Maryland facilities identified in the report have made a choice to lead the effort to put their institutions in the forefront of environmentally sensitive practices —to do more than is required by current regulations— and to embrace practices that seek to prevent or avoid the use of toxic pesticides. These facilities are utilizing a system of pest management that we call *defined* integrated pest management (IPM) —a form of IPM with clear parameters and goals that seek to eliminate the use of toxic pesticides and only use least-toxic pesticides as a last resort. The IPM system seeks to limit pest entryways and harborage through systems of facility and staff management that focus on sanitation and maintenance practices and exclusion through the sealing of cracks and openings.

We live in a society where, unfortunately, regulation of toxic chemicals has not kept pace with the latest science. We see toxic pesticides in wide use while the controversy surrounding their use is steadily brewing. It is not uncommon for federal and state regulators to evaluate a pesticide's use for 15 or 20 years while in wide use, only to determine that its use presents unreasonable adverse effects. The facilities identified in the report are committed to staying ahead of the curve, seeking to avoid the use of chemicals that are linked to hazards such as cancer, birth defects, reproductive effects, neurological and immunological illness and other effects, such as endocrine disruption —not fully or adequately regulated by EPA.

The Veterans Administration actually acknowledged the special importance of this issue to health care facilities in its Pest Management Operations policy. The VA policy reads: "Pest management in health care facilities differs from control practices in other types of institutions. The effect on patients in various stages of debilitation and convalescence, and in varied physical and attitudinal environments, requires that a cautious, conservative policy be adopted concerning all uses of pesticides."

A majority of the facilities identified in the report, including Johns Hopkins Hospital, have adopted a policy, established a plan that governs pest management practices and appointed of an IPM Coordinator. These elements -a policy, plan and coordinator- are critical to the long-term success of the facilities' IPM program. They not only help drive the facilities' commitment to a program, but they inform the coordination required among the departments and staff of the health care facility and define the criteria for a facility's contract with a pest control company.

Working with companies

We have found that health care facilities typically hire companies for their pest management. These companies typically use a variety of chemicals that we define as unacceptable, so it is critical that an IPM program articulate non-chemical practices to prevent or exclude insects and rodents, and clearly define allowable least-toxic chemicals to be used only as a last resort. In this issue, we include Beyond Pesticides' least-toxic definition. Of important note in the report is the high degree of pest control company receptivity to the transition to the *defined* IPM approach.

Under the defined IPM system, the relationship with the company changes from one in which pest control responsibility is delegated in whole to the pest control company to one in which there is a partnership and collaboration that ensures the causes of pest problems are identified and corrected. It shifts pest management from the *outsourced hands-off* to the *partner hands-on* model.

An IPM system therefore requires new types of communication among those working in the facility so that all staff understand how different practices and problems can contribute to insect and rodent problems. Additionally, training becomes a critical element, so that pest problems are identified and quickly reported. Gone are the days when pest control technicians walk through the facility with a wave and a short logbook entry. Instead, walkthroughs are accompanied and pest-conducive situations are communicated and addressed.

The program reported in this issue makes sense and works. Our goal is to move this program around the country. There's absolutely no reason not to.

Jay Feldman is executive director of Beyond Pesticides.

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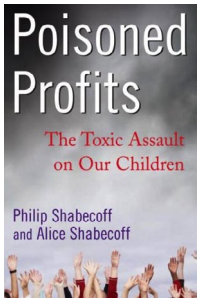

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Help with Silverfish

I am a Custodial Manager for a school district in Colorado. My boss and I could use your help in identifying and the treatment of what appears to be silverfish at one of elementary schools. It is our hope that you can help us manage this problem. I look forward to hearing back from you.

Thank you,
David (Greeley, CO)

Dear David,

Thank you for contacting Beyond Pesticides with your question regarding silverfish control. Silverfish are wingless insects that thrive in dark, damp areas. They grow to between 1/2 and 5/8 inches long, and adults may live up to three years. Because of their preferred habitat, they can be indicators of excessive moisture, whether through faulty plumbing, accumulated in wall voids, or other sources. They are most commonly found in lower levels of buildings, around foundations or water pipes. They prefer warmer temperatures, but cannot survive extremes of above 112 or below 32 degrees Fahrenheit. If they are in an area where temperature manipulation is possible, temperatures outside these ranges will readily kill juveniles. Lowering the indoor temperature even moderately, reducing humidity, improving air circulation, and increasing lighting will create a less hospitable site for silverfish.

Silverfish feed on materials high in sugar, starch, or protein: cereals, flour, fabric, wallpaper paste, glue, paper, and book bindings. Keeping any likely food sources elevated, sealed in airtight containers, and away from moisture is key to reducing habitat. Silverfish can survive for up to a year without food or water, however, so some type of control may be necessary to initially reduce the population.

Some least-toxic pesticide options include boric acid, diatomaceous earth, and silica aerogel are all good choices, provided they are not applied where students can access them. They remain effective for a relatively long time, so dusts sealed in walls, cracks, and baseboards will continue to control the problem beyond the initial application. In dust form, all three can present an inhalation risk, so take care when applying. For more information on all three products, visit our website for the fact sheet "Alternatives to Using Chlorpyrifos."

Silverfish are primarily a nuisance pest, and can be controlled through improved ventilation, sanitation, and less-toxic products.

If you have any further questions, please do not hesitate to contact us.

Beyond Pesticides Daily News Blog

Read and comment on stories at www.beyondpesticides.org/dailynewsblog.

Excerpt from Beyond Pesticides original blog post (10/1/08):

Organic Farm Compensated for Pesticide Contamination

Last week, a jury awarded $1 million in compensation to Jacob's Farm, an organic farm in Santa Cruz, California that had its herbs contaminated by pesticides. The jury found that organophosphate pesticides, used on vegetables on neighboring farms, drifted onto the organic farm, leaving the herbs in violation of organic standards.

Anita Says:

It's amazing Western Farm Service can make the comment that Jacobs Farm should not have come into an area where chemicals are being used. They called the herb farm "incompatible" for the area. We operate a non-certified organic farm in Illinois and deal with spray all season. Just because we don't want to spray our crops doesn't mean we have to accept spray from the corn and soybean growers in our area. To call another farmer's crops incompatible just because they are grown without the use of chemical is true ignorance. It seems to us, the spray guys have the opinion they can spray when and where they want. It's time for the chemical applicators to wake up and realize they can't just pollute our environment, our children and our organic food.

Response to "Chemical Sensitivity and the ADA"

In an article we published on chemical sensitivity (CS), we use the term "environmental illness" interchangeably with CS. The original article was published in Pesticides and You, Vol. 28 No. 3: "Chemical Sensitivity and the ADA: Beyond Pesticides asks the Department of Justice to recognize the accessibility issues for those with Chemical Sensitivity and Environmental Illness."

Yes, the environment is ill, but people have toxic chemical illness.

The environment itself, unspoiled, is healthy for us. The term "environmental illness" suggests the wrong culprit.

Thank you for your vital contributions every day, and for bringing to us the bee issue with information on the pollination crisis. Let me know whenever I can help.

Grace Ziem, M.D., Dr. P.H. (Baltimore, MD)

Speak Your Mind!

Whether you love us, disagree with us or just want to speak your mind, we want to hear from you.

All mail must have a daytime phone and verifiable address. Space is limited so some mail may not be printed. Mail that is printed will be edited for length and clarity. Please address your mail to:

Beyond Pesticides
701 E Street SE #200
Washington, DC 20003

Controlling Crabapple Scab

I have been a contributor to Beyond Pesticides for many years. I have a crabapple tree in my yard that suffers from crabapple scab each year. At the beginning of spring, it looks fine, but by mid-summer, a huge number of leaves will have turned brown and will have dropped off the tree.

I realize that I probably need to spray the tree each year with a product that will prevent or lessen the effect of the scab. I want, of course, to use a product which will be non-toxic (if possible). I've read about potassium bicarbonate on the Internet, but it's not clear to me how effective it is. I'm also assuming that potassium bicarbonate is non-toxic (correct me, if I'm wrong).

Thank you,
Marshall (Chicago, IL)

Dear Marshall,

As I'm sure you already know, apple scab is one of the most common blights on apple trees, and infects crab apples, as well. The pathogen is most common in cool, wet climates, but occurs elsewhere when conditions are favorable, from coastal California to the Midwest to Connecticut.

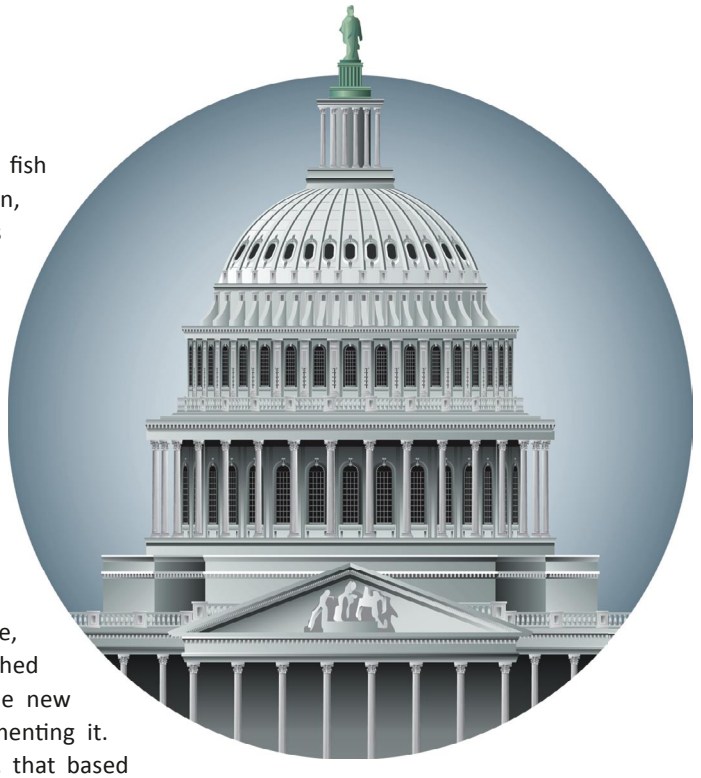
As the University of Illinois's weekly column, "Stateline Yard & Garden," wrote in 1998, "Apple scab management focuses on prevention, rather than 'curing' an infected tree in midseason." Spores overwinter on infected leaves beneath the trees, and infect new leaves, flowers, and fruit the following spring. To prevent an outbreak each spring, rake leaves each fall and destroy by burning or composting. Avoid wetting foliage with sprinklers or other irrigation systems. If you are considering replacing or planting new trees, there are several varieties of apple trees being developed that are resistant to scab, including Liberty, Prima, and Priscilla. The University of California's Statewide Integrated Pest Management Program (UC IPM) has a more complete list at www.ipm.ucdavis.edu.

However, if you are already seeing infection, prevention will not save this year's crop. While some may recommend using fungicides, there are a variety of less toxic alternatives to consider.

The South Dakota State University Cooperative Extension Service offers some detailed information on scab management. They include two less toxic options, sulfur and neem oil, for which we have fact sheets on our website.

UC IPM also recommends sulfur, as well as soaps and summer oils. They emphasize that, "Successful use of fungicides requires careful attention to application timing," and provide further guidance on its frequency. Keep in mind, though, once you make it through the season, the best method is prevention and planting of resistant varieties. Best of luck!

EPA Completes Reregistration of Controversial Antibacterial Triclosan



Despite widespread criticism of its preliminary risk assessment by the environmental community, the U.S. Environmental Protection Agency (EPA), in its completed the Reregistration Eligibility Decision (RED) for the controversial antibacterial triclosan, concludes that all uses, with the exception of the paint use, are eligible for reregistation. In the RED document, EPA acknowledges that triclosan interacts with androgen and estrogen receptors and has effects on thyroid homeostasis in rat studies. The agency also mentions that it is aware of research looking at triclosan's link to antibacterial and antibiotic resistance. However, the agency continues to be complacent on these serious impacts on public health by stating that it will continue to "monitor the science." EPA also continues to ignore triclosan's degradates and has once again failed to conduct any risk assessments for these hazardous chemicals. EPA also ignores triclosan residues in fish and drinking water. In addition, much of the triclosan RED is based on cumulative exposure estimates based on biomonitoring data from the National Health and Nutrition Examination Survey (NHANES). While it might prove useful, this model estimates population exposures solely on NHANES data, a process that has not been subject to public review. Furthermore, EPA abandons its established methodology in favor of the new model, rather than supplementing it. EPA has conceded however, that based on the ongoing research on triclosan, it would review the chemical again in 2013, 10 years earlier than scheduled. *For more information on the triclosan and triclocarban toxicity, alternatives and regulatory status, visit www.beyondpesticides.org/antibacterial.*

Safety Reviews Inadequate for Pesticides Found in Waterways

The Environmental Protection Agency (EPA) acknowledged in an October 8, 2008 notice in the *Federal Register* (Vol. 73, No. 196) that antimicrobial pesticides in wide use are not adequately tested for their impacts on human health and the environment. Controversy surrounding the impacts of many antimicrobials in the environment has arisen in recent times due to the prevalence of these chemicals in surface and drinking water. EPA, trying to play catch-up with the science while products continue in larger and larger numbers to incorporate the controversial antimicrobials, issued new and amended data requirements. Environmental fate data for antimicrobials dominate these new requirements, especially pertaining to the discharge of these chemicals into waste water treatment plants from household sources. Many of the new data requirements will inform a screening-level assessment on the fate of antimicrobials that reach a wastewater treatment plant, according to the proposal. "Since many antimicrobial pesticides are typically rinsed down the drain, EPA has considered the potential impacts of pesticides that are discharged into wastewater treatment plants," it states. Along with these requirements, EPA also proposes to use modeling tools such as the Down the Drain Model with the Probabilistic Dilution Model (PDM) to assist in its environmental fate screening and assessment.

The National Association of Clean Water Agencies (NACWA), a trade group for wastewater treatment plants, has long supported added scrutiny of the approval process for products regulated under the *Federal Insecticide, Fungicide and Rodenticide Act* (FIFRA), particularly of emerging contaminants. The group is particularly concerned that the amount of antimicrobials in the wastewater stream could harm the microbes in activated sludge, which is a biological process that treatment plants use to cleanup wastewater. Beyond Pesticides is supportive of the new studies in the proposed rule, but believes that the public should be warned about the data deficiencies until the chemicals are more thoroughly studied. *The public comment period is expected to be extended until April 2009. Check Beyond Pesticides website, www.beyondpesticides.org, for an update after publication in the Federal Register.*

Tell EPA to Regulate Nanomaterial Products as Pesticides

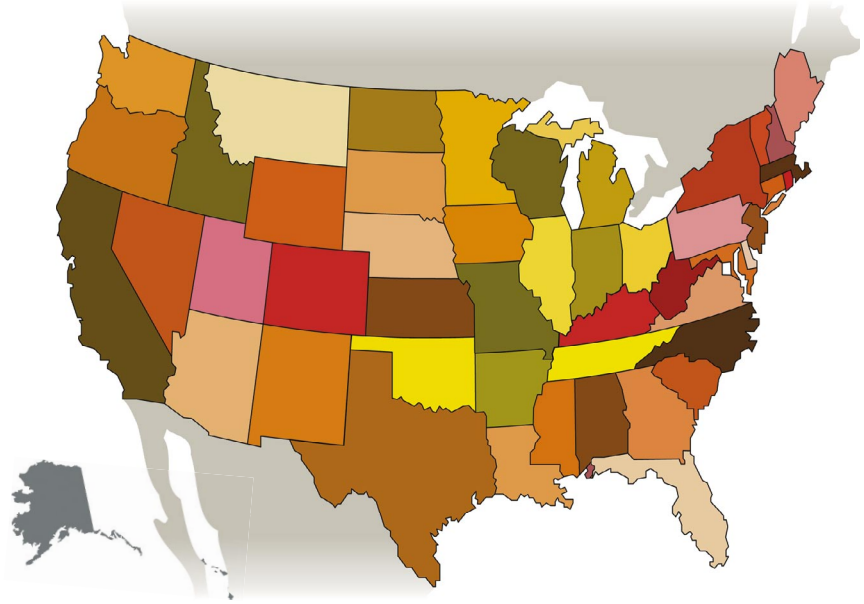
Acknowledging the critical need for in-depth review of products utilizing nanotechnology pesticides, the Environmental Protection Agency (EPA) opened a 60-day public comment period in response to a petition filed by the International Center for Technology Assessment (ICTA), Beyond Pesticides and others, which demands the agency stop the sale of numerous consumer products with nano-silver. The May 2008 petition challenges EPA's failure to regulate nanomaterials in pesticides. The 100-page petition addresses the serious human health concerns raised by these unique substances, as well as their potential to be highly destructive to natural environments, and calls on the EPA to fully analyze the health and environmental impacts of nanotechnology, regulate nano products as new pesticides, and require labeling of all products. Nanotechnology is a new technology for reconstructing nature at the atomic and molecular level. The same size and chemical characteristics that give manufactured nanoparticles unique properties -tiny size, vastly increased surface area to volume ratio, high reactivity- can also create unique and unpredictable human health and environmental risks. Increasingly, manufacturers are infusing many and diverse consumer products with nanoparticle silver (nano-silver) for its enhanced "germ killing" abilities. There are more than 260 nano-silver products currently on the market, ranging from household appliances and cleaners to clothing, cutlery, and children's toys to personal care products and electronics.

Comments must be received by EPA by January 20, 2009. Include docket ID EPA-HQ-OPP-2008-0650. Submit comments online at www.regulations.gov, or by mail: Office of Pesticide Programs Regulatory Public Docket (7502P), Environmental Protection Agency, 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

Gulf War Research Panel Finds 1 in 4 Vets Suffers from Illness Caused by Toxic Exposure, Including Pesticides

At least one in four of the 697,000 U.S. veterans of the 1991 Gulf War suffer from Gulf War illness, a condition caused by exposure to toxic chemicals, including pesticides and a drug administered to protect troops against nerve gas, and no effective treatments have yet been found. This is the conclusion of a federal panel of scientific experts and veterans in a landmark report released November 17, 2008. The Congressionally-mandated *Research Advisory Committee on Gulf War Veterans' Illnesses* wrote the report, with scientific support from Boston University School of Public Health. "The extensive body of scientific research now available consistently indicates that Gulf War illness is real, that it is the result of neurotoxic exposures during Gulf War deployment, and that few veterans have recovered or substantially improved with time," the report says. The report finds that Gulf War illness differs fundamentally from stress-related syndromes. "Studies consistently indicate that Gulf War illness is not the result of combat or other stressors, and that Gulf War veterans have lower rates of post-traumatic stress disorder than veterans of other wars," the Committee wrote. Gulf War illness is characterized by a combination of memory and concentration problems, persistent headaches, unexplained fatigue and widespread pain, and may also include chronic digestive problems, respiratory symptoms and skin rashes.

According to the report, the most commonly used personal repellants were DEET, which was primarily used on the skin, and permethrin, which was sprayed onto uniforms. Some personnel are known to have acquired personal use pesticides in addition to those supplied by the military, including the commercial product OFF, citronella products, and flea collars. Military environmental pesticide control measures included surface spraying and environmental fogging using the organophosphates chlorpyrifos, diazinon, and malathion, in varying concentrations, as well as the carbamates propoxur and bendiocarb. The organochlorine lindane was used by military police and other personnel for delousing in the processing of the more than 87,000 enemy prisoners captured in the war. Lindane was also issued to troops for their personal use, primarily to Army personnel. The new report says that scientific evidence "leaves no question that Gulf War illness is a real condition."



Pesticide Mixtures Toxic at Low Doses

A toxic soup of the most commonly used pesticides frequently detected in nature can adversely affect the environment and decimate amphibian populations even if the concentration of the individual chemicals are within limits considered safe, according to research published November 2008 in the online edition of the journal *Oecologia*. The study, "A cocktail of contaminants: How mixtures of pesticides at low concentrations affect aquatic communities," examines the link between the global decline in amphibians, pesticide use, and the possible threat to humans. Amphibians are considered an environmental indicator species because of their unique sensitivity to pollutants. Their demise from pesticide exposure could foreshadow the fate of less sensitive animals, according to study author Rick Relyea, Ph.D., an associate professor of biological sciences in the University of Pittsburgh.

Dr. Relyea exposed gray tree frog and leopard frog tadpoles to five insecticides (carbaryl, chlorpyrifos, diazinon, endosulfan, and malathion) and five herbicides (acetochlor, atrazine, glyphosate, metolachlor, and 2,4-D). He administered each of the pesticides alone, the insecticides combined, the herbicides combined, and all 10 of the poisons combined. Dr. Relyea found that a mixture of all 10 pesticides killed 99 percent of leopard frog tadpoles as did the insecticide-only mixture. The herbicide mixture had no acute effect on the tadpoles. While leopard frogs perished, gray tree frogs did not succumb to the poisons and instead flourished in the absence of leopard frog competitors. Dr. Relyea also discovered that endosulfan, an organochlorine neurotoxin banned in several nations but still used extensively in U.S. agriculture, is inordinately deadly to leopard frog tadpoles. For most of the pesticides, the concentration administered (2 to 16 parts per billion) is far below the human-lifetime-exposure levels set by EPA and also falls short of the maximum concentrations detected in natural bodies of water. Dr. Relyea has published a number of similar studies, including a 2005 study showing that the popular weed-killer Roundup (glyphosate) is extremely lethal to amphibians in concentrations found in the environment. EPA does not require amphibian tests to register pesticides.

Researchers Strengthen Link Between Diabetes and Pesticides

Researchers at the Duke University School of Medicine have linked organophosphate pesticides to the epidemics of obesity and type 2 diabetes. The researchers specifically link neonatal low-dose parathion exposure in rats to disruption of glucose and fat homeostasis. The study, "Exposure of Neonatal Rats to Parathion Elicits Sex-Selective Reprogramming of Metabolism and Alters the Response to a High-Fat Diet in Adulthood," was published in the November 2008 issue of *Environmental Health Perspectives*. The researchers chose parathion as a representative organophosphate. Neonatal rats were given doses that straddle the threshold for the first signs of systemic toxicity. While both doses affect the rats' metabolism, the researchers observed different effects in the males and females throughout the study. Male rats exposed to the low-dose of parathion outweigh control rats on the same diet and also evoke signs of a prediabetic state, with elevated fasting serum glucose and impaired fat metabolism. The males exposed to the higher dose of parathion have similar weights to the control, but eat less. Exposed females, on the other hand, weigh less than the control group, indicating a "wasting" condition, which was confirmed by the disruption of both glucose and lipid metabolism at both doses. After reaching adulthood, half the rats were switched to a high-fat diet. Increased fat intake exaggerates parathion's metabolic effects, particularly in females. The researchers believe early-life exposure to parathion and other chemicals might similarly disrupt human metabolism, thereby contributing to obesity and diabetes. This study follows research by the National Institutes of Health (NIH) that links pesticide exposure to type 2 diabetes using epidemiological data from the intergovernmental *Agricultural Health Study*.

Dow Invokes NAFTA To Challenge Canadian Pesticide Bans

In an effort to keep its popular yet toxic herbicide 2,4-D on the market, Dow AgroSciences has filed a notice with the Canadian government claiming that Quebec's ban on cosmetic use of pesticides breaches legal protections under the *North American Free Trade Act* (NAFTA). The company is likely to pursue compensation from Canada's federal government under Chapter 11 of NAFTA, which restricts a country from taking measures "tantamount to nationalization or expropriation" of an investment. Despite the threat of legal action, Ontario, which instituted restrictions similar to Quebec's earlier this year, says it will go ahead with its ban. Chapter 11 of NAFTA is just one of the legal avenues pesticide manufacturers have to make stricter pesticide regulation cumbersome, expensive, and in some cases impossible. For example, 41 states in the U.S. have preemption laws that prohibit municipal authorities from adopting pesticide restrictions that are more restrictive than their state's. In a statement that could equally apply to preemption laws, Kathleen Cooper, a senior researcher with the Canadian Environmental Law Association, says she is troubled that chemical producers can invoke NAFTA in an effort to "undermine the decisions of democratically-elected governments."

Dow's legal brief accuses the Quebec government of implementing a pesticide ban that "is not based on science." Like many pesticide cases, it boils down to a battle over which scientific studies should be used in assessing pesticide risk, and how much risk is acceptable, especially in a situation in which the use in question is purely cosmetic. There is a large body of scientific literature that outlines numerous risks of 2,4-D. It has been linked to cancer, reproductive effects, endocrine disruption, kidney and liver damage, is neurotoxic and toxic to beneficial insects, earthworms, birds, and fish. Despite the health and environmental effects of 2,4-D, it is the top selling herbicide for non-agricultural use and fifth in agriculture. *For more information, contact Beyond Pesticides.*

Report Documents Chemical Security Risks and Recommendations

A new report on U.S. chemical security, which includes two pesticide and 30 bleach manufacturing plants on its list of 101 most dangerous chemical facilities, was released in November 2008 by the Washington-based think tank Center for American Progress (CAP). The report, *Chemical Security 101: What You Don't Have Can't Leak, or Be Blown Up by Terrorists*, calls on chemical plants to use substitutes for their most hazardous chemicals and processes in order to protect the lives and health of 80 million people living near the facilities. The Department of Homeland Security (DHS) has repeatedly warned that terrorists could use industrial chemicals as improvised weapons of mass destruction. However, advocates say current chemical security efforts are inadequate to protect workplaces and communities. In October 2008, Greenpeace and 35 labor and environmental groups called on Congress to pass legislation on chemical plant security before the "interim" law expires in October 2009. In March, the House Homeland Security Committee adopted the *Chemical Facility Anti-Terrorism Act of 2008* (H.R. 5577). The bill addresses many of the flaws in the interim law, but was derailed by the chemical manufacturers' lobby.

The report authors recommend protecting communities by removing the possibility of a toxic gas release by converting facilities to safer, more secure alternative technologies. While many of the products produced at the facilities are necessary, such as the safe drinking water produced at water treatment facilities using chlorine gas, the report stops short of evaluating the necessity of products like pesticides, which could be eliminated. The report recommends that the two pesticide manufacturers that made the "101 worst" list (which produce pentachloronitrobenzene and chlorthalonil) generate chlorine as needed without bulk storage or co-locate with an as-needed source of chlorine. Chlorine storage and transport is a problem for many of the facilities in the report. To address the deficiencies, CAP recommends that Congress establish a comprehensive chemical security program rooted in identifying, developing, and leveraging the use of safer and more secure technologies.

Pyrethroid Pesticides Found in Homes and Daycare Centers

A new study, *Pyrethroid pesticides and their metabolites in vacuum cleaner dust collected from homes and day-care centers*, by the U.S. Environmental Protection Agency's (EPA) National Exposure Research Laboratory, finds concentrations of 13 synthetic pyrethroids and their degradates in indoor dust collected from homes and childcare centers in North Carolina and Ohio. With 85 vacuum cleaner bags analyzed, permethrin was present in all 85 dust samples and phenothrin was found in 36 samples. According to the study findings published in the November 2008 issue of the journal *Environmental Research*, the median concentration of permethrin in the samples is 1454ng/g of dust. Excluding permethrin, pyrethroid concentrations are less than or equal to 100ng/g of dust. The majority of the metabolites are present in more than half of the dust samples. The results are troubling to public health advocates who point to studies showing links between impacts on nerve, hormone and immune systems at extremely low doses. Children are especially sensitive to the effects of permethrin and other synthetic pyrethroids. A study found that permethrin is almost five times more toxic to eight-day-old rats than to adult rats, due to incomplete development of the enzymes that break down pyrethroids in the liver. Additionally, studies on newborn mice have shown that permethrin may inhibit neonatal brain development. *For more information, contact Beyond Pesticides.*

Federal Agency Releases Plan to Protect Salmon from Pesticides

On November 18, 2008, the National Marine Fisheries Service (NMFS) released a biological opinion that sets forth a plan for protecting Pacific salmon and steelhead from three toxic organophosphate pesticides. The decision comes after almost a decade of legal wrangling between salmon advocates and the federal government. In the biological opinion, federal wildlife scientists comprehensively reviewed the science regarding the impacts of pesticides on salmon and ultimately concluded that current uses of the insecticides chlorpyrifos, diazinon, and malathion jeopardize the existence of these imperiled fish. The biological opinion prescribes measures necessary to keep these pesticides out of water and protect salmon populations in Washington, Oregon, California, and Idaho. The new mitigation measures must be implemented within one year. They include prohibiting: aerial applications of the three pesticides within 1,000 feet of salmon waters; ground applications of the three pesticides within 500 feet of salmon waters, while requiring a 20 foot non-crop vegetative buffer around salmon waters and ditches that drain into salmon habitat; and, applications of the three pesticides when wind speeds are greater than or equal to 10 mph.

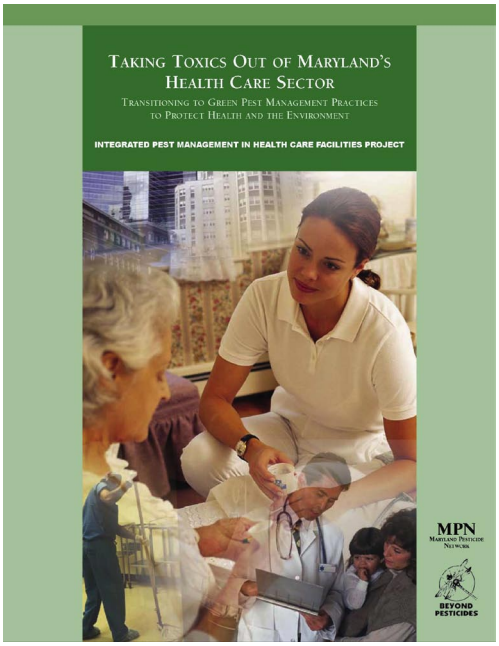
In 2002, Pacific Coast Federation of Fishermen's Associations, Northwest Coalition for Alternatives to Pesticides and others, with legal representation from Earthjustice, obtained a federal court order declaring that the U.S. Environmental Protection Agency had violated the *Endangered Species Act* by failing to consult with NMFS on the impacts that certain pesticides have on salmon and steelhead in the Pacific Northwest and California. As a result of that lawsuit, EPA began consultations, but NMFS never issued biological opinions or identified the measures needed to protect salmon and steelhead from the pesticides. In 2007, the salmon advocates filed a second lawsuit and entered into a settlement agreement with NMFS that establishes a schedule for issuing the required biological opinions. This is the first of several decisions that will assess a total of 37 pesticides to be released over the next three-and-a-half years. *For more information, visit NCAP's Safe Water for Salmon project page at www.pesticide.org/CleanWaterSalmon.html.*

Taking Toxics Out of Health Care

An examination of the Maryland health care sector's shift away from toxic pesticide use

By Jay Feldman and Mike Boeck

*This piece is adapted from the report, T*aking Toxics Out of Maryland's Health Care Sector*, released in October 2008, that describes approaches being embraced by the health care sector to stop the use of toxic pesticides in their facilities. Health care facilities typically use pesticides that are linked to cancer, neurological effects, reproductive effects, birth defects and developmental effects, skin sensitization and irritation, liver or kidney damage, and endocrine disruption. Recognizing that health care facilities serve people who are particularly vulnerable to pesticide exposure because they are suffering from illnesses that can be caused or exacerbated by pesticides, these institutions are becoming leaders in the adoption of practices that manage pests without toxic chemicals. The management practices, identified in the report as defined integrated pest management (IPM), seeks to limit pest entryways and harborage through systems of facility and staff management that focuses on sanitation and maintenance practices, and exclusion through the sealing of cracks and openings, only using defined least-toxic pesticides as a last resort. This report serves as a model for putting the health care sector on the leading edge of practices that "green" the institution and in the process protect the health of those who use, visit and work in the facility.*



I. Executive Summary

Taking Toxics Out of Maryland's Health Care Sector reports on a shift in Maryland's health care sector away from the use of toxic pesticides in the management of health care facilities. Major health care institutions in the state are now embracing pest management strategies for their facilities that give priority to non-chemical pest control methods and only use defined least-toxic chemical strategies as a last resort.

While conventional pest management relies heavily on toxic chemicals, the Integrated Pest Management (IPM) in Health Care Facilities Project, spearheaded by the Maryland Pesticide Network and Beyond Pesticides, in collaboration with Maryland Hospitals for a Healthy Environment (MD H2E), is working with major medical, psychiatric and elder care facilities in the state to protect health care facility patients, visitors, staff, and the environment

Johns Hopkins Hospital, named "Best Hospital in the U.S." for the past 18 years (*U.S. News and Workd Report*), joined the pilot program to eliminate toxic pesticide use.

from the hazards of pesticides. This transition is coming at a time when health care facilities across Maryland and nationwide are embracing "green" management strategies.

A statewide survey conducted by the Project (*Maryland Health Care Facilities Pest Management Survey*) reveals a general reliance on toxic pesticides at Maryland hospital and elder care facilities for pest control. Of the 25 pesticides identified by survey participants as being used at facilities, 11 are linked to cancer, 12 are associated with neurological effects, 10 are associated with reproductive effects, 5 cause birth defects or developmental effects, 12 are sensitizers or irritants, 10 cause liver or kidney damage and 6 are suspected endocrine disruptors.

The results of the survey led to the Project's collaboration with 13 health care facilities that are committed to achieving effective pest control with safer, least-toxic pest management systems that protect the health of vulnerable patients and residents and reduce the pesticide burden on the environment. The initial seven facilities that joined the Project in 2006 have made substantial progress in achieving their green pest management goals and share a common goal of serving the health of their communities.

They include:

- Broadmead Retirement Community, Cockeysville, MD
- Johns Hopkins Bayview Medical Center, Baltimore, MD
- Johns Hopkins Hospital, Baltimore, MD
- Riderwood Retirement Community, Silver Spring, MD
- Sheppard and Enoch Pratt Hospital, Baltimore, MD
- Springfield Hospital Center, Maryland Department of Health and Mental Hygiene, Sykesville, MD
- University of Maryland Medical Center, Baltimore, MD

The pilot facilities (an additional six facilities joined the project in 2008) have been assessing current practices, evaluating causes of pest problems, and adopting measures that seek to prevent pests through non-chemical means of sealing pests out and eliminating the food, harborage and entryways that are attractive to pests. The Project, through a series of walk-through assessments with national experts, has provided the tools and recommendations to develop policies and plans for ongoing programs committed to the health of people using and working in the facilities and living in the surrounding community.

The primary focus of this report is structural pest management, those practices utilized to manage the facilities' buildings. Efforts are ongoing at the facilities to address management practices on the grounds of the facilities, where natural landcare practices on turf and landscapes are being developed.

The integrated pest management policies and programs promoted by the Project establish critical challenges that require (i) new ways of educating and coordinating facility staff, (ii) defining chemicals that are acceptable for use in a health care setting, (iii) requiring how pest control companies operate in the health care environment, and (iv) reaching out to patients and the community to advance pest management practices that "do no harm."

II. Introduction

A. Overview

The health care sector is becoming a leader in an age of environmental or "green" practices. In addressing the hazards of toxic chemical production, use, and exposure, health care facilities are increasingly identifying toxic pesticides as a central health and environmental concern. Toxic chemical-based pest management in health care facilities unnecessarily exposes patients (who are particularly vulnerable), visitors, and health care workers to pesticides and a range of associated adverse health effects, from cancer, to reproductive, nervous system, immune function, and respiratory illness. In fact, the U.S. Department of Veterans Affairs has said (Pest Management Operations, 1986), "Pest management in health care facilities differs from control practices in other types of institutions. The effect on patients in various stages of debilitation and convalescence, and in varied physical and attitudinal environments, requires that a cautious, conservative policy be adopted concerning all uses of pesticides."

Through the Integrated Pest Management (IPM) in Health Care Facilities Project, spearheaded by the Maryland Pesticide Network and Beyond Pesticides in collaboration with Maryland

Hospitals for a Healthy Environment (MD H2E), more than a dozen environmental leaders in the health care facility sector in Maryland have taken up the challenge of toxics reduction and elimination in their buildings and grounds through institutionalization of pest management programs that focus on non-chemical pest prevention strategies to avert pest problems. The integrated pest management (IPM) approach utilized in the Project prevents pests without chemicals as a first line of defense and considers defined least-toxic chemical pesticides as a last resort. Through their efforts, Maryland facilities are national leaders on IPM in the health care sector.

> "The effect on patients in various stages of debilitation and convalescence, and in varied physical and attitudinal environments, requires that a cautious, conservative policy be adopted concerning all uses of pesticides."

Similar to other sectors, pest management in health care settings often escapes the scrutiny of institutional "greening" efforts. Reasons for this extend from a fundamental misunderstanding of the health risks of chemical pesticides, especially for vulnerable and sensitive populations in health care facilities, false belief that toxic pesticides are necessary in pest control, to the outsourcing of pest control to service providers that utilize chemical-intensive approaches. These factors typically lead to a widespread and systematic reliance on chemical pesticides to prevent and control pests in the health care sector and generally in pest control.

Defining IPM

Programs often described as IPM lack clear definitions of program components or adequately protective standards, a situation exacerbated by the tendency of health care facilities to defer to the perspective of contracted pest control companies without adequate facility involvement, oversight, or assessment of the vendor's practices and products used. Time and again, the IPM in Health Care Facilities Project has found that delegating pest control decisions to the pest management industry, without governing policies or other requirements that give priority to non-chemical methods and mandate reduction or elimination of toxic chemical use, can institutionalize unnecessarily hazardous approaches to pest control.

Pilot Sites Adopting New Approaches

To tap into concern about toxic chemical use, the Project has partnered with 13 Maryland health care facility pilot sites to evaluate their state of pest management practices and approaches to safer alternatives. These facilities chose to participate as pilots as part of their forward looking vision of patient, worker and community safety and in the context of other efforts to "green" their facilities.

Toxic chemical-based pest management in health care facilities unnecessarily exposes patients who are particularly vulnerable to pesticides and a range of associated adverse health effects, from cancer, to reproductive, nervous system, immune function, and respiratory illness.

Maryland Health Care Facilities Pest Management Survey

A. Survey Executive Summary

The *Maryland Health Care Facilities Pest Management Survey* reveals an overall reliance on toxic pesticides by Maryland hospital and elder care facilities for their pest management programs. The survey indicates that nearly all facilities contract for structural pest control (93%) and lawn care (70%). At these facilities, the survey found limited oversight of specific methods and chemicals used by contractors, inadequate disclosure of pesticide use to staff, patients and visitors, and few facilities that provide training for health care facility staff on pest management. While most characterize pest control at their facility as integrated pest management (IPM) that relies on non-chemical preventive techniques, mechanical methods and biological controls, the majority of the sites responding to the survey indicated that they *do not give priority* to non-chemical methods.

Of the 25 specific pesticides identified by survey respondents as being used at facilities, 11 are linked to cancer, 12 are associated with neurological effects, 10 are associated with reproductive effects, 5 cause birth defects or developmental effects, 12 are sensitizers or irritants, 10 cause liver or kidney damage and 6 are suspected endocrine disruptors. Of the 13 pesticides identified as being used for lawn and landscape care, two potentially leach and contaminate groundwater, 8 are toxic to birds, 8 are toxic to fish, 10 are toxic to aquatic organisms, and 3 toxic to bees.

Despite an overall dependence on chemical approaches and a lack of stated commitment or policy to only use pesticides as a last resort, a significant number of survey respondents (45%) recognize that their IPM program should address the root causes of the pest problem, such as sanitation, mechanical sealing, or structural repairs, which is the basis for an IPM program that minimizes toxic exposure. This is the basis for putting in place pest management systems for hospital and elder care facilities that are designed to protect the at-risk population, those who because of illness or age are among the most sensitive to chemicals known to cause or exacerbate nervous and immune system damage, cancer, respiratory problems, adverse impacts on reproductive and endocrine systems, and other health effects.

B. Findings

The findings of the survey indicate that 80% of Maryland's hospital and elder care facilities, ranging in size from 62 to 365 beds, use toxic pesticides in their buildings, while 11% said they did not, and 9% did not know or answer the question. At the same time, 34% of the facilities use toxic pesticides in their landscaping programs, while 45% said they did not and 21% did not know or answer the question.

a. Contracted and In-House Pest Management

The vast majority (93%) of Maryland health care facilities contract for structural pest management services and 70% contract for landscaping services. Respondents indicate that they run in-house programs for structural and landscape management 5% and 16% of the time, respectively. In most cases (21) the contractor's performance is monitored by the facility manager or the environmental services director (9), less frequently by the maintenance or housekeeping director, or grounds supervisor.

i. Integrated Pest Management (IPM)

Most facilities believe that they have an IPM program in place. When asked if the contract service company provided a facility IPM plan for indoors, 89% indicate yes, 2% say no, and 9% did not answer or did not know. The survey did not elicit a specific definition of IPM in most cases, however specific answers to questions identified many of the elements of IPM, at the same time that they indicated that the majority of programs in place are chemical-dependent. In fact, 80% of respondents indicate that their pest management program utilizes chemicals. Only 9% add any qualifying statements, such as only when needed beyond thresholds or only approved products are used. Forty-five percent of sites describe IPM techniques as addressing the root cause of the problem, such as sanitation, mechanical sealing, or structural repairs, however they do not give priority to non-chemical methods. Rather, they describe IPM as incorporating a combination of approaches, including chemical products.

ii. Contractor Usage of Pesticides

With a high percentage of structural pest control reliant on pesticides (80%) and fewer for outdoor management (34%), there is some awareness that other techniques should be used before bringing chemicals into the facility. It is significant that 11% of facilities indicate that no chemical pesticide products are used in structural management and 45% indicate no use of chemical products on the facilities' lawns and landscapes. One respondent captures the essence of a prioritized IPM system, when in answer to the question of including the use of chemical pesticide products, it was said, "No, only extreme measures (chemicals) are used when all else fails."

iii. Contractor-related Right-to-Know

Despite a Maryland law requiring commercial applicators to post pesticide-treated landscapes with a warning sign, respondents indicate that notification of pesticide use is more common for structural pesticide use than for lawn and landscape use. Sixty-four percent of the indoor contractors and 36% of the outdoor contractors alert the facility personnel to the potential acute and long-term health effects of the pesticides it uses in the indoor and outdoor environment. Eighteen percent of indoor contractors and 14% of outdoor contractors do not alert the staff to any health effects, with 18% of indoor contractors and 50% of outdoor contractors not answering or indicating that they do not know.

Of the respondents that answered yes to using chemicals inside the facility, only two say they do not have Material Safety Data Sheets (MSDSs) on file for the indoor environment. In all, 39 (89%) have MSDSs, and one indicates the question is not applicable because they do not use pesticides indoors. Of those that use pesticides outdoors, 87% have MSDSs and 13% did not answer.

Overall, those that have MSDSs keep them in the facilities' environmental, maintenance, safety, or housekeeping office, in some type of log book. Most of the facilities (80%) that make MSDSs available to the public do this on a walk-in basis, by phone or written request, or some combination.

iv. In-House Pest Management

The sites that maintain in-house pest management, which are a small percentage of the survey respondents (5% for indoor and 16% for outdoor), provided less information on their practices. Between the two facilities that do not contract for structural pest control, one describes an IPM approach and pest management plan that only uses "approved products." Since there is no official approved list of IPM products, it is assumed that this reference is to the list of EPA-registered pesticide products, which span the range of toxicity and hazards. The other facility left the question blank. Regarding outdoor management, 29% indicate that they do not use pesticides. Only one site indicates that they are aware of information about the potential acute and long-term health effects of the pesticides they use and keep Material Safety Data Sheets (MSDSs) onsite, and make them available to the staff.

b. Pest Management Practices

i. General IPM Methods

Twenty facilities (45%) describe IPM techniques that address the root cause of the problem, such as sanitation, mechanical sealing, or structural repairs, however most were in combination with baits, traps, chemical sprays and crack and crevice treatments. In some cases, not enough specifics were given (e.g. sanitation first, then chemical) to determine the full IPM approach.

It is important to note that the one hospital that describes a totally preventive approach reported no pest problems during the survey period.

The kinds of pest management techniques used by the majority of facilities include: exclusion techniques that include seal openings (cracks and crevices), door sweeps and structural repairs that include repair of leaking pipes; mechanical techniques that include the use of traps and vacuuming; and sanitation techniques that include trash management. Mentioned as an exclusion technique only once is caulking and harborage reduction (such as elimination of storage in cardboard boxes). In the sanitation area, 50% of the facilities indicate two important practices, washing recycling bins and floor drain covers; power washing kitchens and cleaning floor drains are cited 34% and 11%, respectively.

ii. Pest Problems

Ants, cockroaches and rodents (mice and rats) are the predominant pest problems identified in Maryland health care facilities. Other indoor pests identified include flying insects (generally), bees, gnats, fruit flies, spiders and termites. Outdoor pests identified include birds and pigeons, clover mites, grubs. Seven percent of facilities indicate no pest problems.

iii. Specific Techniques Used

Specific methods for cockroach control identified by respondents include vacuuming, glue boards, insect growth regulators, and crack and crevice treatments. For rodent control, respondents identified removal of ivy and ground cover that provide harborage, cleaning nesting areas, dusting burrows with tracking powder, structural improvements in patient rooms at all units, repairs, snap traps and mechanical traps in areas of activity.

Thirty percent of facilities describe techniques that are not considered IPM. In these cases, the majority of the emphasis is on baits and traps first, with no identification or correction of the conditions that are attracting the pest problem.

Three answered not applicable because they do not have pest problems, and six did not answer the question even though three of those describe pest problems.

The evaluations, conducted through a series of individual surveys, "walk-through" assessments, and consultations with independent pest control advisors, led to new thinking and management strategies to improve systems and increase health protection, including better recordkeeping, staff training, interdepartmental communication, policies and contracts, and oversight of pest control vendors. Project staff opened direct lines of communication with pest control companies that have become increasingly responsive to proposed changes in IPM protocols, selection of defined least-toxic chemicals to be used as a last resort, and communication of pest-conducive conditions and other issues to their facility client. Facility staff became committed to putting the necessary apparatus in place to ensure that underlying problems contributing to pest issues are documented by the pest control company and addressed by the facility in a timely fashion.

> Long-term solutions to pest problems are the rule for IPM at health care facilities.

B. Methodology

The IPM in Health Care Facilities Project was launched in 2005 to bring the health and environmental benefits of integrated pest management to health care facilities in Maryland. The project grew out of the report *Healthy Hospitals: Controlling Pests Without Harmful Pesticides*, based on a study of pest management at hospitals across the U.S. conducted by Beyond Pesticides and Health Care Without Harm (2003). The report documented significant reliance in the health care sector on pest management that emphasizes chemical intervention with toxic effects. With the backdrop of this report, the Project initiated a:

- Mail survey of the state of pest management practices in Maryland health care facilities (including hospitals, psychiatric facilities, and elder care facilities) to identify the full range of approaches and chemicals used.

- Pilot IPM program to work closely with facilities interested in adopting model pest management policies and programs to curtail toxic chemical use and serve as a model for Maryland's health care sector.

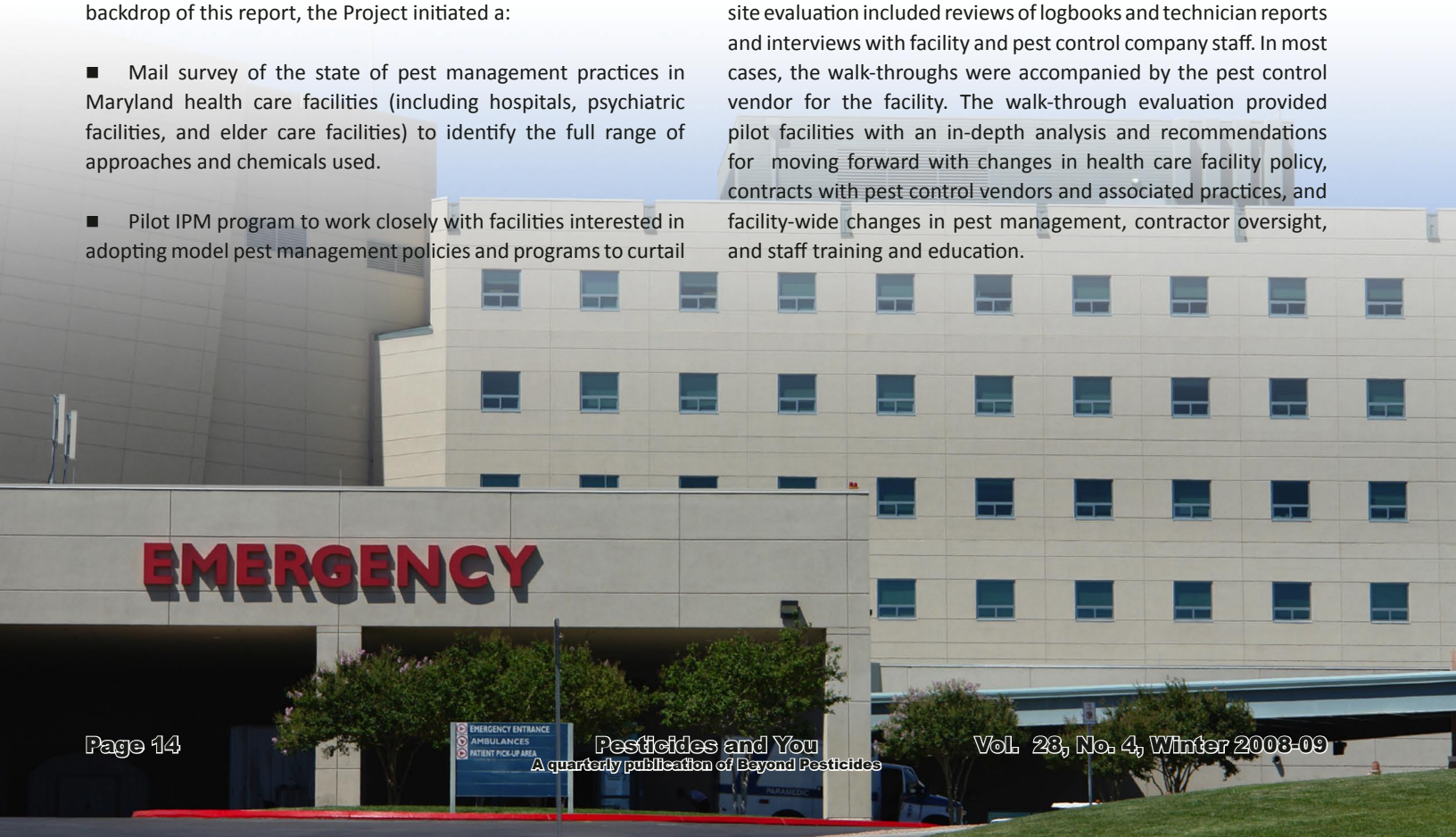
Survey Methodology

The survey represents a snapshot of pest management practices of hospitals and elder care facilities in the state of Maryland. Surveys were mailed to 56 hospitals and 140 elder care facilities. Respondents include 44 of the surveyed sites, or 22%, with a response rate of 59% for hospitals, including 32 medical hospitals and two psychiatric hospitals (three of the hospitals have a nursing home, rehabilitation and long-term recovery or assisted living facility), and 8% for elder care facilities.

The survey asked questions regarding indoor and outdoor pest management practices, delineating pest management conducted in-house and services provided by a contractor. The survey also ascertained whether and what type of IPM approaches are being implemented, the nature and degree of pest issues, whether and what types of pesticides are used, and the types of training, notification, and recordkeeping at the facility, if any.

Pilot Site Methodology

In the first phase, 13 Maryland health care facilities (hospitals, psychiatric facilities, and elder care facilities) have volunteered to collaborate with the IPM Project on pilot partnerships. Work at each pilot site includes a detailed pesticide use survey and walk-through evaluation conducted by expert IPM practitioners. The on-site evaluation included reviews of logbooks and technician reports and interviews with facility and pest control company staff. In most cases, the walk-throughs were accompanied by the pest control vendor for the facility. The walk-through evaluation provided pilot facilities with an in-depth analysis and recommendations for moving forward with changes in health care facility policy, contracts with pest control vendors and associated practices, and facility-wide changes in pest management, contractor oversight, and staff training and education.



III. Health Care Facilities Pilot Program

Since 2006, the seven pilot health care facilities in Maryland have been transitioning their pest management programs to green or *defined* Integrated Pest Management (IPM) that seeks to avoid hazardous pesticide-dependent practices and institute pest prevention techniques resulting in better pest control. The IPM pilot partners are working to achieve this type of IPM through:

- Staff education on the health and environmental risks of pesticides.
- Third-party assessment of pesticide use and pest management approaches and conditions at the facility.
- IPM plans for meeting the challenges of defined least-toxic IPM.
- IPM contracts with pest management service providers for implementation of safe pest management systems.
- Official IPM policies for their facilities that sustain the commitment to safe pest management.

Most of the seven pilot partners have adopted an IPM policy, sustaining the facility's commitment to IPM. The policies define IPM for the facility, require the approach for pest management, and provide details on implementation, including requirements for contractors, the role and definition of least-toxic pesticides, pesticide use notification, and staff training and performance requirements.

Through the policy development and implementation process, health care facilities assume a leadership role in defining IPM and their program, including responsibilities and expected outcomes. Facilities that have undertaken this active role have seen substantial results and improvement in pest control.

A. Environmental Leaders in the Field

From the outset, the IPM in Health Care Facilities Project recognized the importance of environmental leadership to effect positive change in the health care sector for the protection of patient, resident, visitor, and worker health from pesticide hazards. This leadership has initiated a rigorous evaluation of existing practices, challenged institutionalized approaches to pest control, conducted thoughtful assessments of proposed contracts with pest control vendors, and provided commitment and oversight to strive for program success. These examples of leadership have created a model for IPM transition for the health care sector in Maryland and across the U.S.

B. Evaluation Criteria

In evaluating pest management practices and transitioning to IPM, the Project staff looked for elements in the facilities' pest management program that incorporate effective IPM strategies, including:

- effective sanitation and maintenance programs that prevent pest activity attracted by food sources, harborage or entryways;
- restrictive allowable chemical product list based on health and environmental criteria; and,
- communication and coordination among facility departments and with the pest control vendor, governed by a clear IPM policy and plan.

i. Effective Sanitation and Maintenance.

Pest-conducive areas that are the focus of walk-through assessment evaluate the following areas.

- Trash handling/compactors
- Soil/utility areas
- Staff lounges and break rooms
- Receiving and loading areas
- Storage areas
- Food preparation
- Dishwashing
- Leaking pipes and drains in general
- Independent food vendors (eg, food courts)
- Elevator shafts
- Cluttered areas and stored food in offices

Using door sweeps and properly mounted doors that eliminate spaces help keep pests out.

Key elements evaluated include the following.

Exterior and Entryways

■ Door sweeps and seals need to be checked on each exterior door to verify a tight seal. Door sweeps close the gap between the bottom of the door and the door sill, and exclude mice and insects, reduce energy escape and costs, and prevent windblown dirt from entering the facility. Proper installation, inspection, and maintenance are essential to avoid gaps and pest entry.

■ Corrugated metal and beam overhangs, and light fixtures over entryways are potential bird roosts and should be checked regularly for signs of bird activity. Mechanical deterrents including spikes, wire and non-drying sticky barriers can be used to prevent bird roosting or nesting.

■ Exterior lighting should be installed on poles away from the building to avoid attracting insects to the building at night. Yellow or sodium-vapor bulbs are less attractive to insects.

■ Entryway floor mats should be sufficiently long to allow five full steps on the mat(s) prior to stepping on the floor. This length maximizes the amount of dirt removed from shoes.

Wall openings and spaces around fixtures should be sealed with caulk.

Plumbing/Mechanical/Electrical

■ All plumbing, piping, and electrical penetrations through walls and floors should be sealed to eliminate pest entryways, harborage, and transit through the facility. Sealing will also reduce energy loss and fire hazard/spread. Sealed escutcheons are most effective.

■ Seal around all fixtures, bulletin boards, electrical panels, bumper guards, etc. with caulk. Start in one corner of a room and go around the entire room, and then systematically through the room to ensure all opening are sealed.

■ Sumps should be sealed to prevent fly breeding and access by cockroaches.

Storage Areas

■ Bottom shelf of shelving units should be at least 6” above floor to allow for ready cleaning and inspection.

■ Inspection/cleaning aisles of at least 6” should be provided between shelf units or any stored items and walls. This ideal needs to be balanced with safety, e.g., depending on design, shelf units may need to be secured to wall to prevent tipping. No products should be stacked against walls.

■ Ceiling tiles should always be maintained in place to prevent pest access into the suspended ceiling area.

■ Remove all incoming product from cardboard boxes on receipt and remove cardboard immediately to a recycling dumpster. Do not store items in cardboard inside the facility. Cardboard is an ideal refuge, food source and egg-laying site for cockroaches.

Trash Handling

■ Trash and recycling dumpsters and receptacles should be placed as far from building as possible to avoid attracting pests to the facility and entryways.

■ Dumpsters should be maintained in clean condition.

■ Contracts with waste handlers should include clear provisions for dumpster cleaning or replacement as needed.

■ Receptacles with spring-loaded doors prevent pest access.

■ Tear-resistant trash and recycling receptacle liners help keep receptacles and dumpsters clean. Trash receptacles should be emptied daily.

Drains

■ Fill all drains with clean water on a regular basis. A dry drain allows cockroaches access to and from sewer.

■ Brush or pressure washing of floor drains can launch bacteria (e.g., listeria) into the air when brushed or pressure washed. If the facility uses pressure washing for drains, all food in the area should be stored prior to the drain servicing, and all food-contact surfaces in the area should be cleaned afterward to remove any

resettled microorganisms. Alternatively and ideally, after an initial clean out, a weekly service with an enzyme-based cleaner can help keep the drains clean and open.

Receiving/Loading Areas

- Ensure sanitation and maintenance in hallways leading to loading docks. Floors and walls should be power-washed and kept painted. Trash carts should be cleaned on a regular basis.

Food Preparation Areas

Areas evaluated for the following particular concerns:

- Standing water from leaking pipes and around drains.
- Complete floor cleaning to ensure that mopped floors are not pushing dirt and grime to corners and baseboards of hard to reach areas, rather than mopped up.
- Cleaning and maintenance of ice machines.
- Cleaning around and under floor ramps for handtruck access to cold storage units, warming racks, etc.

Independent Food Vendors

- While independent food vendors that lease space in a facility (e.g., a food court) are under the jurisdiction of local health inspectors and authority, the facility should require lessees to conform to the facility's IPM standard, followed up with regular inspection by the facility.

General Cleaning and Clutter Removal

Assign responsibility for cleaning and clutter control in neglected areas and conduct regular supervisory visits of these including:

- Floor drains throughout.
- Hallway to loading dock and trash compactor.
- Loading dock area.
- Laundry area.
- Storage rooms.
- Food court and other vendor locations serving food, including vending areas.
- Staff rooms including food storage (refrigerators).

Soil/utility rooms

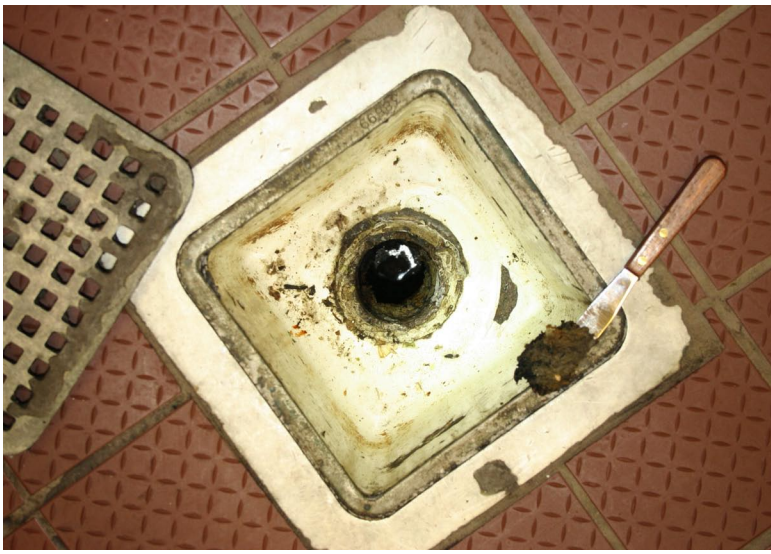
- In addition to the care standard for pipes and drains, mops should be properly stored hanging head up.
- There should be no standing water in a sink or bucket in these rooms. Consider using microfiber mops that dry quickly.

ii. Allowable Least-Toxic Chemicals

Long-term solutions to pest problems are the rule for IPM at health care facilities (and elsewhere). While long-term solutions usually require more involvement and cooperation from the client facility to improve sanitation and exclusion, it is incumbent upon pest service providers to provide expertise, communicate IPM needs to facility managers, and adhere to an approach to IPM that minimizes use of harmful pesticides. At a minimum, the IPM approach should:

Proper storage, including a six inch space under storage shelves and removal of carboard boxes, is a key part of pest prevention.

- Employ only defined least-toxic pesticides (See p. 22), only as a last resort after reasonable non-chemical interventions have been exhausted, and only in response to a pest sighting.
- Prohibit interior spray applications of pesticides, which are ineffective and unnecessarily expose applicators, staff and patients to toxic chemicals.
- Use effective bait products, but only if non-chemical measures are inadequate to manage an ongoing problem.
- Make extensive use of insect monitors in food service and other pest-vulnerable areas. These should be checked on each service provider visit, and increased in problem areas. If a pest is captured, the service provider should determine if it is an isolated introduction or a sign of re-infestation, and identify conducive conditions that need to be resolved.
- For structural pests, preferred formulations include non-



Drains should be cleaned and traps filled with water regularly to keep insects from coming in from the sewer.

volatile gels, baits or pesticides contained within tamper-resistant bait stations. Spray-applied liquids are rarely if ever needed and increase potential for staff and patient exposure.

iii. Communication, Coordination and Policy.

Staff Education

At hiring, new staff should receive training on their role in the facility's IPM program. Food service, housekeeping, cleaning, and maintenance staff should receive more detailed training on why minimizing hazards from both pests and pesticides is important, and how their responsibilities specifically relate to pest prevention. All staff should receive continuing education on their role in pest management.

Design and Construction

Pest entry and pest-conducive conditions can often be prevented at the design and construction stage. For example, outdoor lighting on poles away from doors rather than on the building near doors will not attract flying insects to the building. Many of these issues are particularly frustrating for facility managers and service vendors responsible for conditions that could have been avoided. Pest management service providers should, at a minimum, review plans for any new construction or renovation to reduce pest-friendly conditions, including landscaping. This practice can save thousands of dollars in remediation costs for birds, rodents and other organisms that can take advantage of pest attractive design features. Vendors also should review construction in progress and at hand-over to ensure pest-proofing design features are implemented properly, including verifying that all plumbing, electrical and other penetrations are sealed both inside and outside, and that the contractor is not disposing of trash or construction debris in walls, crawlspaces, etc. where they will lead to pest problems later.

In addition, active construction and renovation sites present a host of pest-conducive conditions and pressures on a facility. Construction zones should be strictly policed for trash, pest harborage, and entry points.

Client Communication

The shift from the *outsource* to the *partnering* model for effective IPM is most readily apparent in changes in client communication for vendors. An effective working relationship includes regular communication between vendor and client that has pest prevention at its core. Hand-held electronic reporting devices that provide real-time information on pest sightings and inspections to facility managers are a great tool. A service call should always include a debriefing of the facility manager in charge, supplemented by (usually) monthly meetings dedicated to identifying and solving current pest concerns.

The pest complaint logging system is a primary tool for the success of the IPM program, and should correspond to the overall goals of continual communication between the facility and the vendor. Pest logging forms should emphasize inspection, monitoring and pest identification and prevention as primary strategies. The form should provide plenty of room for detailed comments on the specific location of pests sighted within a building, and for technician recommendations for prevention.

Service tickets at a minimum should include date, technician, time in and out, pesticide product used, amount, room and location, method of application and target pest. The target pest should be as specific as possible, e.g., species of ants and cockroach. Service tickets should include notations regarding pest-conducive conditions or recommendations for corrective actions, e.g., "plant filled with fungus gnats, please remove plant" and "wash inside of trash cans to reduce fly problems."

IPM Policy, Contract and Plan

Ultimately, the effectiveness of an IPM program is tied to a clearly articulated IPM policy, contract and plan. Three elements are essential to implementation of an effective IPM program.

- An IPM policy for the facility that defines IPM as relying on non-chemical pest prevention with a goal of effective pest control without toxic chemicals and only the use of least-toxic pesticides as a last resort, carried out with an emphasis on communication, coordinator and staff education.

■ Contract provisions that clearly specify IPM responsibilities as well as standards.

■ IPM plans that assign IPM communication and implementation responsibilities in detail, including frequent, regularly scheduled communication between the facility and pest management company.

Under the partnering model, the facility and the vendor both "own" the pest management system for the facility and operate the system as partners, recognizing that neither can be effective without the active support of the other. Responsibilities for key decisions are held jointly or clearly assigned to one or the other, and both are accountable to the other for the operation of the pest management system. In practical terms, this means that the facility and the vendor engage in 'real-time' communication to the extent possible regarding the operation of the pest management system, collaborate as required to make and execute decisions, and follow up in a timely manner to the needs of the pest management system.

IPM at health care facilities begins with an institutional commitment to safer pest management formalized in an IPM program. While the details of the program will reflect the particular needs, all programs share some common elements:

■ **IPM policy.** This document should clearly articulate the institution's commitment to defined IPM, including the prioritization of non-chemical preventive measures and intervention. The policy establishes the underlying basis for embracing approaches that protect patient, visitor, and staff health, as well as advance environmental protection, with methods that reduce pest-conducive conditions first and only use least-toxic pesticides as a last resort. The policy should be formally adopted and provide the authority for the IPM Coordinator to carry out an IPM program.

■ **IPM plan.** The plan should detail frequently encountered pest problems and strategies employed to manage those problems. A vendor's plan may be adequate, but should be thoroughly reviewed, preferably by a third-party expert. The plan should clearly reflect the pest management approach required by the facility's IPM policy. The plan should address particular known pest problems and provide details on notification procedures, communication and reporting requirements, monitoring, recordkeeping, and contingency planning requirements.

> Facilities that contract for pest management services should have IPM based structural pest control bid and contract policies and rules in place.

■ **IPM Coordinator.** This individual, preferably an administrator with operations and/or risk management authority, provides daily oversight of the facility's pest management program. It is key that this person can facilitate a response to identified problems contributing to pest problems, whether under the purview of maintenance, environmental services, housekeeping, or food service personnel or contractors. The person should lead an interdepartmental IPM committee, or participate on a safety/risk management, or green committee. The IPM Coordinator should attend continuing IPM education courses, network with other IPM coordinators, and oversee in-house staff training.

Facilities that contract for pest management services should have IPM-based structural pest control bid and contract policies and rules in place. IPM specifications can be adapted and included in an existing contract. The emphasis is on diagnosis and long-

term, preventive solutions to pest problems rather than pesticide applications. The contractor selection process should be designed to verify that the bidder can meet the standards, and oversight should be ongoing to ensure performance.

Multiple vendors are operating under separate management and contracts can be awkward. All should be under similar contract specifications and oversight standards. Close communication is needed to permanently resolve any ongoing infestation.

IV. Conclusion

The Integrated Pest Management (IPM) in Health Care Facilities Project and its pilot health care facility partners are identifying management strategies to control unwanted pests without hazardous chemicals and embracing policy to codify this approach. The pilot facilities that have taken this on represent a group of leading institutions that are asking the questions necessary to protect their patients, visitors and staff. The health care environment serves a population that is especially vulnerable to chemical exposure and most of the hazardous chemicals typically used to manage pests in this setting are unnecessary with the adoption of sound and sensible IPM programs.

Johns Hopkins Hospital

Johns Hopkins Hospital's Director of Environmental Services, Chris Seale, describes the transition:

When I arrived at Johns Hopkins Hospital two years ago, I discovered significant service and quality issues with our pest control. I found that our pest control service provider had been in place for some 42 years with little progression in the realm of IPM. I am a sustainability enthusiast and was very concerned about the amount of pesticide that was being introduced into our environment both internally and externally. The Project was a great discovery, as it helped design the IPM request for proposals (RFP) and vet the proposals.

We have come a very long way in the last 18 months. We now have, what I would call, a platinum level IPM program thanks to the collaboration between Johns Hopkins, Maryland Pesticide Network, Beyond Pesticides, and our pest control vendor. We have essentially eliminated the use of pesticides and reduced our year after year's pest complaints by almost 60%.

The health care benefits are numerous. We are no longer are at risk of exposing staff, visitors, or patients to toxic pesticides. We are no longer adding to the growing level of pesticides found in our communities and waterways.

I am very proud of the accomplishments here at the Johns Hopkins Hospital. I am even more proud that we have expanded the IPM project to Howard County Hospital. The synergy and momentum speaks for itself. Together we are meeting the needs of society today, while respecting the ability of future generations to meet their needs.

Managing a Hospital that Protects Health and the Environment

The health care facility pilots want pest management programs that are effective and protective of health and the environment. They are working to assess current practices, evaluate chemical use, establish effective pest control, involve staff and coordinate departments, work with pest control service providers, and protect those who are patients, visitors, employees and the surrounding community. The IPM and Health Care Facilities Project and the pilot facilities are charting a course that is at the leading edge of pest management and serves as a model for the state of Maryland the nation.

Health Facility Model Integrated Pest Management Policy

[Health Facility] uses defined Integrated Pest Management (IPM) to alleviate pest problems with the least possible hazard to people, property and the environment. IPM emphasizes non-chemical strategies such as sanitation and exclusion to achieve long-term solutions in order to protect people and the environment from unnecessary exposure to pests and pesticides. Least toxic pesticides are only to be used in the facility as a last resort when non-toxic options have been exhausted or are deemed unreasonable.

Pesticides are only to be applied in and around the [Health Facility] by certified commercial applicators in accordance with the policy.

The [Health Facility] will maintain a limited list of pre-approved least-toxic pesticides for use when required. Products will be selected after careful consideration of hazards in accordance with Addendum 1. The list will be reviewed annually by the Environmental Services Senior Director and Safety Committee and their use may only be approved after a determination that other preventive and non-chemical means have been exhausted and control measures are needed to protect the health of those who use and work in the facility.

As with all pest infestations, emergency pest problems shall be initially addressed by using non-chemical interventions (i.e., vacuuming bee and wasp nests if in public areas). The facility allows for limited use of least-toxic pesticides for pest infestations that pose an immediate and serious health threat to the health and safety of patients, visitors or employees where non-chemical interventions have failed to resolve the problem.

The [Health Facility] will maintain detailed records of all chemical pest control treatments for at least three years. Information regarding pest management activities is available to the public at the facility's administrative office.

The [Health Facility] recognizes that all those who use the building have a role in reducing pest problems and reliance on pesticides. It is the policy of the facility to take the following preventive measures to eliminate pest-conducive conditions:

a. To reduce potential to introduce pests, especially cockroaches, all food products and other supplies in the food service area will be removed from cardboard shipping containers after arrival. Cardboard will be moved immediately to the recycling storage outside the buildings.

b. To facilitate cleaning in food service areas and reduce food sources for pests, non-refrigerated food product storage will be on open metal racks. Any new metal racks purchased will have locking wheels for ease in moving to clean under and behind.

c. When events are scheduled that include serving food, the cleaning staff will be informed at least one week in advance in order to arrange for prompt removal of trash and cleaning.

d. Where possible, inspection aisles of 4-6" in width will be maintained between walls and any appliances, stored items and other objects to facilitate visual inspection and regular cleaning. Shelving and hangers will be used in closets and other areas to keep stored objects off floors for ease of cleaning.

e. Upholstered furniture will not be used in areas where eating is permitted.

f. To reduce pest harborage, clutter will be avoided on shelves, in closets and cupboards and other locations. In general, supplies not used within one year will be offered to other staff who may have more immediate use for them, recycled or otherwise disposed of properly.

g. To improve access for cleaning, closets will have stored items placed on shelves, leaving the floor accessible for regular cleaning.

h. To prevent pest access to potential food items, edibles stored in rooms and closets will be stored in plastic or metal

containers with tight-fitting lids.

i. To prevent pest access to water, dripping faucets or other leaks will be repaired promptly. Mop buckets will be dumped daily, and damp mops hung from racks, head up, to dry.

j. Dumpsters will be placed away from buildings, on hard, easy-to-clean surfaces, and lids will be kept closed.

k. To maximize staff ability to be full partners in implementing IPM, all new staff will receive training on the IPM program, including in-house and contracted cleaning staff. Current staff will receive refresher training at least every two years.

Addendum: Least Toxic Pesticides

Least-toxic pesticides are any pesticide or pesticide product ingredients, which, at a minimum, have not been classified as or found to have any of the following characteristics:

(1) Toxicity Category I or II by the United States Environmental Protection Agency (EPA). These pesticides are identified by the words "DANGER" or "WARNING" on the label.

(2) A developmental or reproductive toxicant as defined by the State of California Proposition 65 Chemicals Known to Developmental or Reproductive Harm.

(3) A carcinogen, as designated by EPA's List of Chemicals Evaluated for Carcinogenic Potential (chemicals classified as a human carcinogen, likely to be carcinogenic to humans, a known/likely carcinogen, a probable human carcinogen, or a possible human carcinogen), the International Agency for Research on Cancer (IARC), U.S.National Toxicology Program (NTP), and the state of California's Proposition 65 list. Any of the following classifications shall deem the chemical a carcinogen and unacceptable:

- Known to the State of California to Cause Cancer (California)
- Group A: Human Carcinogen (EPA 1986 category)
- Group B: Probably Human Carcinogen (EPA 1986 category)
- Group C: Possible Human Carcinogen (EPA 1986 category)
- Known Carcinogen (EPA 1996 category)
- Likely Carcinogen (EPA 1996 category)
- Carcinogenic to Humans (EPA 1999 category)
- Likely to be Carcinogenic to Humans (EPA 1999 category)
- Suggestive Evidence of Carcinogenicity (EPA 1999 category)
- Known to be Human Carcinogens (NTP)
- Reasonably Anticipated to be Human Carcinogens (NTP)
- Group 1: Carcinogenic to Humans (IARC)
- Group 2A: Probably Carcinogenic to Humans (IARC)
- Group 2B: Possibly Carcinogenic to Humans (IARC)

(4) Neurotoxic cholinesterase inhibitors, as designated by California Department of Pesticide Regulation or the Materials Safety Data Sheet (MSDS) for the particular chemical,

(5) Known groundwater contaminants, as designated by the state of California (for actively registered pesticides) or from historic groundwater monitoring records (for banned pesticides).

(6) Pesticides formulated as dusts, powder or aerosols, unless used in a way that virtually eliminates inhalation hazard (for example, applied to cracks or crevices and sealed after the application, or as a directed spray into the entrance of an insect nest).

(7) Nervous system toxicants, including chemicals such as cholinesterase inhibitors or chemicals associated with neurotoxicity by a mechanism other than cholinesterase inhibition, or listed on:

- Toxics Release Inventory (TRI), EPA EPCRA Section 313 (Identified as "NEUR" on Table 1)
- EPA Reregistration Eligibility Decisions (RED)
- Insecticide Resistance Action Committee (IRAC) Mode of Action Classification:

- ♦ Acetylcholine esterase inhibitors;
- ♦ GABA-gated chloride channel antagonists;
- ♦ Sodium channel modulators;
- ♦ Nicotinic Acetylcholine receptor agonists /antagonists;
- ♦ Chloride channel activators;
- ♦ Octopaminergic agonists;
- ♦ Voltage-dependent sodium channel blockers; or
- ♦ Neuronal inhibitors (unknown mode of action).

(8) Endocrine disruptors, which include chemicals that are known to or likely to interfere with the endocrine system in humans or wildlife, based on the European Commission (EC) List of 146 substances with endocrine disruption classifications, Annex 13 (and/or any subsequent lists issued as follow-up, revisions, or extensions).

(9) (Regarding outdoor use) Adversely affect the environment/ wildlife, based on:

■ Label precautionary statements including "toxic" or "extremely toxic" to bees, birds, fish, aquatic invertebrates, wildlife or other non-target organisms, unless these organisms are the target pest and/or environmental exposure can be virtually eliminated.

■ Pesticides with ingredients with moderate or high mobility in soil, according to the Groundwater Ubiquity Score (GUS), or with a soil half-life of 30 days or more (except for mineral products). Persistence and Soil Mobility procedures appear below.

- ♦ If GUS (Groundwater Ubiquity Score) cannot be found, search for the aerobic soil half-life and soil-binding coefficient Koc. GUS is then calculated from the formula: GUS = log10(half-life)*(4 – log10 (Koc)).

(10) Have data gap or missing information in EPA registration documents, including pesticide fact sheets, or EPA reregistration eligibility decisions, which EPA is requiring the registrant to fulfill.

(11) Contaminants and metabolites recognized by EPA that violate any of the above criteria.

(12) Inert or active ingredients that are Chemicals Included on EPA's List 1 (Inerts of Toxicological Concern) or EPA List 2 (Potentially Toxic, High Priority for Testing).

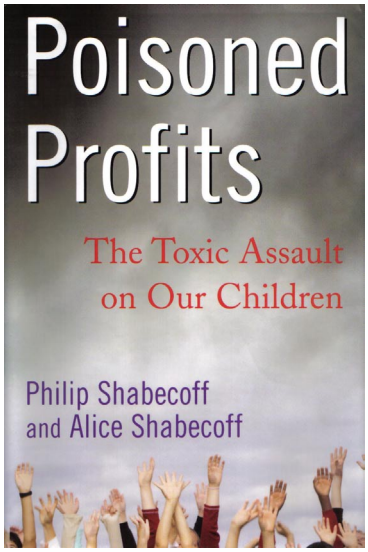
About the Report

Taking Toxics Out of Maryland's Health Care Sector was issued by the IPM and Health Care Facility Project, directed by the Maryland Pesticide Network and Beyond Pesticides, in partnership with Maryland Hospitals for a Healthy Environment. Jay Feldman, executive director of Beyond Pesticides, and Mike Boeck, project director for the IPM and Health Care Facility Project, are the authors of the report. Ruth Berlin, executive director, Maryland Pesticide Network, is a contributor. National experts who provided technical contributions and participated in the evaluation of the sites in the Project include Luis Agurto (president, Pestec, San Francisco, CA), Tom Green (president, IPM Institute, Madison, WI), and Chip Osborne (president, Osborne Organics, Marblehead, MA).

A complete copy of the report is available from Beyond Pesticides for $5.00 or can be found at www.beyondpesticides.org/hospitals. A copy of the earlier report, Healthy Hospitals: Controlling Pests Without Harmful Pesticides (2003) is also available on Beyond Pesticides Healthy Health Care web page.

Poisoned Profits: The Toxic Assault on Our Children

Philip Shabecoff and Alice Shabecoff, Random House, 2008, 353pp. $26.00.



This is a powerful, well-researched, and poignant book about "the toxic plague that is harming our children." The stories of the children victimized by toxic chemicals from Port Arthur, Texas to Dickson, TN to Toms River NJ to Fallon, Nevada, to Harlem, New York City are woven into an indepth discussion of technical studies, statistics, and the scientists' voice.

The authors' research finds, "The scientific method is a way of looking at and trying to understand the world. But, as we came to realize with some surprise during our research, uncertainty and controversy "flow through science like a river." They continue, "Science likes simplicity. But the world is infinitely varied. . .[I]t's almost impossible to study the various combinations of multiple chemicals that are today's reality." Then, "[A] study of exposure at any one time may be different from a study that examined another window of exposure."

The authors conclude that there is, however, adequate "proof" to find that purveyors of toxic chemicals are committing a crime and that government is the co-conspirator. They write, "[N]o golden rule of scientific endeavor has yet surpassed this, offered by Austin Bradford Hill, a noted English epidemiologist and statistician in the mid-1960s: 'All scientific work is incomplete, whether it be observational or experimental. All scientific work is liable to be upset or modified by advancing knowledge. That does not confer upon us a freedom to ignore the knowledge we already have, or to postpone the action it appears to demand at a given time.'"

Linking illness with chemical exposure has always been difficult. Even in communities where rare illnesses or birth defects, cited in the book, are highly elevated, the evidence is written off to random chance. "Out of the hundreds of studies of cancer clusters the CDC has made, they found only two that might represent cause and effect rather than chance."

Gene-environment interactions

One of the complexities that is found as a thread throughout the book is the connection between disease, genes, and environmental toxicants. The authors repeat a phrase they heard throughout their research, "Genetics loads the gun, but the environment pulls the trigger." Then there is the exquisite fine-tuning of neural circuits that occurs during children's development and the permanent brain damage that can occur as a result of exposure to neurotoxicants, such as mercury, lead, pesticides, PCBs and others. "The fetus and young children are further handicapped in the capacity to detoxify substances." Differences in DNA sequencing, or polymorphisms, establish our unique physical characteristics and vulnerability to environmental insults. "Yet a child might have a predisposition to asthma or autism that might never surface without the toxic assault." "Another minor gene variation can affect the level of enzymes available to protect against carcinogenic damage from pesticides or air pollutants." The conclusion: "It turns out that very few diseases are caused solely by a defective inherited gene. In most cases a chronic illness, such as cancer or autism, it is both –genes plus environment."

As the theories take on more proof, the stark statistics define what the authors call "the extent of the epidemic of childhood chronic illnesses. "Of America's 73 million children, almost 21 million, nearly 1 out of 3, suffer from one chronic disease or another. Cancer threatens the lives of 58,000 children. Almost 2.5 million live with disfiguring, debilitation birth defects. Those whose bodies and minds are poisoned with lead number 310,000. About 6 million children suffer and some of them die from asthma. Twelve million have some form of developmental disorder, from autism to ADHD and serious learning disabilities that cloud their minds and torment their behavior." Herbert Needleman, M.D. founds years ago that children with delinquent behavior were 4 times more likely to have high concentrations of lead in their bodies.

Crimes against children

The authors point out that it was the economist Milton Friedman who wrote that corporations have no responsibility "to make expenditures on reducing pollution beyond the amount that is in the best interest of the corporation. . ." And the authors conclude, "In the name of profit, industry continues to produce, deploy, and dispose of enormous quantities of chemicals. . ."

Change

The authors do preface their "crime story" with the belief that "change is possible," that "this wave of environmentally induced illness among our children is preventable." In response to their indictment, the authors urge the country to rise up and join the parents (captured in the book) who are fighting for their children: "Unless the rest of us join them in their anger and activism, however, decisive change will not happen [and] we are all accomplices in this crime against our children."

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Vol. 28, No. 4, Winter 2008-09

Using Rachel Carson's own words, Kaiulani Lee embodies this extraordinary woman in a documentary-style film, which depicts Ms. Carson in the final year of her life. Struggling with cancer, she recounts with both humor and anger attacks by the chemical industry, government and press as she focuses her energy to get her message to Congress and the people.

The film was shot in HD by Oscar-winning cinematographer Haskell Wexler at Ms. Carson's cottage on the coast of Maine.

A Sense of Wonder

Rachel Carson's love of the natural world and her fight to defend it

Written by and starring Kaiulani Lee, the film version of *A Sense of Wonder* is now available on DVD through Beyond Pesticides' online store at www.beyondpesticides.org.

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