PESPWire

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Innovative NYC Project to Reduce Pest-Related Asthma Triggers and Improve Asthma Outcomes

Healthy Homes Program, NYC Department of Health and Mental Hygiene

Asthma is the most common childhood chronic disease in the United States. In New York City (NYC), 13 percent of children age 12 and under are affected by asthma, translating to hundreds of thousands of children. Although some improvements have been seen in medical management, NYC's asthma hospitalization rates remain high.

Cockroaches and mice produce allergens that may trigger allergies and worsen asthma symptoms. Between 34-45% of children with asthma are allergic to cockroaches and 18-22% are allergic to mice. In NYC, households with cockroaches are 50% more likely to have asthma, and those with mice are twice as likely, compared to homes without pests. Studies have found that children with asthma living in housing largely free of cockroaches and mice have fewer symptom days, fewer hospitalizations, and fewer school absences than those in homes with pests.

In an effort to improve health outcomes and reduce avoidable hospital use, the NYC Health Department's Healthy Homes Program (DOHMH HHP) has partnered with OneCity Health on a new project for home-based asthma trigger reduction services, especially related to pests, in the homes of children with asthma. DOHMH HHP has contracted with three pest management professionals (PMPs) to provide specialized allergen reduction services using integrated pest management (IPM).

Specialized Allergen Reduction Services

IPM is an effective, prevention-based pest management method. Unlike traditional pest control which relies on pesticides, IPM addresses pests and building conditions that promote pests. According to DOHMH HHP, if pesticides must be used, IPM uses the least toxic chemicals, applied in the safest manner to protect people and pets.

What is OneCity Health?

OneCity Health is the NYC Health + Hospitals-sponsored Performing Provider System (PPS), formed under the auspices of the New York State Delivery System Reform Incentive Payment (DSRIP) program. Comprising hundreds of healthcare providers, community-based organizations, and health systems, OneCity Health is the largest PPS in New York City.

What is DSRIP?

The Delivery System Reform Incentive Payment Program (DSRIP) is part of NYS's Medicaid redesign initiative. Its principal goal is to reduce avoidable hospitalizations by 25% over 5 years. DSRIP's focus is on prevention in order to reduce costs, improve care and improve health outcomes. This project is supported by DSRIP funding.

In This Issue:

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For the OneCity Indoor Allergen Reduction Project, DOHMH HHP has added a specialized allergen reduction piece to basic IPM services. This component includes intensive cleaning of pest-infested areas using steam cleaning, HEPA vacuuming and scrubbing of components to remove roach excrement (frass) and food residue.

How Families Will Access the Service and What Will Be Done

As part of the overall project, OneCity is contracting with organizations that provide community health worker (CHW) home visiting services. CHWs will work with families to promote proper use of asthma medication and provide health education. CHWs will also perform a visual inspection for asthma triggers. If pests are identified or if the family reports pests in the home, the CHW will make a referral to DOHMH HHP.

The referral will be assigned to one of the PMPs working on the project to perform an inspection and treatment. During the initial visit, the PMP assesses home conditions, especially kitchens and bathrooms, and prepares for treatment. Pests and conditions conducive to pests are identified and documented, caregivers are educated about the treatment, pest monitoring devices are placed to help identify hot spots and measure the level of infestation, mouse traps and/or bait stations are placed if mice are present, and temporary bins are given to the families so they can safely store their food and other cabinet items during the home treatment.

During the follow-up visit, the PMP conducts the IPM treatment. Mice trapped since the first visit are removed, cockroaches and pest evidence are removed via HEPA vacuum, pest-infested areas are intensively cleaned by steam cleaning and HEPA vacuuming, areas with roach frass and food residue are scrubbed down, cracks, crevices and gaps in the cabinets are sealed, and holes and other pest access points plugged.

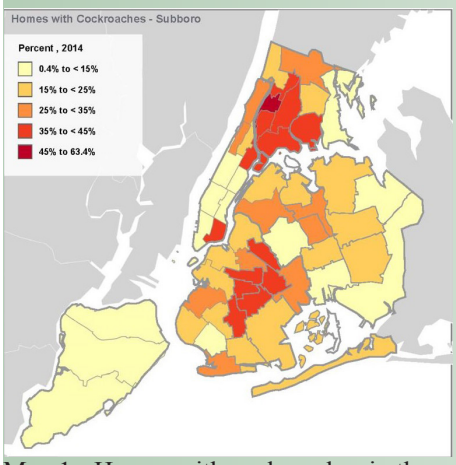
DOHMH will perform periodic spot checks to monitor the quality of IPM interventions. In addition, for building issues outside of the PMP scope of work, DOHMH will work with building owners to address other types of building conditions, including significant structural defects (e.g. large holes and gaps), mold contamination and water leaks.

Reducing Disparities and Making a Difference

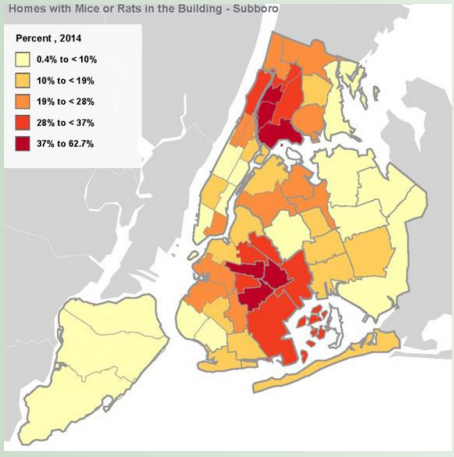
This new service has the potential to contribute to reducing disparities in asthma outcomes and avoidable hospitalizations by addressing housing quality issues. The project could serve to demonstrate the cost-effectiveness of integrating IPM into care delivery for patients whose asthma is not controlled by routine medical management.

NYC HEALTH+ HOSPITALS | ONECITY HEALTH

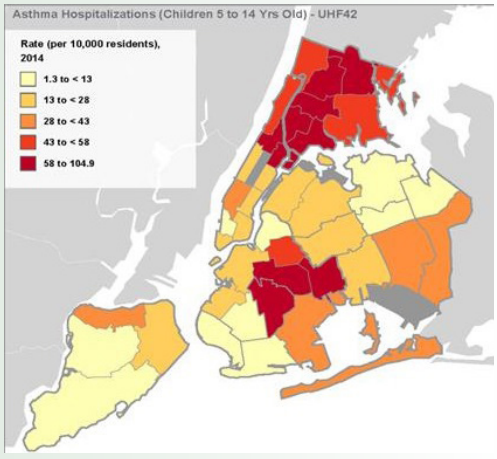
The following NYC maps show that cockroach (Map 1) and rodent (Map 2) activity in homes coincides with higher asthma hospitalization rates (Map 3).



Map 1 - Homes with cockroaches in the building

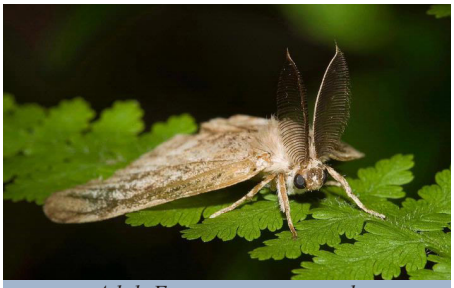


Map 2 - Homes with rodents in the building



Map 3 - Asthma hospitalizations, children 5 to 14 years old

Biopesticides are Working to Control Gypsy Moths



Adult European gypsy moth

Photo: Susan Ellis, Bugwood.org

The gypsy moth is one of 14 insects identified by the World Conservation Union in its recently released list of the *100 World's Worst Invasive Alien Species*. For over a century, the gypsy moth has earned its reputation as one of the most notorious pests of hardwood trees in the eastern United States. It defoliates a million or more forested acres each year and kills or weakens trees that are defoliated in consecutive years. Stands of oak are the gypsy moth's preferred host followed by other hardwoods, such as apple, sweetgum, gray and white birch, and poplar.

The gypsy moth was introduced into the United States from Europe in 1869 by a Massachusetts businessman hoping to breed the gypsy moth with the silkworm to produce hardier US silkworms. The moths escaped from his backyard and the rest is history. Over the past 100+ years, millions of dollars have been invested in researching methods for controlling gypsy moth, including using pesticides, releasing parasitoids and predators, and using fungi, viruses and bacteria.

The minute Ooencyrtus parasitic wasp attacks freshly laid gypsy moth eggs

Many natural enemies are now established in the parts of North America that have gypsy moth and can help to control modest population outbreaks. These organisms infect and kill the larvae without harm to people or beneficial insects like honeybees. Natural parasitoids of the gypsy moth include several wasp and fly species, many of which lays their eggs in the caterpillars. When the eggs hatch, the larvae feed on the gypsy moth caterpillar ultimately killing their hosts. Other wasps parasitize the gypsy moth eggs. Predators of the gypsy moth include ground beetles, ants, nematodes, birds, and small mammals.

These bacteria, viruses, and other naturally occurring organisms can now be mass produced as pesticidal products. These biopesticides can be particularly effective when incorporated into Integrated Pest Management (IPM) programs that include conventional pesticides.

Oak branch defoliated by gypsy moth larvae

Photo: Louis-Michel Nageleisen, Département de la Santé des Forêts, Bugwood.org

Gypsy moth larva

Photo: John H. Ghent, USDA Forest Service, Bugwood.org

Biopesticides can also be effective in helping delay the resistance that pests commonly develop when a pesticide is used repeatedly. When a biological pesticide is substituted for a conventional pesticide, the cycle of repeated applications that leads to pest and disease resistant populations is broken, extending the effective lifespan of the conventional product.

Only the larval stage of the gypsy moth damages trees and shrubs. While feeding behavior can vary, gypsy moth larvae typically eat the leaves of host trees then move on in search of another host tree to feed upon. The larvae reach maturity between mid-June and early July. The hatching of gypsy moth eggs and larval emergence coincides with the budding of most hardwood trees in the spring. That is the time for the first application of the biopesticide *Bacillus thuringiensis* variety *kurstaki* (*Btk*), a naturally-occurring soil bacterium that has become an important tool in many IPM programs.

Btk is a microbial pesticide that must be eaten by insect larvae to be effective. After ingesting *Btk*, the larvae stop feeding and die within a few days. Because *Btk* must be eaten to work, good spray coverage of the plant leaves is essential for control. *Btk* used for controlling gypsy moth has no effect on other types of insects (such as bees) except for other larvae that eat the treated leaves. It is also considered "practically nontoxic" to humans and other vertebrates. *Btk* works best as part of an IPM plan.

A gypsy moth larva killed by NPV. Larvae killed from by infection "wilt" and typically take on a V shape

The *Lymantria dispar nucleopolyhedrosis virus* (NPV) is a naturally occurring organism, that persists in the soil and bark, and has been developed as a microbial pesticide specific to the gypsy moth. It is presently registered by the EPA under the name "Gypchek", and produced in limited quantities by the USDA Forest Service, with use restricted to areas where non-target impacts are rare. The NPV, also called 'wilt', has the ability to causes a dramatic collapse of gypsy moths when their populations are high.

Gypsy moths 'catch' the virus when they eat foliage contaminated with viral occlusion bodies which contain the virus particles. The alkaline condition of the gypsy moth gut dissolves the occlusion bodies and the virus particles penetrate through the gut wall. The virus reproduces rapidly, and quickly liquefies the moths' internal organs, causing death.

Once the gypsy moth eats foliage with the NPV virus, it takes roughly 10 – 14 days for death to occur. The virus is unable to infect humans or other mammals because it cannot replicate in mammalian cells. Physical barriers called barrier bands are another tactic to block gypsy moth larvae from feasting on trees. These consist of double-sided tape, sticky barriers, petroleum jelly, or grease applied to the surface of an impermeable material to prevent larvae from crawling up the trunks of susceptible trees.

One fungal pathogen, *Entomophaga maimaiga* (*Em*), has been successful in controlling gypsy moth populations in the eastern United States. The fungus has not been successfully produced commercially but spreads naturally and is a very important component in keeping gypsy moth populations suppressed once they have become established in an area. The caterpillars become infected when they contact the fungus on the ground as they crawl from tree to tree. Fungal spores actively shoot out of the dead larvae, disperse into the environment, and spread quickly to other caterpillars.

Finally, gypsy moth caterpillars enter the pupal stage when they metamorphose into moths ready to reproduce. Female gypsy moths attract male moths by emitting a pheromone. This mating phase is when imitation pheromones are effective in disrupting mating. When pheromones are applied throughout an area, the male moths are confused by the multitude of aerial plumes. This significantly lowers their chances of locating and mating with a female, effectively breaking the reproductive cycle.

Pheromones are effective as a stand-alone treatment in the national *Slow the Spread* program to manage gypsy moth. This program is implemented along the expanding front of gypsy moth populations, where populations are recently established and at very low densities. However, it is not effective as a control method, either stand-alone or in conjunction with other control measures, in suppression programs where the goal is to prevent defoliation by established, high-density populations.

To help manage the gypsy moth on smaller properties, an approach is to collect and destroy egg masses and caterpillars. Exercise caution is when handling the egg masses as the layer of scales that coat them can cause an allergic reaction.

Maintaining the health of your specimen trees will go a long way in giving them an edge in surviving a gypsy moth defoliation event. Best practices for tree management in areas prone to gypsy moth invasions include proper fertilization, following the label when applying herbicides near trees, and using mulch or ground cover plants.

EPA would like to thank the experts from the Maine Forest Service, U.S.Forest Service, and USDA Animal and Plant Health Inspection Service who lent their knowledge to the development of this article.

Slow the Spread Program

Since Congress funded the Slow the Spread Program (STS) in 2000, the USDA Forest Service and eleven states located along the leading edge of gypsy moth populations have implemented a region-wide strategy to minimize the rate at which gypsy moth spreads into uninfested areas. While traditional approaches to gypsy moth management address potentially defoliating populations occuring in generally infested areas, the STS project focuses on populations in the area between that of general infestation and generally uninfested. The project attempts to meet its goals by conducting intensive monitoring with pheromone-baited traps in order to detect isolated or low-level populations in the transition zone. Although all available tactics to control gypsy moth populations are considered, emphasis is placed upon the most environmentally benign tactic which meets management objectives.

As a direct result of this program, spread has been dramatically reduced by more than 70% from the historical level of 13 miles per year to 3 miles per year. In its first 6 years, this program prevented the impacts that would have occurred on more than 40 million newly infested acres. To learn more, please visit Slow the Spread's website.

The Importance of an IPM Champion in School Districts

Marcia Anderson

For the past ten years, Pennsylvania's Upper Merion Area School District (UMASD) has embraced Integrated Pest Management (IPM) as a safe, smart and sustainable approach to pest control that helps safeguard children's health. The district's administration knows that exposure to pests can adversely affect children, and that the unnecessary exposure to pesticides is just that, unnecessary!

UMASD Director of Operations Frederick (Fred) Remelius believes every school district needs a champion to find IPM success. From day one he has been that champion for Upper Merion, seeking involvement from everyone within the district.

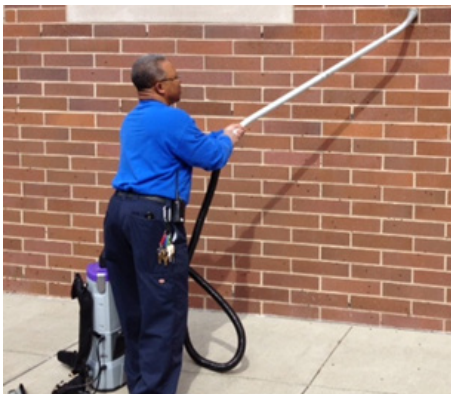
In Pennsylvania, only state-licensed applicators are allowed to apply pesticides in a school. The state also has IPM regulations requiring all schools to adopt IPM programs, and provides comprehensive IPM guidance for schools.

This has prompted the change in many Pennsylvania school districts from reactive, pesticide-centric pest control to preventing pest infestations through IPM, with an emphasis on pest monitoring.

Mr. Remelius encourages facility managers everywhere to step out of their comfort zone and become IPM educators and champions. Mr. Remelius is a shining example of how a facility manager can utilize the health benefits of IPM to obtain buy-in for district-wide implementation.

IPM can significantly reduce asthma triggers and improve indoor air quality. In addition to being a health concern, asthma is a financial burden for Pennsylvania school districts, as student attendance is linked to school funding. Approximately 15% of the Upper Merion's nearly 4,000 students have asthma. To obtain and keep the buy-in of school staff, Fred regularly reminds them that mice and cockroaches are two of the most common asthma triggers. Discussing IPM in terms of reducing asthma triggers is an effective way to get the attention of principals and nurses. By taking this approach, Fred has had few challenges obtaining buy-in from staff and administration.

Mr. Remelius began the process of implementing IPM at Upper Merion by educating his department. The head custodians attended IPM training, where they learned to eliminate the pests' food and water sources.



Vacuuming a swarm of insects on the outside of a school

Photo: Fred Remelius

Next, Mr. Remelius turned his attention to educating sanitation and building maintenance staff, followed by engaging a widening group of other school staff.

Fred's favorite reminder is "*If you feed them, they will come*!" One of the main staff behaviors he and his team had to change was inadvertently feeding pests. Before IPM was implemented in the district, teachers would store food in their desks and create make-shift kitchenettes in classroom closets. To tackle this problem, Fred and his team refined the district's sanitation protocols to tackle classroom clutter, food and waste. For example, facilities provided larger, lined trash cans for each classroom to better contain and isolate waste. Not all food can be eliminated from the classroom, but ensuring that food does not become a meal for pests is possible.

The Importance of Positive Identification

Correctly identifying a pest helps determine the threat it poses and how it should be managed. Understanding a pest's action thresholds, the point at which action is required to reduce that pest's numbers, is also extremely helpful. Many classrooms can tolerate the occasional house fly or a few scavenging ants without the need for pest control action. On the other hand, a single yellow jacket in a classroom necessitates an immediate response.

Boxelder bugs cling to a school building

Photo: Fred Remelius

Upper Merion staff encountered a swarm of boxelder bugs clinging to a middle school building. Mr. Remelius identified the boxelder bugs, then did some research to discover the best way to manage the swarm. He discovered that the bugs were benign, and that simply removing them would solve the problem. The team rectified the situation with a vacuum.

Sharply contrasting this situation's IPM-based resolution was a different district's response to a spider. In this district, which did not have an IPM program, a teacher thought a spider in her classroom was a brown recluse. Without confirming the identification, the entire school was treated with pesticide. Had they followed an IPM approach, the harmless spider would have been properly identified, and it would have been determined that no pest control action was necessary.

Mr. Remelius strongly encourages staff in the six UMASD schools to become engaged in IPM. He's found that once the administrators understand the health issues posed by pests, they are motivated to work with teachers, staff, and students to reduce pest problems and pest conducive conditions. Mr. Remelius provides weekly updates to the administration on maintenance and sanitation protocols and includes pictures of pest problems and pest-friendly areas. He also provides simple brochures and e-mails to teachers and administrators as subtle reminders to keep up their good pest prevention work.

Even with an effective IPM program in place, Upper Merion continues to face pest pressures. Mice in older facilities are one of their more challenging pest issues. Mice had spent years developing hidden pathways in ceilings and behind walls in these older buildings. Occasionally they would chew right through ceiling tiles and drop into the cupboards. Because the mice confined most of their activity to nighttime, they often went unnoticed.

Ultimately, the district's maintenance staff recognized and then followed the mouse trails to find pest entry points. They sealed the holes, and closed any gaps in the building that they found. In areas prone to mouse problems, the custodians placed peanut butter baited traps after school hours and collected the mice they caught in the morning before staff and students returned. Multiple IPM techniques keep the rodent population well within control in Upper Merion schools.

Through the use of integrated pest management, the Upper Merion School District has found success in both controlling pests and maintaining a healthy indoor environment for students, teachers, and staff. By focusing on preventing infestations and IPM-based tactics, the district will continue to deftly handle pest problems as they arise while minimizing any impact on student education.

For more information, Mr. Remelius can be reached at fremelius@umasd.org

Funding Opportunity

National Indoor Environments Program: Reducing Public Exposure to Indoor Pollutants

Closing Date: February 17, 2017

U.S. EPA's Office of Air and Radiation (OAR), Indoor Environments Division (IED) has posted a new RFA (EPA-OAR-ORIA-17-02) www.epa.gov/grants/air-grants-and-funding, and www.grants.gov/web/grants/view-opportunity.html?oppId=290725. IED's priorities include, yet are not limited to, (1) radon, (2) indoor environmental asthma triggers, and (3) multiple indoor air contaminants.

Examples of projects eligible for funding include those that result in (1) an increase in the number of homes and schools built with radon-reducing features, (2) an increase in the number of home visiting programs providing in-home asthma interventions by licensed providers in disproportionately affected communities, and (3) an increase in the number of homes, schools and office buildings with interventions that reduce exposure to multiple indoor air contaminants.

To learn more about IED's currently funded (2014–2017) cooperative agreements and partners, visit www.epa.gov/indoor-air-quality-iaq/cooperative-agreement-funding-indoor-air-quality.To learn more about healthy indoor environments and indoor air quality, visit www.epa.gov/indoor-air-quality-iaq. Opt in here to receive periodic email updates about healthy indoor air.

Change Coming to Grant Application Process

Starting in December 2017 applicants will have to apply through Grants.gov using the Workspace submission method. Grants.gov expects this change will benefit applicants in a number of ways due to the features it will offer. Workspace has been available to applicants for quite some time and currently they can apply using it or they can apply using the older single PDF application package of forms (what Grants.gov calls the "legacy" package). In December 2017, Grants.gov will no longer support the legacy submission method and applicants will be required to apply using Workspace. Accordingly, we will be revising our standard grants.gov instructions to include the paragraph below to put applicants on notice about this.

Please note that Grants.gov is strongly encouraging users to sign up for and use their "Workspace" feature when applying for opportunities. Grants.gov will be phasing out the "legacy" application process, so EPA recommends that all applicants begin using Workspace as soon as possible so they are prepared when the "legacy" application process is no longer available.

Upcoming Events

Annual Conference, Association of Applied IPM Ecologists
February 6-7, 2017
Napa, CA

Global Summit of Pest Management Services
April 2-4, 2017
New York, NY

National Association of School Nurses conference
June 30 - July 3, 2017
San Diego, CA

National Pest Management Association's PestWorld 2017
October 24-27, 2017
Baltimore, MD

9th International Integrated Pest Management Symposium
March 19-22, 2018
Baltimore, MD

School IPM Webinars
Presented by the EPA Center of Expertise for School IPM

- January 24, 2017- *How Integrated Pest Management Helps Control Pests of Public Health Importance in Schools*
- February 21, 2017- *More Than Just a Firm Handshake: Bid and Contract Guidance for Securing IPM-Based Services for Schools*
- March 14, 2017 - *Feed the Kids, Not the Pests: Effective IPM for Cafeterias and Kitchens*
- April 11, 2017 -- *Contending with Invasive Plants on School Grounds*

EPA News

EPA Grant of More Than $215,000 Will Aid Oklahoma's Pesticide Program

The U.S. Environmental Protection Agency recently awarded the Oklahoma Department of Agriculture, Food and Forestry a grant of $216,922 for implementing pesticide programs. These funds are part of a cooperative agreement between EPA and the state of Oklahoma to support the state in continuing to administer an effective pesticide regulatory and enforcement program. The funds will go toward for enforcement, applicator certification, worker protection standards, pesticides in water, and endangered species programs.

EPA Takes Action to Prevent Poisonings from Herbicide

The EPA is finalizing safety measures to stop poisonings caused by ingestion of the herbicide paraquat, which can also cause severe injuries or death from skin or eye exposure.

Since 2000, there have been 17 deaths – three involving children – caused by accidental ingestion of paraquat. These cases have resulted from the pesticide being illegally transferred to beverage containers and later mistaken for a drink and consumed. A single sip can be fatal. To prevent these tragedies, EPA is requiring:

- new closed-system packaging designed to make it impossible to transfer or remove the pesticide except directly into the proper application equipment;
- special training for certified applicators who use paraquat to emphasize that the chemical must not be transferred to or stored in improper containers; and
- changes to the pesticide label and warning materials to highlight the toxicity and risks associated with paraquat.

In addition to the deaths by accidental ingestion, since 2000 there have been three deaths and many severe injuries caused by the pesticide getting onto the skin or into the eyes of those working with the herbicide. To reduce exposure to workers who mix, load and apply paraquat, EPA is restricting the use of paraquat to certified pesticide applicators only. Uncertified individuals working under the supervision of a certified applicator will be prohibited from using paraquat.

Paraquat is one of the most widely-used herbicides in the U.S. for the control of weeds in many agricultural and non-agricultural settings and is also used as a defoliant on crops such as cotton prior to harvest.

Actions on specific pesticides are one way that EPA is protecting workers from pesticide exposure. EPA's Final Certification and Training and Worker Protection Standard rules will also protect pesticide applicators and farmworkers.

To View the docket on www.regulations.gov: EPA-HQ-OPP-2011-0855-0112