

Maine Board of Pesticides Control

**Miscellaneous Pesticides Articles
July 2015**

(identified by Google alerts or submitted by individuals)

Some Maine retailers phasing out products that harm bees

[centralmaine.com/2015/05/26/some-maine-retailers-phasing-out-products-that-harm-bees/](http://www.centralmaine.com/2015/05/26/some-maine-retailers-phasing-out-products-that-harm-bees/)

By Eric Russell Portland Press Herald | @PPHEricRussell | 207-791-6344

A growing number of Maine retailers have begun phasing out use of a class of pesticides that research shows harms honey bees, but consumers may still be confused about what stores have done to get rid of them.

Neonicotinoids have come under closer scrutiny because of their effect on bees, which are vital to plant pollination, but the Environmental Protection Agency still hasn't taken a firm stance on banning production. Retailers, in part because of public pressure, are attempting to address the problem pesticides themselves, but there is no uniform policy. Some stores have pulled products with neonicotinoids from shelves, some have begun labeling them and some have done nothing, creating confusion among consumers about which plants to purchase.



Pam Jones of Kennebunk holds a heather plant on Tuesday that she bought at Home Depot in Biddeford recently. Because the label on the pot didn't list any pesticides, Jones thought she was buying a pesticide-free heather plant. When she pulled the plant out of the pot to put it into the ground, she was surprised to find a label at the bottom of the pot stating the plant was treated with a pesticide containing neonicotinoids. She thinks plants that contain pesticides should be clearly labeled in an easy to see place. Portland Press Herald photo by Gregory Rec





Pam Jones of Kennebunk holds a heather plant on Tuesday that she bought at Home Depot in Biddeford recently. Because the label on the pot didn't list any pesticides, Jones thought she was buying a pesticide-free heather plant. When she pulled the plant out of the pot to put it into the ground, she was surprised to find a label at the bottom of the pot stating the plant was treated with a pesticide containing neonicotinoids. She thinks plants that contain pesticides should be clearly labeled in an easy to see place. Portland Press Herald photo by Gregory Rec

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Pam Jones, who lives in Kennebunk, found that out the hard way.

She uses organic soil in her garden and tries to avoid pesticides. When she purchased a heather plant recently from the Home Depot in Biddeford, she assumed it was free of neonicotinoid pesticide because there was no label on the plant indicating its presence.

It wasn't until Jones got home and took the plant out of its temporary pot that she saw the label — stuck to the bottom of the plant.

"If that's where they are putting these labels, what's the point?" she said. "When I went back to the store, the clerk said several other customers had asked about labeling as well."

Matt Harrigan, spokesman for Atlanta-based Home Depot, which has more than 2,200 stores worldwide, said the company — with guidance from the EPA — is still monitoring research on the effects of neonicotinoids on honey bees.

"In the meantime, we're one of the few retailers that has started requiring our suppliers to label neonic-treated plants so customers who believe neonics are impacting the bee population won't purchase those plants unknowingly," Harrigan said in a statement. "The fact is, most nurseries sell at least some plants treated with neonics."

Harrigan said all plants sold at Home Depot are supposed to be clearly labeled, but he couldn't speak for every store.

Lowe's, the second-largest home improvement chain, announced last year that it was phasing out the sale of all products that contain neonicotinoid pesticides within 48 months. However, products that still contain neonicotinoids may not all be labeled.

"We are currently working with growers and suppliers of live plants to eliminate the use of neonic pesticides on bee-attractive plants we sell and encouraging them to use biological pest control methods," said Steve Salazar, manager of corporate communications for Lowe's, based in North Carolina. "We plan to have plants and nursery products tagged with information highlighting bee health and encouraging customers to be mindful of pollinator health when using pesticides. The timeframe for adding the tags is being determined."

Two southern Maine retailers, Eldredge Lumber and Hardware in York and Kittery Ace Hardware, have already removed several lawn and garden products that contain neonicotinoids. The stores also have stopped carrying the widely used weed killer Roundup and is considering discontinuing other products that may have adverse environmental impacts.

"It is easy to order the stuff into the store, but almost impossible to return it to the manufacturers," said owner Scott Eldredge. "Sure, I might lose some sales, but I don't care. There are potentially less harmful alternatives, and my staff is ready to help the public make better, safer choices."

Eldredge said he hopes to eventually make his stores completely chemical-free.

Katherine Paul, associate director of the Organic Consumers Association and a Freeport resident, said many more retailers nationwide have taken steps to eliminate the pesticides, although all have different timelines and guidelines for labeling.

Some other retail chains have yet to update their policies on neonicotinoids, she said, but are facing growing pressure.

The movement away from neonicotinoids is in part a response to a study published by Environmental Science and Pollution Research that found that pesticides were a key contributing factor in the population decline of honey bees.

The Environmental Protection Agency last month issued a moratorium that restricts the use of new pesticides, but the policy does not apply to products currently on the market.

"Unfortunately, the EPA, in deference to large pesticide-makers, is slow to move on regulating toxins like neonicotinoids," Paul said. "The shift away from toxic pesticides shows the power of consumer pressure on corporations to do the right thing."

Staff Writer Eric Russell — 791-6344

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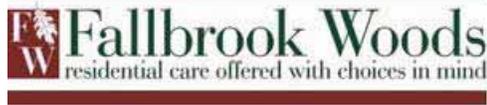


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News

Turf wars: Health debate accompanies Portland-area artificial fields



[William Hall](#)

Tuesday, May 12, 2015 at 8:50 am

PORTLAND — Walking by the shuttered stands of Fitzpatrick Stadium, where final touches are now being made on a new artificial turf field, you might believe the adage: The grass really does grow greener on the other side of the fence.

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Photo: *Ben McCanna / For The Forecaster*

Caleb Johnson, a subcontractor of Northeast Turf of South Portland, smoothes freshly laid artificial turf at Fitzpatrick Stadium in Portland on Thursday, May 7.

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Photo: *William Hall / For The Forecaster*

"Crumb rubber," like the pellets seen here at a Yarmouth High School field and used as infill in other area artificial-turf playing grounds, may be linked to cancer, some health experts warn.

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HARBORVIEW

Tony Johnson, an employee of Georgia-based Sprinturf, puts the finishing touches on the soccer lines at the Yarmouth High School turf field two years ago.



Photo: *File*

Construction of an artificial turf field at the Edward J. McMann Outdoor Athletic Complex at Morse High School in Bath in the summer of 2013.



Photo: *File*

Employees of Sports Turf International, a Scarborough company, install the turf playing field at Scarborough High School in 2006.

But some critics think recent alleged health concerns and questions about turf costs make playing grounds like Fitzpatrick, scheduled to re-open in less than a month, merely a field of dreams.

In October, NBC News aired [a report about Amy Griffin](#), a women's soccer coach at the University of Washington, who had noticed a disturbing trend. Beginning in 2009, Griffin has compiled a list of 38 soccer players struck with cancer.

All 38 had played on artificial turf, and 34 of them were goalies, who are constantly diving into the stuff.

"I've coached for 26, 27 years," she told NBC. "My first 15 years, I never heard anything about this. All of a sudden it seems to be a stream of kids (getting sick)."

Neither Griffin nor NBC claimed there was a causal link between the turf and cancer. But the coincidence has been enough to fuel a simmering debate about the safety of crumb rubber, the tiny pellets of recycled car tires used as "infill" cushioning in nearly all of the country's 11,000 artificial fields.

The rubber's composition is hard to pinpoint, but often includes toxic chemicals such as lead, other heavy metals and carbon black. Many of these are cancer-causing, and can be especially dangerous to children and teens, whose bodies are still developing.

Nevertheless, Portland has gone ahead with plans to spend \$835,000 to replace the artificial turf and surrounding running track at 6,000-seat Fitzpatrick.

The new field, including dark-blue end zones and emblazoned with a Portland High School bulldog logo, is expected to open by June 20 for the state lacrosse championship and to be hosting football and soccer this fall, according to Ethan Owens, the city's recreation and athletic facilities manager.

Nine of the 17 high schools in The Forecaster's coverage area now send their athletes to play on artificial turf fields. Two of those – Fitzpatrick and the Yarmouth High School varsity field – are replacements for man-made grass installed in 2001. At that time, the two were among the first artificial-turf playing surfaces in the state.



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Since then, turf-adopters have included Cape Elizabeth, Deering, Falmouth, Morse and Scarborough high schools, as well as The Hyde School in Bath and North Yarmouth Academy.

And as at Fitzpatrick, Portland may double down by replacing the artificial turf at Deering's Memorial Field in 2017, according to a city memo.

But opinion is divided about the fake fields.

Crumbs of evidence

School Administrative District 51 is now [considering plans for a \\$1.6 million turf field at Greely High School in Cumberland](#). Yet the proposal has been under review for six months and it's not clear when or if a decision will be made, according to Eliza Miller, chairwoman of the district's Athletic Advisory Board.

Regional School Unit 5 in 2013 [rejected a similar proposal at Freeport High School](#). So did South Portland in 2010. Morse built its \$580,000 artificial-turf field in 2013, but only after the [Bath City Council overcame three years of opposition](#), including a public referendum that repealed an earlier approval.

While most local opposition has focused on the high up-front costs of installing artificial turf, concern about the health effects of crumb rubber has prompted other regions to reconsider their use of turf.

Kennedy Catholic High School in suburban Seattle [decided not to use crumb-rubber infill](#) after the school principal viewed the NBC report. Last month, voters in Concord, Massachusetts, [nearly passed a proposed two-year moratorium](#) on the town's use of artificial turf.

The Los Angeles Unified School District and the New York City Parks Department both stopped construction of new fields with crumb rubber several years ago. The California legislature is now considering banning the use of state funds for such fields. And some municipalities have required chemical testing of their artificial-turf fields before players set foot on them.

Owens isn't worried, however.

"It's pretty clear that there are really no issues," he said in a recent interview. "I kind of find it odd that we keep hearing these reports, when it's out there pretty explicitly that there really are no troubles with the rubber."

He said the city's request for the turf replacement took a year to draft, and required the field to meet high industry standards for safety factors such as shock absorbency.

(Three turf companies submitted bids on the project; the winning bidder, Northeast Turf of South Portland, also installed the stadium's first artificial surface.)

But there was no standard set for chemical safety and no requirement for study or testing.

"I don't think we did (testing) because of the information that is out there already," Owens said. "I think we felt there was no need because we would rely on the (industry) standards and the ... studies that had previously been done."

Yarmouth's athletic director, Susan Robbins, shares Owens' confidence in the safety of artificial turf. She called the NBC report "sensationalized."

"There's absolutely no link (to cancer)," she said recently. "As a parent here, I would never put my own children at risk if I thought there was."

Like Owens, she cited scientific studies touting the safety of artificial turf. Fact sheets published by the turf industry cite dozens of them.

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But some health experts claim the studies are too limited to be useful, examining only a small number of fields and the effects of only a small number of chemicals.

And regardless of the scientific debate, these experts say, there has been no study of turf's long-term effects, simply because today's fields haven't been around very long.

In the beginning, AstroTurf

Artificial turf dates to 1966, when the first brand, AstroTurf – basically, short-pile nylon carpeting laid over concrete – was installed at the Houston Astros' indoor baseball stadium. But crumb rubber infill has been used less than 20 years.

Reflecting the uncertainty, both the federal Environmental Protection Agency and the Consumer Product Safety Commission have recently back-pedaled from claims they made more than five years ago that artificial turf is safe.

The EPA's website now states that it "is not possible to extend the results beyond the four (artificial fields studied) or to reach any more comprehensive conclusions without the consideration of additional data."

And a CPSC spokesman last month told an Atlanta reporter that "what was done in 2008 was not good enough to make a claim either way as to the safety of those fields."

Local sports experts are keeping a close watch on the potential cancer risks of turf.

"There certainly seems to be some sort of a connection. Maybe it's worth a second look, to continue the research," said Matt Gerken, head athletic trainer at the University of Southern Maine, which installed turf in 2011. "But where do you draw the line?"

"For now, we will continue to watch (the health risks) until we start to feel it's a problem. It hasn't risen to that level yet."

Gerken, who served as trainer to the USM women's soccer team for 15 years, speculated whether crumb rubber infill could be inhaled, ingested or ground into an open cut or abrasion.

"Those rubber pellets get everywhere, cleats, coolers, socks," he said. "Those things migrate."

At SAD 51, Miller said, "We've looked at the reports, and are investigating options for infill" on the proposed Greely field. School Board members and Cumberland residents have already asked questions about artificial turf's safety, she said.

Back at Fitzpatrick, Owens doesn't dismiss the cancer claims entirely.

"Like any product, you can buy the Yugo or you can buy the Cadillac," he said. "Companies that make the Cadillac (turf) put in their time, they do the research, they make sure the rubber they use is a clean rubber. The others? Well, who knows where their rubber comes from?"

Artificial turf provides a more uniform playing surface that is easier on athletes' joints, he adds. And the high price tag of the turf is offset by maintenance that is far less costly than a natural grass field's.

Still, municipalities such as Montgomery County, Maryland, estimate that the need to replace turf every eight years or so makes the long-term costs of both field types about the same.

Owens believes the bigger advantage is the heavy use turf can take. Fitzpatrick could only accommodate about 140 hours of use annually when the field was grass; in its last season of use, the turf field hosted 3,500 hours of play.

"If I was going to have this as a grass field, there would be a night and day difference," he

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said. "You'd only have varsity teams out there. You wouldn't have community use."

Last week, as workers prepared to lay down the first rolls of new turf, a visitor wondered when the project would be finished.

"It can't be soon enough," said Patricia Allen, whose children attended Portland schools and who often walks the track. "I worry a bit when I think about those rubber bits and what they could do. But I guess that's a risk we have to take."

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US EPA forced to decide this month on pesticide's fate

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Buffer zones are required around fields treated with some pesticides, including chlorpyrifos, which has been linked to neurological effects in children.

The EPA is on the clock to decide the future of a popular pesticide linked to health problems

June 11, 2015

By Brian Bienkowski (.../..)

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 Environmental Health News

A California appeals court ruled this week that the U.S. Environmental Protection Agency has until the end of this month to decide whether or not to ban a widely used pesticide linked to a number of health problems.

The order, filed yesterday by the 9th Circuit Court of Appeals, forces the EPA's hand on the pesticide chlorpyrifos (pronounced KLOR – pie –ra – phos), one the most commonly applied organophosphate pesticides with an estimated 10 million pounds applied annually.

While banned for more than a decade for household use, it's still used commercially on corn, soybeans, fruit and nut trees and some golf courses. In 2012 the EPA required homes and schools to have buffers to reduce exposure.

The order is in response to a lawsuit filed in 2007 by the Pesticide Action Network and the Natural Resources Defense Council calling for the EPA to cancel registration for the pesticide.

While manufacturers such as Dow Agrosciences have maintained the safety and efficiency of chlorpyrifos, scientists have expressed concern over what it does to exposed people. Various studies have linked it to birth defects, low birth weights (<http://www.ncbi.nlm.nih.gov/pubmed/15238288/>) and impaired brain development (http://www.epa.gov/ncer/events/news/2010/04_05_10_feature.html), and endocrine disruption (<http://www.ncbi.nlm.nih.gov/pubmed/9588346>).

Fetuses exposed to the pesticide while in the womb are most at risk.

The EPA has until June 30 to respond to the lawsuit. **[See yesterday's court order here.]** (<http://cdn.ca9.uscourts.gov/datastore/opinions/2015/06/10/14-72794.pdf>)

"It is time for EPA to protect children in the face of overwhelming scientific evidence that this pesticide causes brain damage in children," said Earthjustice attorney Patti Goldman, who represented the groups in the lawsuit, in a statement. "EPA has dragged its feet for far too long in the face of harm to children and workers."

An EPA report earlier this year found that chlorpyrifos poses health risks to workers who mix and apply it and also can contaminate drinking water.

"We are concerned about some workers who mix, load and apply chlorpyrifos to agricultural and other non-residential sites," the EPA wrote about the report. "We are also concerned about workers who work around areas that are treated with chlorpyrifos, even if they are not using chlorpyrifos products as part of their jobs."

If EPA intends to deny the administrative petition, "the final denial shall be issued no later than September 15, 2015," according to the court order.

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For questions or feedback about this piece, contact Brian Bienkowski at bbienkowski@ehn.org (mailto:bbienkowski@ehn.org).



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11 June **The more they dig, the more they find: DDT cleanup continues for mid-Michigan town.** (<http://www.environmentalhealthnews.org/ehs/news/2015/jun/michigan-superfund-ddt-epa-birds-health-pesticide>) Federal, state officials are making progress cleaning up harmful chemicals in St. Louis, Michigan, but more work remains and there is still no health study. Environmental Health News (<http://www.environmentalhealthnews.org>).

9 June **Visiting a national park? Be prepared to learn about climate change.** (<http://www.environmentalhealthnews.org/t/1762574135413031456>) The National Park Service is not only trying to reduce its own carbon footprint, but yours as well. And visitors don't seem to mind. Daily Climate (<http://www.dailyclimate.org>).

6 June **Unintended consequences.** (<http://www.environmentalhealthnews.org/ehs/news/2015/jun/honeybees-bald-eagles-epa-protection-habitat-chemicals-pesticides>) The Bald Eagle Protection Act, signed into law 75 years ago on June 8, 1940, could offer a lesson to save today's honeybees. Environmental Health News (<http://www.environmentalhealthnews.org>).

6 June **America at war with its national symbol.** (<http://www.environmentalhealthnews.org/ehs/news/2015/jun/america-at-war-with-its-national-symbol>) In pre-statehood Alaska, salmon fishermen, hunters and fur ranchers saw the eagles as competition. And Alaska's political leadership won an exemption from the Bald Eagle Act. Environmental Health News (<http://www.environmentalhealthnews.org>).

3 June **BPA still a favorite among canned good brands.** (<http://www.environmentalhealthnews.org/ehs/news/2015/jun/bpa-still-a-favorite-among-canned-good-brands>) In a survey of more than 250 brands of canned food, researchers found that more than 44 percent use bisphenol-A lined cans for some or all of their products. Environmental Health News (<http://www.environmentalhealthnews.org>).

2 June **Analysis: That time when Lindsey Graham was (almost) all-in on climate change.** (<http://www.environmentalhealthnews.org/t/8929261619107666834>) As the latest announced presidential candidate, Lindsey Graham parts ways with many of his Republican rivals. He thinks climate change is real. But that's where he draws the line. Daily Climate (<http://www.dailyclimate.org>).

2 June **10 reasons clean coal is a marketing myth.** (<http://www.environmentalhealthnews.org/ehs/news/2015/jun/10-reasons-clean-coal-is->

a-marketing-myth) Politicians of all stripes like to tout the benefits of clean coal, a catch-all phrase for a host of technologies aimed at reducing the environmental impact of coal. But while the alliteration sounds nice in a campaign speech, "clean coal" is more myth than reality.

Environmental Health News (<http://www.environmentalhealthnews.org>).

30 May **For the birds: A Pete Myers photography exhibit shows off its plumage.** (<http://www.environmentalhealthnews.org/ehs/news/bird-photography-pete-myers>) We'll get to the health and climate links in a minute. First turn your attention to the black luster of a raven's back. The iridescence of an eastern bluebird's wings. The hidden, alluring patterns within a flock of flamingos. Environmental Health News (<http://www.environmentalhealthnews.org>).

29 May **Do our bodies safely break down BPA? Fat chance, study suggests.** (<http://www.environmentalhealthnews.org/ehs/news/2015/may/bpa-endocrine-disruptors-obesity-fat-chemicals-science-fda>) A new study suggests the long-held industry assumption that bisphenol-A breaks down safely in the human body is incorrect. Instead, researchers say, the body transforms the ubiquitous chemical additive into a compound that might spur obesity. Environmental Health News (<http://www.environmentalhealthnews.org>).

22 May **Findings cast doubt on plant benefits from risin.** (<http://www.environmentalhealthnews.org/t/-8845509432960312931>) More than 40 years' of evidence from a Montana meadow shows that increasing carbon dioxide levels don't help plants. Daily Climate (<http://www.dailyclimate.org>).

14 May **Bacteria making meds in wastewater outflows.** (<http://www.environmentalhealthnews.org/ehs/news/2015/may/bacteria-making-meds-in-wastewater-outflows>) Wastewater treatment plants not only struggle removing pharmaceuticals, it seems some drugs actually increase after treatment. Environmental Health News (<http://www.environmentalhealthnews.org>).

13 May **Global warming and the "Green Rush."** (<http://www.environmentalhealthnews.org/t/-36724283297600363>) A warming climate could boost the medicinal and psychoactive properties of plants including cannabis. But that's not all: Climate change will also open up higher elevations to growing weed clandestinely on public lands, a practice that's putting increased strain on fragile ecosystems. Daily Climate (<http://www.dailyclimate.org>).

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South Portland flits closer to pesticide ban



Gabor Degre | BDN

A bumblebee is seen in Jonesboro in this June 2011 file photo. *Buy Photo*

By Alex Acquisto, *The Forecaster*

Posted June 11, 2015, at 2:33 p.m.

SOUTH PORTLAND, Maine — Protect South Portland has set its sights on a new goal: eliminate the use of pesticides. City Council chambers were filled to maximum capacity by members of the grassroots group and others Monday night, many of whom spoke during the public comment portion of the meeting.

After three presentations on the dangers of using and being exposed to pesticides, and the availability of viable, organic alternatives, each councilor and every resident who spoke agreed that the use of chemicals on public and private property needs to be curtailed.

“The perfect lawn is not our goal. Our goal is the perfect life. It’s about living well,” Councilor Maxine Beecher said.

Jay Feldman, executive director of [Beyond Pesticides](#), a national coalition against the use of pesticides, was among those who presented information to the council.

“A lot of the adverse effects we suffer from today are clearly linked to pesticide exposure, among other things,” Feldman said.

“This is a critical issue in today’s world.

“We believe you, as legislators, can adopt for this community incentives through law that will ensure that organic systems are put in place at the same time that you meet community expectations,” he said.

“The bottom line is, whether we all agree, the fact is that there are proven issues with some of these products, and we have viable alternatives now that will work,” Chip Osborne of [Osborne Organics](#) in Marblehead, Massachusetts, said.

Homeowners use “80 million pounds of toxic pesticides each year in pursuit of the perfect lawn,” he said.

Transitioning from inorganic fertilizers and weed killers isn’t just about changing one’s habit, Osborne said, it’s about changing the approach entirely.

“It’s a system-based approach versus a product-based approach. It’s conceptually different. [Using organic methods] is problem solving, not symptom treating,” he said. “We’re taking a feed-the-soil approach as opposed to feed the plant.”

Mary Cerullo, associate director of Friends of Casco Bay, said the effects aren’t just seen on land, but in the water.

“About 10 years ago, we started thinking, what’s the possible impact of pesticides and herbicides on Casco Bay?” Cerullo told the council.

From 2001 to 2009, Friends of Casco Bay sampled stormwater runoff for pesticides as it flowed into Casco Bay. Their findings showed 13 coastal runoffs in southern Maine with detectable levels of pesticide.

In the public comment portion of the workshop, Rick Towle, director of parks, recreation and waterfront for the city, said that while South Portland “complies with all federal, state and local guidelines, those may or may not be enough.”

The city does not have a formal, integrated pest management program in place, Towle said, “but that doesn’t mean that the city doesn’t use best practices or follow those guidelines.”

In many ways, the city has been aware of this threat for a while, and other, very expensive precautions have been taken along the way, Councilor Claude Morgan said.

“Because the eyes of the world may be upon us, there’s a certain kind of sexiness to this work, but I think it’s also very important to remember that South Portland has been leading the way in the drudgery work for two decades,” Morgan said.

“We have been consistently digging up our grounds and completing our combined system overflow system.”

This project, Morgan said, “is all about preventing flow from getting into our bay.”

Adopting an ordinance that would curb the use of pesticides in the city would be a “very simple” effort that the city can make, “which really costs us nothing and it’s just a continuation of the slog work that we’ve been doing for decades,” he said.

All councilors expressed a desire to see an ordinance tailored to South Portland’s needs proposed in a timely manner.

“If not now, when? What more do we need to move in the right direction?” Councilor Patti Smith said.

“I’m ready to move forward as quick as we can do it,” said Morgan, who requested that city staff draft an ordinance to be examined by the council at a July workshop.

Resident Meg Braley of Beech Street said it feels like “we’re riding a wave, and it’s a very exciting wave to be on. It’s a wave of the future. I love that we are considering this and educating ourselves.”

Protect South Portland formed in 2013 to promote a citizen-initiated referendum that would have banned the flow of tar sands from Canada to South Portland through a pipeline operated by Portland Pipe Line Corp.

Although that effort narrowly failed, the City Council eventually adopted a “Clear Skies Ordinance” backed by the group that prohibits the bulk loading of crude oil, including tar sands, onto ships in the city.

<http://bangordailynews.com/2015/06/11/news/portland/south-portland-flits-closer-to-pesticide-ban/> printed on June 12, 2015

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Article published Jun 16, 2015

Spraying on track toward controversy

By [Eric Blaisdell](#)

STAFF WRITER

MONTPELIER — After a one-year hiatus, the Vermont Rail System has a permit to spray herbicides next month on the track that runs through Montpelier, much to the dismay of residents and officials in the Capital City.

Last year, the Vermont Pesticide Advisory Council, a division of the Agency of Agriculture Food and Markets, declined to allow the railroad to spray herbicide on the track from Pioneer Street in Montpelier to the Interstate 89 overpass. According to the minutes from the meeting in May 2014, several Montpelier residents expressed concerns over herbicides being used on the track and the possible health impacts. The residents wanted the railroad to use alternatives to herbicide in its effort to keep the track clear and safe for travel.

When the idea of a one-year hiatus was brought up, spokesmen for the railroad said it was possible, as the 2.5-mile section of track was sprayed in 2013, reducing the possibility of track degradation. The council then approved the hiatus, with the understanding that the railroad would work with the state and the public over the year to find alternatives.

John Snell, chairman of the city's Tree Board, volunteered to act as the public liaison for the conversations about alternatives. He said Monday those conversations never happened because the railroad never got in touch with him.

The railroad did not return a request for comment Monday.

At its meeting in April, the pesticide council again discussed spraying on the track in Montpelier. According to the draft minutes, railroad spokesman Ben Delorme told the council that a "cooperative effort" could not be achieved. When pressed by the council why the effort failed, Delorme said a suggested volunteer effort to remove weeds was not viable because of safety concerns for the volunteers working on the track. He said the railroad would also have to fund the effort for equipment and materials.

The council then approved the railroad's permit, which included spraying in Montpelier, and the permit was issued in May stating the spraying would occur in July.

Snell said he doesn't want the track to be unsafe. "But there have got to be viable alternatives to what they have been doing," he said.

Snell said if the herbicide is used, those people who live or walk in the area will have their safety in jeopardy.

Barbara Burnett lives on Barre Street about a block from the track. Burnett said Monday she is medically sensitive to chemicals and would have to live somewhere else during spraying.

She called it appalling and outrageous that the railroad could ignore the council's instructions about working with the public for alternatives.

"(The railroad) can just not do what they were told to do and then do whatever they want," she said.

Burnett said there are several vegetable gardens along the track in the city that would be hit with the herbicide. She said those who walk the bike path in the city also could be exposed to the chemicals.

Mayor John Hollar said Monday he had been in contact with Agency of Agriculture Food and Markets Secretary Chuck Ross about the issue. Hollar said the railroad is private property owned by the railroad and regulated by the state.

He said he doesn't know enough about any possible alternatives to make a suggestion for one; and he doesn't know the extent of the health risks for the herbicide. As he understands it, the herbicide to be used — Glyphosate — and the quantities used are safe.

Hollar said he would be working with the state and the railroad to look into alternatives and to see whether there is anything the city can and should do about the issue.

Secretary Ross said Monday the railroad is bound by the federal government to make sure the rails are clear. He said herbicide spraying is nothing new and is done in many places. Even so, he's hopeful the different parties can sit down for a meeting soon in an effort to find an alternative to the herbicide.

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DDT Exposure in Utero and Breast Cancer

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Context: Currently no direct evidence links in utero dichlorodiphenyltrichloroethane (DDT) exposure to human breast cancer. However, in utero exposure to another xenoestrogen, diethylstilbestrol, predicts an increased breast cancer risk. If this finding extends to DDT, it could have far-reaching consequences. Many women were heavily exposed in utero during widespread DDT use in the 1960s. They are now reaching the age of heightened breast cancer risk. DDT exposure persists and use continues in Africa and Asia without clear knowledge of the consequences for the next generation.

Hypothesis: In utero exposure to DDT is associated with an increased risk of breast cancer.

Design: This was a case-control study nested in a prospective 54-year follow-up of 9300 daughters in the Child Health and Development Studies pregnancy cohort ($n = 118$ breast cancer cases, diagnosed by age 52 y and 354 controls matched on birth year).

Setting and Participants: Kaiser Foundation Health Plan members who received obstetric care in Alameda County, California, from 1959 to 1967, and their adult daughters participated in the study.

Main Outcome Measure: Daughters' breast cancer diagnosed by age 52 years as of 2012 was measured.

Results: Maternal *o,p'*-DDT predicted daughters' breast cancer (odds ratio fourth quartile vs first = 3.7, 95% confidence interval 1.5–9.0). Mothers' lipids, weight, race, age, and breast cancer history did not explain the findings.

Conclusions: This prospective human study links measured DDT exposure in utero to risk of breast cancer. Experimental studies are essential to confirm results and discover causal mechanisms. Findings support classification of DDT as an endocrine disruptor, a predictor of breast cancer, and a marker of high risk.

D iethylstilbestrol (DES) is a synthetic estrogen, which was prescribed to pregnant women until it was banned in the United States in 1971 and is a seminal example of a transplacental carcinogen (1). The discovery that DES exposure in utero causes clear-cell carcinoma of the vagina and cervix (2) and also predicts higher risk for breast cancer (3) raises the possibility that other man-

made chemicals, particularly those that disrupt normal estrogen-related functions, could cause breast cancer in later life. Although DES (4) and other exogenous estrogenic chemicals (5, 6) have been shown to cause mammary cancer experimentally, no other in utero chemical exposures have been quantified and related prospectively to

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Abbreviations: CCR, California Cancer Registry; CERLab, Clinical and Epidemiologic Research Laboratory; CHDS, Child Health and Development Studies; CI, confidence interval; DDE, dichlorodiphenyldichloroethylene; DDT, dichlorodiphenyltrichloroethane; DDTs, DDT compounds such as the isomers *p,p'*-DDT and *o,p'*-DDT; DES, diethylstilbestrol; DMV, Department of Motor Vehicles; OR, odds ratio.

risk of breast cancer in a human population. The present study addresses this gap.

The influence of these in utero exposures in cancer risk informed an Endocrine Society scientific statement emphasizing that the timing of an exposure either to a hormone or an endocrine disruptor determines its effects (7). For this reason, human studies of adult exposure to estrogenic chemicals in relation to breast cancer risk are not sufficient (8, 9). Indeed, prior studies that investigated the association between midlife exposure to the pesticide dichlorodiphenyltrichloroethane (DDT) and breast cancer were largely negative (10).

We reported the one prior prospective and quantitative study to consider the implications of young age at DDT exposure on breast cancer risk. This study was based on incident breast cancer diagnosed before age 50 years in the mothers' generation of the Child Health and Development Studies (CHDS) pregnancy cohort over a 17-year follow-up (11). We used age in 1945, when DDT was widely introduced into the United States as a proxy for earliest age at DDT exposure to evaluate whether there was an increased susceptibility to breast cancer among women with early life exposure to DDT. We found that mothers who were exposed to DDT prior to age 14 years showed a 5-fold increase in risk of breast cancer (66th percentile of serum p,p'-DDT compared with the 33rd percentile); risk was greatest for women who were exposed even earlier, by age 4 years, and the DDT association with breast cancer was observed only for women who were exposed prior to age 14 years ($P = .02$ for interaction between p,p'-DDT and age in 1945). These findings clearly support the need to further investigate the role of early-life DDT exposure in later breast cancer risk. Other than this study, there is an absence of human breast cancer studies of in utero exposure to the DDTs (DDT compounds such as the isomers p,p'-DDT and o,p'-DDT that are found in technical DDT and also compounds that are breakdown products of DDT such as p,p'-dichlorodiphenyldichloroethylene (DDE), the most prevalent and persistent metabolite of p,p'-DDT) (12) due in part to the logistic barriers of quantitative assessment of gestational exposure coupled with follow-up of at least 50 years needed to identify breast cancer cases (13), given that the median age at diagnosis is 61 years (14).

DDT remains relevant to living populations for numerous reasons. First, most women born while DDT was extensively used worldwide are still alive today and are hence at risk for breast cancer. Second, DDT remains in active use for control of malaria in Africa and Asia in accordance with World Health Organization recommendations despite intense debate (15, 16). Third, because of its persistent presence in the environment, people worldwide con-

tinue to be exposed to DDTs that are already present (17). Environmental contamination and human exposure are greater where use was recent and where safer use, storage, and disposal are challenging (18), such as in China (19) and areas in Mexico (20, 21) and Africa (22, 23). Indeed, DDT health effects will remain relevant for the foreseeable future, given that the distribution of malaria vectors is predicted to expand with climate change (24). Melting glaciers release DDTs into arctic waters in which it is known to bioaccumulate to 1 million-fold higher concentrations in people, reaching levels found among populations with endemic malaria in tropical regions in which DDT use remains in effect (25, 26).

Here we conducted the first prospective study to relate quantitative measures of in utero DDT exposure to risk of breast cancer in daughters.

Materials and Methods

Subjects

This unique study is made possible by a 54-year follow-up of 20 754 pregnancies, resulting in 9300 live-born female offspring in the CHDS pregnancy cohort.

The CHDS was designed to examine the association between prenatal exposures and health and development over the life course for parents and children. The CHDS recruited women residing in the area of Oakland, California, who were members of the Kaiser Foundation Health Plan and received obstetric care for pregnancies between 1959 and 1967 (27). More than 98% of all eligible women enrolled. CHDS founding mothers voluntarily participated in an in-person interview and gave permission to researchers for medical record access for themselves and their children. Their blood specimens were collected at several times through pregnancy and 1–3 days after delivery. The present study was reviewed and approved by the Institutional Review Board of the Public Health Institute (Oakland, California), and we have complied with all federal guidelines governing use of human subjects.

Breast cancer cases

All members of the CHDS cohort are linked to the California Department of Motor Vehicles (DMV) files on a regular basis to determine California residence history, allowing us to update any name changes. All names registered with the DMV are used in establishing a match. Simultaneous linkage of multiple family members enhances matching. The regular DMV matching provides a history of location for each subject, which is used to determine the population at risk for cancer, corresponding with geographic surveillance by California's cancer registries.

Breast cancer cases were identified by linkage to the California Cancer Registry and the California Vital Status Records as previously described (11, 28) and by self-report during a survey of CHDS daughters conducted from 2010 to 2013. All names for each CHDS subject were submitted for cancer linkages using fixed (ie, birth date, sex, race, and name) and changeable (ie, address and patient record number) identifiers. A rigorous protocol was used to verify cases, comparing fixed vs changeable

identifiers by manual review. The California Cancer Registry (CCR) is reported to be greater than 99% complete after a lag time of about 2 years (29). We ascertained 80% ($n = 94$) of the cases via CCR linkage as of 2012 and 20% ($n = 24$) via self-report as of 2013. Due to the CCR lag time, the self-reported cases are more recently diagnosed than those from CCR. Tumor characteristics were available for 87% of CCR cases and for 50% of self-reported cases. Thus, we expect to have more complete information on tumor pathology with continuing CCR linkage.

Cases were defined as CHDS daughters with incident invasive or noninvasive breast cancer diagnosed by age 52 years, identified through surveillance and through self-report through March of 2013. There were 137 cases who met this case definition, diagnosed as of 2012. To be included in the present study, cases were required to have a maternal perinatal blood sample for measurement of DDT exposure, resulting in inclusion of 118 cases (86%). Three controls, matched on birth year and trimester of maternal blood draw, were selected at random for each case from among those who were under cancer surveillance and known to be free of breast cancer at the age of diagnosis for the matching case. Inclusion in the present study also required available data for the following variables known to be correlated with DDT exposure and potentially daughters' breast cancer: maternal lipids, age, race, early pregnancy weight, height, and history of breast cancer and whether the daughter was breast-fed, resulting in a final sample size of 103 cases (87% of those with serum samples) and 315 controls (83% of those with serum samples).

Serum assays

In 2014, we measured DDTs and serum lipids in nonfasting maternal perinatal serum samples that had been collected from 1959 through 1967. The mean age of subjects when blood was drawn was 26.9 years. We preferred to use the early postpartum samples (collected within 1–3 d after delivery) when available to conserve serum for future studies when timing within pregnancy is more critical. Early postpartum samples were available and used for most case-control strata (77.7%); third-trimester samples were used for 17.7%; second-trimester samples were used for 3.8%; and first-trimester samples were used for 0.7%. Prior work has established that organochlorine levels are consistent across all trimesters of pregnancy and soon after delivery within women (30). Serum samples had been stored at -20°C and were first thawed to prepare an aliquot of 1.5 mL for organochlorine assays. Aliquots were then shipped frozen to the laboratory of the California Department of Toxic Substances Control where they were assayed for DDTs, including *p,p'*-DDT and *o,p'*-DDT, the primary constituents of technical DDT, and the primary metabolite of *p,p'*-DDT, DDE using methods developed previously (31).

Briefly, human serum samples (1 mL) spiked with surrogate standards (tetrachloro-*m*-xylene, polychlorinated biphenyls-14, -65, and -166) were denatured with formic acid, extracted using Oasis HLB SPE cartridges (Waters Corp) and subsequently cleaned up with 33% sulfuric acid silica using an automated sample extraction system (RapidTrace; Biotage). DDT compounds (*o,p'*-DDT, *p,p'*-DDT, and *p,p'*-DDE) were analyzed on a DB-5ms column (30 m \times 0.25 mm inner diameter, 0.25 μm film thickness; Agilent Technologies) installed in an Agilent gas chromatograph-tandem mass spectrometer (7890/7000B series). Chromatographic conditions included pulsed splitless in-

jection at 250°C and helium carrier gas at 1 mL/min. The gas chromatograph temperature program started with an initial temperature of 90°C , a hold for 1 minute, a ramp of $50^{\circ}\text{C}/\text{min}$ to 150°C , a hold for 1 minute, a ramp of $8^{\circ}\text{C}/\text{min}$ to 225°C , a hold for 6.5 minutes, and a final ramp of $14^{\circ}\text{C}/\text{min}$ to 310°C , a hold for 6 minutes. The mass spectrometer was operated in electron impact ionization mode using multiple reaction monitoring, source temperature of 275°C , ionization energy of 70 eV, and mass resolution of 1.2 amu. A calibration curve, consisting of five to eight standards with concentrations ranging from 0.1 to 30 $\text{pg}/\mu\text{L}$ (DDTs) or from 0.1 to 800 $\text{pg}/\mu\text{L}$ (DDE) and an R^2 value of 0.990 or greater, was used for quantitation.

Each batch of 10 samples was analyzed using a standard quality assessment and control protocol: a laboratory method blank (HyClone bovine serum; Fisher Scientific), a matrix spike in bovine serum, and a standard reference material (1958; National Institute of Standards and Technology). Matrix spike recoveries from bovine serum for *p,p'*-DDE, *p,p'*-DDT, and *o,p'*-DDT congeners ranged from $93\% \pm 14\%$, $102\% \pm 19\%$, and $101\% \pm 12\%$, respectively. Precisions from 51 standard reference material samples were reasonable, eg, coefficients of variation were 12%, 19%, and 14% for *p,p'*-DDE, *p,p'*-DDT, and *o,p'*-DDT, respectively. The method detection limits, calculated as 3 times the SD of the concentrations in method blanks ($n = 51$), were 0.013 ng/mL *o,p'*-DDT, 0.054 ng/mL *p,p'*-DDT and 0.158 ng/mL *p,p'*-DDE. Sample order was randomly assigned within and across batches. Case-control strata were analyzed in the same batches to minimize differences due to laboratory drift. The laboratory was blind as to case or control status of the samples. Interbatch and intrabatch coefficients of variation were 15% and 5% for *p,p'*-DDT, 6% and 5% for *p,p'*-DDE, and 11% and 7% for *o,p'*-DDT, respectively. The proficiency of the laboratory is demonstrated through regular successful participation in the Arctic Monitoring and Assessment Program (32) testing rounds ($z\text{-score} < 1$).

Using 150 μL undiluted serum, total cholesterol and triglycerides were measured enzymatically on a Roche P Modular system using reagents and calibrators from Roche Diagnostics at the Clinical and Epidemiologic Research Laboratory (CERLab) at Boston Children's Hospital, which is certified by the Centers for Disease Control and Prevention/National Heart, Lung, and Blood Institute Lipid Standardization Program. For cholesterol the method combines the specificity of the enzymatic reaction with peroxidase/phenol-4-aminophenazone indicator reaction (33). Cholesterol esters are hydrolyzed by cholesterol esterase to produce free cholesterol. In the presence of oxygen and cholesterol oxidase, cholesterol is oxidized to cholest-4-en-3-one and H_2O_2 . The latter product then reacts with a dye to generate a quinoneimine dye. The intensity of the generated color is measured at 505 nm and is directly proportional to the concentration of cholesterol in the measured sample. At cholesterol concentrations of 132.8 and 280.4 mg/dL, the day-to-day reproducibility in the CERLab, reflected by coefficient of variation, is 1.7% (SD = 2.4 mg/dL) and 1.6%, respectively ($n = 693$).

Triglycerides were measured enzymatically with correction for endogenous glycerol (34). In a preliminary reaction, the endogenous glycerol is phosphorylated in the presence of glycerol kinase and ATP. The formed glycerol-3-phosphate is oxidized to generate H_2O_2 , which reacts with 4-chlorophenol to produce an oxidative product. Then in the actual assay reaction, triglycerides are hydrolyzed by lipase mixture to generate glycerol and fatty acids. Similarly to the preliminary reaction, glycerol is phos-

phorylated by the action of glycerol kinase and the generated glycerol-3-phosphate is oxidized to produce H_2O_2 . The latter product reacts with a dye to generate a colored product. The intensity of the generated color is measured at 505 nm and is directly proportional to the concentration of triglycerides in the measured sample. Triglycerides at concentrations of 84.0 and 201.8 mg/dL are determined in the CERLab with a day-to-day reproducibility of 1.8% (SD 1.6 mg/dL) and 1.7% (SD 3.5 mg/dL), respectively ($n = 675$).

Statistical analysis

Data analyses were performed using age-matched, conditional logistic regression. Each DDT variable (o,p'-DDT, p,p'-DDT, and p,p'-DDE) was categorized in quartiles of the logged distribution based on the control population and represented as three nominal variables in models: quartile 2, quartile 3, and quartile 4 in which quartile 1 was the reference category.

We used a likelihood ratio criterion ($P < .05$) to choose the best model from among the following nested models: 1) all three DDT compounds were entered into the model, 2) terms for one of the three compounds was deleted beginning with the compound showing the highest P values and smallest effect sizes, and 3) models with only one DDT compound included. Trends across quartiles of DDT compounds in the best model were tested using natural log-transformed continuous variables. All models were adjusted for serum total cholesterol and total triglycerides entered as natural logs, maternal age (continuous), race (African American vs non-African American), overweight in early pregnancy (coded as overweight vs not, based on a body mass index ≥ 25 kg/m²), parity (primiparous vs multiparous), maternal history of breast cancer (yes vs no), and whether the daughter was breast-fed. The final model deleted adjustment variables that had little or no influence on the DDT predictors as evidenced by less than 10% change in the DDT coefficient(s) when removed from the model. Saturated interaction models were also tested for the three DDT variables (coded as continuous log transformed variables) and for the DDT variables in the final model with each

potential confounder. These were not significant and are not reported.

Results

Distributions of study variables are shown in Table 1. There were significant correlations among the DDT variables. However, the correlation of o,p'-DDT with p,p'-DDT was higher (Spearman rank correlation coefficient 0.78) than the correlation of either of these compounds with p,p'-DDE (0.60 and 0.66, respectively). Comparison of DDT associations in nested models are shown in Table 2, in which the best model included o,p'-DDT and p,p'-DDE (model 4, Table 2). Independent of a maternal history of breast cancer, elevated maternal serum o,p'-DDT significantly predicted a nearly 4-fold increase in the daughter's risk of breast cancer (Table 3). Maternal overweight in early pregnancy was associated with a lower risk of breast cancer in daughters but with marginal statistical significance. Maternal lipids, age, race, and parity and whether the daughter was breast-fed did not confound these findings and were not significant predictors of daughters' breast cancer. No interactions were statistically significant.

Most cases in this cohort were estrogen receptor positive (83%), progesterone receptor positive (76%), and HER2-negative (74%). In human breast cell lines, DDT activates HER2, a clinically relevant protein expressed in some breast cancers (35, 36). Therefore, we evaluated whether in utero DDT exposure was associated with HER2-positive breast cancers in this cohort of women

Table 1. Maternal Variables by Daughters' Breast Cancer Status

Maternal Variables	Controls (n = 315)			Cases (n = 103)		
	Percentile			Percentile		
	25th	50th	75th	25th	50th	75th
Age, y	22	26	30	23	27	31
o,p'-DDT, ng/mL	0.27	0.46	0.78	0.32	0.52	1.06
p,p'-DDT, ng/mL	8.38	12.98	18.57	9.47	13.18	20.11
p,p'-DDE, ng/mL	29.29	42.81	57.56	30.91	43.13	58.08
Cholesterol, mg/dL	182	222	278	188	227	283
Triglycerides, mg/dL	139	183	227	136	182	227
	Percent			Percent		
History of breast cancer ^a	4.44		14	20.39		21
Primipara	29.84		94	26.21		27
African-American	25.08		79	23.30		24
Overweight (BMI ≥ 25 kg/m ²)	25.08		79	17.48		18
Breast-fed her daughter	26.03		82	31.07		32

Abbreviation: BMI, body mass index.

^a $P < .0001$ for difference between controls and cases.

Table 2. DDT Results for Nested Models

	$\text{o,p}'\text{-DDT}$	$\text{p,p}'\text{-DDT}$	$\text{p,p}'\text{-DDE}$
	OR	OR	OR
Univariate models			
Model 1, $\text{o,p}'\text{-DDT}$			
Quartile 2	1.8	—	—
Quartile 3	1.6	—	—
Quartile 4	2.8 ^a	—	—
<i>P</i> trend	0.053	—	—
Model 2, $\text{p,p}'\text{-DDT}$			
Quartile 2	—	1.9	—
Quartile 3	—	1.5	—
Quartile 4	—	2.2 ^b	—
<i>P</i> trend	—	0.074	—
Model 3, $\text{p,p}'\text{-DDE}$			
Quartile 2	—	—	1.3
Quartile 3	—	—	1.1
Quartile 4	—	—	1.3
<i>P</i> trend	—	—	NS
Model 4, $\text{o,p}'\text{-DDT}$ plus $\text{p,p}'\text{-DDE}$			
Quartile 2	2.0	—	1.0
Quartile 3	1.8	—	0.7
Quartile 4	3.7 ^c	—	0.7
<i>P</i> trend	0.048	—	NS
Model 5, $\text{p,p}'\text{-DDT}$ plus $\text{p,p}'\text{-DDE}$			
Quartile 2	—	2.0	1.1
Quartile 3	—	1.7	0.8
Quartile 4	—	2.9 ^d	0.8
<i>P</i> trend	—	0.037	NS
Model 6, $\text{o,p}'\text{-DDT}$ plus $\text{p,p}'\text{-DDT}$ plus $\text{p,p}'\text{-DDE}$			
Quartile 2	1.9	1.7	1.0
Quartile 3	1.7	1.2	0.7
Quartile 4	3.5 ^e	1.4	0.6
<i>P</i> trend	NS	NS	NS

Abbreviation: NS, not significant. All models are adjusted for maternal cholesterol and triglycerides, maternal overweight in early pregnancy, and maternal history of breast cancer. *P* trend is based on continuous log-transformed DDTs. Model 4 is the best model because deletion of $\text{p,p}'\text{-DDT}$ (model 4 vs model 5) does not impact other associations, but deletion of $\text{p,p}'\text{-DDE}$ (model 1 vs model 4) decreases the point estimate for $\text{o,p}'\text{-DDT}$. Although $\text{p,p}'\text{-DDE}$ is not itself significant, it is inversely associated with daughters' breast cancer while being positively correlated with $\text{o,p}'\text{-DDT}$. NS, $P > .15$.

^a $P = .007$.

^b $P = .058$.

^c $P = .004$.

^d $P = .054$.

^e $P = .019$.

with available stage at diagnosis (73%) and available HER2 status (59%).

We found that $\text{o,p}'\text{-DDT}$ was significantly, positively associated with advanced stage at diagnosis (regional or distant disease vs local or in situ) and with the occurrence of HER2-positive tumors, independent of maternal overweight, history of breast cancer, and $\text{p,p}'\text{-DDE}$. Despite small sample sizes for these analyses, 22 advanced-stage tumors and 16 HER2-positive tumors, respectively, results were statistically significant. The estimated odds ratio (OR) for diagnosis at an advanced stage was 2.2 [95%

Table 3. Maternal Predictors of Daughters' Breast Cancer

	OR	95% CI	<i>P</i> Value
History of breast cancer (yes vs no)	6.4	2.8–14.3	<.0001
Overweight in early pregnancy (yes vs no)	0.6	0.3–1.1	.077
$\text{o,p}'\text{-DDT}$ (reference category is quartile 1)			
Quartile 2	2.0	0.9–4.3	.083
Quartile 3	1.8	0.8–4.0	.160
Quartile 4	3.7	1.5–9.0	.004
<i>P</i> trend	0.048		

Quartile cut points are given in Table 1. This table is based on a single model adjusted for variables shown and also adjusted for the maternal serum $\text{p,p}'\text{-DDE}$, total cholesterol, and total triglycerides, which were not significant predictors. Test for trend was based on log-transformed $\text{o,p}'\text{-DDT}$ entered as a continuous variable instead of quartile variables.

confidence interval (CI) 1.1–4.2, $P = .02$] for a doubling of $\text{o,p}'\text{-DDT}$. The estimated OR for a HER2-positive tumor was 2.1 (95% CI 1.0–4.8, $P = .05$) for a doubling of $\text{o,p}'\text{-DDT}$. Levels of $\text{o,p}'\text{-DDT}$ not only doubled but also tripled for women in the fourth quartile of the study compared with those in the first quartile (as seen in Table 1). The corresponding risk of advanced-stage and HER2-positive breast cancer for these women is more than 4-fold (for late stage, OR 4.6; 95% CI 1.3–16.5 for the fourth quartile of $\text{o,p}'\text{-DDT}$ vs the first quartile; for HER2 positive, OR 4.6, 95% CI 1.1–19.7). These results suggest a strong effect of in utero $\text{o,p}'\text{-DDT}$ on breast cancer stage, and HER2 status in this population, and the relevance of these findings is discussed below.

Discussion

Strengths

Exposure timing

Human and animal evidence establish the existence of developmental windows when the breast is more vulnerable to xenoestrogens, such as DDT (9). One of these windows is in utero. The present study is the first to quantify exposure to DDT in utero and link it to subsequent breast cancer risk.

Quantifying exposure

DDT was introduced in the general population in the United States in 1945 and was most heavily used worldwide in the late 1950's and 1960's (37). The CHDS enrolled pregnancies during 1959–1967, which, by coincidence, covered the years of highest DDT exposure (26,

38). Consistent with these data, the CHDS maternal serum samples, which were collected during the peak years of DDT use in the United States, show the highest levels of DDT compared with other studies of breast cancer in which samples were collected in later decades (11, 13). Thus, the present study uses unique historic samples to quantify typical in utero exposure when DDT use was at its peak. Our laboratory methods were able to quantify three DDT target compounds in all samples, including the lower concentration *o,p'*-DDT, a 15%–20% contaminant of technical DDT. This strength is due to state-of-the-art laboratory methods, which optimized the detection of all compounds, but is also due to collection of serum samples in the 1960's during a time period when there was high use of technical DDT.

Relevance to countries in which DDT is now banned

DDT was banned in the 1970's in the United States and western Europe (39). However, the women exposed most heavily while in utero during the 1960's are currently reaching the age of heightened breast cancer risk. Recent cases of breast cancer in daughters (F1) in the CHDS cohort represent the leading edge of birth cohorts heavily exposed to DDT when in utero. Thus, the findings of this present study are relevant to breast cancer, even in countries in which DDT is not currently used. In addition, DDT remains a global environmental contaminant due to its environmental persistence and semivolatility (25).

Relevance to countries in which DDT is still used

In those countries that continue to use DDT to control malaria, human exposure remains high (40). Thus, the findings of this study are relevant to current populations in which high in utero exposure is certainly occurring, such as in South Africa (23). The impact of DDT use on unborn generations has been recently raised as an ethical consideration (41). Our findings are relevant to this debate.

Plausibility

DDTs have been studied as possible endocrine disruptors on the basis of observed deleterious reproductive effects in wildlife (39, 42) and based on demonstrated endocrine-active effects including estrogen activity, particularly for *o,p'*-DDT (43, 44). Remarkably, independent of estrogen, there is likely a biological basis for the putative association of in utero DDT and HER2-positive cancers (36, 45, 46). For example, low-dose *o,p'*-DDT (1 nM) enhanced the tyrosine kinase activity of HER2 in human MCF-7 breast cancer cells irrespective of tamoxifen exposure or estrogen depletion of culture media (36, 46). *o,p'*-DDT also gave rise to increased MCF-7 foci (ab-

normal concentric piling up of cells in postconfluent cultures) (46). The effects of *o,p'*-DDT on tyrosine kinase activity of HER2 and MCF7 foci formation were blocked by a mononuclear antibody specific to HER2. These experimental results are consistent with the hypothesis this paper supports that *o,p'*-DDT can cause human mammary tumor formation that depends on the activation of HER2 (36, 46). Although this hypothesized effect of in utero DDT exposure on mammary cancer has not yet been tested experimentally in vivo, when exposure to its metabolite *p,p'*-DDE was initiated at weaning, the latency of HER2-positive mouse mammary tumors was shortened (47). Our nested pilot analysis also suggested that high exposure was significantly associated with advanced stage. Although no in vivo studies have evaluated this, a recent study of human breast cancer cell lines suggested *o,p'*-DDT caused estrogen-dependent invasion (48). Prioritizing the acquisition of tumor blocks and their immunohistochemical analysis of estrogen receptor and HER2 in the ongoing CHDS and in parallel experimental models will likely aid in resolving which receptor is the mechanistic target of in utero DDT on mammary carcinogenesis.

DES is the most well-studied perinatal xenoestrogen exposure in humans and is known to be associated with increased risk of breast cancer in both F0 (exposed in pregnancy) (49) and F1 (exposed in utero) (3). Similar to DES, we found that maternal serum *p,p'*-DDT was associated with an increased risk of breast cancer in CHDS mothers (F0) (11). We used birth year as a proxy for earliest age at DDT exposure and found the strongest association was observed in mothers who were initially exposed to DDT before the age of 4 years (11). The present study provides a direct, quantitative measure of exposure in utero for daughters (F1) in the CHDS and also finds an association between in utero DDT exposure and breast cancer.

Limitations

Outcome window

The present study investigates breast cancer diagnosed before age 52 years. Thus, these results do not address DDT associations with breast cancer diagnosed at a later age. One prior study of dioxin exposure to girls and women after a chemical explosion in Seveso, Italy, reported a significant association for breast cancers diagnosed within the first 20 years, which then declined over the subsequent 10 years of follow-up (50). Continuing follow-up in our cohort will be required to determine whether in utero DDT associations with breast cancer are observed for cases diagnosed in the future.

Exposure window

Whereas we have measured exposure directly relevant to fetal life, we cannot rule out a contribution of postnatal exposure. We did not observe a contribution or synergy with breast-feeding, even though this is a major maternal route of DDT exposure to offspring. However, this negative association may be partly explained by the low frequency of breast-feeding in the CHDS and the relatively small sample size.

Unmeasured confounders

We cannot rule out a contribution of other exposures that are correlated to DDT, including other unmeasured DDT metabolites. However, we were able to account for the DDTs that are present in the highest concentration in women.

Small sample

This study investigates the first cases observed in CHDS daughters. Although the sample size was adequate to observe a sizable association with in utero DDT, we are unlikely to have had the power to observe smaller associations with other risk factors or synergy among variables. To date, incomplete data on tumor pathology limits the interpretation of the correlation between DDT and tumors with more aggressive features.

Summary

We observed a sizable, statistically significant association between in utero DDT exposure and risk of breast cancer in young women and a possible association with more aggressive tumors. These findings are the first ever reported for a prospective observation of a large pregnancy cohort. Experimental studies are essential to confirm findings and discover causal mechanisms. If confirmed, these findings could lead to discovery of biomarkers and interventions for DDT-associated breast cancer. Our findings are relevant to the international debate on the costs and benefits of DDT use for malaria control.

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The point of view and conclusions expressed in this paper are those of the authors and do not necessarily represent the official position or policies of the funding agencies.

The ideas and opinions expressed herein are those of the author(s) and endorsement by the State of California, Department of Public Health the National Cancer Institute, and the Centers for Disease Control and Prevention or their contractors and sub-contractors or any of the funders of this research is not intended nor should be inferred.

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Settlement: EPA to Analyze Impacts of World's Two Most Widely Used Pesticides on 1,500 Endangered Species

Historic Settlement Means Harms of Atrazine, Roundup Will Be Assessed

WASHINGTON— The Environmental Protection Agency will analyze the impacts of atrazine and glyphosate — the two most commonly used pesticides in the United States — on 1,500 endangered plants and animals in the United States under the terms of a settlement reached today with the Center for Biological Diversity. The EPA will also analyze the impacts of propazine and simazine, two pesticides that are chemically similar to atrazine. It has committed to completing the assessments by June 2020.

“This settlement is the first step to reining in the widespread use of dangerous pesticides that are harming both wildlife and people,” said Brett Hartl, endangered species policy director at the Center for Biological Diversity. “Atrazine, for instance, chemically castrates frogs even in tiny doses, is an endocrine disruptor, and likely causes birth defects in people. The EPA should have banned this years ago.”

Up to 80 million pounds of atrazine are used in the United States each year. In addition to causing severe harm to endangered species, atrazine exposure may be linked to increased risks of thyroid cancer, reproductive harm and birth defects in people. A recent [study](#) showed that children whose mothers were exposed to atrazine had an increased risk of birth defects. Atrazine is the second most commonly used pesticide after glyphosate, more commonly known as Monsanto’s Roundup.

“This settlement will finally force the EPA to consider the impacts of glyphosate — widely known as Roundup — which is the most commonly used pesticide in the United States, on endangered species nationwide,” said Hartl. “With more than 300 million pounds of this stuff being dumped on our landscape each year, it’s hard to even fathom the damage it’s doing.”

Glyphosate has also been linked to the decline of many wildlife species, including the [monarch butterfly](#). The EPA has never completed any endangered species assessments of glyphosate at any point over the lifetime of this chemical on the market. The agency last evaluated the general ecological impacts of glyphosate in 1993, when approximately 10 million pounds were applied annually. The increase in use within the United States has come with the widespread adoption of herbicide-tolerant, genetically engineered crops such as corn and soy. The World Health Organization recently declared glyphosate a probable human carcinogen.

The EPA has, for decades, continued to register and allow the use of pesticides without considering their impacts to endangered species, despite the legal requirement for them to do so and the well-documented risks of pesticides to thousands of imperiled species. A series of lawsuits by the Center has forced the agency to consult on the impacts of scores of pesticides on some endangered species, primarily in California, and resulted in temporary restrictions on pesticide use in sensitive habitats.

Last year the Center entered a nationwide settlement with the U.S. Fish and Wildlife Service requiring the agency to analyze impacts on endangered species across the country from five dangerous pesticides — carbaryl, chlorpyrifos, diazinon, malathion and methomyl — that have been found to be toxic to wildlife and may pose a health risk to humans. Today’s settlement follows a similar framework and will require the EPA to begin the consultation process on these chemicals.

The Center for Biological Diversity is a national, nonprofit conservation organization with more than 900,000 members and online activists dedicated to the protection of endangered species and wild places.

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Health | Tue Jun 23, 2015 5:51am EDT

WHO agency says insecticides lindane and DDT link cancer

LONDON | BY [KATE KELLAND](#)

The insecticide lindane, once widely used in agriculture and to treat human lice and scabies, causes cancer and has been specifically linked to non-Hodgkin lymphoma, the World Health Organization said on Tuesday.

The WHO's International Agency for Research on Cancer (IARC) also said that DDT, or dichlorodiphenyltrichloroethane, probably causes cancer, with scientific evidence linking it to non-Hodgkin lymphoma (NHL), testicular cancer and liver cancer.

In a review of various agricultural chemicals, IARC's specialist panel said it had decided to classify lindane as "carcinogenic to humans" in its Group 1 category, DDT as "probably carcinogenic to humans" in its Group 2A class, and the herbicide 2,4-D as "possibly carcinogenic to humans" in its Group 2B.

It said epidemiological studies did not find strong or consistent increases in risk of NHL or other cancers from 2,4-D exposure, but there was strong evidence it induces oxidative stress, a process that can damage cells in the body, and moderate evidence it can suppress the immune system.

Lindane, which since 2009 has been banned or restricted in most countries under the Stockholm Convention on Persistent Organic Pollutants, was previously used extensively for insect control in agriculture. An exemption to the ban allows it to be used as a second-line treatment for lice and scabies.

IARC said high exposures to lindane have previously been reported among agricultural workers and pesticide applicators.

"Large epidemiological studies of agricultural exposures in the United States and Canada showed a 60 percent increased risk of non-Hodgkin lymphoma in those exposed to lindane," it said.

DDT was introduced for the control of insect-borne diseases during World War Two and was later applied widely to eradicate malaria and in agriculture.

PHOTOS OF THE DAY



Our top photos from the last 24 hours.

Although most uses of it were banned from the 1970s, IARC cautioned that DDT and its breakdown products are "highly persistent and can be found in the environment and in animal and human tissues throughout the world".

"Exposure to DDT still occurs, mainly through diet," it said, adding that DDT is still used, mainly for malaria control in parts of Africa, although under very strict conditions.

Since it was introduced in 1945, 2,4-D has been widely used to control weeds in agriculture, forestry and urban and residential settings.

IARC said occupational exposure to 2,4-D can occur during manufacturing and application, and people in the general population can be exposed through food, water, dust, or residential application, and during spraying.

(Reporting by Kate Kelland; Editing by [Raissa Kasolowsky](#))

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Norway is creating a 'bee highway' to protect pollinators

By **Rachel Feltman** June 25 at 11:36 AM

The city of Oslo [now has what it's calling a bee highway](#) — a path of flowering plants designed to keep bees well-fed as they pass through the urban area. Supporters hope that initiatives like this one can help protect bees — one third of Norway's native bee species are now endangered — and by extension protect the crops that rely on bees for pollination.

The idea is pretty simple: The Oslo Garden Society has placed flowerpots full of bee-friendly plants on roofs and balconies throughout the city, creating a route for bees to travel through without starving. [A Web site shows locals](#) where more flower coverage is needed and encourages them to plant more.

[Graphic: We all get stung by bee colony collapse]

“The idea is to create a route through the city with enough feeding stations for the bumblebees all the way,” Tonje Waaktaar Gamst of the Oslo Garden Society [told a local paper in May](#). “Enough food will also help the bumblebees withstand man-made environmental stress better.”

[Agence France-Presse reports](#) that businesses have also joined in, with one accounting firm putting up around \$50,000 to cover its terrace in flowering plants and enough beehives to house 45,000 bees.

[Why you shouldn't freak out about swarming honeybees — and how to save bees from those who do]

The [decline of the pollinating bee](#) — and the potential causes of that decline, which could include fungi, pests, lack of food and pesticide use — is a subject of much debate. But while the restriction of pesticides like [neonicotinoids](#), which some believe have an adverse effect on honeybees, may not make sense without more evidence, planting flowers is a fix that's hard to argue with.

Besides, [research suggests](#) that so-called “green spaces” in urban areas — ones with trees, grass, flowers, and animals — are beneficial to human health and wellness. So planting flowers for transient bees is really a win-win.

Those outside of Oslo can take advantage of a similar site with a global reach. [The Pollinator Partnership](#) encourages individuals to create bee-friendly environments on their property and add them to an online map.

Read More:

[Bill Nye explains how climate change works \(with emoji, obviously\)](#)

[New studies find that bees actually want to eat the pesticides that hurt them](#)

[How the White House plans to help the humble bee maintain its buzz](#)

Rachel Feltman runs The Post's Speaking of Science blog.

<http://www.komonews.com/news/local/Agriculture-department-investigating-Portland-bee-die-off-310356521.html>

Agriculture department investigating Portland bee die-off

By Associated Press Published: Jun 27, 2015 at 3:31 PM PDT

PORTLAND, Ore. (AP) - The fifth mass bee death in Portland in the past several days has state investigators on the hunt for a cause.

[The Oregonian](#) reports that dead and dying bumblebees littered the sidewalk in some parts of the city.

Oregon Department of Agriculture lead pesticide investigator Mike Odenthal says lab results from the earlier die-offs are expected next week.

He says the department is trying to find out whether humans did something to the bees with a pesticide or pollutant or whether there's something strange going on with the linden tree blossoms the pollinators had been feeding on.

Every major bee die-off reported to the agriculture department in the past few years has taken place near the trees, which are often sprayed with chemicals to control



Cause unknown in spate of Portland bee die-offs

Kelly House | The Oregonian/OregonLive By Kelly House | The Oregonian/OregonLive

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Corinne Fletcher stepped outside her apartment building Friday morning to find a pollinator genocide in the park that serves as her backyard.

Dead and dying bumblebees littered the sidewalk near the Market Street entrance to downtown Portland's **Pettygrove Park**. The carcasses were so thick, the Lewis & Clark College law student said, "you had to step carefully to not step on any bees."

The fifth mass bee death in Portland in the past several days has state investigators on the hunt for a cause.

Lab results from the first four die-offs are expected next week, said Mike Odenthal, lead pesticide investigator for the **Oregon Department of Agriculture**.

It's too early to say what killed the bees, but all of the die-offs share a similarity: The bees had been feeding on linden tree blossoms.

"We're trying to find out whether this is something humans did to the bees – a pesticide or pollutant or something – or is there something weird going on with the trees?" Odenthal said.

Every major bee die-off reported to the Oregon Department of Agriculture in the past few years has taken place near the trees, which are often sprayed with chemicals to control aphids.

"They don't harm the tree, but they secrete a honeydew that's considered a nuisance," said Aimee Code, pesticide program coordinator for the Xerces Society for Invertebrate Conservation.

A **high profile poisoning in 2013** of more than 50,000 bees in a Wilsonville Target superstore parking lot raised public awareness about bee deaths. A class of insecticides known as neonicotinoids were at fault in the Wilsonville incident and several subsequent Oregon bee die-offs.

The incidents spurred state and local restrictions on the use of neonicotinoids. A **statewide ban** on the use of four types of neonicotinoids on linden trees and related species took effect in February. Portland followed suit in April with a ban on the use of all neonicotinoids on city lands.

After reaching out to Portland Parks and the Xerces Society, Fletcher took Code's advice to return to the park and collect bees for state testing.

By the time she returned, she said, "a lot of them were gone."

A worker in one of the adjacent buildings told her bees in the park have been dropping dead daily for more than a month.

Mark Ross, spokesman for **Portland Parks & Recreation**, said the agency does not spray insecticides at Pettygrove Park.

Most of the dead bees found Friday appeared to be concentrated on the sidewalk just outside the park, where bees were swarming several large linden trees in full bloom.

There's little chance they died of natural causes, Code said. Mass mortality events aren't part of the bumblebee life cycle.

But it's not certain insecticides or other chemical applications are to blame, either. When stressed, lindens sometimes produce a sugar that can be dangerous to bees.

If Fletcher collects enough bees to conduct testing, lab analysts will look for substances that could have killed them. If any banned neonicotinoids show up, investigators will have to ask another question: Were the chemicals applied before or after the state's ban took effect in February?

Neonicotinoids can remain present at levels lethal to bees for months after application on a tree, Odenthal said.

"It's possible we may have had a legal application of a now-banned product before we banned it, that's causing the activity now," he said.

What to do if you spot a bee die-off?

Call The Oregon Department of Agriculture, take a photo and ask whether you should collect a sample. As Fletcher experienced in Pettygrove Park, the bodies are often swept or blown away before state investigators arrive.

Code offers another piece of advice.

"Create a habitat in your yard that is pesticide-free with many options for foraging and food sources for bees," she said.

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Jonathan Kantrowitz

Political activist, health nut

Pesticides banned on municipal playgrounds in CT

Posted on July 1, 2015 | By Jonathan Kantrowitz

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Source: *Citizens Campaign for the Environment (CCE)*

Today, the CT General Assembly passed legislation to ban pesticides on municipal playgrounds in CT, building on existing bans on CT school grounds. The new law is aimed at protecting small children, pets, and wildlife from unnecessary exposure to dangerous pesticides.

“This is an important step forward in protecting the health and well being of our most vulnerable populations,” said Louis Burch of Citizens Campaign for the Environment. “Pesticides have been shown to contribute to cancer, asthma and developmental delays, and they disproportionately hurt our children. By eliminating these poisons on public spaces where our children play, we are sparing an entire generation of youngsters from the potential health hazards associated with exposure to pesticides. This is a significant victory, and it sets a good example for other states to follow.”

The law also improves the existing parents’ notification system by requiring school districts to provide at least 24 hour electronic notification any time a pesticide application is scheduled to occur on school property.

“Providing advanced notice of pesticide applications allows parents to take precautions to protect their children from unnecessary exposure,” continued Burch. “Providing this right to know is a commonsense improvement, and we commend the legislature for taking this step.”

Connecticut established itself as a nationwide leader on this important public health issue in 2005, when it became the first state in the nation to prohibit the use of lawn care pesticides on school athletic fields serving grades K-6. That law was expanded in 2009 to include middle school fields (Grades 7 and 8). This gradual expansion represents a growing consensus among the health and science communities that chemical pesticides pose a disproportionate and undue risk to children.

“As we have recognized for many years in Connecticut, children are particularly endangered by pesticides – because these chemicals accumulate in kids’ growing bodies faster than for the rest of us,” said Rep. Andrew Fleischmann, House Chairman of the Education Committee, which drafted the 2005 and 2009 laws prohibiting pesticide use on school fields. “This measure represents a great step forward for our state, safeguarding our children from these toxic chemicals on town playgrounds – and ensuring that parents get notice when pesticides are used at public schools,” he added.

“Time and time again pesticides have been shown to have serious health and environmental consequences, and it is critical that we begin limiting their use,” said Senator Ted Kennedy, Jr., Senate Chair of the Environment Committee. “By keeping playgrounds off of playgrounds and school property, we limit their exposure to those who are most likely to become ill as a result of them. Improving our state’s notification procedures will better inform parents about pesticide and herbicide applications at their children’s schools.”

“This is an important law that will help parents protect their young children from the harmful effects of pesticides,” said Senator Danté Bartolomeo, Senate Chair of the Committee on Children. “Pesticides have been linked to serious health problems, particularly in pregnant women and children, and I am glad we have acted to limit their use. Communities such as Cheshire, one of the towns I am proud to represent, have shown us that using these toxic chemicals is not necessary to maintain public green spaces. I believe this commitment to non-toxic landscaping is an admirable goal that I would like to see adopted by more Connecticut communities.”

“We have worked long and hard to protect children from unnecessary exposure to pesticides,” said Rep. Diana Urban, House Chair of the Committee on Children. “This is a major step forward in assuring our children’s health. I often encourage parents to read the warning labels on commercial pesticides and then decide if they want them anywhere near their children. Kudos to the advocates for their tenacity and many thanks to my colleagues for their help and support, particularly my co-chair on the Children’s Committee Sen Bartolomeo”.

“After years of input and debate,” said Rep. Shaban (R), Ranking Member of the Environment Committee. “I’m pleased that we were finally able to craft a bill that focused on the main goal of the initial ban – protecting young children – while being sympathetic to the real world needs of state and municipal property managers.”

“This is a big step forward in toxins reforms for CT,” said Senator Beth Bye, Senate Chair of the Appropriations Committee. “Parents will now know when pesticides are used at their child’s schools and have the information they need to advocate for safer school grounds.”

“We know many pesticides are toxic not only to their intended targets, but to our children and wildlife as well,” said Rep. Terry Backer. “The more pesticides we can remove from the environment, particularly for ornamental use, the more children we will protect in the future.”

“We recognize that children haven’t fully developed their defenses, and that exposure to pesticides is problematic,” said State Rep. Philip Miller, House Chair of the Committee on Planning and Development. “This bill protects our vulnerable children and it forces landscapers to use sustainable practice to uphold public health by reducing those exposures.”

EPA to propose banning chlorpyrifos insecticide

Mateusz Perkowski

Capital Press

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The EPA says it plans to ban the common insecticide chlorpyrifos but may change its mind based on discussions with manufacturers.

The federal government said June 30 that it's planning to ban chlorpyrifos, a common insecticide, but may change its mind based on consultations with the chemical's manufacturer.

The U.S. Environmental Protection Agency's tentative decision to revoke all "tolerances" for residues of the insecticide on crops came in response to a request from environmental groups.

Pesticide Action Network North America and the Natural Resources Defense Council claim that exposure to the chemical causes farmworkers' children to experience long-term health problems, among other problems.

The EPA is signaling that it may take action on chlorpyrifos but "there are many opportunities for going astray and failing to protect communities from this chemical," said Paul Towers, spokesperson for PANNA.

The groups petitioned EPA to prohibit chlorpyrifos based on numerous risks in 2007, but the agency did not take final action on the request, arguing it would take time to study the issue.

The 9th U.S. Circuit Court of Appeals recently ordered the EPA to make up its mind, which led to the filing of the June 30 report in which the agency said it would propose canceling all chlorpyrifos tolerances by April 2016.

While it was initially inclined to deny the petition in favor of "additional risk mitigation action" to reduce hazards, the EPA is now "less confident" it can achieve that goal without formal regulatory proceedings, the report said.

In some watersheds, potential exposure to the chemical through drinking water and other pathways has prevented the agency from finding "that there is a reasonable certainty of no harm to people who would be drinking such water," the report said.

The EPA noted that threats to agricultural employees may also justify new restrictions on the chemical.

Before proposing the revocation, though, the agency plans to conduct an in-depth assessment to see which watersheds are most vulnerable to chlorpyrifos contamination.

The EPA also plans to negotiate with the chemical's manufacturers to potentially revise the pesticide label and avoid hazardous applications of chlorpyrifos rather than have the chemical tolerances revoked.

Towers, of PANNA, said he's concerned that any changes agreed to by manufacturers will fall short of what's necessary to protect human health.

"The proof will come months down the road," he said.





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HOME > MISCELLANEOUS > NEW REGULATIONS: CHLORPYRIFOS LABELED 'RESTRICTED USE' IN CALIFORNIA EFFECTIVE JULY 1

New regulations: Chlorpyrifos labeled 'restricted use' in California effective July 1

Farm Press Staff | Western Farm Press

Jun 30, 2015

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- Contact local agriculture commissioner's office for permit requirements



California regulations have changed Chlorpyrifos to a "restricted use" pesticide. Applicators will need a permit from county agriculture commissioners to use products with Chlorpyrifos in them.

Getty Images

Chlorpyrifos is labeled effective July 1, 2015 as a restricted material in California when it is an ingredient in pesticides for use in the production of an agricultural commodity.

Applicators will need to obtain a restricted materials permit from their county agriculture commissioner if they wish to purchase, possess or apply affected chlorpyrifos products.

The California Department of Pesticide Regulations (DPR) is currently developing interim permit condition recommendations, this will be additional mitigation to the instructions users of restricted materials must follow.

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The interim permit conditions may include buffer zones near sensitive sites, GMP (good management practices) to prevent drift or offsite movement into the air and measures to reduce runoff into surface waters.

County agriculture commissioners will be notified by the DPR with a letter of the recommended interim conditions.

A [list of products](#) published by DPR includes 31 pesticides that will be affected by the new regulation.

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