

## Toxic legacy of herbicide exposure

By Lisa  
Arkin

One year ago, on Oct. 16, 2013, a helicopter pilot and a forestry consultant sprayed herbicides above homes in Cedar Valley, a rural area near Gold Beach on Oregon's south coast. The pilot-pesticide applicator flew four round trips as he sprayed a chemical soup of 2,4-D and triclopyr, two potent herbicides with grim records of human health risks.

Spraying herbicides over clear-cut land is a widespread forestry practice, but on that day business as usual went horribly wrong. As many as 45 residents became mysteriously ill after smelling chemical fumes and feeling chemicals drop on their faces.

Residents rushed to emergency rooms and doctors' offices for relief from severe asthma attacks, wrenching abdominal pain, coughed-up blood, vomiting, loss of eyesight and intense vertigo. Their symptoms were recurrent textbook responses documented in peer-reviewed scientific literature. As is common in forestry herbicides sprays, the pilot flying above Cedar Valley mixed additional highly toxic chemicals that increase the potency of active neurotoxins.

Put yourself in one victim's shoes. Beau Hanson was outside with his wife and their 8-month-old baby when they were hit with droplets of petroleum oil laced with herbicides and chemical surfactants. The baby started vomiting and Hanson missed three days of work due to a severe asthma attack.

Now, a year later, many residents who were directly exposed to herbicides are still reporting troubling symptoms.

Barbara Burns, a retired emergency room nurse and a member of the local fire department's first responder team, helped her neighbors who were sickened by the spray. She continues to suffer ill effects. Summing up the community's feelings, Burns said, "We are not only worried about how long we will be sick; we worry for the future of children. What are the long-term consequences for them?"

The same questions are being explored in research labs across the country. Not only do chemical defoliants such as 2,4-D cause acute illness, they disrupt hormones needed for normal operation of the thyroid gland, kidneys, ovaries and testes. Long-term effects may not be seen or felt until years after exposure.

Studying these long-term effects is a new field of science called epigenetics, the study of genetic changes caused by factors other than an individual's DNA sequence of genes. Such factors include genetic mutations resulting from exposure to environmental toxicants, or poisons. Epigenetic studies prove that invisible, devastating harm from exposure to chemical defoliants can show up in the next generation.

Yes, you read that right — damage from environmental poisoning can be inherited by unexposed generations. In some cases, genetic mutations are experienced into the third generation, our grandchildren.

Thanks to the work of scientists like Dr. Tyrone Hayes, a professor of integrative biology at the University of California, Berkeley, we are learning that even tiny amounts of herbicides can cause epigenetic changes in our bodies by flipping hormonal switches. For example, Hayes proved that exposure to low levels of the herbicide atrazine can stop normal



male hormone function.

He calls this “chemical castration.” An adult male frog grows ovaries, lays eggs, and, as a chemically created female, mates with other males. In addition to demonstrating that atrazine stops sperm formation, Hayes has shown that it promotes estrogen hormonal imbalances linked to higher risk of breast cancer.

Hayes uses frogs for his research on herbicides’ interference with normal hormone function. But in Oregon, children are the experimental polliwogs for policies that allow helicopters to spread gene-altering chemicals into the environment.

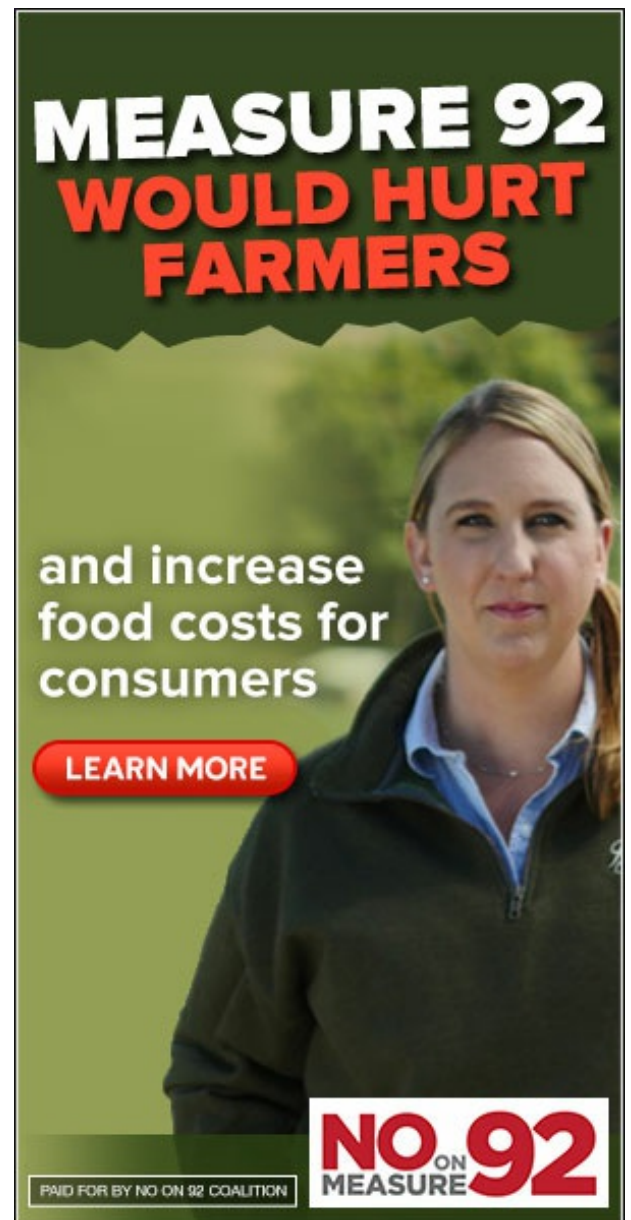
Named an “Emerging Explorer” by National Geographic magazine, Hayes approaches rock-star status as a scientist who knows how to deliver a gripping speech. He has appeared in nearly a dozen documentaries. Hayes will be the keynote speaker at the University of Oregon Environmental Studies Convocation from 7 p.m. to 9 p.m. Friday in 182 Lillis Hall. His keynote speech, “From Silent Spring to Silent Night: Of Toads and Men,” is timely for the people of Cedar Valley who feel effects from herbicide exposure a full year later.

Appropriately, Hayes, the expert on atrazine, will visit Triangle Lake, where dozens of residents tested positive for atrazine and 2,4-D in their urine.

Given the intergenerational toxicity of many of these chemicals, Hayes’s research is a stark reminder that we are, in his words, “affecting the health of our grandchildren’s grandchildren by the chemicals we are putting into the environment today.”

For the sake of our grandchildren’s health, and as an informed community, we can work together to protect our families’ futures.

Lisa Arkin of Eugene is executive director of Beyond Toxics. For more information on other events featuring Tyrone Hayes, go to [www.BeyondToxics.org/TyroneHayes](http://www.BeyondToxics.org/TyroneHayes).



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