

Hesperian Group's PESP Strategy

Describe Your Organization's Five-Year Goals Related to Pesticide Risk Reduction

Our mission is to seek a careful balance of safety and efficacy in pesticide use with companion animals. Though the mission's central objective is risk reduction of human exposure, in close parallel it covers risk reduction for pets. Our strategy is comprehensive, specific in its tactics and performance measures, and aggressively geared for new standards of best practices. With cooperation from the EPA and stakeholder pesticide registrants our abstract solutions are adaptable to the field.

What do you envision doing (broadly) to try to resolve your major issues?

Background

Over the past decade flea and tick control for dogs and cats has evolved to a singularly dominant model of chemical use—the “spot-on” pesticides. The model is based on monthly application of a low-volume dose of a solution comprising active pesticide ingredient in a lipid-soluble vehicle or “spreader”. Through a dynamic called “translocation”, when focally applied to the animal's skin the pesticide-spreader solution diffuses steadily throughout oils of the skin, hair, and oil glands of the hair follicles. When translocation is complete the active ingredient persists in the skin oil of the animal's entire body surface at levels lethal to fleas and ticks by contact.

In that manner the pet's skin oils function as both point of activity and reservoir for the active ingredient, and as a source of chronic pesticide exposure; skin oil containing pesticide is directly transferable to humans and the variety of microenvironments they share with their pets—furniture, beds, floors and carpets, food areas, car interiors, etc.

Consequently this exposure scenario presents multiple pathways for continuous transfer and accumulation of pesticide residue. The scenario is amplified in households with multiple pets. Accurate exposure assessments are challenging.

Those challenges are compounded by two distinct factors: the intrinsic unpredictability of pet/owner interactions, and the high variability of spot-on product dosing protocols.

Children are at highest risk of exposure to spot-on pesticides:

- They tend to have longer and closer interactions with pets.
- Child-specific tendencies give rise to intensified exposure routes:
 - mouth-to-surface (oral),
 - hand-to-surface-to-mouth (oral), and
 - body-to-surface (dermal).

Those routes relate to contact with both the treated pet and residues in the shared microenvironments.

Accordingly children, specifically toddlers, are typically the designated sentinel population for residential pesticide exposure assessments, including the spot-on products for pets. Due to strong evidence from recent animal studies in trans-generational epigenetics, it has been recommended that “pregnant women and/or their fetuses be explicitly designated as sentinel populations.”¹

Issues

Pet Safety

Spot-on products attempt to treat broad weight groups of dogs and cats with single fixed-size doses—a simplistic, imprecise system which renders marked dose-rate variability within and between groups, and dosing extremes to individual animals. Current label protocols force some owners to dose their pets by as much as ten-fold the levels of other animals in the same designated weight/dose group; e.g., a 2 lb kitten or puppy receives the same prepackaged dose of pesticide as a 20 lb adult.²

Higher dosing levels of spot-on pesticides correlate with the incidence and severity of the adverse reactions in pets reported to the EPA.³ Moreover, higher dosing levels correlate directly with the pet's potential as a source of chronic pesticide exposure for its owner.

Human Exposure

Over half of U.S. households have dogs and/or cats. By their widespread and continuous usage, spot-on products pose one of the most prevalent and persistent sources of pesticide exposure for that segment of the human population. As a novel use of novel compounds, the potential human health effects from chronic low level exposure to some spot-on formulations have not been fully evaluated; their range of active ingredients includes chemicals listed as possible carcinogen^{4, 5, 6, 7} and suspected *endocrine disruptor.^{4, 5, 6, 7, 8, 9}

* In the early 1990s scientists began to compare their observations of disturbing changes across a diversity of North American wildlife. New generations were exhibiting a variety of physical, metabolic, reproductive, and behavioral abnormalities: hermaphroditism, deformities, neonatal wasting, thyroid derangements, infertility, and diminished mating, migratory, and territorial drive. If able to survive and reproduce, affected animals appeared to be passing the anomalies and dysfunctions on to their own progeny (epigenetic transmission). In some regions wildlife populations were in critical declines. In other areas species had already disappeared.

The scientists converged on a central theory:

- that specific chemical pollutants were the underlying cause, and,
- that even infinitesimally low levels of those chemicals in a female's body could transfer to the earliest life stages of her offspring—in the egg or in the womb—and via intricate mechanisms of hormone mimicking or hormone blocking, alter or interfere with normal gene expressions in the developing embryo or fetus. Some of the abnormal gene activities and their effects were immediate. Others laid latent, manifesting later in life.

The collective syndrome was termed endocrine disruption.

Those findings in nature have catalyzed mainstream science's search for environmental links to analogous multigenerational trends in the human population, including a plurality of endocrine-related disorders:

- autism, attention deficit hyperactivity disorder (ADHD), learning disabilities,
- Parkinson's disease, Alzheimer's dementia,
- diabetes (juvenile and adult), obesity,
- breast cancer, prostate cancer, testicular cancer, juvenile cancers,
- osteoporosis, endometriosis, cryptorchidism, hypospadias, male dysgenesis syndrome,
- asthma, and autoimmune diseases.

Relatively rare before 1950, many of those disorders began to increase noticeably in the early 1970s when the first generation exposed in the womb to post-World War II chemicals reached

maturity.¹⁰ Recently introduced in Congress, *The Endocrine Disruptor Screening Enhancement Act of 2011*¹¹ and *The Endocrine-Disrupting Chemicals Exposure Elimination Act of 2011*¹² propose sweeping, multidisciplinary approaches to that complex and essentially unaddressed issue. Even with those ambitious efforts complete answers will be years away, as exposure continues.

The sharp rise of reported acute adverse reactions in pets to spot-on pesticides would underscore the implications of chronic exposure—not only for the pets, but their human counterparts as well. Children are at greatest risk of exposure. Children and prenatal life are the most vulnerable to the potential health effects.

The National Center for Environmental Assessment characterizes this unique pesticide exposure scenario as problematic; the rubric is “variability and uncertainty”. In managing the uncertainties—notably of endocrine disruption, where effects thresholds can register at body burdens as low as parts-per-billion to parts-per-trillion—reduction in unnecessary levels of pesticide use with pets is an axiomatic stopgap. The Precautionary Principle applies.

Strategy—Overview

Our approach will embody two fundamentals of pesticide risk reduction: efficiency of use, and selectivity for lowest toxic potential.

The first phase of our strategy focuses on the modern spot-on pesticides for pets. It begins with stringent improvements to their baseline dosing precision, followed by design of flexible and efficient new protocols which, in balance,

- maintain or improve upon the products’ intended clinical benefits,
- while reducing dosing variability/risks to pets, net usage, and human exposure to theoretical minimums.

An incidental benefit is significant cost savings for the majority of pet owners. The combined benefits—protocol improvements and reductions in use, exposure, and cost—are expressible in hard percentages. The bulk of the paradigm has been completed under the following PESP Goals:

Goal 1—Refined Dose Curves for Spot-On Pesticide Products

Goal 2—New Protocols for Spot-On Pesticides

Goal 3—Analysis of Consumer Cost Savings Achieved under Goals 1 & 2

The paradigm duals as the framework for definitive efficacy studies of spot-on products, individual and comparative.

Goals 1 and 2 will demonstrate efficiency tactics for quantifiable reductions in spot-on pesticide use. Qualitative measures are also integral to the full equation of risk reduction:

Goal 4—Review Toxicological Profiles of Chemicals Used for Flea and Tick Control, compare their utilities against their risks as profiled, and weigh the distinctions in terms of risk/reward for both pet owner and pet—for example:

- Active ingredients labeled for both ticks and fleas profile the highest risks to human health. In most urban and many suburban settings, often only flea control is indicated (vs. both flea and tick control). Where only flea control is needed, several of the EPA-regulated chemicals for spot-on products profile as lower-risk options, especially for use around children and pregnant women.^{13, 14, 15}

- The FDA-regulated fleacidal compounds also profile lower risk, several of which pose zero human exposure.^{16, 17, 18, 19}

(For the above, our strategy includes methods for selectively adding and removing tick control, timed to windows and factors of actual need: weekend outings, camping trips, seasonality, etc.)

- For pets, heightened field surveillance was initiated with the *EPA Data Evaluation Records of 2008 Pet Spot-On Products*.³ That growing database will be instrumental in profiling the relative risks of pet toxicities from specific products, formulations, and active ingredients. (EPA currently coordinates with the National Pesticide Information Center in gathering data on adverse pesticide incidents; NPIC's portal for direct reporting from the public is 1-800-858-7378).

Goal 5—Explore Biorational Approaches for Synergy with Reduced Chemical Use

This activity builds upon Goals 1-4, and will consider the full spectrum of available solutions for pest control with companion animals. Our ultimate goal is to continually develop effective new IPM hybrids by combining proven green strategies with our models of lowered chemical use, and lower the use further.

Each goal will be presented in detail at <http://www.hesperiangroup.org/>

EXIT EPA

Reference Links

EXIT EPA

1. [FIFRA Scientific Advisory Panel Meeting, Oct. 6-9, 2009 \(minutes\), Docket Number EPA-HQ-OPP-2009-0516](#)
2. [Frontline Plus[®], Frontline Top Spot[®], produced by Merial Ltd., Duluth, Ga.](#)
3. [EPA Data Evaluation Records of 2008 Pet Spot-On Products](#)
4. [Pesticide Action Network > Database > Fipronil](#)
5. [Pesticide Action Network > Database > Permethrin](#)
6. [Pesticide Action Network > Database > Amitraz](#)
7. [Pesticide Action Network > Database > Ethofenprox \(Etofenprox\)](#)
8. [Pesticide Action Network > Database > Phenothrin](#)
9. [Pesticide Action Network > Database > Cyphenothrin](#)
10. [The Endocrine Disruption Prevention Act of 2009 \(preamble\) S-2828, HR-4190](#)
11. [The Endocrine Disruptor Screening Enhancement Act of 2011 HR-553](#)
12. [The Endocrine-Disrupting Chemicals Exposure Elimination Act of 2011 S-1361, HR-2521](#)
13. [Pesticide Action Network > Database > Imidacloprid](#)
14. [Pesticide Action Network > Database > Dinotefuran](#)
15. [Pesticide Action Network > Database > Spinetoram](#)
16. [Pesticide Action Network > Database > Spinosad](#)
17. [Pesticide Action Network > Database > Selamectin](#)
18. [Pesticide Action Network > Database > Nitenpyram](#)
19. [Pesticide Action Network > Database > Lufenuron](#)