

Urban deer contraception: the seven stages of grief

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Until about 1990, deer contraception was based on techniques so impractical that few people paid attention to it. The public knew little, and what state fish and wildlife agencies knew, they ignored. The media didn't know the technology existed, and regulatory agencies, like the U.S. Food and Drug Administration (FDA) had no policies that applied to it.

With the advent of immunocontraception and demonstrations in the early 1990s that a contraceptive vaccine could be delivered to wild horses (*Equus caballus*; Kirkpatrick et al. 1997), captive exotic species (Kirkpatrick et al. 1996a,b), and white-tailed deer (*Odocoileus virginianus*; Turner et al. 1996), the subject rapidly emerged from obscurity to become immensely controversial and then sensational. Today, while the science of wildlife immunocontraception moves quickly along, its actual application to white-tailed deer is bogged down in a morass of social and political turmoil. It is clear that the science has outstripped our social and political capacities to deal with it. Thus, the overriding question for the authors—and probably for many others—is why is there so much controversy, irrationality, and even hostility surrounding deer contraception? We will try to explore this subject in the context of our own experiences with immunocontraceptive trials in free-roaming populations. The story that follows is a distillate of our experience in about 30 communities and parks and involving hundreds of people. We have made the names in this story fictitious, but the content is, unfortunately, real.

The call

The adventure begins, usually, when a group of residents from the Town of East Overshoe calls one

of us and begs for help in saving their urban deer from a planned hunt or cull. These are generally nice people who dislike the killing of animals in general, and in their backyards in particular. The first and most consistent characteristic we notice about them is that they have absolutely no legal authority to do anything about the deer. For many years we consented to come to their communities to discuss the subject in a public forum.

The town meeting

The town meeting is a reliably consistent phenomenon. Its participants include (1) those who want to save "their" particular deer, (2) those who object to hunting in general, (3) those who object to management of any kind, (4) those who hate deer for eating their shrubbery or defecating on their lawns, or who believe that the deer will give them Lyme disease or wreck their cars, (5) some township and county officials who want to be reelected, (6) at least 1 representative from the state fish and wildlife agency, (7) some shotgun hunters, (8) some bow hunters, (9) a representative from either an animal-rights or an animal-welfare organization, and (10) the media.

We take about 30 minutes to present our talk on state-of-the-art deer contraception. After that, almost everyone ignores us and the real show begins. We mostly watch and listen. The discussion begins with a review of the evidence that there are too many deer. The deer eat the blue flowers of those gardeners who grow blue flowers, and their lawns are scattered with deer feces. Numerous testimonies are given on the number of deer-vehicle collisions in the area, the number of cases of Lyme disease in town,

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Key words: contraception, deer, grief, immunocontraception, urban deer.

and the process by which deer have destroyed the town's only remaining 1-ha woodlot (the town's other woodlot was flattened the previous year for a minimal). Finally, the estimate of deer living in East Overshoe is given as somewhere between 500 and 2,000.

The town's bird-watching club provides data (the only real data other than our report that finds its way into this meeting) indicating that over the past 15 years the number of bird species has declined by 64% in East Overshoe. They blame it on the condition of the woodlot and, therefore, the deer. They do not point out that in the last 15 years, suburban development has reduced the extent of forest in East Overshoe by 87%.

There is an immediate rebuttal by the deer lovers. Those who grow red flowers, which the deer don't eat, don't seem to have any trouble, and the droppings on their lawns go unnoticed or, they explain, are easily removed by raking. While these people acknowledge there have been some deer-vehicle collisions, they attribute the accidents to a lack of reflectors and signs, and to people who drive too fast. This group doesn't have much to say about the woodlot, largely because they value the deer more than the trees. They estimate the deer population to be somewhere around 45 animals.

A passionate speech is now made by an animal-rights representative, who, disliking any form of hunting, cites the moral and ethical dimensions of killing animals and argues, "Let nature take its course." This is followed by a more calm and reasoned speech by an animal-welfare representative (who is ignored by the animal-rights representative) about the need for more tolerant attitudes about urban wildlife, the risks of wounding, and the dangers of using lethal weapons within the town boundaries. The animal-rights representative jumps up at this point and makes it clear that immunocontraception is the means by which all sport hunting can be ended, and an audible stir occurs in the hunter groups. This last comment is made despite the description we provided earlier of deer contraception—a process that requires getting to within 30–40 m of each deer and darting it several times over a 5-year period. At this point the town officials become very quiet, and the media representatives begin to realize that they have before them the makings of a really interesting story.

Now it's the hunters' turn. The shotgun hunters speak of sport, recreation, a wasted resource, and the safety of 00 buckshot. Some speak on behalf of the needy and on how a hunt can feed the hungry. Next the bowhunters speak and give similar testimony. Both hunter groups are concerned about the effects of the contraceptive drugs. "What will happen," they ask, "if someone eats a treated deer?" But just min-

utes before we have explained that it is totally digestible protein, like the meat itself, and won't pass through the food chain. The hunter groups estimate the deer herd to be about 10,000.

One of the deer lovers who reads quite a bit, points out that 00 buckshot is really not all that safe and that although bow hunting may be described by some as recreation, it is not a management tool. Another deer lover cites anecdotes about wounded deer with arrows sticking out of them running about the community.

The state fish and wildlife agency representative reminds everyone that the state is the only legal entity that has the right to make decisions about deer management. This person is concerned about what the FDA thinks and about the dangers of darts lying about in the city park (although he does not seem to have the same concern about broadhead arrows buried under the same grass). He is courteous, and for his reward, invokes the wrath of almost everyone in the group. When pressed, he admits that he has no idea how many deer are in East Overshoe and no systematic studies to document the health of the town's woodlot. His position is that "too many deer are too many deer" regardless of how many there are.

Each group accuses the other groups of either inflating or deflating the number of deer in town, and when questioned by us, not a single group has any data to support its numbers. Finally, the town-county officials speak up. "Who will pay for contraception?" they ask. The state agency representative makes it clear that the state won't, and the hunters and deer haters agree vociferously. The deer lovers claim that they can raise the necessary money. The mayor asks who will do the work, and the city manager makes it clear that the town won't. The deer lovers indicate that they can find people who will do the work, probably for nothing. We point out that, public intuition to the contrary, it requires significant training and skill to successfully dart wild deer with contraceptives. One of the more thoughtful hunters points out that he has read an article, written by a computer population modeler, reporting it would be impossible to control deer with contraception. We acknowledge the reference but point out that the study employed population data collected 2,000 miles away from a herd of deer living a few miles from the Arctic Circle. The relevance of site-specificity to deer contraception in East Overshoe is pondered by the group for 12 seconds.

Next, a heated discussion of the health of the deer ensues. The deer lovers see only healthy deer, the deer haters see only sickly deer. It soon emerges that during the past year about 100 deer were killed on

the local highways, but no one has examined these deer to see if they were healthy or not. The state fish and wildlife agency representative suggests that 50 deer be killed to assess their health. A deer lover points out that these deer will not be healthy after they are killed.

Another deer lover—let's call him Ned—who is an avid reader begins to question the state fish and wildlife agency representative—let's call him Joe. "Do you have nonhunting deer populations in the state?" he asks. Reluctantly, Joe admits that there are nonhunting populations here and there. Next, Ned asks him if the state is responsible for the state's wildlife. "Yes," Joe replies. "All the wildlife?" Ned asks. "Yes," responds Joe. "Even the nonhunting wildlife?" presses Ned. "Yes," replies Joe, knowing exactly where this discussion is going. Ned puffs on his pipe for effect, pauses, and then asks what the state is doing about managing the nonhunting deer populations. Poor Joe, who has very little to do with making policy and who at that moment wants very much to be somewhere else, says quietly, "Nothing."

At this point the deer lovers try to capitalize on the "nothing" response. The pitch of voices rises and emotions are running high, but all that happens is that all the arguments we have just described begin a second round, and, much later, a third round. The meeting finally ends after exchanges become hostile and insults frequent, without decisions by anyone with legal authority to act on the problem.

For many years we actually were foolish enough to keep accepting invitations to come back to these meetings, which occurred several times a year. Our time and energy resources were used up, and the same old arguments occurred over and over again. In most instances decisions were deferred, in some it was decided to cull deer, and in just a few cases it was decided to try contraception. As we grew wiser, we decided not to return to East Overshoe until someone with the legal authority to do something bad actually decided to try contraception. For the sake of this essay, let's assume that the East Overshoe officials determined that there were more deer lovers than deer haters on this particular election year, and that it was in their best interest to try contraception.

The media: part I

The newspaper reporters and television people absolutely loved the town meeting. For weeks after the meeting, the papers and television screens are filled

with reports of the heated arguments and close-ups of grimaces and snarls. Soon the "Letter to the Editor" sections of the newspapers begin to fill up with indignant letters from all sides. The local sportswriters make fun of the idea of deer contraception and air out all the old questions: "Will men grow breasts if they eat meat from one of these treated animals?" or "How do you get the condoms on the bucks?" or "How will sport hunting survive if this becomes a reality?" In most cases, they disparage us personally (we have grown to philosophically enjoy some of the more vitriolic remarks—after all, we don't live in these communities). Few of the published "facts" regarding the science of deer contraception are correct; the media focuses on the interpersonal conflicts rather than substantive issues. Much of this printed matter is sent to us by residents of East Overshoe, and occasionally we even get a tape or 2 from the local broadcasts regarding the conflicts. If we had not been at the meeting ourselves, we would hardly recognize what these stories are about. In general, the media merely inflames the issues and offers nothing constructive to the community in the way of education.

The proposal

We carry out the early field projects ourselves, but know that the deer issue is much bigger than us. So, we involve The Humane Society of the United States (HSUS). Part of their role is to sponsor an Investigational New Animal Drug (INAD) exemption, which provides for FDA authorization to conduct field studies with deer using the contraceptive vaccine. What the FDA wants for each deer field study is a proposal that explains in detail how the project will be carried out, who will be conducting the research, how data will be collected, and so forth. The HSUS provides East Overshoe officials with a generic proposal to aid them with writing this document. But no one in East Overshoe has the time to do this or understands how to copy the generic proposal, and someone at HSUS ends up writing the proposal. During the course of this exercise, several heated arguments break out in East Overshoe between officials and residents, over who will do the work, where exactly will the work be carried out, and who will pay for the project. Finally it is decided that several municipal park employees will do the work on their off hours and that several philanthropists in town will provide much of the funding. The battle over the precise site of the work is more intense, because everyone with 3 deer in their backyard wants the project to be carried out with "their" deer. The proposal is written and is sent to FDA, which reviews it and sends back a letter full

of comments. This causes immediate confusion within the community. Has the FDA approved the project? No, the FDA has merely "commented upon the project, setting conditions and recommending changes. Unless the FDA specifically says it cannot go ahead, it can go ahead, because there is already an INAD exemption for the vaccine, permitting research in animals. No one in the community understands that "approval" by the FDA is reserved for the manufacture and marketing of commercial drugs, and has nothing to do with our contraceptive vaccine.

After FDA has commented, the proposal next goes to the state fish and wildlife agency. In this agency, several heated discussions are held behind closed doors. One group passionately opposes the project because they fear that 3 park employees with dart guns will bring an end to hunting in America. Another group opposes the project largely because they dislike HSUS. Fortunately, cooler heads prevail and some people, who understand that deer contraception and sport hunting are separate and unrelated issues, approve the project. In fact, several of these people are relieved that they do not have to authorize either a public hunt or a bait-and-shoot program in a town park rimmed with people who already dislike the idea of killing semi-tame deer in downtown East Overshoe. Some don't even care if contraception works; they are just thankful that the problem has been dumped into someone else's lap.

The project

This is the only part of the entire saga that goes fairly well. The park employees are sent off to Washington, D.C., where they are trained by HSUS. They begin to learn how to box-trap deer and how to chemically immobilize deer for the purposes of ear-tagging. They work with an array of capture guns and darts. In class they learn how the vaccine works, strategies for delivering the vaccine, regulatory issues, and even the importance of a good education program to keep the public informed. Soon after, they begin their actual work.

In the few field projects we have conducted thus far, deer contraception works fairly well, with fertility reductions of 72-86% (Kirkpatrick et al. 1996, MeShea et al. 1997). Urban deer are reasonably accessible, and using bait stations we average a time investment of about 1 person-hour per deer. A dart that leaves a visible dye mark on the treated animal at the same time it injects the vaccine has been developed and used with some success (R. Naugle, HSUS, Gaithersburg, Md, pers. commun.). It has been possible to deliver the contraceptive vaccine to a signifi-

cant proportion of the wild deer, and contraceptive efficacy has been good enough to stop herd growth and bring about a small decline after only 3 years of treatment (B. Underwood, Natl. Biol. Surv., Syracuse, N.Y., pers. commun.). Our lessons have been that obstacles to deer contraception are social and political, not a lack of science. And, while the scientific dimensions of a project move smoothly ahead (in a relative sense), the social and political dimensions do not.

The media: part II

Now that park employees are out there in the park, darting deer with the vaccine, the media rushes forth to record the event. Reporters try to tag along after the researchers, stumbling over logs and frightening the deer. It's worse with the television personnel, who follow along with a camera man, a sound man, and a correspondent. The whole scene must be awesome to a previously unmanaged deer. Few deer get darted when this retinue of followers are present, and that only means that they stay longer. However, most remarkably, and despite the fact that only 3 deer have been treated in East Overshoe's park so far, the media declares the project a success!

Epilogue

Although the project has moved along with reasonable success, some people in the community think it is moving too slowly and should be expanded to other areas. They begin harassing town officials. After receiving no satisfaction at the town hall, they propose creating a private foundation that will take over the project, and they demand that HSUS provide the vaccine to them. HSUS politely refuses, citing FDA obligations. The disgruntled residents inquire as to where they might buy blowguns. Everyone ignores them and they become more hostile.

A group of hunters, still upset that the project went forward at all, hires an attorney. The attorney writes us a letter demanding that we send him every paper ever published on the subject. Our own legal counsel tells us to ignore the letter. We never hear from them again, but several articles appear in hunting magazines. They claim that contraception won't work and that if it did, the gene pool would be ruined. The next article tells how to kill the biggest bucks. Another group that opposes the contraceptive project contacts the media and tells them about 4 deer that have died mysterious deaths, probably from the vaccine they received. The 4 deer, 3 of which were males that never received the vaccine, died of rat poison that someone had put out on their

property. This has already been confirmed by the state's wildlife laboratory, but the media never bothered to ask.

An animal-rights advocate writes a letter to the local newspaper, pointing out once again, that this contraceptive project, which by now has treated 76 deer over 2 years, will be the instrument to end all sport hunting in the Western Hemisphere. This stimulates a barrage of letters from the hunting community to the local newspaper. Incidentally, each new publicity cycle engages a whole new cadre of people who has never heard of wildlife contraception.

The state fish and wildlife agency in the neighboring state, which abhors the idea of deer contraception, contacts the fish and wildlife agency in East Overshoe's state and asks them to stop the project. They cite some new evidence, based on the genetics of inbred chickens, that this "mass immunization" of 76 deer will change the nature of the country's deer herd. They suggest that only healthy animals will respond to the vaccine and soon 20 million North American deer will be unhealthy. Meanwhile, the average life expectancy of deer hunted in their state is about 1.5 years.

The East Overshoe forester, who is responsible for the 1-ha woodlot, complains that while the growth of the deer herd has been stopped in only 2 years, his forest is in no better shape. In reality it took hundreds of deer about 20 years to create the damage, and the woodlot is also used by horseback riders, picnickers, dog walkers and dirt bikers. He insists that the problem be solved overnight. No one considered the prospect that reducing the number of deer may not help the forest at all, because relatively few deer can keep the debilitated forest from regenerating. Someone from a federal agency who knows about these things suggests that East Overshoe either eliminate deer or put a fence around the forest.

By the waning days of the project, 86 deer have been treated and the growth of the herd has slowed or stopped and in some cases the population is beginning to decline. The cost of the scientific effort has been about \$50 per deer, but when the costs of the phone calls, town meetings, copying charges, peoples' time, postage, attorney's fees, travel to and from town meetings, and coffee and donuts for the various meetings is calculated, the cost reaches \$17,000 per deer. Deer hunting goes on as usual in other portions of the state, and plans have been drawn up to convert one-half of the 1-ha woodlot to yet another mini-mall.

As we prepare to leave East Overshoe we take stock; we are merely researchers trying to solve a problem. The deer are in this fix because people put them there. We suburbanized their historic habitat. Then we built up humanity all around them, so they couldn't get out even if they wanted to. We owe them a solution. Working together, we can find it; the solution will most certainly be a compromise. But until we put aside our egotism, territorialism, and defensiveness and sort through the facts as a focused, interdisciplinary team, all of us and the deer will suffer.

We can't extend this story much further; it is at the point where we find ourselves now. What the future will hold is anyone's guess. One thing is certain though; we will probably spend more time conducting research on contraception in wild horses, zoo animals, and even elephants (Fayrer-Hosken et al. 1997). Although none of these 3 endeavors are apolitical, the problems they arouse pale when compared to the turmoil and emotions aroused by deer contraception.

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