

Appendix

THE VACUUM EFFECT: WHY CATCH-AND-KILL DOESN'T WORK

Removing cats from an area—by killing or relocating them—doesn't work. Killing or relocating cats may seem like a quick and permanent fix, but the facts show it is anything but. Killing cats is cruel. In fact, 80 percent of Americans think having a cat caught and killed is inhumane.ⁱ Animal control agencies and city governments have perpetuated this futile approach for decades, but scientific research, years of failed attempts, and evidence from animal control personnel prove that total elimination of feral cats through catch-and-kill has been an elusive goal that has cost untold thousands of cats their lives.

Scientific evidence shows that removing outdoor cat populations only opens the habitat up to an influx of new cats, either from neighboring territories or born from survivors. It's a natural phenomenon known as "the vacuum effect." According to one scientific article, "... the presence of feral cats in a place indicates an ecological niche for approximately that number of cats."ⁱⁱ Each time cats are removed, the population will rebound to fill that niche, drawing the community into a costly, endless cycle of trapping and killing.

The vacuum effect is a phenomenon scientifically recognized worldwide, across all types of animal species.

Well-documented among biologists, the vacuum effect describes what happens when a portion of an animal population is permanently removed from its home range. Sooner or later, the empty habitat attracts other members of the species from neighboring areas, who move in to take advantage of the same resources that attracted the first group (like shelter, food, and water). This means that even if a group of cats is killed or removed, the resources available in the environment stay the same and will attract new cats. Even if a strict feeding ban is implemented, it is impossible to rid an area of the abundant food supply from rodent populations and dumpsters.ⁱⁱⁱ Removing cats only creates a "vacuum" that will inevitably draw in other cats living nearby, who breed back to full capacity.

Scientific research has observed the vacuum effect across many species.

In one study, upon evaluating the results of culling a badger population, scientists realized that "social disruption led to more migration of badgers into the area that was culled."^{iv} Similar results have also been documented in foxes^v, mice^{vi}, voles^{vii}, and possums^{viii}, among others.

A habitat will support a population of a certain size. No matter how many animals are removed, if the resources remain, the population will eventually recover. Any cats remaining after a catch- and-kill effort will produce more kittens at a higher survival rate,^{ix} filling the habitat to capacity. As one study found, "populations greatly reduced by culling are likely to rebound quickly."^x Over time, "a population vacuum is created, which soon attracts cats from adjacent areas. On moving into abandoned territory, new cats will breed to fulfill whatever population the area will support."^{xi}

"Furthermore, the repeated influx of new cats into the colony increases territorial and hierarchic fighting, increases the probability that new disease will be introduced into the colony and generally exacerbate the very behavioral patterns for which feral cats are usually labeled a nuisance."^{xii}

Years of failed Catch-and-Kill policies prove this method’s ineffectiveness.

Animal control officers across the country have taken a stand against misguided policies after observing the futility of lethal methods firsthand.

In Washington, D.C., Humane Rescue Alliance contracts with the city to provide animal care and control services, which includes Trap-Neuter-Return. As the former vice president of external affairs, Scott Giacoppo says, “Rounding up and killing of feral cats [is] essentially a reversal back to the animal policies of the 1800s that were ultimately proven to have no impact on the population. When they do a round-up-and-kill, that’s going to cost taxpayers money, and people won’t tolerate it.”^{xiii}

Per the website of Maricopa County Animal Care and Control in Arizona, “We have over 20 years of documented proof that traditional ways of dealing with feral cats don’t work. The ‘catch and kill’ method of population control (trap a cat, bring it to a shelter, ask that the cat be euthanized) has not reduced the number of feral cats. The cat may be gone, but now there is room for another cat to move in. So, catch-and-kill actually makes the problem worse.”^{xiv}

San Jose Animal Care & Services decided to implement a Shelter-Neuter-Return (SNR) program to replace their policy of euthanizing feral cats when cat impoundments and euthanasia rates for treatable issues continued to increase at the municipal animal shelter. Jon Cicirelli, Director of San Jose Animal Care & Services, says the alternative is to continue euthanizing cats that don't have owners, a policy that's shown limited results. "For the past 50 years, we've killed umpteen million cats and we're no better off," he said. "That system clearly does not work. We have to try something new."^{xv}

In 2009, Arlington County in Virginia approved a TNR program after years of trapping and killing community cats resulted in a continued increase of cat populations, nuisance calls, and euthanasia rates.^{xvi} Susan Sherman, COO of the Animal Welfare League of Arlington, the county’s animal control shelter, says, “I have been surprised that almost every resident who has complained about feral cats has chosen to participate in TNR once they understand it.”

As more municipalities trade in their outdated catch-and-kill policies for Trap-Neuter-Return, it’s no surprise that leadership organizations are adjusting their policies as well. The National Animal Care & Control Association amended its feral cat policy in 2008 to be more supportive of Trap-Neuter-Return, in part because, as then-president Mark Kumpf put it, “It’s recognizing that in some cases, certain jurisdictions and communities are more interested in maintaining a stable cat population than they are in simply bailing the ocean with a thimble.”^{xvii} He continues: “What we’re saying is the old standard isn’t good enough anymore. As we’ve seen before, there’s no department that I’m aware of that has enough money in their budget to simply practice the old capture and euthanize policy; nature just keeps having more kittens.”

If catch-and-kill had any long-term effect on cat populations, animal control officers nationwide—and their leadership organizations—would have observed it by now. Instead, they are reading the writing on the wall and switching to the method that works: Trap-Neuter-Return.

CASE STUDIES OF SUCCESSFUL TNR PROGRAMS

Below are examples of communities across the country that have been transformed by Trap- Neuter-Return (TNR) programs!

ALBUQUERQUE, NEW MEXICO^{xviii xix}

When Jim Ludwick joined the city's Animal Welfare Department in 2007, he realized several thousand cats were being euthanized each year without any evidence it successfully controlled the community cat population. Per Ludwick, "It was adding to crowding in our catteries, at a time when crowding was a major contributing factor in the suffering and death of domestic, adoptable housecats at the shelters." In 2008, the city began covering the cost for community cat spay and neuter at clinics organized by New Mexico Animal Friends, a local nonprofit organization. Four years later, Ludwick reported that the shelter's intake of cats was down 24 percent and the euthanasia rate for cats was down 72 percent. As of July 2016, the city's animal intake is down from more than 27,000 nearly a decade ago, to less than 18,000 now.

ARLINGTON, VIRGINIA^{xx}

In 2009, Arlington County approved a countywide TNR program. The decision came after years of trapping and killing community cats resulted in a continued increase of cat populations, nuisance calls, and euthanasia rates. The shelter performed spay and neuter surgeries at no cost to the public, started a foster kitten program, loaned humane traps for TNR, organized community training workshops, and stopped euthanizing feral cats. Six years later, cat-related nuisance complaints decreased 94 percent, total cat intake decreased 30 percent, and total cat euthanasia decreased 73 percent. Shelter staff morale improved and animal control officers developed positive relationships with community cat caregivers. Susan Sherman, COO of the Animal Welfare League of Arlington, the county's animal control shelter, says, "I have been surprised that almost every resident who has complained about feral cats has chosen to participate in TNR once they understand it."

BUCKS COUNTY, PENNSYLVANIA^{xxi}

In late 2015, the Bucks County Municipal Government brought in animal organizations Animal Lifeline and Red Rover to initiate a TNR program in Core Creek Park, where a population of nearly 500 community cats lived. The goal was to achieve zero cats in 10 years. Animal Lifeline and Red Rover united officials, shelters, rescues, donors, and volunteers for a TNR effort that began in April 2016. Within 10 days of the start of the program, 465 cats and kittens were trapped and spayed or neutered. Over half of those were found to be adoptable, and the 169 cats who were returned to the park now live in a safe environment with trained caregivers. The project also put in place strict measures to prevent additional cats from being abandoned in Core Creek Park. Since the 10-day TNR program ended, only one new cat and a few kittens have been found in the park. Over 80 percent of the park's cats are estimated to have been neutered, which means the colony numbers will decline. The Core Creek Park project shows that even large-scale TNR can be done over a short time period.

CARVILLE, LOUISIANA^{xxii}

Until 1988, the Gillis W. Long Hansen's Disease Center had continuously attempted to remove the feral cat population on their grounds by trapping and removing them, but a reduction in overall numbers was never achieved. Patients continuously ignored regulations to stop feeding cats, and they interfered with the removal process by releasing trapped cats in fear of the cats being killed. On top of that, any void from the successful removal of cats created a vacuum effect and was quickly filled back to capacity. A study was conducted with the end goal of stabilizing the feral cat population and

reducing turnover. The patients were informed that instead of eradicating the cats, a Trap-Neuter-Return (TNR) program would be put in place, and were reassured that the trapped cats would be returned to their colony after they were spayed or neutered. The cats were then observed on a weekly basis for six months, with a census taken at the 18 and 36 month marks. At the end of the 36-month program, 30 of the 40 original cats were located and identified, and no new litters were found. The overall health of the cats had improved, and there was a reduction in reproductive or territorial behaviors, and nocturnal vocalizing. Not only was the colony successfully stabilized, but the nuisance factor had also drastically decreased. TNR as an alternative to catching and killing, along with the benefits it provides, gained great support from both the patients and the administration.

FOSTER CITY, CALIFORNIA^{xxiii xxiv}

In 2004, approximately 175 community cats were living along a popular hiking and biking trail in the San Francisco Bay Area. The City of Foster City, the Homeless Cat Network, and the community decided to join forces to humanely stabilize this colony of cats, and Project Bay Cat was formed. Today, there are 24 cats there. Project Bay Cat's success is due to volunteers who undertook an intensive TNR effort, two private veterinary hospitals that donated their services to sterilize and vaccinate the cats, and one veterinarian who provides free ongoing care to the cats. As of 2017, 133 cats have been adopted, 96 percent of the cats have been spayed or neutered and vaccinated, and the colony size has been reduced by 86 percent.

JACKSONVILLE, FLORIDA^{xxv}

The group First Coast No More Homeless Pets introduced its Feral Freedom TNR program in 2008. The program was the first public-private collaboration in the nation to save all feral, stray, and community cats that entered a city's shelters. Jacksonville Animal Control and Protective Services reported that by 2012, the city saved over one million dollars, decreased cat intakes by over 25 percent (including intake for TNR), decreased cat euthanasia by over 75 percent, and increased feline live release rates to a 12-year high of 72 percent. The number of adoptable cats who are either adopted or transferred to a rescue organization has increased by an incredible 322 percent since 2007. The Feral Freedom program has also improved shelter employee morale and productivity, reduced workers' compensation claims, and reduced instances of shelter disease, like upper respiratory infections.

NORTHERN KENTUCKY AREA DEVELOPMENT DISTRICT^{xxvi}

The Northern Kentucky Area Development District (NKADD) launched a community cat program in October 2016 to improve the live-release rates in three of the district's eight counties. Local nonprofit organizations and private veterinarians formed a partnership to provide free and low-cost spay and neuter surgeries to community cats who were diverted from the county shelters, as well as cats owned by low-income people and indoors cats whose owners do not qualify as low-income. In the first four months, the program did 2,262 surgeries and all three of the target county shelters improved their live release rates. Comparing the live-release rates for cats in those shelters for the first nine months of 2016, before the program started, to the first four months of the program from October 2016 through January 2017, live-release rates for cats increased from 82 percent to 88 percent in Boone, from 42 percent to 71 percent in Kenton, and from 49 percent to 83 percent in Campbell. Not only has the NKADD community cat program improved shelter outcomes, the counties also have more resources available for animals in need, such as large cat-hoarding cases. Seven other districts in the state are now interested in implementing similar programs.

RICHLAND, MISSOURI^{xxvii}

In 2015, the organization TNR A Better Chance collaborated with Alley Cat Allies to start a huge TNR effort, with the goal of spaying and neutering all of the estimated 1,000 outdoor cats in the city. In just one year, over 814 of the 1,000 cats were successfully neutered, vaccinated, eartipped, and returned. The Richland City Administrator, Greg Stratman, reported many benefits of a TNR program for his community, including a reduction of calls to city hall voicing concern about stray cats, increased public awareness, and more individuals taking responsibility for their pet's reproductive health. TNR A Better Chance has grown, reaching communities surrounding Richland City and over 2,500 community cats—with several hundred additional kittens and socialized cats adopted out. With support from Alley Cat Allies, TNR A Better Chance helped legislators in seven Missouri towns, including Richland, adopt model TNR ordinances that protect eartipped cats. These cats were once caught and killed or left to have endless litters of kittens—now they can live free, healthy lives in their outdoor homes.

SAN JOSE, CALIFORNIA^{xxviii xxix}

In 2010, San Jose Animal Care and Services began a new Shelter-Neuter-Return (SNR) program. Cats who qualify are spayed and neutered, vaccinated, microchipped, and eartipped at the municipal shelter. After they recover from surgery, they are transferred to a nonprofit group, Town Cats, who returns them to their colony location. Four years later, cat and kitten impounds decreased by 29.1 percent, euthanasia decreased to 23 percent of intakes, and euthanasia due to upper respiratory infection decreased by 99 percent. The city is also saving money, since the SNR program costs approximately \$72 per cat, versus \$233 per cat for impoundment and euthanasia. Jon Cicirelli, Director of San Jose Animal Care & Services, says the alternative is to continue euthanizing cats that don't have owners, a policy that's shown limited results. "For the past 50 years, we've killed umpteen million cats and we're no better off," he said. "That system clearly does not work. We have to try something new."

SPARTANBURG, SOUTH CAROLINA^{xxx xxxi}

When Major Steve Lamb started directing Spartanburg Animal Services in 2009, he decided to shift the agency's focus from enforcement—handing out tickets and catching stray animals—to being a community partner. He launched a TNR program in 2013, which is funded by grants and includes low-cost spay and neuter clinics and educational workshops for the public. Since implementing the program, the euthanasia rate of cats impounded by animal control officers has gone from 78 percent to virtually zero. In fact, the city of Spartanburg's program has been so successful, a countywide program launched in October 2016.

ST. CLAIR SHORES, MICHIGAN^{xxxii}

The city changed its ordinances in 2014 to allow TNR. That was the only way to continue its contract with Macomb County Animal Shelter, which no longer accepts any cats caught by a city that does not have a TNR program. Per Jeff Randazzo, Macomb County Chief Animal Control Officer, "This county was euthanizing all these cities' cats. The whole goal is to change things and make things better for the animals in our care." Not only did the ordinance change save animals' lives, it was also a financially responsible decision. Mayor Kip Walby of St. Clair Shores said, "It is actually cheaper this way than euthanizing. We didn't do it for the money, but as it happens... it is less expensive."

KEY SCIENTIFIC STUDIES ON THE EFFECTIVENESS OF TNR

The following scientific studies show that Trap-Neuter-Return (TNR) is the humane and effective approach for managing community cats.

Finkler, Hilit, Idit Gunther, and Joseph Terkel. “Behavioral differences between urban feeding groups of neutered and sexually intact free-roaming cats following a trap-neuter- return procedure.” *Journal of the American Veterinary Medical Association* 238, no. 9 (2011):1141-1149.

FINDINGS:

Researchers compared data from four community cat colonies: two that were cared for through Trap-Neuter-Return programs and two that were not. This study demonstrates that TNR reduces the behaviors associated with mating and can therefore address community concerns. They found that cats in the TNR colonies were less aggressive overall and that the neutered males were rarely aggressive towards each other at all, resulting in less yowling, fighting, and potential for injury than males in the intact colonies.

Hughes, Kathy L. and Margaret R. Slater. “Implementation of a Feral Cat Management Program on a University Campus.” *Journal of Applied Animal Welfare Science* 5, no. 1 (2002): 15-28.

FINDINGS:

Hughes and Slater document the success of a new Trap, Test, Vaccinate, Alter (spay or neuter), Return, and Monitor (TTVARM, a.k.a. TNR) program on the campus of Texas A&M University, looking at the changes between the implementation year and the year that followed. In the first year, 123 cats were trapped, compared to 35 in the second. Over the course of the program, 32 cats and kittens were adopted. In the second year, only three kittens were found, and the researchers assume that these were lost or abandoned, as no litters or nursing mothers were seen in that year. The program illustrates how a well-managed TNR program can stabilize a population of cats.

Levy, Julie K., David W. Gale, and Leslie A. Gale. “Evaluation of the Effect of a Long- Term Trap-Neuter-Return and Adoption Program on a Free- Roaming Cat Population.” *Journal of the American Veterinary Medical Association* 222, no. 1 (2003): 42-46.

FINDINGS:

This study tracks a TNR program on a Florida college campus over the course of 11 years to determine the characteristics of cats involved and to document the effectiveness of the program at controlling the population of cats on the campus. Kittens and tame cats were adopted out, and new cats were trapped and neutered. At the end of the study, the population had decreased by 66 percent, and over 80 percent of the cats had been residents for more than six years—a duration comparable to the mean lifespan of 7.1 years for pet cats.

Neville, P.F. and J. Remfry. “Effect of Neutering on Two Groups of Feral Cats.” *The Veterinary Record* 114 (1984): 447-450.

FINDINGS:

Researchers studied two colonies in Regent's Park, London, to determine whether neutering had any negative effects either on the social structure of the colony or on the individual cats. No negative health effects were observed, and the colony's social structure seemed to strengthen after the cats were neutered. Cats were seen to spend more time in groups, show fewer aggressive behaviors toward each other, and fight less.

J.K. Levy, N.M. Isaza, K.C. Scott. "Effect of high-impact targeted trap-neuter-return and adoption of community cats on cat intake to a shelter, *The Veterinary Journal* (2014), doi: 10.1016/j.tvjl.2014.05.001

FINDINGS:

This study assessed the effect of TNR concentrated in a region with historically high cat impoundments in a Florida community. A two-year program was implemented to capture and neuter at least 50 percent of the estimated community cats in a single zip code area, followed by return to the neighborhood or adoption. Trends in shelter cat intake from the target zip code were compared to the rest of the county. A total of 2366 cats, representing approximately 54 percent of the projected community cat population in the targeted area, were captured for the TNR program over the 2-year study period. After 2 years, per capita shelter intake was 3.5-fold higher and per capita shelter euthanasia was 17.5-fold higher in the non-target area than in the target area. Shelter cat impoundment from the target area where 60 cats/1000 residents were neutered annually decreased by 66 percent during the two-year study period, compared to a decrease of 12 percent in the non-target area, where only 12 cats/1000 residents were neutered annually. This study demonstrates how high-impact TNR combined with the adoption of socialized cats and nuisance resolution counseling for residents is an effective tool for reducing shelter cat intake.

HOW TNR BENEFITS PUBLIC HEALTH

Approximately 2–3 million cats enter animal shelters annually in the United States. A large proportion of these are unowned community cats that have no one to reclaim them and are too unsocialized for adoption. More than half of impounded socialized cats are euthanized due to shelter crowding or shelter-acquired disease, while the euthanasia rate for feral cats is virtually 100 percent. Trap-Neuter-Return (TNR) is an alternative to shelter impoundment, improves cat welfare, and stabilizes or reduces community cat populations. Opponents of TNR argue free-roaming cats are a threat to public health, but there is a lot of misinformation in their claims.

THE TRUTH ABOUT CATS AND TOXOPLASMOSIS

Understanding its Complex Lifecycle^{xxxiii}

Enteroepithelial replication occurs in the cat intestine after ingestion of oocysts from fecal contamination or bradyzoites within tissue cysts. The oocyst is excreted unsporulated in the feces and is noninfectious. It sporulates in the environment, becomes infectious, and then can be ingested by a variety of intermediate hosts. Muscle and tissue encystment occur in the intermediate host.

The enteroepithelial cycle is found only in the definitive feline host. The extra-intestinal development of *Toxoplasma gondii* is the same as it is for all hosts, including rodents, dogs, cats, and humans, and is not dependent on whether tissue cysts or oocysts are ingested. After ingestion of oocysts,

sporozoites excyst in the lumen of the small intestine. Sporocysts divide into two and become tachyzoites which multiply in almost any cell of the body and eventually encyst. These cysts grow intracellularly and contain numerous bradyzoites. Bradyzoites are released in the stomach and intestines when digestive enzymes dissolve the cyst wall.

Most cats become infected from eating animals soon after weaning and shed oocysts for only short periods (under three weeks) thereafter. Typically, cats shed oocysts for no longer than two weeks after their first exposure to the organism and generally do not shed them again.

Causes of Toxoplasmosis

Ingestion of undercooked, contaminated meat, or eating food that was contaminated by knives, utensils, cutting boards, or other foods that had contact with raw, contaminated meat are the most common sources of *Toxoplasma* infection for humans. The CDC lists Toxoplasmosis as the second leading cause of death from foodborne illness in the US.^{xxxiv} Despite the infrequency of cat-associated toxoplasmosis, many physicians, including obstetrician-gynecologists, still focus on cat litter disposal and overlook other, more common, potential sources of food ingestion or environmental exposure.

Substantial scientific evidence now exists that given that individual cats provide human emotional health benefits and are not a direct risk factor for acquiring toxoplasmosis where good hygiene is practiced, relinquishing them for that reason is unnecessary.

Toxoplasmosis and Schizophrenia

Research that shows individuals with schizophrenia, compared to controls, have had more contact with cats during childhood has been discredited by rigorous scientific review. According to the National Institutes of Health, research has identified several factors that contribute to the risk of developing schizophrenia: genes, environment, and different brain chemistry and structure. No mention of *Toxoplasma gondii* is included.^{xxxv}

In Summary

“Cats have gotten a bad rap about how they transmit toxoplasmosis to humans and how they cause spontaneous abortion in women and blindness and mental retardation in newborn and older children. While it is true that cats are the only definitive host for the infective stage of the *Toxoplasma* organism, they are not the most common source of human infection. The most efficient way to get toxoplasmosis from a cat is to eat the cat undercooked!”^{xxxvi}

THE TRUTH ABOUT CATS AND RABIES

Rabies in the United States

Every year the Centers for Disease Control and Prevention publish rabies surveillance in the United States the previous year.^{xxxvii} This comprehensive document lists the numbers, and percentages, of wild and domestic animals diagnosed with rabies. It also gives guidance for what is considered exposure.

For the latest year available, cats accounted for 61.1% (272/445) of the rabid domestic animals reported in 2014, a 10.12% increase, compared with the 247 reported in 2013. Most of the rabid cats were reported from states where the raccoon rabies virus variant was considered enzootic (Pennsylvania, 47 [17.3%]; Virginia, 28 [10.3%]; New York, 25 [9.2%]; New Jersey, 22 [8.1%]; and Texas, 22 [8.1%]).

The 10.12% increase in feline rabies during 2014 does not signal a significant increase. CDC data shows that while there are annual fluctuations, the incidence is relatively flat over the past decade and a half. And, the 272 cases reported in 2014, while an increase of 10.12% over 2013 is below the average of 283 reported during the period 2009-2013, and is consistent with the average during the period 1989-2014.

Rabies has been diagnosed in a total of 37 persons in the United States since 2003. Twenty-six of the 37 (70%) individuals acquired the disease in the United States or Puerto Rico. Organ or tissue transplantation was identified as the source of infection for 5 of these 26 (19%) individuals. Bats were implicated as the source of infection in 17 of the 26 (65%) individuals.

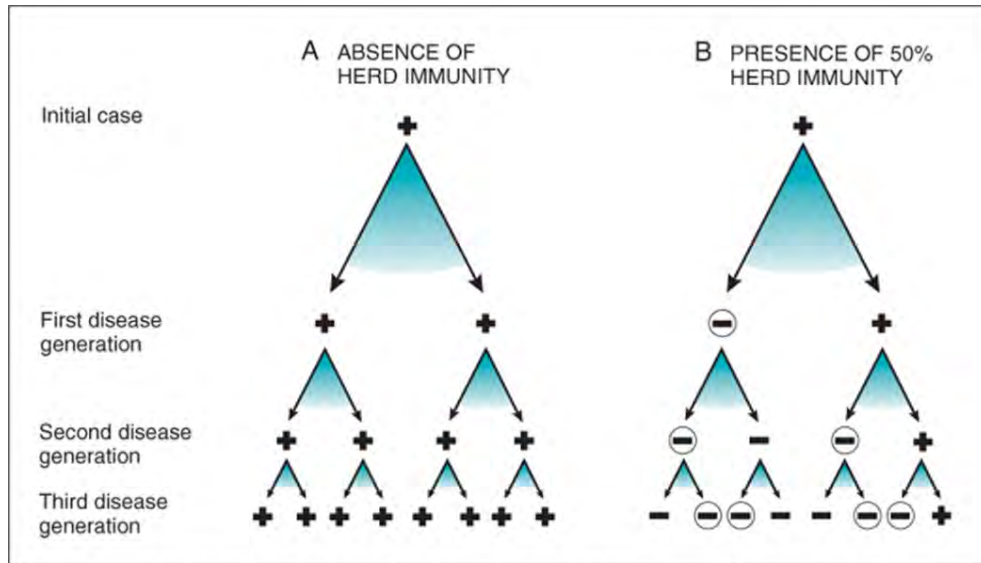
The remaining four individuals consisted of two patients who were infected with the raccoon rabies virus variant, one who was infected with the mongoose rabies virus variant (Puerto Rico), and one (the only patient who survived) who was infected with an unknown rabies virus variant.

Nowhere does it list the cat as a source of exposure for a person acquiring rabies during 2014 (the latest year for which reporting exists). The last documented case of human rabies from exposure to a rabid cat was in 1975.

Understanding Herd Immunity

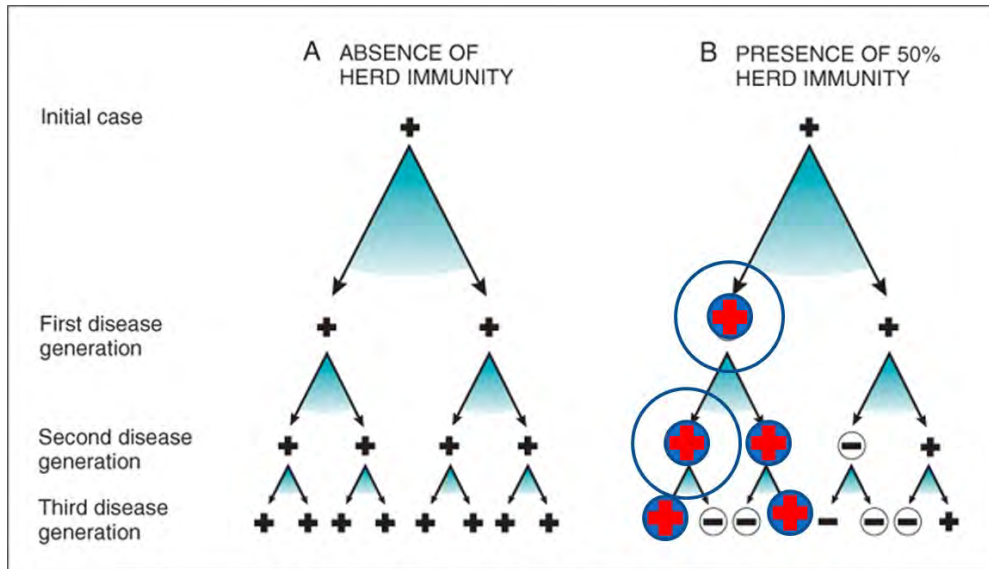
Herd Immunity is a form of indirect protection from infectious disease that occurs when a large percentage of a population has become immune to an infection, thereby providing a measure of protection for individuals who are not immune.^{xxxviii} Individuals who are immune to a disease act as a barrier in the spread of disease, slowing or preventing the transmission of disease to others.

The following diagrams illustrate how rabies could spread in a susceptible colony of feral cats if each infected animal were exposed to two other cats. The plus sign represents an infected animal; the minus sign represents an uninfected animal; and the circled minus sign represents an immune cat who will not pass the infection to others. In the absence of herd immunity, the number of cases doubles for each disease generation. In the presence of 50% herd immunity, the number of cases remains constant.



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The following diagrams illustrate how trapping and removing previously-vaccinated cats will increase the susceptible cat population. If two vaccinated cats (circled minus sign) are trapped and removed, and replaced with susceptible cats, then the number of rabid cats in the colony skyrockets.



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Rabies Vaccinations

Misinformation about rabies vaccines is largely due to confusion about the labeled duration of the vaccine and the duration of the certificate issued at the time of vaccination. There is guidance in the form of the Compendium of Animal Rabies Prevention and Control, which is updated every few years. The latest issue, published on March 1, 2016, took five years to be developed because there was ongoing research that documented the fact that dogs and cats who had been previously vaccinated, but were overdue, had just as robust an anamnestic response as those who were currently vaccinated. This scientific evidence has fundamentally changed the guidance in the Compendium with how to handle animals who had been previously vaccinated, but were not currently vaccinated, and were exposed to rabid, or potentially, rabid animal.

Community cats have an excellent immune response following vaccination at the time of neutering.^{xxix} These vaccinations, which are an integral component of Trap-Neuter-Return (TNR) programs, help protect the health of individual cats and reduce the disease burden in the community. In addition, the vaccination of community cats at the time of neutering may protect them for much of their lifespan since the immunity that is developed has been shown to persist for a minimum of three to seven years in most cats.

In Summary

Ideally, community cats should be recaptured to receive booster vaccinations, particularly against rabies, according to the guidelines established by the American Association of Feline Practitioners. While it may not be practical to consistently revaccinate all community cats, the implementation of a TNR program is far more effective than removing cats or doing nothing. The reality is that one rabies vaccine in a community cat is better than no rabies vaccine at all.

ⁱ Chu, K. & Anderson, W.M. (2007) U.S. public opinion on humane treatment of stray cats. Law and Policy Brief, Alley Cat Allies, Bethesda, MD.

ⁱⁱ Karl I. Zaunbrecher, D.V.M., and Richard E. Smith, D.V.M., M.P.H., “Neutering of Feral Cats as an Alternative to Eradication Programs”, *Journal of American Veterinary Medical Association*, August 1, 1993 (JAVMA).

ⁱⁱⁱ Mahlow J.C Slater M.R. 1996. “Current issues in the control of stray and feral cats.” *Journal of the American Veterinary Medical Association* 209:2016-2020 (1996 Dec. 15).

^{iv} Killian, Gary, Kathleen Fagerstone, Terry Kreeger, Lowell Miller, and Jack Rhyan. *Management Strategies for Addressing Wildlife Disease Transmission: The Case for Fertility Control*. Staff Publication, Lincoln, NE: U.S.D.A National Wildlife Research Center, 2007.

^v Tuytens, F. A., Delahay, R. J., Macdonald, D. W., Cheeseman, C. L., Long, B., & Donnelly, C. A. (2000). “Spatial perturbation caused by a badger (*Meles meles*) culling operation: implications for the function of territoriality and the control of bovine tuberculosis (*Mycobacterium bovis*).” *Journal of Animal Ecology*, 69(5), 815-828. doi:10.1046/j.1365-2656.2000.00437.x

^{vi} Ji, W., S. D. Sarre, N. Aitken, R. K. S. Hankin, and M. N. Clout. “Sex-Biased Dispersal and a Density-Independent Mating System in the Australian Brushtail Possum, as Revealed by Minisatellite DNA Profiling” *Molecular Ecology* 10 (2001): 1527-1537.

^{vii} Ibid.

^{viii} Ibid.

^{ix} Karl I. Zaunbrecher, D.V.M., and Richard E. Smith, D.V.M., M.P.H., “Neutering of Feral Cats as an Alternative to Eradication Programs”, *Journal of American Veterinary Medical Association*, August 1, 1993 (JAVMA).

Proposal 62: Appendix & References

- ^x Killian, Gary, Kathleen Fagerstone, Terry Kreeger, Lowell Miller, and Jack Rhyan. Management Strategies for Addressing Wildlife Disease Transmission: The Case for Fertility Control. Staff Publication, Lincoln, NE: U.S.D.A National Wildlife Research Center, 2007.
- ^{xi} Mahlow J.C Slater M.R. 1996. "Current issues in the control of stray and feral cats." Journal of the American Veterinary Medical Association 209:2016-2020 (1996 Dec. 15).
- ^{xii} Karl I. Zaunbrecher, D.V.M., and Richard E. Smith, D.V.M., M.P.H., "Neutering of Feral Cats as an Alternative to Eradication Programs", Journal of American Veterinary Medical Association, August 1, 1993 (JAVMA).
- ^{xiii} <http://www.washingtoncitypaper.com/news/city-desk/blog/13069891/district-may-target-feral-cats-as-part-of-wildlife-action-plan>
- ^{xiv} Maricopa County Animal Care & Control. "Living with Feral Cats." 2011.
- ^{xv} <http://www.sfgate.com/bayarea/article/Cats-San-Jose-shelter-spays-releases-strays-2437677.php>
- ^{xvi} <https://www.awla.org/services/feral-cat-program/>
- ^{xvii} http://www.aplnj.org/assets/pdf/NACA_Interview.pdf
- ^{xviii} http://www.petroglyphsnm.org/newsletters/fall_2012/TNR_is_a_success_in_Albuquerque.html
- ^{xix} <http://krqe.com/2016/07/16/city-funded-trap-and-release-program-touts-continuing-success/>
- ^{xx} Virginia Department of Agricultural and Consumer Services
- ^{xxi} <http://philadelphia.cbslocal.com/2016/05/02/groups-join-forces-to-combat-feral-cat-problem-in-bucks-county-park/>
- ^{xxii} Karl I. Zaunbrecher, D.V.M., and Richard E. Smith, D.V.M., M.P.H., "Neutering of Feral Cats as an Alternative to Eradication Programs", Journal of American Veterinary Medical Association, August 1, 1993 (JAVMA).
- ^{xxiii} <http://www.homelesscatnetwork.com/project-bay-cat.html>
- ^{xxiv} https://www.facebook.com/pg/ProjectBayCat/about/?ref=page_internal
- ^{xxv} <http://www.fcnmhp.org/help-pet-owners/feral-freedom/>
- ^{xxvi} <http://outthefrontdoor.com/2017/03/28/target-zeros-kentucky-initiative/>
- ^{xxvii} https://www.facebook.com/pg/TNR.ABetterChance/about/?ref=page_internal
- ^{xxviii} Johnson KL & Cicirelli J. (2014) Study of the effect on shelter cat intakes and euthanasia from a shelter neuter return project of 10,080 cats from March 2010 to June 2014. <https://peerj.com/articles/646/>
- ^{xxix} <http://www.sfgate.com/bayarea/article/Cats-San-Jose-shelter-spays-releases-strays-2437677.php>
- ^{xxx} <http://www.alleycat.org/major-steve-lamb-majorly-into-helping-cats/>
- ^{xxxi} <http://www.goupstate.com/news/20161018/county-oks-program-to-trap-and-treat-feral-cats>
- ^{xxxii} <http://www.candgnews.com/news/year-try-out-tnr>
- ^{xxxiii} Greene: Infectious Diseases of the Dog and Cat, 4th Edition. 2012.
- ^{xxxiv} <https://www.cdc.gov/parasites/npi>
- ^{xxxv} <https://www.nimh.nih.gov/health/publications/schizophrenia-booklet/index.shtml#pub7>
- ^{xxxvi} Colville and Berryhill. Handbook of Zoonoses: Identification and Prevention. 2007. ^{xxxvii} JAVMA. Vol 248. No. 7. April 1, 2016.
- ^{xxxviii} Gordis, L., Epidemiology. 4th Ed. 2009.
- ^{xxxix} https://www.avma.org/News/Journals/Collections/Documents/javma_230_1_52.pdf