COMBATING THE NAYSAYERS:
WHO SAYS THERE’S NO PROOF TNR WORKS?

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animals enact pets
WHAT DOES “WORKS” MEAN?

TNR policy goals:

Animal sheltering
Lower intake & euthanasia

Public health
Prevent the spread of rabies
Reduce nuisance complaints

Animal welfare
Improve the cats’ quality of life
Fewer unowned cats

Wildlife conservation
Less predation / competition for food
What does “TNR” mean?

- Include adoption?
- Include vaccination?
- Include post-sterilization management?
- Include spay/neuter equally of males and females?
- Is Return to Field a form of TNR?
What does “Proof” mean?

No: Extrapolation - results in one study apply to use of TNR in general.

Why not? Because of variations in:
- Setting (e.g., rural vs. urban)
- Climate
- Culture
- Scale
- Methodology
- Sources of cat inflow & outflow
- Length of study period
WHAT DOES “PROOF” MEAN?

YES: There is evidence policy goals can (or cannot) be achieved in certain circumstances

A growing body of research helps to identify:

- key variables and how to adjust for them
- methodologies with greater or lesser likelihood of achieving goals
- consistent results, if any, across a variety of conditions and settings
Study: People who drink diet soda had a higher risk of dementia and strokes*

- Causation: artificial sweeteners in diet soda damage the brain? OR
- Correlation: people who drink diet soda tend to have higher incidence of diabetes and vascular illness?

ANIMAL SHELTERING: INTAKE & EUTHANASIA


- Altered 2,366 community cats (54% of estimated total) in one zip code over two years
- TNR volume and animal control policies unchanged in rest of county
- 1,230 cats returned outdoors and 1,113 adopted or transferred
ANIMAL SHELTERING: INTAKE & EUTHANASIA

Results:
- Shelter intake in target zip code down 66% in 2nd project year (from 247 to 83)
- Shelter intake in rest of county down 12% (from 3,749 to 3,315)

Authors’ conclusions:
- Adoption of friendly cats one of the most tangible ways for TNR to quickly reduce # of homeless cats in a community
- Targeted TNR interventions likely to reduce intake faster than spreading limited TNR resources over a wider area

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ANIMAL SHELTERING: INTAKE & EUTHANASIA


- Analyzed cat admissions at San Jose Animal Care Center from 2006 through 2013
- Over 90% of admissions from City of San Jose (approx. pop. 1 million)
- Return to Field (aka SNR) introduced on March 8, 2010

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Animal Sheltering: Intake & Euthanasia

Results:

- Euthanasia decreased from 68.9% of live admissions in 2006 (7,392 of 10,732) to 27.4% in 2013 (2,321 of 8,489)
- 8,086 cats in SNR program from launch through 2013 (approx. average 2,000/yr)
- Live intake down from 10,732 in 2006 to 8,489 in 2013 (21% decrease)
Lower intake = fewer community cats?

- Authors identify multiple possible factors for decrease in admissions:
  - Improving economy
  - Changes in shelter protocols
  - SNR program
  - Other TNR and spay/neuter programs
  - Deterred admissions (from SNR program)

- Authors: “[I]t may be difficult to discern the true extent to which the number of feral cats in the SJACC service area decreased during the study period.”

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In U.S. and Puerto Rico, 6,033 cases of rabies in animals, 1 in humans

92.6% of animal rabies in wildlife (most frequent = raccoons, bats, skunks, foxes)

272 reported cases of cat rabies (4.5% of total reported for animals; 1.1% of cats tested)

Most cat cases (52.9%) from areas with raccoon rabies
PUBLIC HEALTH: DISEASE CONTROL (RABIES)

Centers for Disease Control and Prevention, *Cost of Rabies Prevention*,
https://www.cdc.gov/rabies/location/usa/cost.html

- Potential exposure without 10 day quarantine may require administration of rabies post-exposure prophylaxis (PEP)
- Estimated cost of PEP is $3,000/person
- Estimated number of PEP treatments in U.S. is 40,000 to 50,000 per year


- Most PEP treatments due to exposure to domestic animals like cats and dogs
Public Health: Disease Control (Rabies)


- Neighborhood dogs defined as “either semi-dependent or independent of people for food and shelter and unrestricted in their movements.”
- Target area = section of Jaipur, India
- Target dog demographic = females & prepubescent males
- 8 year study period (1994 – 2002); 24,986 captured; 89.8% released after treatment
**Results:**
- By end, 65.7% females and 5.8% of males sterilized and vaccinated; 35% of all dogs vaccinated
- Reported rabies cases in target area declined from maximum of 10 (1996) to 0 in last 26 months of study; increased elsewhere in Jaipur
- Dog population declined 28%
- Combining sterilization with vaccination may reduce required vaccination coverage
PUBLIC HEALTH: DISEASE CONTROL (RABIES)


- China 2nd highest for human rabies case; dogs primary means of transmission
- Mathematical modeling to study impact of dog birth rate and vaccination rates
- Concluded most effective way to control rabies in China is to decrease dog birth rate while increasing immunization rates
- Immunization about ten times more effective than culling at controlling rabies

- Disease caused by single cell parasite
- Estimated 60 million people in U.S. infected; few show symptoms
- Most at risk are pregnant women, immune-compromised
- Routes of transmission include handling undercooked & contaminated meat, drinking contaminated water, accidental ingestion of contaminated cat feces, mother-to-child transmission, receiving infected organ or blood

- Population representative birth cohort study (n = 837); all born in 1972 or 1973, same city in NZ
- Assessed periodically beginning at age 3 through age 38
- 28.2% infected by age 38
- Toxoplasmosis not significantly associated with neuropsychiatric conditions, poor impulse control, personality differences or poorer neurocognitive performance.
Finkler H, Gunther I, and Terkel J. (2011) *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; 1141–1149.

- Observed 4 colonies over a period of one year in an urban setting in Israel
- Two of the colonies were TNR’ed to produce adult sterilization rates at the outset of > 70%, two had no TNR performed. Significant immigration of unneutered cats into the TNR’ed colonies occurred during the study period.
- Rate of aggressive interactions significantly lower in TNR’ed colonies
- Almost no aggressive encounters observed between two neutered male cats
- Neutering may lead to less fighting & vocalization
PUBLIC HEALTH: NUISANCE BEHAVIOR


- Altered 38 of 40 free-roaming cats living on the grounds of a federal research facility & hospital in rural Louisiana, then observed for 36 months
- Prior to the study, unwanted noise from cat fighting and mating had been common
- No instances of nocturnal vocalization observed during the three-year study period
- No kittens observed. 10 cats died or disappeared, 6 new cats appeared = decline in colony size from 40 to 36.

- Survey of owners of male cats: following castration, 80 to 90% saw improvement in roaming behavior, aggressive interactions with other neighborhood males and urine spraying in the house.


- Intact males’ urine more noxious than castrated males due to amino acid (felinine) regulated by testosterone.

- At time of neutering, 105 adult feral cats evaluated for body fat, condition and weight.
- Approx. one year later, 14 cats re-trapped and evaluated.
- Cats gained weight, had higher body condition scores, and had grown fatter.
- Caretakers of re-trapped cats judged their cats friendlier, less aggressive, less inclined to roam, heavier and experiencing improved coat condition and health.

- Evaluated data from seven large-scale TNR programs for over 100,000 feral cats with time frames ranging from 1993 through 2004
- Geographic variation: programs were in Arizona, California (San Diego & San Francisco), Florida, Hawaii, North Carolina and Washington
- Few cats euthanized for debilitating conditions (0.4%)
- Fatal complications from surgeries were low (0.4%, range of 0.2% to 0.7% - six groups provided data) – similar to pet cats undergoing elective surgeries
ANIMAL WELFARE

Across all programs:

- Pregnancies were lowest from October through December (< 3.5% of females)

- Pregnancies began to increase in January and February (as the days lengthened in the northern hemisphere, promoting onset of estrus)

- Pregnancies peaked from March through April (range 36.8% to 58% of females)
POPULATION REDUCTION: COLONY SCALE


- University campus in Central Florida
- TNR and adoption program begun in 1991 – total of 155 cats treated, 11 colonies
- 68 cats (67 altered) on campus in 1996; down to 23 in 2002
- No kittens observed after 1995
- Of 155 cats, 47% adopted, 32% died, disappeared or euthanized
**Population Reduction: Colony Scale**


- 9 colonies in rural North Carolina county – 6 sterilized colonies (at least 90% s/n at outset), 3 control (0% s/n at outset)
- All colonies provided daily food and water, shelter and similar medical treatment (vaccines, parasite control); no new kittens or immigrants were altered
- After two years, all 6 sterilized colonies decreased in size (from total 79 cats to 53), while 2 of 3 control colonies increased (23 to 31) and 1 decreased (10 to 3; but rose to 14 after 4 yrs)
- After seven years, the 6 sterilized colonies had decreased to a total of 27 cats with 1 colony extinct.
POPULATION REDUCTION: COLONY SCALE

Natoli, E. et al. (2006) Management of feral domestic cats in the urban environment of Rome (Italy), Preventative Veterinary Medicine, doi:10.1016/j.prevetmed.2006.06.005
- 103 colonies in section of Rome decreased an average of 22% with most declines occurring two years after neutering; 66% total s/n rate

- 134 colonies in North Central Florida declined an average of 26% over a median of 18 months; 70% total s/n rate

- 53 caretakers in mostly urban Australia managed a median of 1.5 colonies and saw colony size reduced from median 11.5 cats to 6.5 over median of 2.2 years; 69% s/n rate
POPULATION REDUCTION: COMMUNITY SCALE


- Simulation model to compare impact of neutering (TNR) and vasectomy/hysterectomy (TVHR) on population reduction and nuisance behavior
- Both TNR and TVHR have potential to significantly reduce populations in urban and rural settings; TNR also can reduce nuisance behaviors
- Effectiveness depends on capture rate, colony size, number of colonies targeted in same area, immigration and abandonment
Population Reduction: Community Scale


- Simulation model to compare impact of TNR, trap-and-remove (TR) and temporary contraception on population reduction in different settings
- When same number of cats are treated, TR is the most effective at reducing numbers, followed by TNR then temporary contraception. All have impact at relative thresholds.
- Immigration and abandonment can have significant negative impact on population reduction regardless of approach
- Targeting females greater impact than males
**POPULATION REDUCTION: COMMUNITY SCALE**


- Targeted non-isolated section of Jaipur, India (Pink City)
- After 8 years, achieved 65.7% sterilization of females, 5.8% of males
- 28% population reduction by end of study

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POPULATION REDUCTION: COMMUNITY SCALE


- Open population = not closed off or a small island
- Performed low-level trapping & culling at two remote Tasmania wilderness areas over 13 months
- Tracked cats with remote cameras – captured 26 of 86 known individuals
- Cat population in trapping areas rose 211% and 75% during the culling period; remained stable at one control site, fluctuated at 2nd; returned to pre-culling levels when trapping ceased
- Authors speculate dominant cats were trapped, leading to higher juvenile survival and increased immigration
POPULATION REDUCTION: COMMUNITY SCALE

Current HSUS Research- cat counting metrics
- In conjunction with population biologist and the Humane Rescue Alliance in Washington D.C.
- Randomized transect walks in control and targeted TNR zip codes
- Counts over time (scale of years) produces an index of change in population
- Pilot project to test efficacy and ease of counting

Long-Term Plans- publish findings and produce a how-to guide and tools for any group to use and build in as another measure of program effectiveness
Research shows evidence of a number of potential benefits from TNR:

- Reduced cat intake and euthanasia at shelters
- Lower risk of rabies transmission
- Less nuisance behavior
- Improved cat welfare
- Population reduction
**Takeaways (Lessons Learned)**

Important factors in maximizing effectiveness:

- High treatment rates within target population
- Combining sterilization/vaccination with adoption
- Municipal support
- Timing
- Mitigating negative impact of immigration and abandonment
- Adequate resources
Takeaways (Lessons Learned)

Immigration:

- Target areas/neighborhoods/communities, not only individual colonies or cats

Immigration:

- Target areas/neighborhoods/communities, not only individual colonies or cats
- Expand outwards from treated areas

**TAKEAWAYS (LESSONS LEARNED)**

**Abandonment**

- TNR alone is not the full solution
- TNR should be part of a comprehensive cat management program that includes:
  - Low cost or free spay/neuter for pet cats
  - Overcoming access issues to spay/neuter
  - Outreach to economically challenged or otherwise isolated communities
  - Pet owner education (re: roaming, surrenders, spay/neuter, etc.)

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YOU CAN SUPPORT FURTHER RESEARCH!

Improve your agency’s data collection on community cats
- Where are the colonies?
- Who are the caretakers?
- What is happening with their cats?

Cat Stats: free online colony tracking system for TNR programs *(from Neighborhood Cats)*
- See [www.catstats.org](http://www.catstats.org)
- Caretakers (or program administrators) enter colony data remotely
- Data is mapped and organized in spreadsheets accessible to program administrators

Get involved with cat counting
- Tools and guide coming soon

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Thank you!

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