

# Puppy Breath & Kitten Tails The Ins & Outs of Pediatric Spay-Neuter

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**Senior Director of Shelter Medicine** 

**Shelter Outreach** 

**ASPCA** 



# How do we know the best time to vaccinate our pets?





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# How do we know the best time to vaccinate our pets?



American Association or Feline Practitioners

The Standard of Veterinary Excellence





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### When do you recommend spay-neuter?





### When do you recommend spay-neuter?



# WHAT IS THE EVIDENCE?

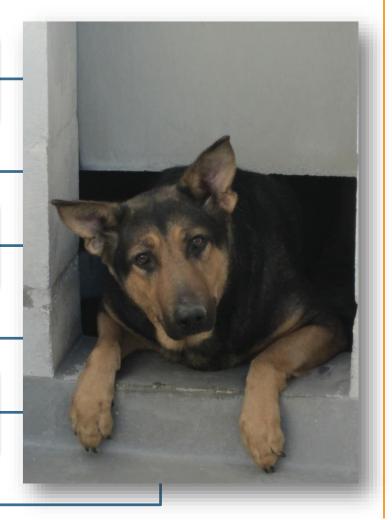


# **Learning Outcomes**

Describe the role of pediatric spayneuter in animal welfare

Understand the evidence

#### Ensure safety of pediatric patients





# What is pediatric spay-neuter?



Home About For Cat Parents For Vets Blog In The Mews Contact

#### Feline Fix by Five: Veterinarians Update Best Practice for Spay Neuter

This campaign advocates that the age for spaying/neutering cats be reduced to five months or earlier, instead of the commonly accepted six months. This small change would help decrease the risk of mammary gland cancer as well as the risk of unwanted litters by ensuring that these kittens will not have accidental first litters.

"Historically, many cat owners have been puzzled about when cats should be spayed/neutered. Leading veterinary organizations, such as the American Veterinary Medical Association, the American Animal Hospital Association, the Association of Feline Practitioners, and the Association of Shelter Veterinarians are trying to clear up the confusion. Since cats can get pregnant at five months of age, these veterinary associations support spay/neuter of cats prior to five months. Spay/neuter by five months of age prevents the birth of unwanted litters of kittens, thereby reducing relinquishment of kittens to animal shelters."

~ Phil Bushby, DVM, MS, DACVS, Feline Fix by Five Veterinary Consultant Marcia Lane Endowed Chair of Humane Ethics and Animal Welfare College of Veterinary Medicine, Mississippi State College of Veterinary Medicine DONATE

Elective sterilization surgery performed between <u>6 and 20</u> weeks of age.

SIGN UP

We respect your privacy. We will not sell or share your contact information



Pet overpopulation

- 1.5 million companion animals euthanized in U.S. (2016)
- Includes healthy puppies & kittens









Misinformed pet owners

- >50% litters are unintentional (PSC 2009, New 2004)
- Cats fertile at 3.5 months of age (Griffin 2001)
- Up to 20% of cats have litters prior to neutering
- Lifetime litter production is the same between neutered and intact animals! (Manning 1992)





### For shelters...

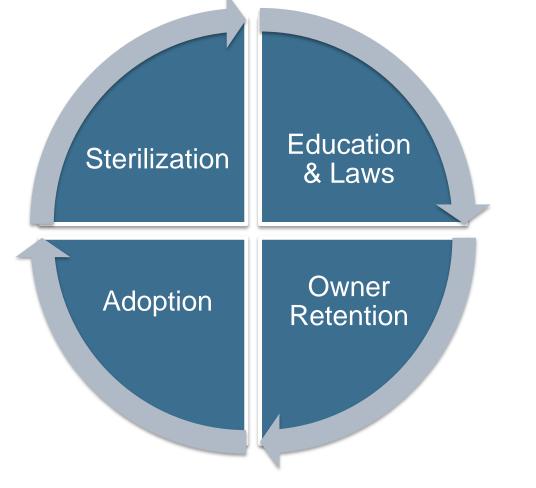
- Neuter-before-adoption is often required by law
- Voucher systems have poor compliance (50-60%) (Moulton 1990)

### For private practitioners...

- 18-30% of pets are acquired from shelters (AHA 2012)
- Most will get neutered somewhere, why not at your clinic?

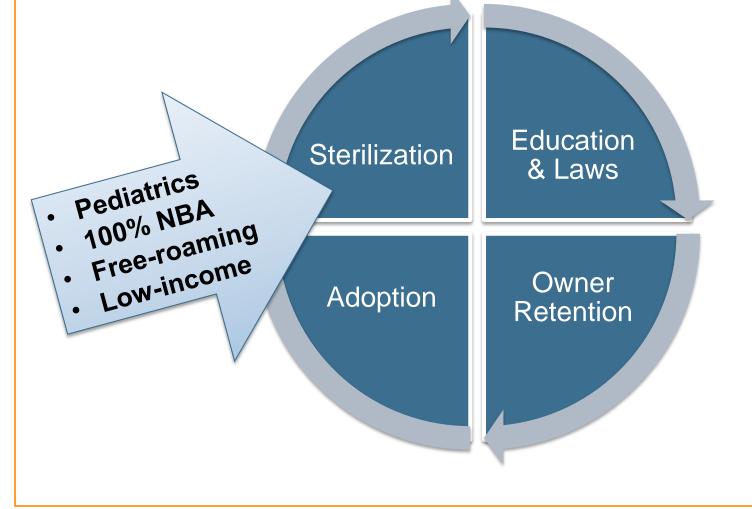


•For communities seeking non-lethal population control...





•For communities seeking non-lethal population control...





### **Pediatric Spay-Neuter: A Best Practice**

American Animal Hospital Association

American Veterinary Medical Association

Association of Shelter Veterinarians

British Small Animal Veterinary Association

Canadian Veterinary Medical Association

# **SHELTER VETERINARIANS**<sup>™</sup>



### **REMEMBER:**

### Statistical association ≠ Cause & Effect





#### UCDAVIS

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Home > News > Golden retriever study suggests neutering affects dog health

#### Golden retriever study suggests neutering affects dog health

By Pat Bailey on February 13, 2013 in Human & Animal Health



"...disease rates...were significantly increased when neutering was performed .... "

#### UCDAVIS

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#### RESEARCH

Home > News > Early Neutering Poses Health Risks for German Shepherd Dogs, Study Finds

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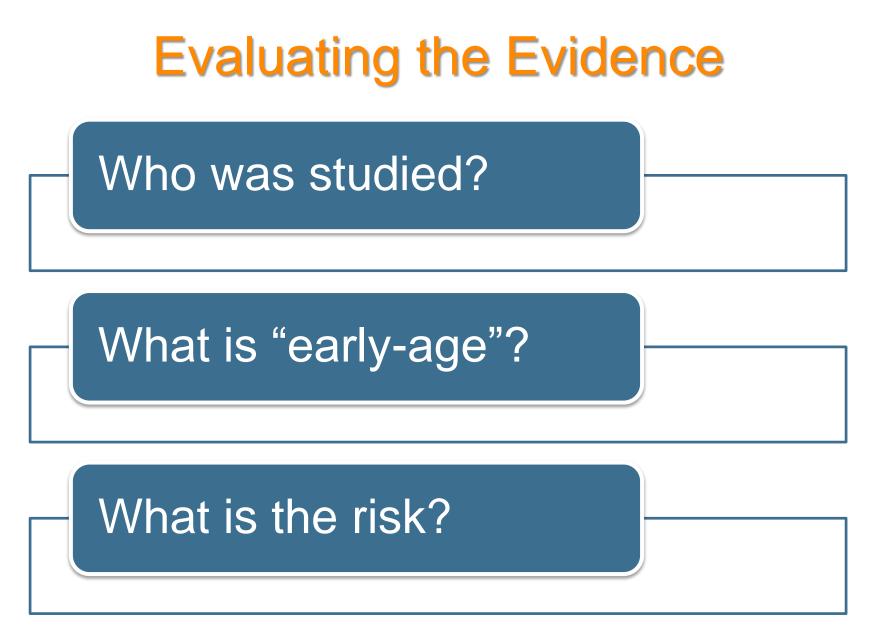
#### Early Neutering Poses Health Risks for German Shepherd **Dogs, Study Finds**

By Trina Wood on May 26, 2016 in Human & Animal Health

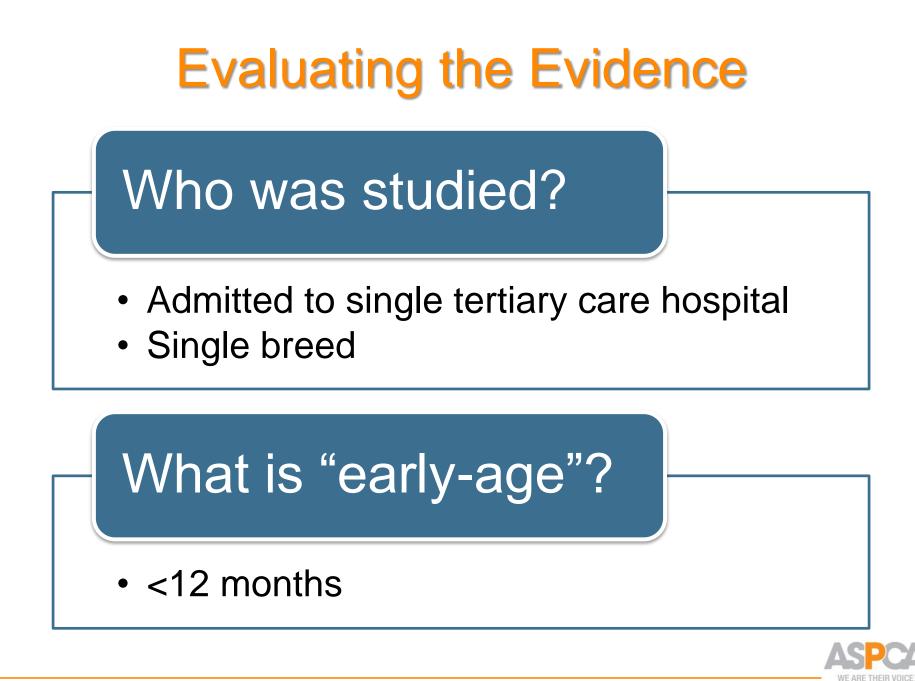


Joint disorders, a concern in German shepherd doas, miaht be less likely to occur if spavina or neuterina procedures are delayed until the doa is at leasl one year old, this study suggests. (Ibrakovic/gettyimages)









### What is the risk?

- Golden Retrievers
  - Early neutering: increased LSA (M), HD (M), CCL
  - Late neutering: increased MCT, HSA (F)
- German Shepherds
  - Early neutering: increased CCL
  - Neutering 6-11mos.: increased UI (F)





### What is the risk?

- Joint disorders
  - Neuter status and BCS are "fairly highly confounded"
  - "...body weight probably plays a role in the development of a joint disorder in overweight dogs"
- LSA, MCT, HSA
  - Low overall prevalence in study population



### Headline

### • "...disease rates...were significantly increased when neutering was performed...."

### Take Home

 Depending on sex, neutering may be associated with increased risk of specific cancers in GRs and UI in GSs



# Long-Term Risks & Benefits

#### Long-term risks and benefits of early-age gonadectomy in cats

C. Victor Spain, DVM, PhD; Janet M. Scarlett, DVM, PhD; Katherine A. Houpt, VMD, PhD, DACVE

and the rate is estimated at 4.3 to 15.4 million cately. represent cats that were never adopted

#### Objective-To evaluate the low fits of early-age gonadectomy adectomy, amon tional-age go arge animal shelter. Design-Retrospective cohor Animals-1,660 cats. Procedure-Cats underwer adopted from an animal she follow-up was available for surgery Imedian follow-up t

surgery imedian sciowrup completed a questionnaire and medical history. When nary records were revewer conducted to identify any occurrence of 47 medical and the cats' age at gonal Results-Among male or gonadectomy (< 5.5 mot

of absoesses, aggression al behaviors, and uning whereas hiding was ind that underwent gonade male and female cat onadectomy, asthma ere decreased, when Conclusions and Cli

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uthanasia of he ues to be a day

> From the Departments (Spain, Scarlett) and Medicine, Cornell U address is the Phila Disease Control, S rted by a gra American Victor The authors that mical assista

> > 372 Sciantif

#### Long-term risks and benefits of early-age gonadectomy in dogs

C. Victor Spain, DVM, PhD; Janet M. Scarlett, DVM, PhD; Katherine A. Houpt, VMD, PhD, DACVE

Objective—To evaluate the long-term risks and bene-fits of early-age gonadectomy, compared with tradi-tional-age gonadectomy, among dogs adopted from a large animal shelter.

Design-Retrospective cohort study. Animals-1,842 dogs.

Procedure—Dogs underwant ganadactomy and ware adopted from an animal shallar before 1 year of age; follow-up was available for as long as 11 years age; rolov-up was available for as long as 11 years after surgery. Adopters completed a questionnaire about their dogs behavior and medical history. When about their dugs version and medical restory, veneri possible, the dogs versionary records ware reviewed. Associations between the occurrence of 56 medical and behavioral conditions and dogs' age at gonadeo

Results—Among female dogs, early-age gonadecto-my was associated with increased rate of cystils and decreasing age at gonadectomy was associated with increased rate of uninary incontinence. Among male and female dow with early monthemers. Increase rate or unsary incommence, among male and female dops with enrylege grandectomy, hip dysplasis, noise phobies, and sexual behaviors were increased, whereas obeaity, separation anxiety, escaping behaviors, insprogrants elimination when hightened, and relinguishment for any teason were demonstrated.

Conclusions and Clinical Relevance—Because early-age gonadactomy appears to offer more banefits than risks for maje dags animal shalters can safely gonadactomize male dags at a young age and vetar-nary practitioners should consider recommending rou-tere newsdetarios for interactometand mile daves before the graduative should conside recommanding rou-the traditional age of 6 to 8 months. For familie dogs, however, moressed urinary incomtinence suggests that delaying gonadectorry until at least 3 months of age may be beneficial. (J Am Var Mad Assoc 2004; 224/380-387).

Reliable estimates of the number of healthy dogs that are euthanatized by animal shelters in the United States each year are difficult to determine, but Control America Carlos Factor Section Control for Detectivities, Data France the Departments of Population Mediane and Degressite Series (Spein, Sariell and Chinael Science Ollough, Calley of Wormany Mediane, Carend Liturescay Bhasa, NY 14863, Dr. Spein Balance Carend, 200 S Band J, Philadelphia, PM 10166, Datawa Carend, 200 S Band J, Philadelphia, PM 10166, Samorated In as sense from the X-sector Anticular Tance upported by a grant from the Kenneth A. Scott Charitable Trust, Cleveland, Ohio.

Caveland, Ohio. Hoerendi in pras at the 120th Annual Annualase Vistermany Madical Association Convention, Nasheliki, Lone, July 2023, the lash Annual Espa, Ikosim, Mao, September 2023, and Association: Conference, Dorver, Codo, September 2020, alto Conference for Boards: Works in Annual Danase, S. Lunas, Ma, Ordenat, Visk Jamary 2021. Orlanda, Fla, Jamany 2003. he authors thank Dr. James Serpell for technical autistance

Address correspondence to Dr. Spain,

380 Scientific Reports: Original Study

the number is in the millions.14 In recent years, some shelters are finding that most of their unadopted dogs are adolescent or adult dogs that are relinquished because of behavior that was unacceptable to the adopter.<sup>34</sup> These data suggest that unplanned litters of pupples must be reduced while also minimizing the frequency of preventable behavioral problems that might lead to relinquishment. Routine early-age gonadectomy of dogs has been viewed as an important step in reducing the number of dogs relinquished to sheliers for 2 reasons. Comprehensive early-age gonadectomy by shelters ensures that no adopted dogs will breed and may reduce the incidence of certain will breed and may reduce the incidence of certain medical or behavioral conditions that lead to relin-quishment of adopted dogs.<sup>49</sup> To date, studies have established safe anesthetic

to care, studies have examining any amendments of a structure and a structure of the struct ated with more rapid anesthetic recovery and fewer ated with mote taple atestinetic recovery and lewer perioperative complications, compared with gonadecto-my at 7 months of age. One study? revaled no adverse medical or behavioral consequences in dogs with follow-up to 1 year of age. Another study<sup>10</sup> found only 1 risk of early-age gonadectomy; dogs gonadecbury a tran or arry up Britage array, some Britage before 24 weeks of age were more likely to become infected with parvovirus, which was probably attributable to early-age exposure in 1 shelter. In a recent survey, however, 84% of practicing veterinarians perceived at least 1 risk associated with gonadectomy before 4 months of age that is not associated with gonadectomy performed at an older age, including 20% possible states and the state of the states of the states

evaluate the long-term risks and benefits of early-age gonadectomy (before 5.5 months of age), compared with traditional-age gonadectomy, among dogs adopt-ed from a large animal shelter.

#### Materials and Methods

Materiais and meetodus Sampling and data collection—The sampling methods and contact procedures for this study have been described " in brief, study locality for the the revension of Cruelty to Animals between 1000 and 1900. During these years, this study with simulaceboxies (study and study the study and study a Animals between 1989 and 1998. During these years, this shelter was a full-service shelter signation control con-tracts. The shelter screened days for the similar control con-ing them for adoption, and against shelter strength and there on a weak shall be a similar to the shelter shelter between 0 weaks and 12 months of age and made in the adoption boundhold for at least 3 months after adopted in the adoption boundhold for at least 3 months after adopted to the shelter of outside days user constraints between 5 months. adopters of study dogs were contacted between January 2000 and January 2001 and asked to complete a questionnaire

about their dogs. The study questionnaire contained 93 questions grouped into 3 sections." Each adopter was asked whether

JAVMA, Vol 224, No. 3, February 1, 2004

>3,500 dogs and cats •Early-age < 5.5 months •Up to 11 years follow-up Adopter questionnaire & veterinary records

 Medical & behavioral conditions evaluated



# Long-Term Risks & Benefits

Cystitis (F) Urinary incontinence (F) Hip dysplasia\* Noise phobias Sexual behaviors Obesity Separation anxiety Escaping behaviors Inappropriate elimination Relinquishment

)ecreasec



Increased

\*Traditional age S-N dogs with HD were 3x as likely to be euthanized as a result of the condition



# Long-Term Risks & Benefits

Hiding Shyness

Increased

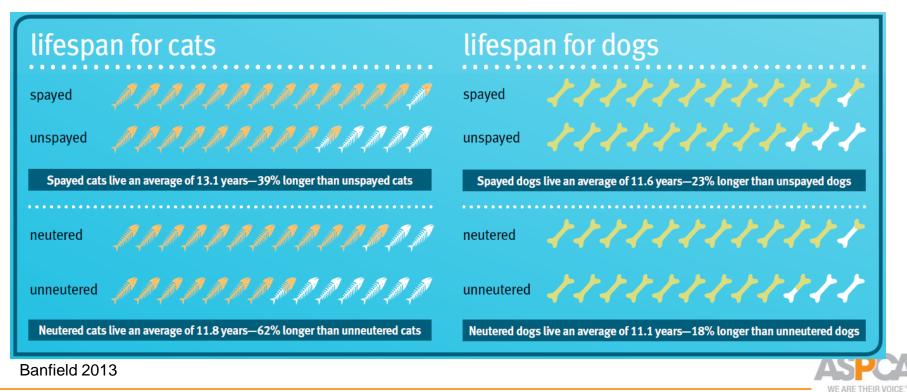
Abscesses (M) Aggression (M) Sexual behaviors (M) Urine spraying (M) Asthma Gingivitis Hyperactivity

Decreased



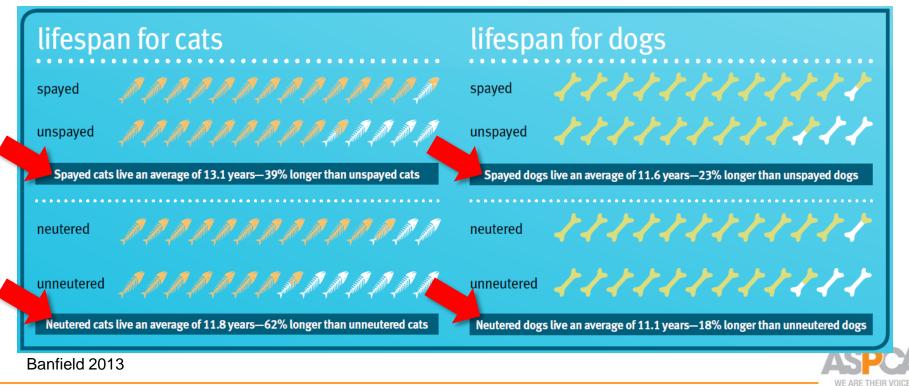
# **Health Benefits of Spay-Neuter**

- Decreased mammary neoplasia, BPH, perineal hernias, perianal tumors
- Decreased fighting, roaming, and spraying
- •No risk of testicular, uterine, ovarian cancer, pyometra



# **Health Benefits of Spay-Neuter**

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## **The Argument Against Spay-Neuter**

#### Female Cats

Increased risk of obesity



#### Female Dogs

• Increased risk of specific neoplasias, USMI, CCL, obesity

Male Dogs

• Increased risk of specific neoplasias, CCL, obesity



# Weighing the Evidence

Female Dogs

Factor	Risk	Prognosis
Obesity	High	Good
Mammary cancer	High	Poor
Pyometra	High	Good
CCL	Moderate	Varies
USMI	Moderate	Good
Neoplasia	Low	Poor
Uterine & Ovarian cancer	Low	Good



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# Weighing the Evidence

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Uterine &		
Ovarian cancer	Low	Good

All risk factors have specific breed predilections!





**Female Dogs** 

# Weighing the Evidence

Table 2	
---------	--

Impact<sup>a</sup> on health of male and female dogs after gonadectomy

Disorder	Female Dog	Male Dog	Female Cat	Male Cat
Mammary neoplasia	+24	_	+19	_
Pyometra	+100	_	_	_
Surgical complications	<b>-20</b>	-16	-7	-3
Osteosarcoma	-2	-2	_	_
Hemangiosarcoma	-2	-2	_	_
Transitional cell carcinoma	-7	-7	_	_
Prostate neoplasia	—	-3	_	_
Testicular neoplasia	_	+5	_	_
Urethral sphincter mechanism incompetence	-66	—	_	_
Benign prostatic hypertrophy	_	+368	_	_
Rupture of the cranial cruciate ligament	-11	-11	_	_
Obesity	-14	-13	-28	-26

<sup>a</sup> Positive impact score = benefit from gonadectomy; negative impact score = detriment from gonadectomy.



# **Maintain perspective!**

In general, neutering...

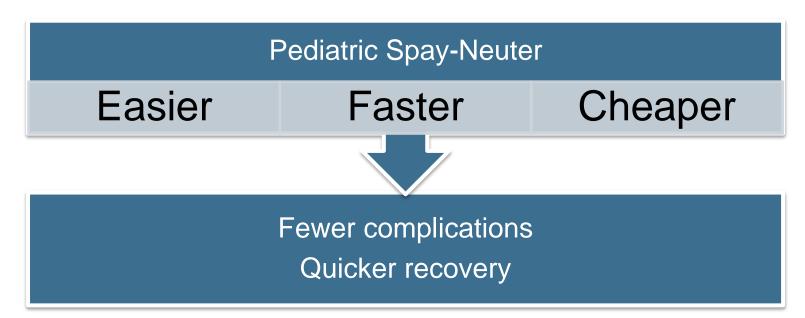
**DECREASES** the risk

# of diseases that occur FREQUENTLY





# **Other Benefits**







UF Veterinary Community Outreach Program College of Veterinary Medicine UNIVERSITY of FLORIDA

#### •2007-2012

- >10,000 spay-neuter surgeries
  - ~80% pediatrics
  - Performed by junior/senior DVM students





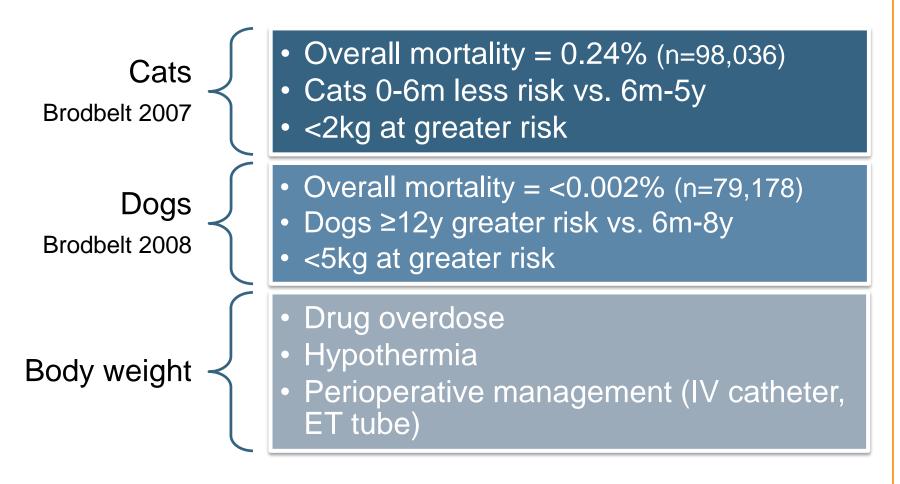
### UF Veterinary Community Outreach Program College of Veterinary Medicine UNIVERSITY of FLORIDA

- •Peri-operative complications 3%
- Mortality rate <0.05%</li>

Reference	Species	Procedure Type	SSI Rate (%)
Vasseur 1988	Dogs & cats	Clean Clean-contaminated	2.5 4.5
Brown 1997	Dogs & cats	Clean Clean-contaminated	4.7 5.0
Nicholson 2002	Dogs & cats	Clean-contaminated	5.9
Eugster 2004	Dogs & cats	Clean Clean-contaminated	6.9 8.0
Burrow 2005	Dogs	Clean-contaminated	8.5



# **Mortality & Pediatric Spay-Neuter**





# Mortality & Pediatric Spay-Neuter



#### Perioperative mortality in cats and dogs undergoing spay or castration at a high-volume clinic



J.K. Levy<sup>a,\*</sup>, K.M. Bard<sup>b</sup>, S.J. Tucker<sup>a</sup>, P.D. Diskant<sup>a</sup>, P.A. Dingman<sup>a</sup>

<sup>a</sup> Maddie's Shelter Medicine Program, Department of Small Animal Clinical Sciences, College of Veterinary Medicine, University of Florida, 2015 SW 16th Avenue, Gainesville, FL, 32610, USA <sup>b</sup> Humane Society of Tampa Bay, 3809 N Armenia Avenue, Tampa, FL, 33607, USA

• Overall mortality = 0.03% (n=56,075 cats; n=37,415 dogs)

- Mortality <6m = Mortality >6 m
- Risk: Females > Males; Cats > Dogs





### PEDIATRIC SPAY-NEUTER: SPECIAL CONSIDERATIONS



Pediatric Physiology	Potential Complication	Preventive Measures
Poor compensation for blood loss	Anemia	Meticulous tissue handling Ensure and verify hemostasis
Low glycogen stores	Hypoglycemia	No fasting Administer Karo syrup
Large surface area to volume ratio Immature thermoregulatory system Lesser fat stores	Hypothermia	Active and passive warming Warm prep solutions Avoid excessive clipping Avoid large incisions Minimize surgical and anesthetic time Warm fluids
Small body weight	Drug overdose	Accurate body weights Dilute stock concentrations
Gradual loss of maternal antibodies	Infectious disease	Vaccination protocols Meticulous sanitation Minimize stress
Fear Imprinting	Sensitization and phobia development	Co-house littermates Low-stress handling techniques Use pre-medications



### **Biosecurity**

- Vaccination
- Sanitation
- Segregation

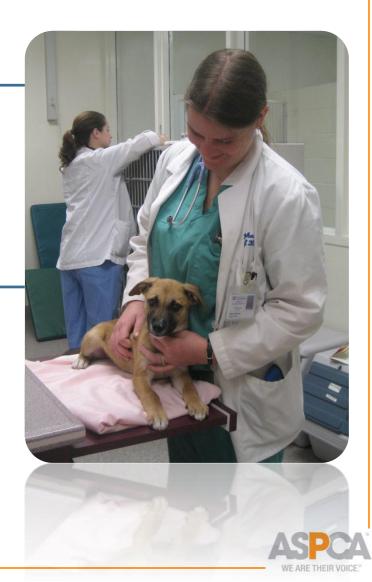






### Stress mitigation

- Gentle handling
- Environmental management
- Co-housing



### Hypoglycemia

### Hypothermia







### Hypothermia

- Maintain small incisions
- Risk of SSI (Eugster 2004)
  - Increases 1.01x per minute of anesthesia
  - Doubles every 70 minutes





### Identification

*"Each spay-neuter program should choose a consistent, permanent means of visually identifying animals that have been neutered."* 

#### Special Report

The Association of Shelter Veterinarians' 2016 Veterinary Medical Care Guidelines for Spay-Neuter Programs

#### Association of Shelter Veterinarians' Veterinary Task Force to Advance Spay-Neuter

Brenda Griffin DVM, MS Philip A. Bushby DVM, MS Emily McCobb DVM, MS Sara C. White DVM, MSC Y. Karla Rigdon-Brestle DVM Leslie D.Appel DVM Kathleen V. Makolinski DVM Christine L. Wilford DVM Mark W. Bohling DVM, PhD Susan M. Eddlestone DVM Kelly A. Farrell DVM Nancy Ferguson DVM Kelly Harrison DVM, MS Lisa M. Howe DVM, PhD Natalie M. Isaza DVM Julie K. Levy DVM, PhD Andrea Looney DVM Michael R. Moyer VMD Sheilah Ann Robertson BVMS, PhD Kathy Tyson DVM

munity Outreach Program (Harrison, Isaza), and the N (Levy), College of Veterinary Medicine, University of partment of Clinical Sciences, College of Veterinary versity, Starkville, MS 39759 (Bushby); Center for Ani School of Veterinary Medicine, Tufts University, Nort Spay ASAP Inc, 163 Clay Hill Rd, Hartland, VT 050-Program of the ASPCA, 25 Heritage Dr, Asheville, N Outreach Services, 78 Dodge Rd, Ithaca, NY 14850 (J ern New York, PO Box 404, East Aurora, NY 14052 ogy Consultants, 6513 132nd Ave NE No. 402, Kirkla Institute for Veterinary Emergencies and Referrals, 2 TN 37406 (Bohling); Associated Veterinary Services, Rouge, LA 70814 (Eddlestone); First Coast No Mor Ave, Jacksonville, FL 32208 (Farrell); Pets Alive Nonp Walnut St, Bloomington, IN 47401 (Ferguson); Dep Services, College of Veterinary Medicine & Biomedic College Station, TX 77845 (Howe); IVG Hospitals, 2 (Looney); Bridgewater Veterinary Hospital, 1740 E (Moyer); Department of Small Animal Clinical Science Michigan State University, East Lansing, MI 48824 (Rob and Services, 2750 Monterey Rd, San Jose, CA 95111 Address correspondence to Dr. Griffin (info@shelter This article has not undergone peer review.

As community efforts to reduce the overpopulation and euthanasia of unwanted and unowned cats and dogs have increased, many veterinarians have increasingly focused their clinical efforts on the provision of spay-neutre services. Because of the wide range of geographic and demographic needs, a wide variety of spay-neutre programs have been developed to increase delivery of services to targeted populations of animals, including stationary and mobile clinics, MASHstyle operations, shelter services, community cat programs, and services provided through private practitioners. In an effort to promote consistent, high-quality care across the broad range of these programs. These guidelines consist of Veterinarians convened a task force of veterinarians to develop veterinary medical care guidelines for spay-neuter programs. These guidelines consist of recommendations for seneral antient care and clinical procedures, neopenerative

From the Department of Small Animal Clinical Sciences (Griffin), the Veterinary Con

### Identification of neutered animals

Each spay-neuter program should choose a consistent, permanent means of visually identifying animals that have been neutered. Application of a visible, standard, distinct identifying mark is recommended. Specifically, the task force recommends the use of a simple green linear tattoo to identify all neutered pet animals and ear-tipping to identify all community cats.

### www.sheltervet.org



## **Scoring Tattoo**

### Females



Lateral to incision

Males

Dogs: Pre-scrotal

Cats: Near umbilicus



## Listen to the patients!

# Libby

1 hr. post-op
1 yr, female
Sx time = 1 hr.





### Listen to the patients!

# AJ & Ali

- 1 hr. post-op
- 3 weeks
  - Sx time = 8 min.
- $\Box$  Sx time = 1 hr.





# **Key Points**

- Pediatric spay-neuter is an essential component of a community animal welfare plan.
- •The benefits of spay-neuter outweigh the potential risks.
- •Elective sterilization surgery can be safely performed on pediatric patients.





### www.cmpvpr.org/SpayNeuterSeminar/



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www.ASPCAPro.org



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