



# Puppy Breath & Kitten Tails

## The Ins & Outs of Pediatric Spay-Neuter

**Brian A. DiGangi, DVM, MS, DABVP** (Canine & Feline Practice, Shelter Medicine Practice)

Senior Director of Shelter Medicine

Shelter Outreach

ASPCA

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



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



The Standard of  
Veterinary Excellence



**WSAVA**  
Global Veterinary Community

# When do you recommend spay-neuter?



# When do you recommend spay-neuter?



***WHAT IS THE EVIDENCE?***



# Learning Outcomes

Describe the role of pediatric spay-neuter in animal welfare

Understand the evidence

Ensure safety of pediatric patients



# What is pediatric spay-neuter?



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## 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  
6 and 20 weeks of age.

SIGN UP

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

# Why *pediatric* spay-neuter?

## Pet overpopulation

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





# Why *pediatric* spay-neuter?



# Why *pediatric* spay-neuter?

## 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)



# Why *pediatric* spay-neuter?

## For shelters...

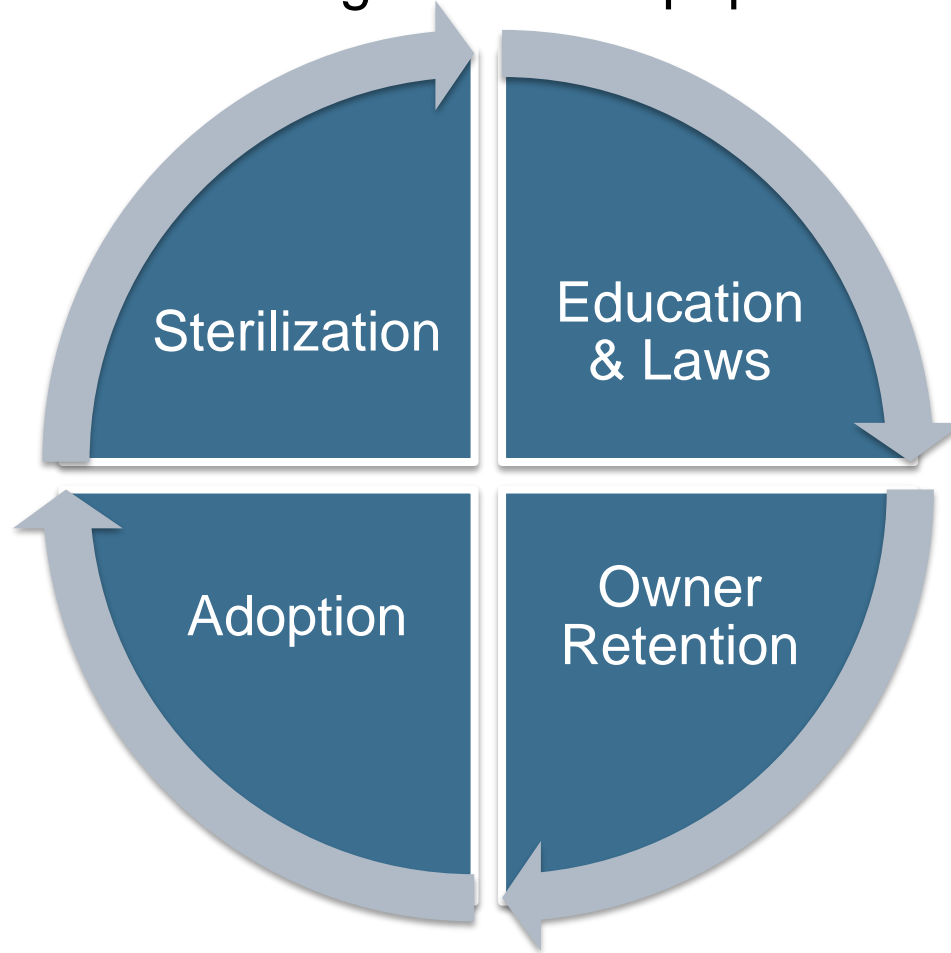
- Neuter-before-adoption is often required by law
- Voucher systems have poor compliance (50-60%)  
(Moulton 1990)

## For private practitioners...

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

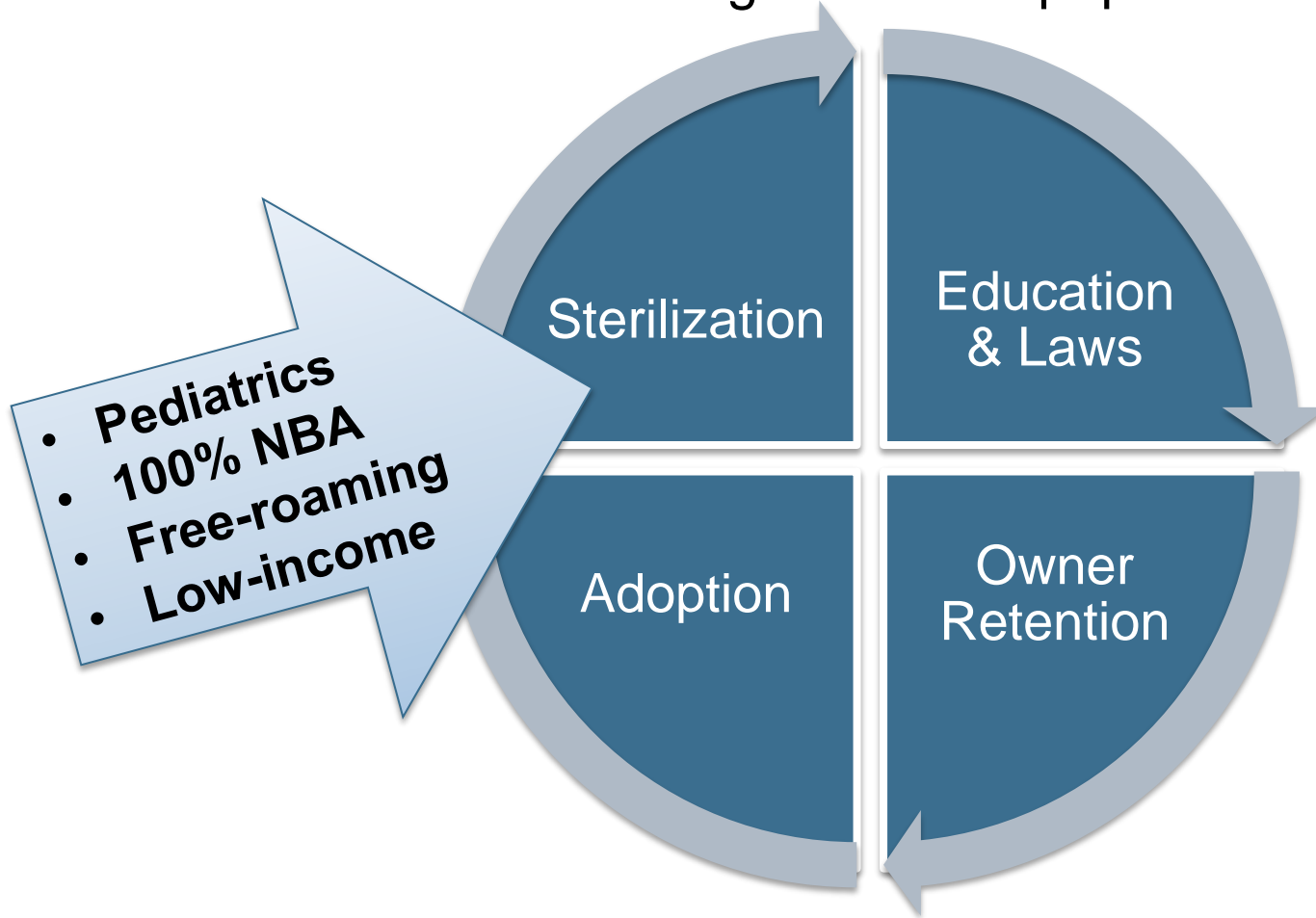
# Why *pediatric* spay-neuter?

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



# Why *pediatric* spay-neuter?

- 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*

ASSOCIATION OF  
**SHELTER VETERINARIANS™**

# Evaluating the Evidence

*REMEMBER:*

Statistical association  $\neq$  Cause & Effect



# Evaluating the Evidence

**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....”*

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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 dogs, might be less likely to occur if spaying or neutering procedures are delayed until the dog is at least one year old, this study suggests. (Ibrakovic/Gettyimages)

# Evaluating the Evidence

Who was studied?

What is “early-age”?

What is the risk?

# Evaluating the Evidence

## Who was studied?

- Admitted to single tertiary care hospital
- Single breed

## What is “early-age”?

- <12 months



# Evaluating the Evidence

## 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)



# Evaluating the Evidence

## 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

# Evaluating the Evidence

## 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

## SMALL ANIMALS

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

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- JGIM, Vol 22, No 3, February 1, 2007

# Long-Term Risks & Benefits

Increased

Cystitis (F)  
Urinary incontinence (F)  
Hip dysplasia\*  
Noise phobias  
Sexual behaviors

Obesity  
Separation anxiety  
Escaping behaviors  
Inappropriate elimination  
Relinquishment

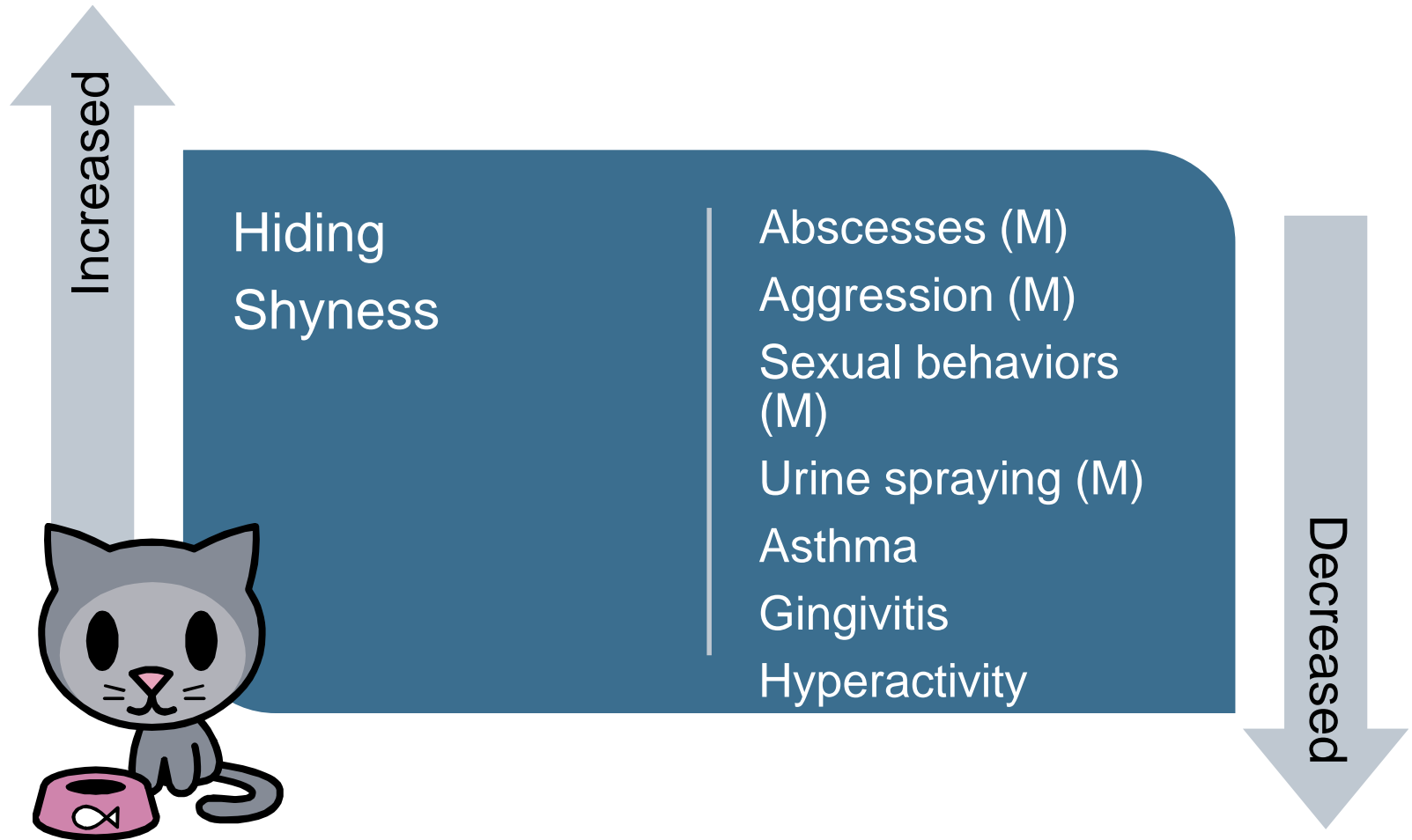
Decreased



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



# Long-Term Risks & Benefits



# 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

## lifespan for cats

spayed



unspayed



**Spayed cats live an average of 13.1 years—39% longer than unspayed cats**

neutered



unneutered



**Neutered cats live an average of 11.8 years—62% longer than unneutered cats**

## lifespan for dogs

spayed



unspayed



**Spayed dogs live an average of 11.6 years—23% longer than unspayed dogs**

neutered



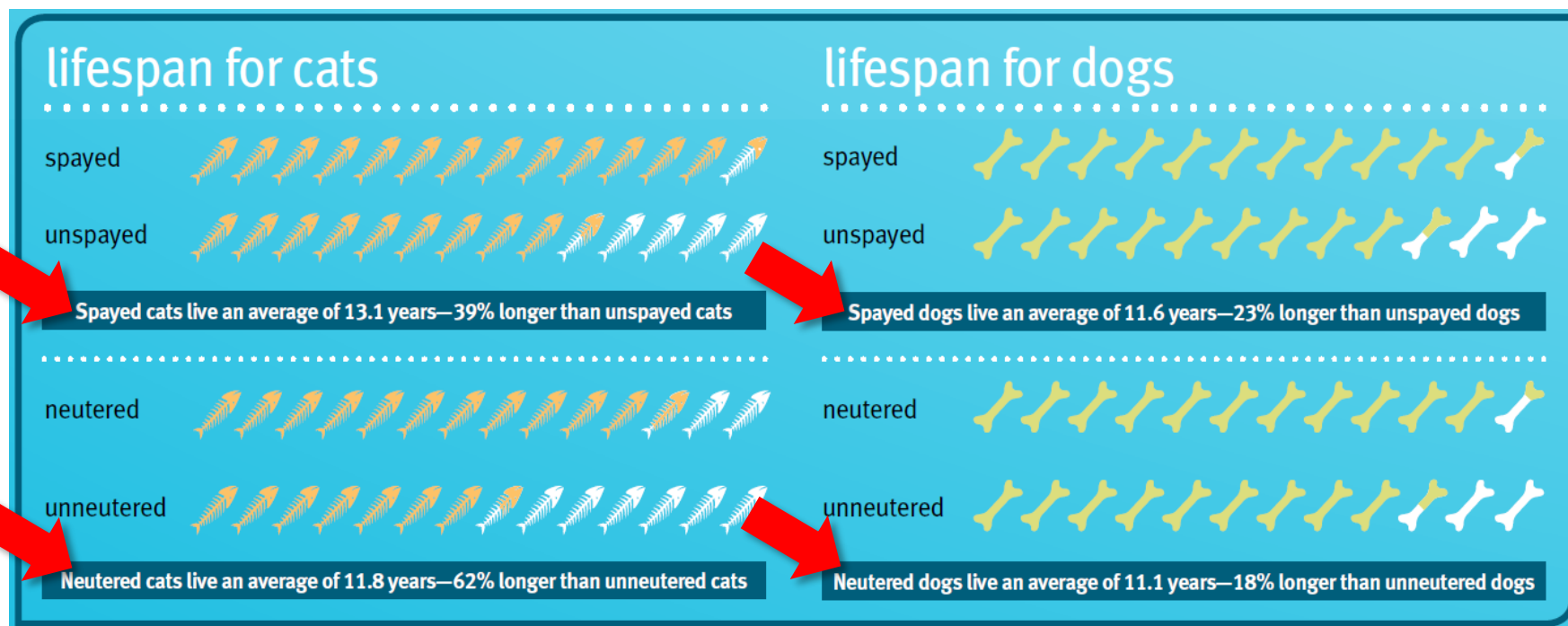
unneutered



**Neutered dogs live an average of 11.1 years—18% longer than unneutered dogs**

# 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



Banfield 2013

# 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



# Weighing the Evidence



## Female Dogs

Factor	Risk	Prognosis
Obesity	High	Good
<del>Mammary cancer</del>	<del>High</del>	<del>Poor</del>
<del>Pyometra</del>	<del>High</del>	<del>Good</del>
CCL	Moderate	Varies
USMI	Moderate	Good
Neoplasia	Low	Poor
<del>Uterine &amp; Ovarian cancer</del>	<del>Low</del>	<del>Good</del>

*All risk factors have specific breed predilections!*

# 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	-20	-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**

*and are* **DIFFICULT** *to treat.*



# Other Benefits

Pediatric Spay-Neuter

Easier

Faster

Cheaper



Fewer complications  
Quicker recovery



# 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



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

- Peri-operative complications 3%
- Mortality rate <0.05%

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



# Mortality & Pediatric Spay-Neuter

Cats  
Brodbelt 2007

- Overall mortality = 0.24% (n=98,036)
- Cats 0-6m less risk vs. 6m-5y
- <2kg at greater risk

Dogs  
Brodbelt 2008

- Overall mortality = <0.002% (n=79,178)
- Dogs ≥12y greater risk vs. 6m-8y
- <5kg at greater risk

Body weight

- Drug overdose
- Hypothermia
- Perioperative management (IV catheter, ET tube)

# Mortality & Pediatric Spay-Neuter

The Veterinary Journal 224 (2017) 11–15



Contents lists available at ScienceDirect

The Veterinary Journal

journal homepage: [www.elsevier.com/locate/tvj](http://www.elsevier.com/locate/tvj)



## 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

# 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	Hypothermia	Active and passive warming
Immature thermoregulatory system		Warm prep solutions
Lesser fat stores		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

# Special Considerations

## Biosecurity

- Vaccination
- Sanitation
- Segregation

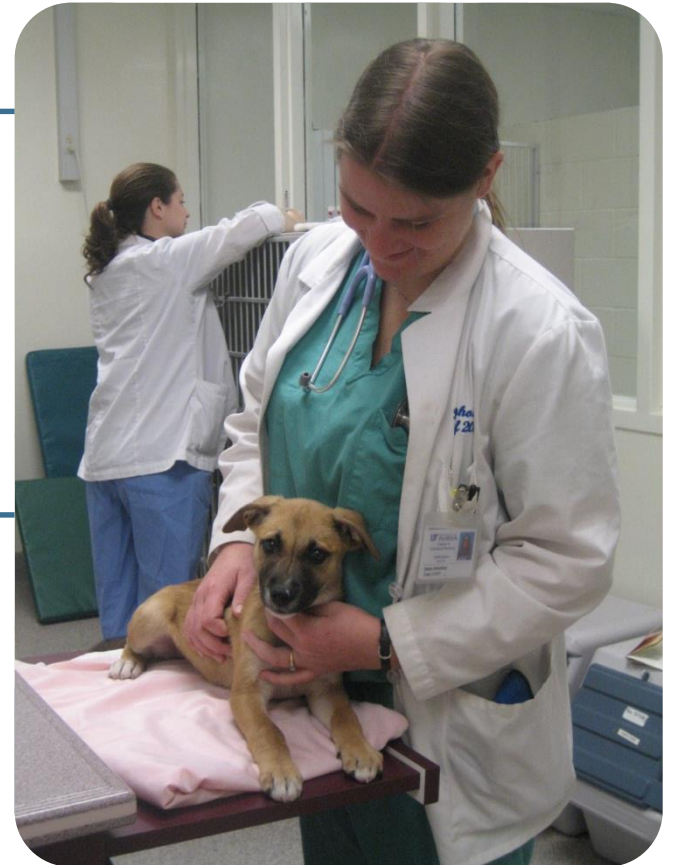




# Special Considerations

## Stress mitigation

- Gentle handling
- Environmental management
- Co-housing

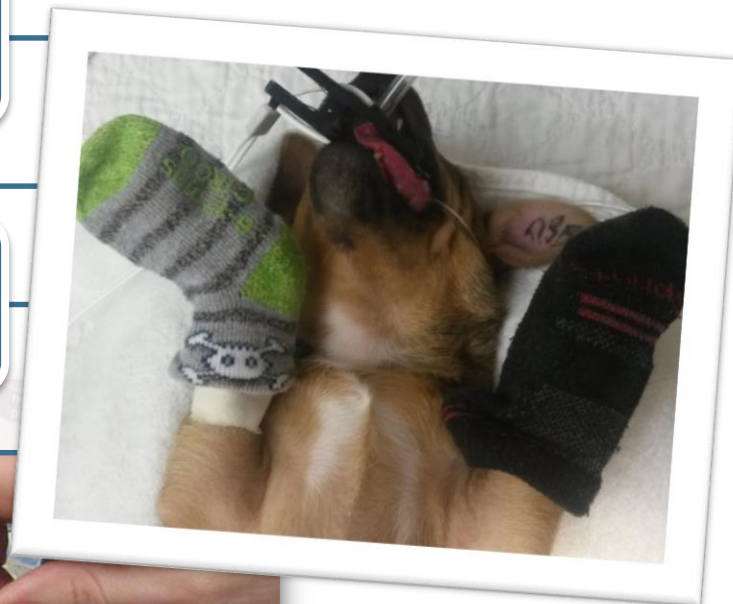




# Special Considerations

Hypoglycemia

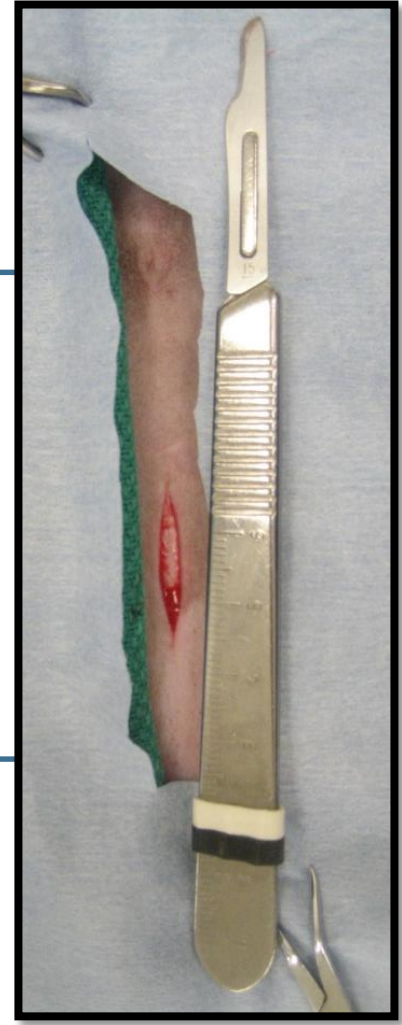
Hypothermia



# Special Considerations

## 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**

From the Department of Small Animal Clinical Sciences (Griffin), the Veterinary Community Outreach Program (Harrison, Iazza), and the M (Levy), College of Veterinary Medicine, University of Minnesota, Department of Clinical Sciences, College of Veterinary Medicine, St. Paul, MN 55105 (Griffin); University of Minnesota, School of Veterinary Medicine, Tufts University Center for Animal Health, 163 Clay Hill Rd., Hartland, VT 05043 (Harrison); Program of the ASPCA, 25 Heritage Dr., Asheville, NC 28806 (Iazza); North American Veterinary Consultants, 78 Dodge Rd., Ithaca, NY 14850 (Aron); New York, PO Box 404, East Aurora, NY 14052 (Griffin); ogy Consultants, 6513 132nd Ave NE No. 402, Kirkland, WA 98033 (Harrison); Institute for Veterinary Emergencies and Referrals, 2 TN 37406 (Bohling); Associated Veterinary Services, 7 Rouge, LA 70814 (Eddlestone); First Coast No More, Jacksonville, FL 32208 (Farrell); Pets Alive, No Walnut St., Bloomington, IN 47401 (Ferguson); Dep Services, College of Veterinary Medicine & Biomedical College Station, TX 77845 (Howe); IVG Hospitals, 2 (Looney); Bridgewater Veterinary Hospital, 1740 B (Moyer); Department of Small Animal Clinical Science Michigan State University, East Lansing, MI 48824 (Ross) and Services, 2750 Monterey Rd., San Jose, CA 95111 (Griffin).

Address correspondence to Dr. Griffin (info@sheltervet.com).

This article has not undergone peer review.

## 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.

As community efforts to reduce the overpopulation and euthanasia of unwanted and uncowned cats and dogs have increased, many veterinarians have increasingly focused their clinical efforts on the provision of spay-neuter services. Because of the wide range of geographic and demographic needs, a wide variety of spay-neuter programs have been developed to increase delivery of services to targeted populations of animals, including stationary and mobile clinics, MASH-style 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, the Association of Shelter Veterinarians convened a task force of veterinarians to develop veterinary medical care guidelines for spay-neuter programs. These guidelines consist of recommendations for general patient care and clinical procedures, preoperative

[www.sheltervet.org](http://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

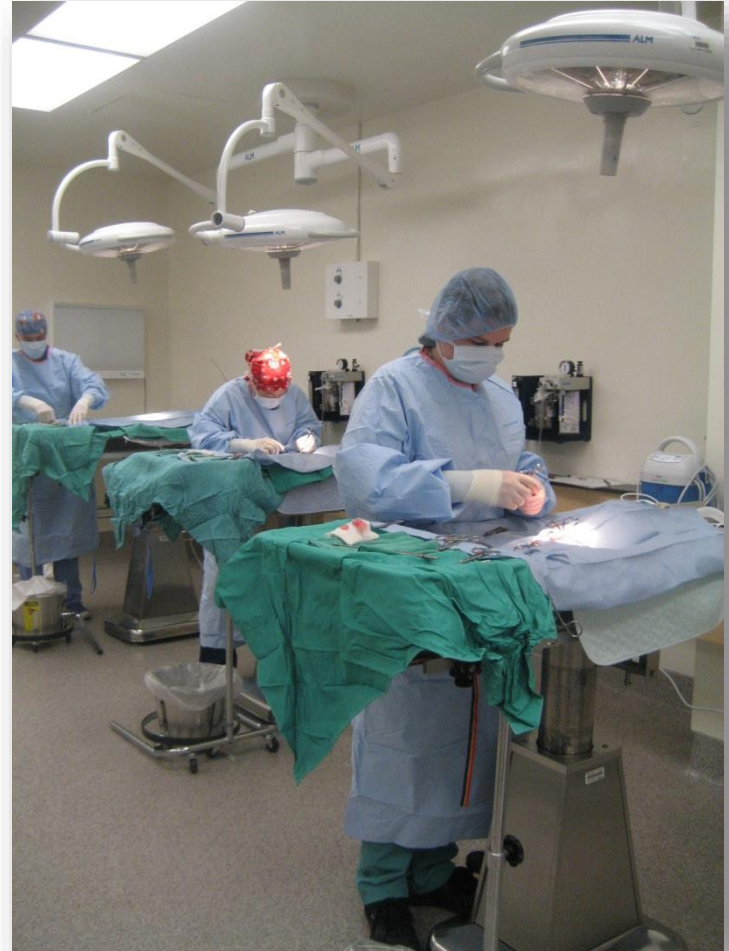
- ☐ 1 hr. post-op
- ☐ 8 weeks
- ☐ Sx time = 8 min.
- ☐ Sx time = 1 hr.





# 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/](http://www.cmpvpr.org/SpayNeuterSeminar/)



[brian.digangi@aspca.org](mailto:brian.digangi@aspca.org)  
[sheltermedicine@aspca.org](mailto:sheltermedicine@aspca.org)

[www.ASPCAPro.org](http://www.ASPCAPro.org)