

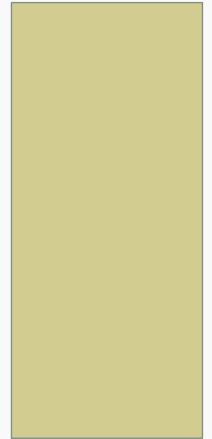
**Harmless
cooler or...**



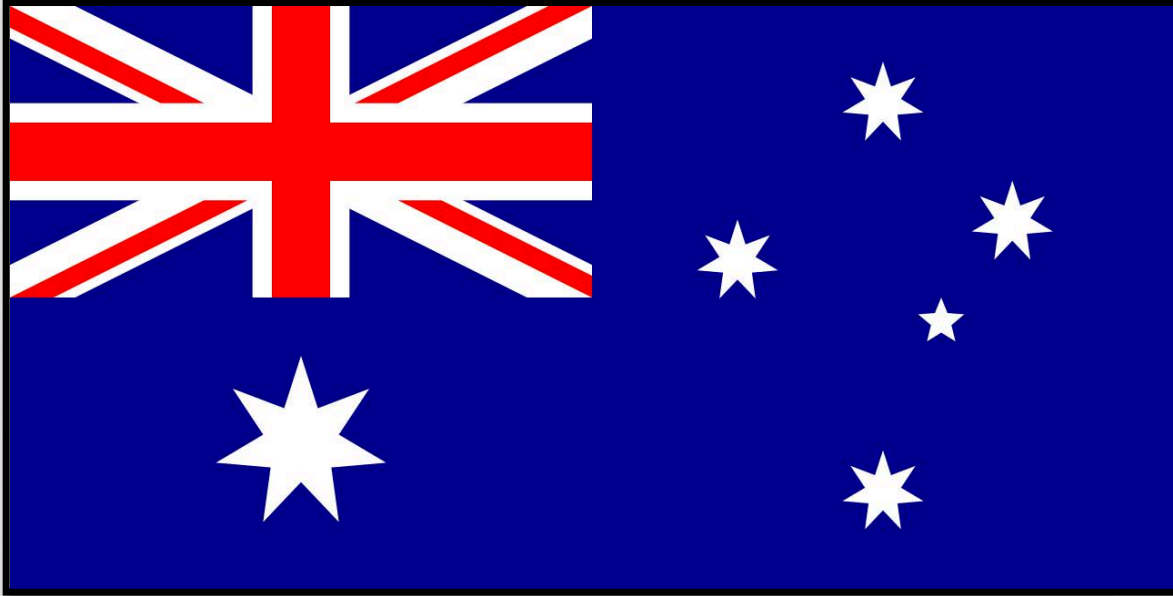
**...Pandora's
box?**

INTRODUCTION TO VETERINARY FORENSIC PATHOLOGY

**JODIE GERDIN DVM DACVP
AUSTRALIA 2018**



MANY THANKS!



CONTACT INFO

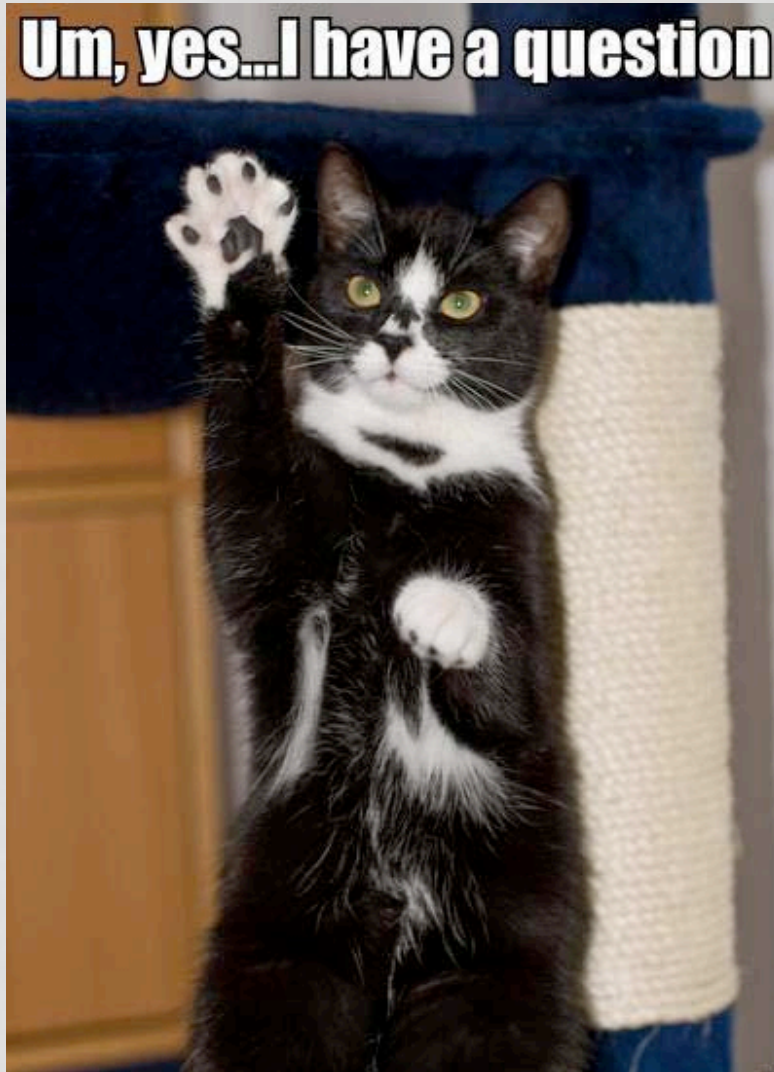
I HAZA QUESTION



***Just ask-
I am happy
to provide
my email !***

GUIDELINES

Um, yes...I have a question



ROADSHOW GOALS

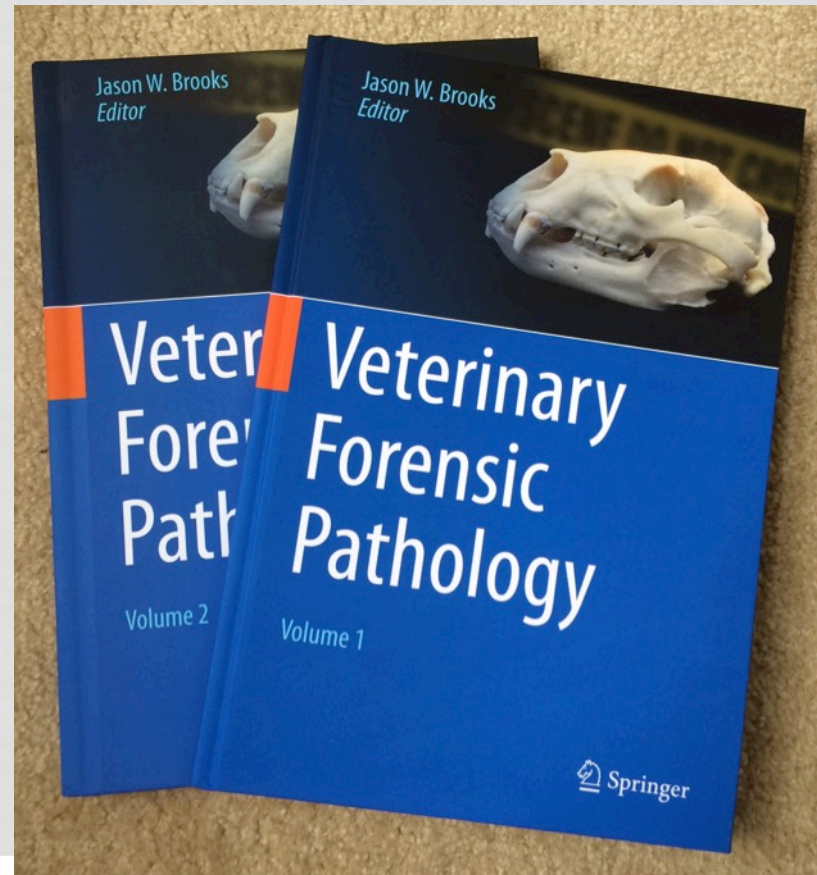
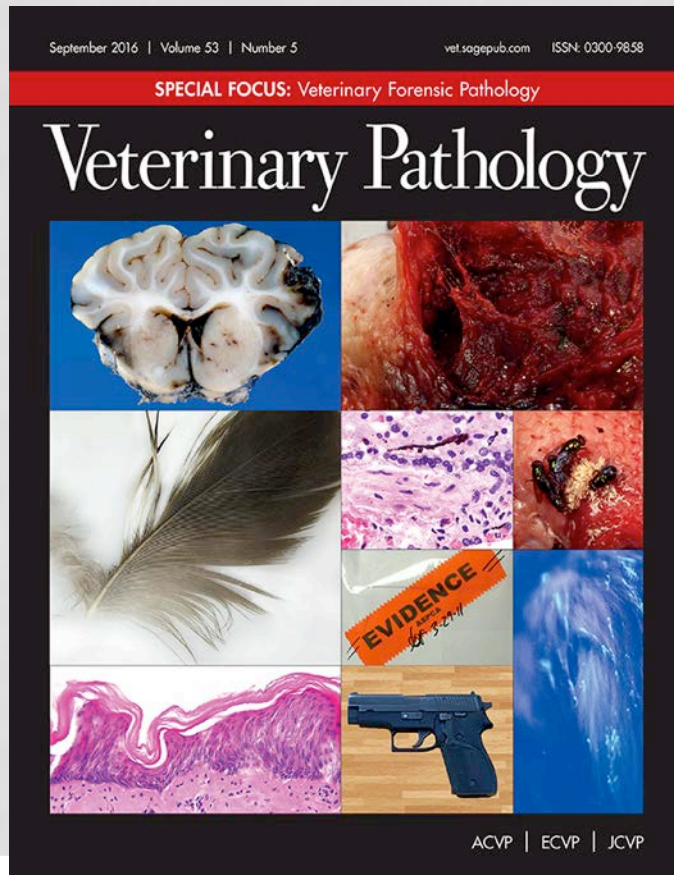
- “Crash course” in veterinary forensics
- Lots of material!
- Overview of the key topics
 - Not exhaustive (can't be)

ROADSHOW GOALS

- “Crash course” in veterinary forensics
- Lots of material!
- Overview of the key topics
 - Not exhaustive (can't be)
- **Ultimate goal: Confidence & knowledge to conduct a postmortem exam for the common types of forensic cases**, knowing it will never be perfect & that you are not in control of the outcome.

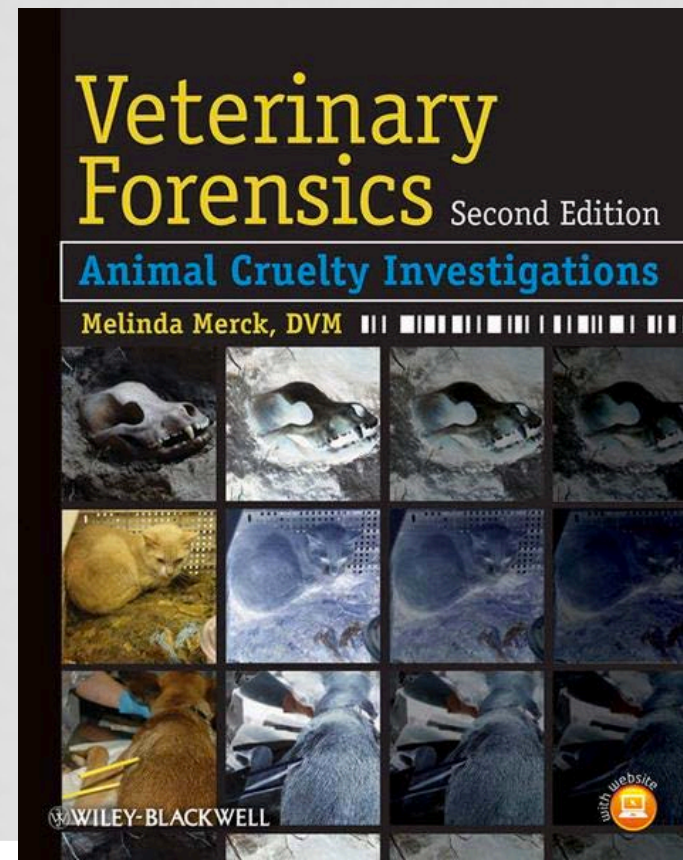
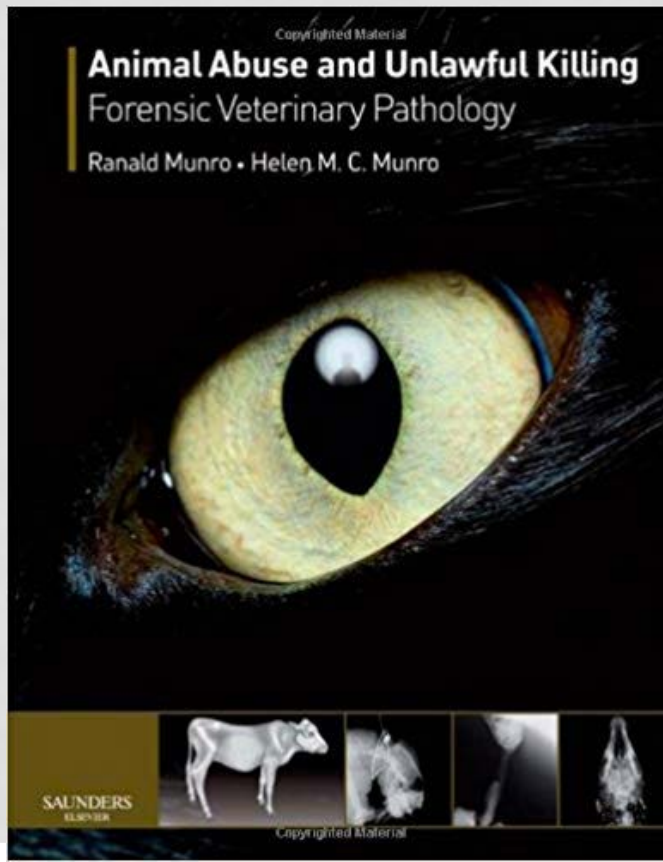
RESOURCES

- Vet Path Forensics issue: Sept 2016, Vol 53, Issue 5
- Veterinary Forensic Pathology: Vol 1&2 J.Brooks



RESOURCES

- Veterinary Forensics **2nd Ed** Melinda Merck, Ed.
- Animal Abuse & Unlawful Killing by The Munros



RESOURCES

- **IVFSA.org** –Conference, Workshops...
- ASPCA / University of Florida - Online CE
- **ASPCAPro.org**



UF ASPCA Veterinary Forensic Sciences Program
Colleges of Medicine and Veterinary Medicine



About ▾

Distance Education

Workshops ▾

DNA T



MS Degree Concentration in Veterinary Forensic Sciences

The Maples Center for Forensic Medicine, in cooperation with the ASPCA and the UF College of Veterinary Medicine announce the first MS degree in Veterinary Forensic Sciences.

[Read More](#)

OVERVIEW

- Background
 - Terminology
 - Why forensic cases matter
 - Forensic vs Diagnostic pathology
 - Circumstance in forensic pathology
- Goals of a forensic necropsy (Nx)
- “Classic mistakes” in forensic pathology
- External Exam

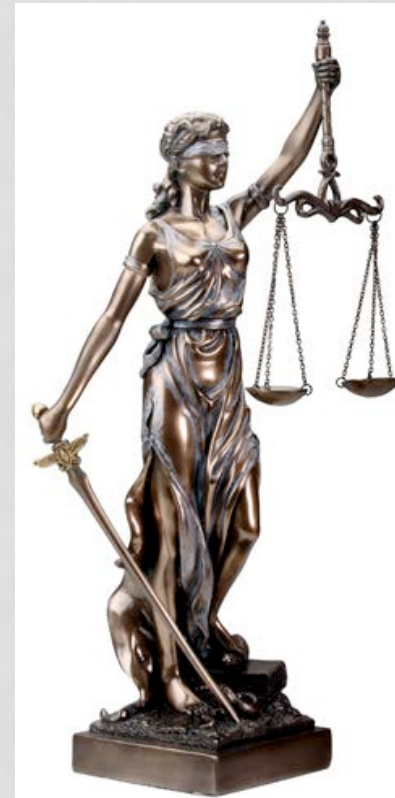
TERMINOLOGY

Forensic

- Use of **knowledge, methods, or tests** to aid an **investigation of a crime** or **answer legal questions**
 - Ex: Forensic accounting, psychology, etc.

Forensic Science

- Use of **scientific** knowledge, methods, or tests to aid an **investigation of a crime** or **answer legal questions**
 - Ex: Forensic medicine, pathology, Blood splatter & Fingerprint analysis



TERMINOLOGY

- **Veterinary Forensic Pathology**

uses necropsy (Nx) +/- histology & ancillary testing to aid the **investigation of a crime** or **answer legal questions**



TERMINOLOGY

- **Veterinary Forensic Pathology**
uses necropsy (Nx) +/- histology & ancillary testing to to aid the **investigation of a crime** or **answer legal questions**
- Pathologists/ vets do **NOT** determine if a crime has been committed
 - ***Animal cruelty is a legal, not a medical, determination***
 - ***The court determines if a crime was committed***



VFP: CASE TYPES

- Medical malpractice
- Insured animals
 - Rule out non-accidental causes of death
- **Animal related crimes**
 - **Abuse**
 - **Neglect**
 - **Other**
 - Hunting out of season, poaching, illegal import/export, etc.



VFP: CASE TYPES

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 - **Abuse**
 - **Neglect**
 - Other
 - Hunting out of season, poaching, illegal import/export, etc.



DEFINITIONS

- **Cruelty:** Act that causes unnecessary pain & suffering
- **Neglect: Failure to act** or **Unintentional act (*omission*)** causing unnecessary pain & suffering
- **Abuse: Intentional act (*commission*)** causing unnecessary pain & suffering

Cruelty

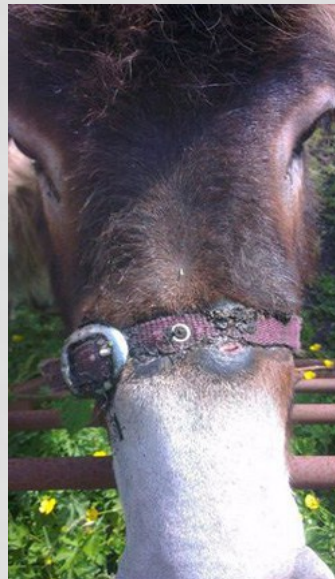
Neglect

Abuse



VET FORENSICS: DEFINITIONS

- **Neglect** = Usually unintentional (*omission*)
 - Sometimes fixed with education
 - EX: Matting, overgrown hooves, imbedded collars



VET FORENSICS: DEFINITIONS

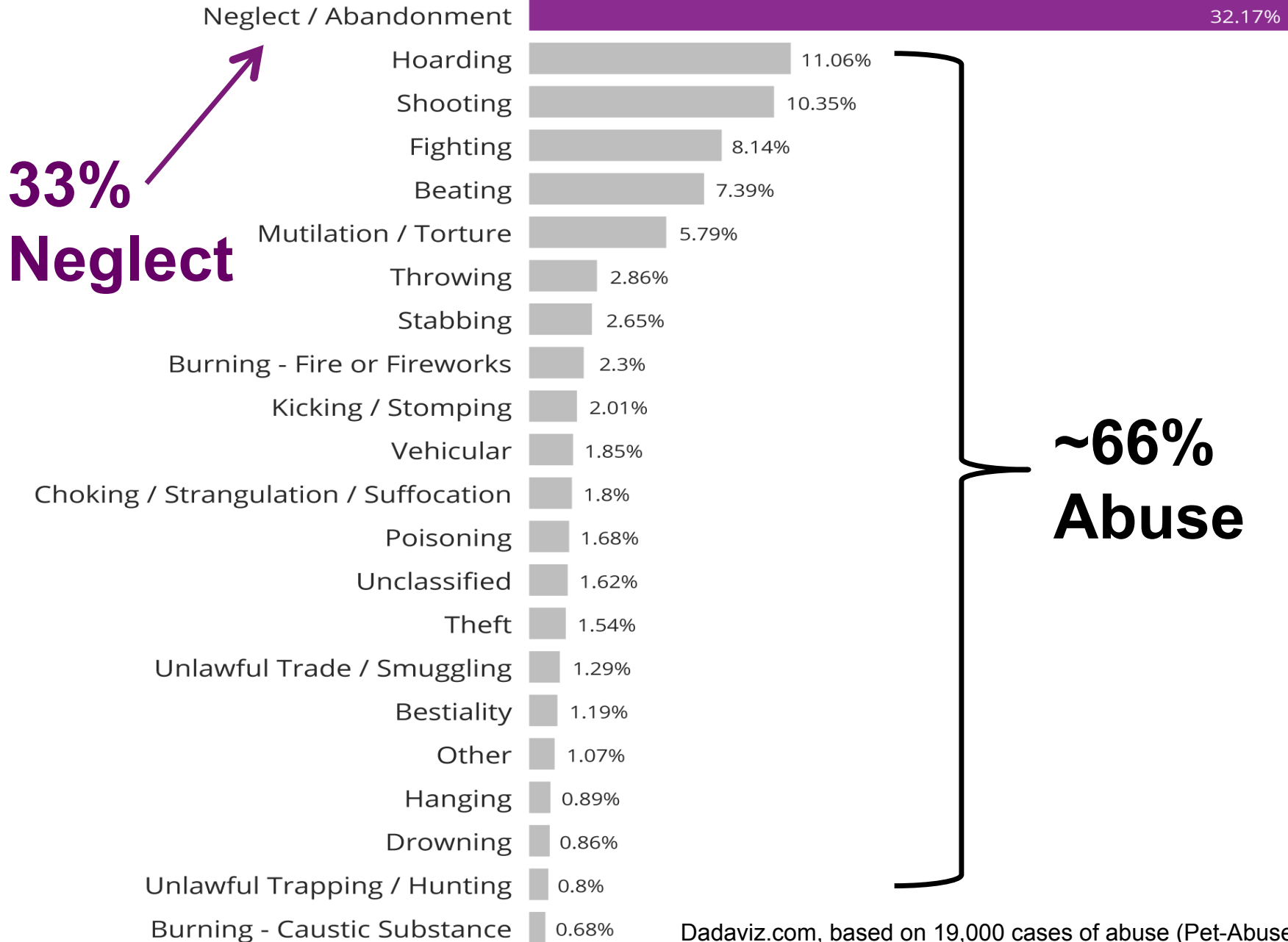
- **Abuse = Intentional** (*commission*)
 - Gives satisfaction to the perpetrator
 - May be part of larger pattern of criminal behavior
 - Includes severe neglect: marked suffering, nearly fatal injury, or death (“mercy killing”)
 - AVMA Guidelines on Euthanasia 2013



Animal Abuse Cases by Abuse Category

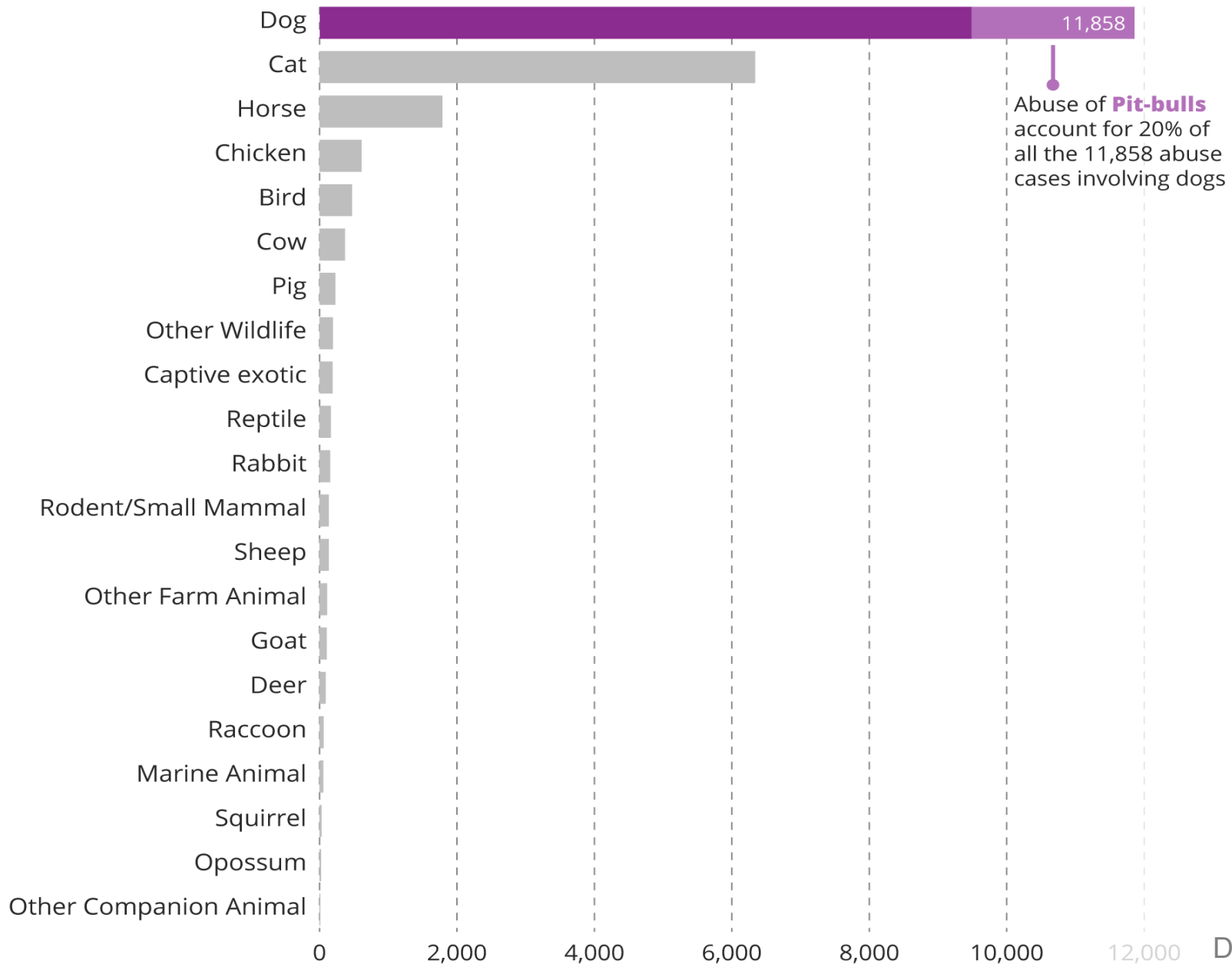
1980-2014, USA

Doesn't add up to 100%, because multiple animal categories can be included in one single abuse case



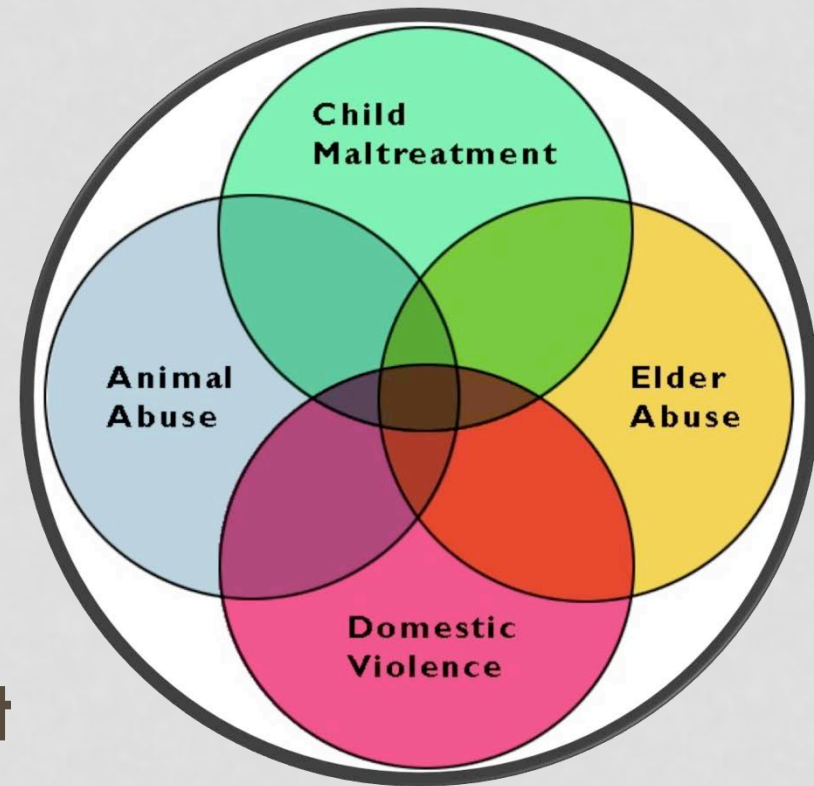
Total Animal Abuse cases reported: 19,448 involving 23,128 animal categories
Every case includes the type(s) of animals involved.

Break-down of animal categories involved in all cases.



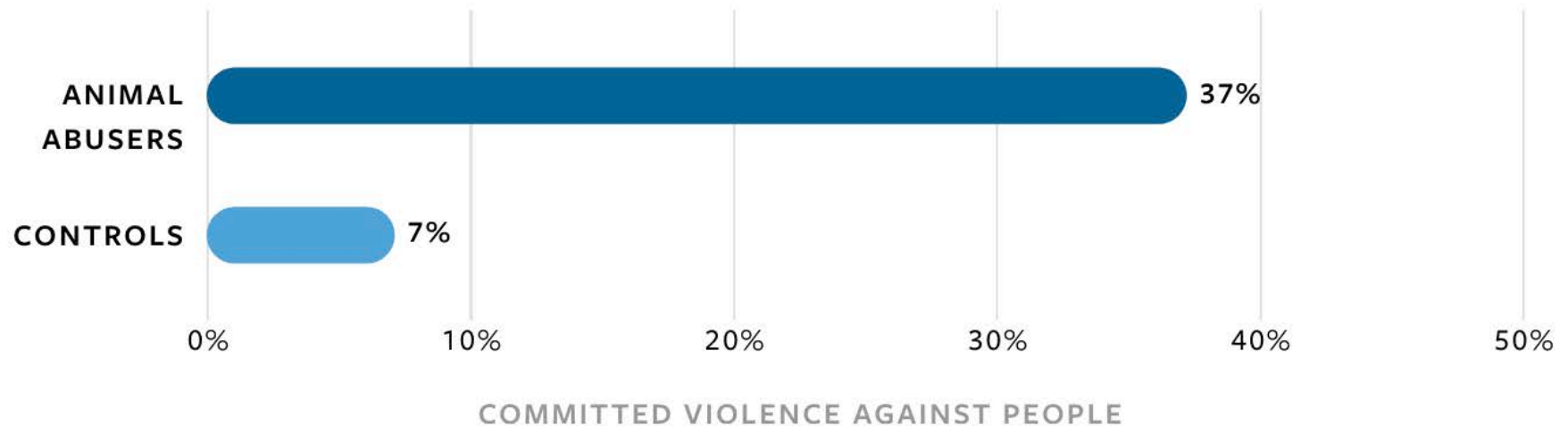
WHY THIS MATTERS

- **Animal related crimes are a threat to public health & safety**
 - **“The Link”**
Animal cruelty often co-occurs with interpersonal violence & other criminal activity.
- **Animal neglect may co-occur with self-neglect**
 - Elderly, Mentally ill



RELATIONSHIP OF ANIMAL ABUSE TO VIOLENT CRIME AGAINST PEOPLE

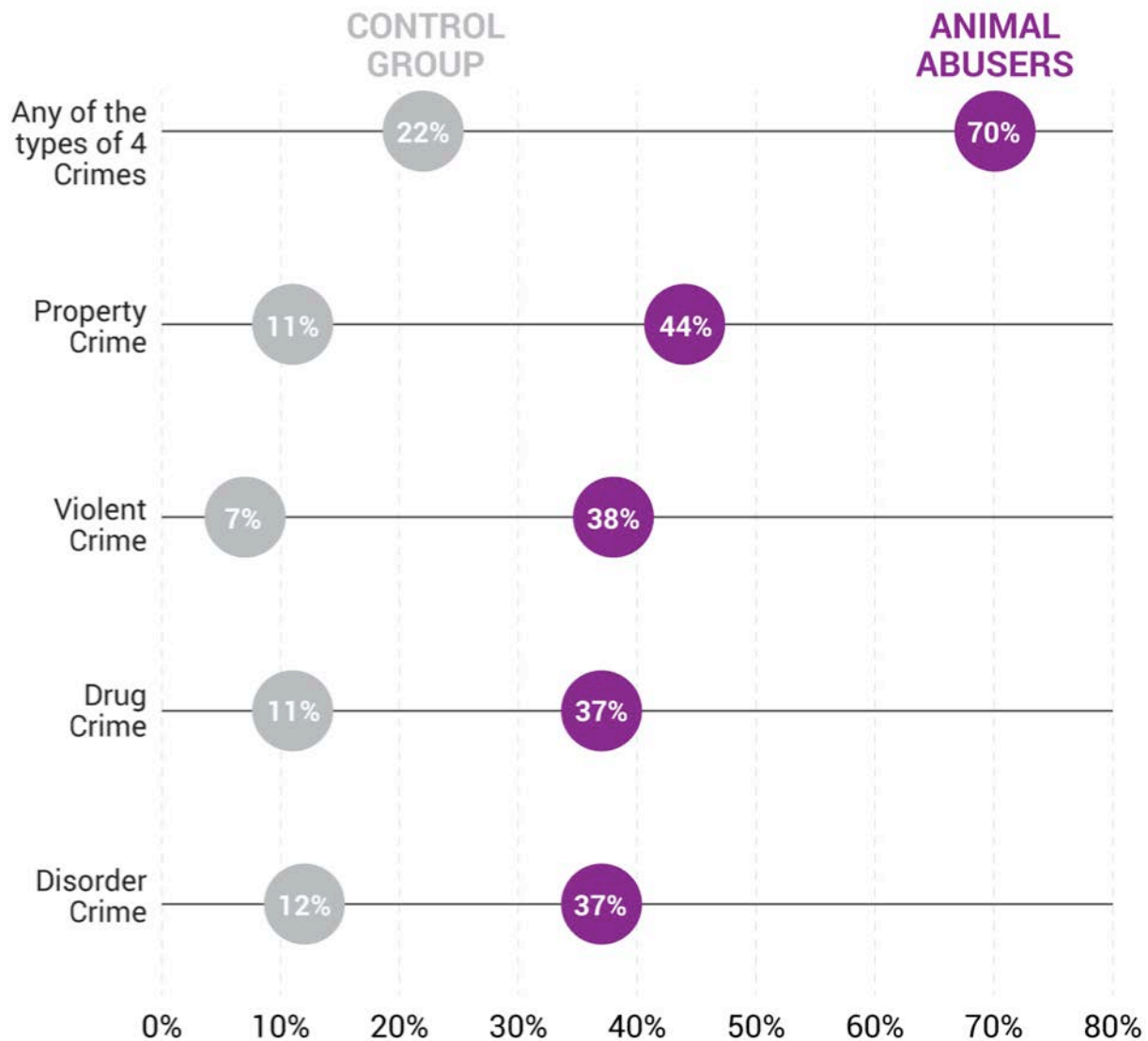
In a study of 153 convicted **animal abusers** and 153 **controls** of similar demographics and socioeconomic status, participants who abused animals were **FIVE TIMES** more likely to commit interpersonal violence.



Source: [Arluke, Luke & Ascione, 1999](#).

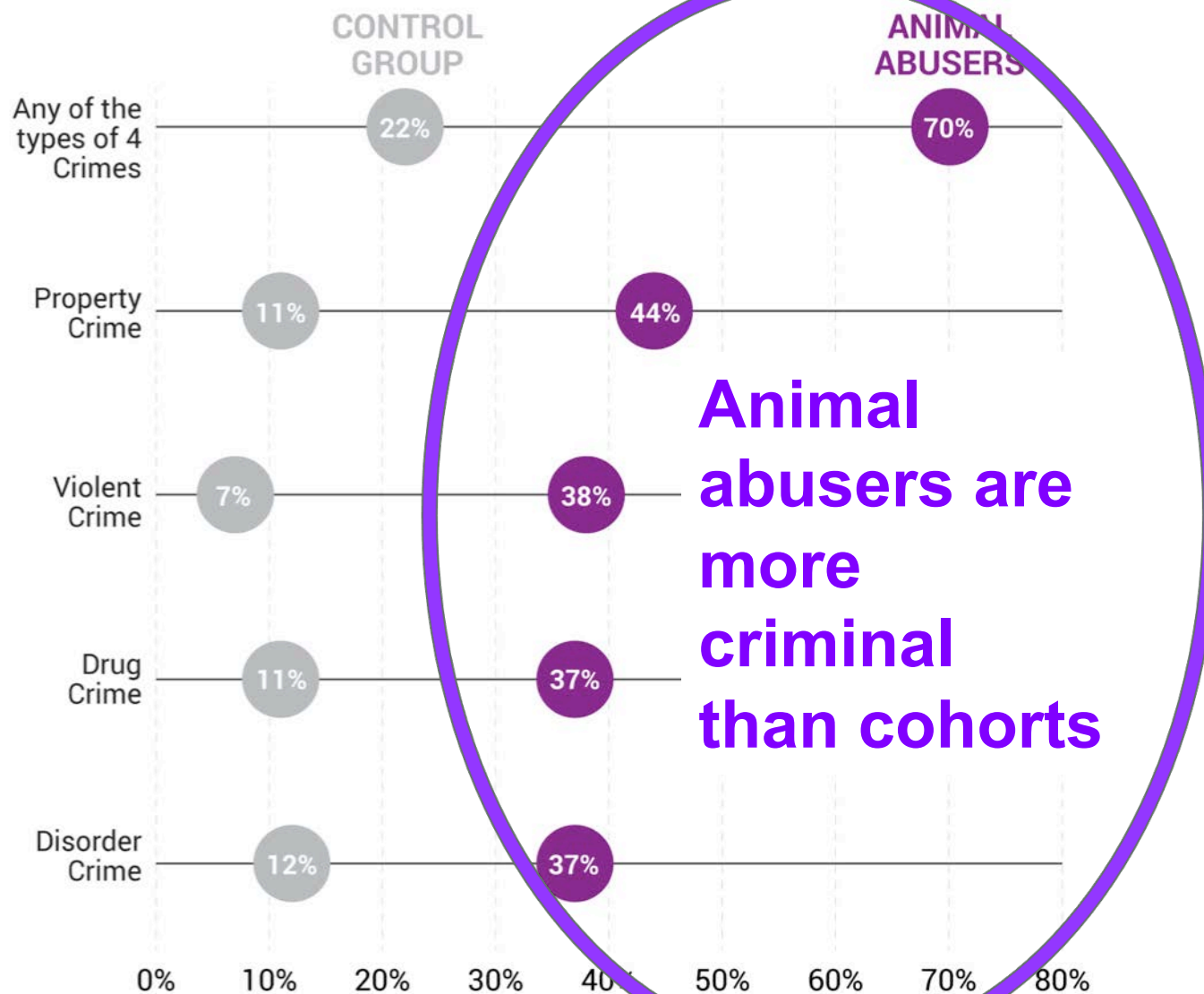
Arluke A, Levin J, Luke C, Ascione F. The relationship of animal abuse to violence and other forms of antisocial behavior. *J Interpers Violence* Sept 1999.14(9):963-975

The criminal records of **animal abusers** compared to a **control group** (neighbors)



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The Link Between Animal Abuse And Domestic Violence

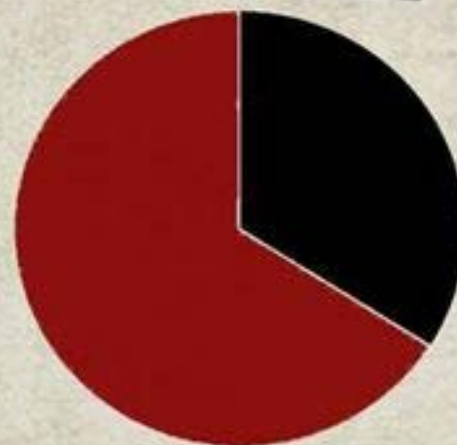
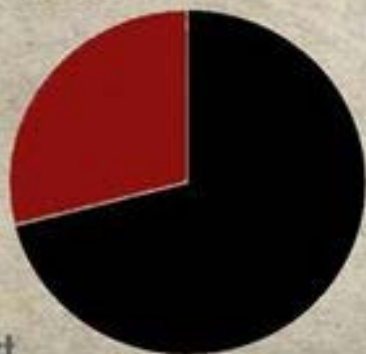
1 in 4 women will be a victim of domestic violence in their lifetime



In many domestic abuse situations the family pet is the only source of kindness and compassion for the victim.

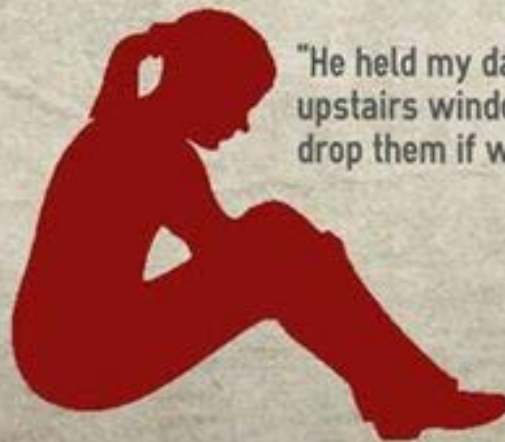
This high dependence and attachment for the pet is commonly used as a means of control by the abuser

In a shelter 71% of the women with pets reported that their partner had threatened, hurt, or killed their pet (Ascione, 1998)



34% of women had delayed leaving out of concern for their pets safety. Many others will simply not attempt to leave.

"He held my daughters pets out of the upstairs window, and threatened to drop them if we did not return home"



"Daddy was always drunk and angry. He used to kick the cat and hit mummy. He scares me"

WHY THIS MATTERS

- **Neglected animals & animals involved in illegal activity may spread disease**
 - Animal diseases
 - Exotic Newcastle -- fighting cocks
 - *Babesia gibsonii* -- fighting dogs
 - Human health risks
 - Hoarders







WHY THIS MATTERS

- **Animal related crimes are crimes**
 - It's our civic & moral duty to uphold the law by being involved
 - It's our professional & civic duty *to help the court* determine if a crime has been committed





Inventory
Date: _____
Item: _____
Quantity: _____
Location: _____
Officer: _____
Signature: _____

276

Shipping Label
KH 17VA
Barcode

Shipping Label
KH 17VA
Barcode

EVIDENCE

EVIDENCE

COLEMAN XTREME 5
ICE CUP HOLDERS

Coleman
XTREME 5



WHY ME?

makeameme.org

I finally caught my tail!

Now what am I supposed to do with it?

ICANHASCHEEZBURGER.COM

	Medical Examiners	Veterinary Pathologists
General pathology training	Yes	Yes
<u>Forensic</u> pathology training	Yes 1 year fellowship & Forensic Board Certification	No Rarely familiar w/ animal abuse & neglect
Experience with non- natural causes of death	Yes	Little to None

**Medical
Examiners**

**Veterinary
Pathologists**

**General
pathology
training**

Yes

Yes

**Forensic
pathology
training**

**Yes
1 year fellowship &
Forensic Board
Certification**

**Some familiarity
with animal abuse
& neglect**

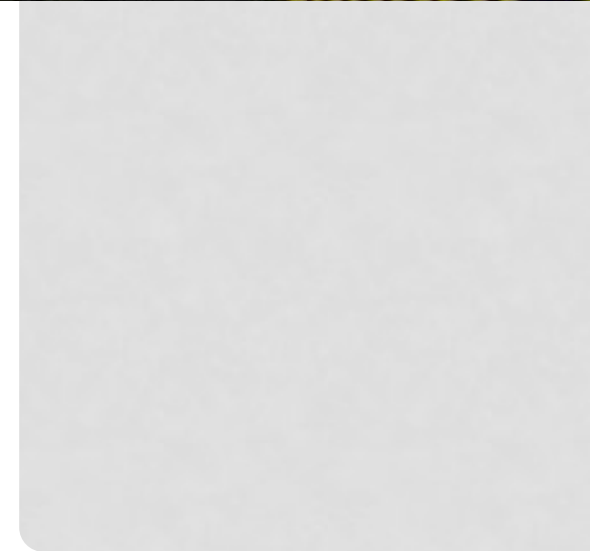
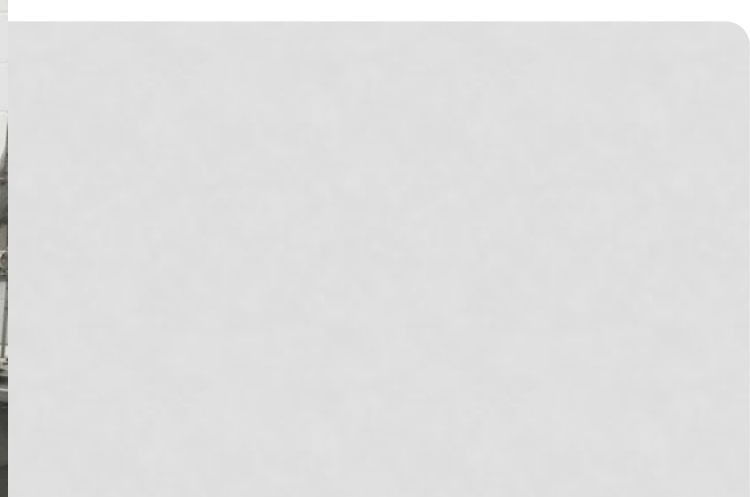
**Experience
with non-
natural causes
of death**

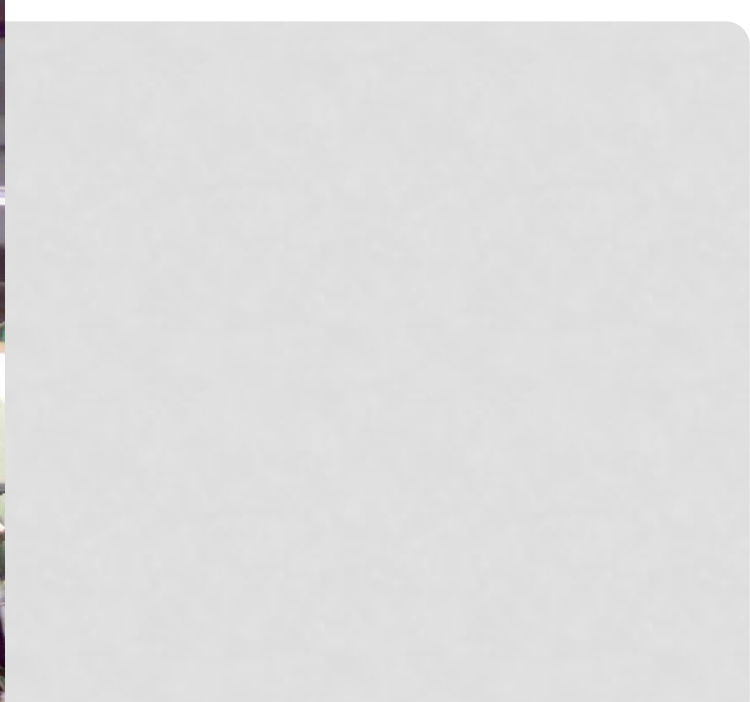
Yes

**Some
familiarity !**

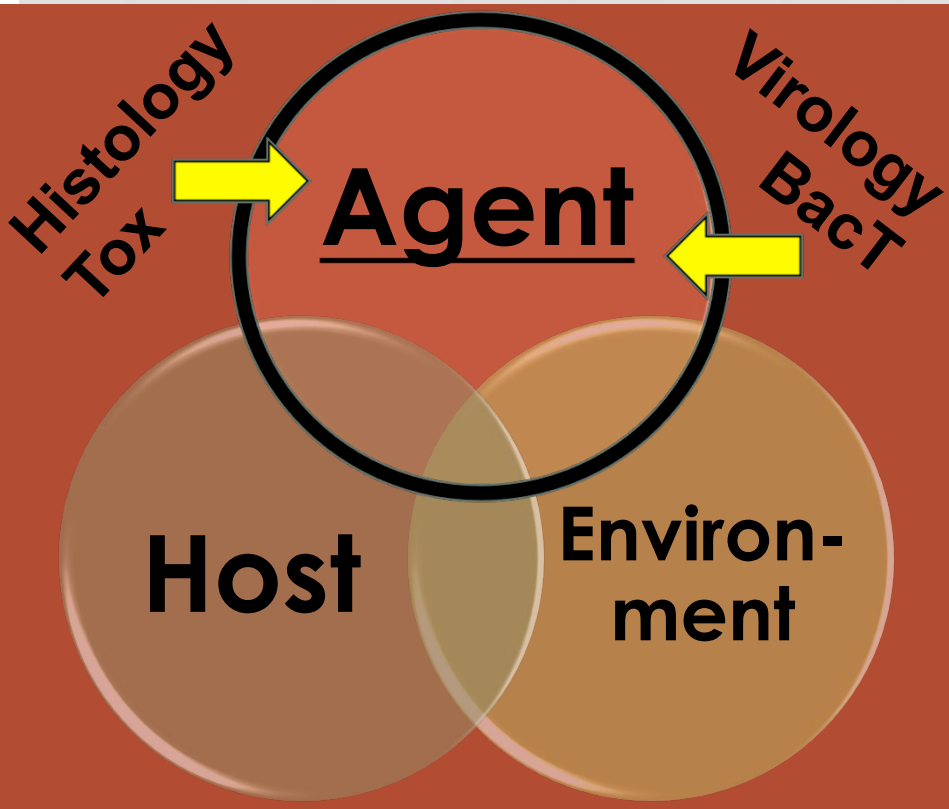












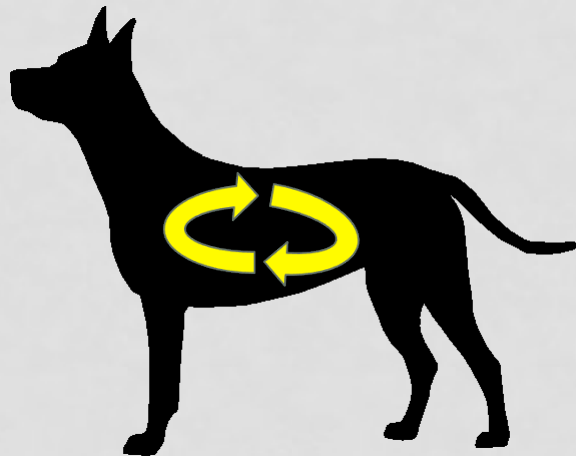
EPIDEMIOLOGY

FORENSIC PATH

- In **natural Dz.**, lesions result from interplay between the host, environment, & **agent**.
- In **non-natural deaths**, lesions are a result of interplay between the victim, the environment, & +/- **criminal activity** (vs. accident).
- **History & scene are crucial** in ruling in/ out **criminal activity**.

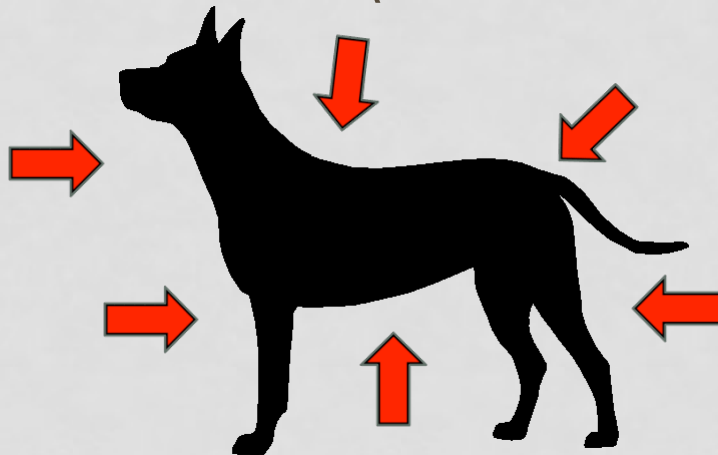
MAKING A DIAGNOSIS

- Diagnostic pathology
 - Death to due natural Dz (endogenous Dz)
 - The COD / Dx is ***in the body***



MAKING A DIAGNOSIS

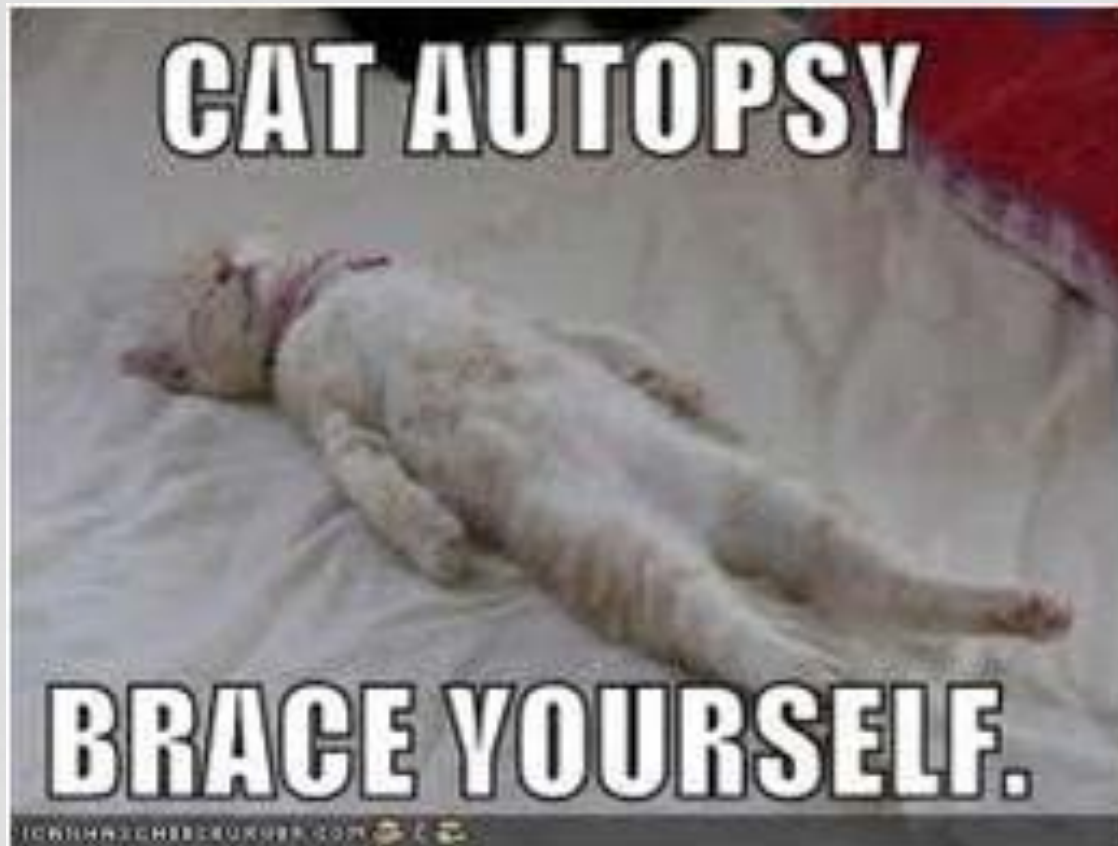
- Forensic pathology
 - Death often due to non-natural, **exogenous causes**
 - CODs originate ***outside of the body***
 - Non-specific mechanisms (blunt trauma, etc.)
 - Adverse environments (too cold, no water, etc.)



MAKING A DIAGNOSIS

- Forensic pathology
 - **Scene & History is key**
 - *External exam is key*





Forensic necropsy goals & How to achieve them

FORENSIC NECROPSY GOALS

1. Answer the court's questions

(Answer the **client's** questions)

- Often anticipate the court's questions
- Questions vary by case
- **Ask** the submitter what they hope to learn
- Prepare by reviewing lesions to look for & anticipate Ddx (defenses)



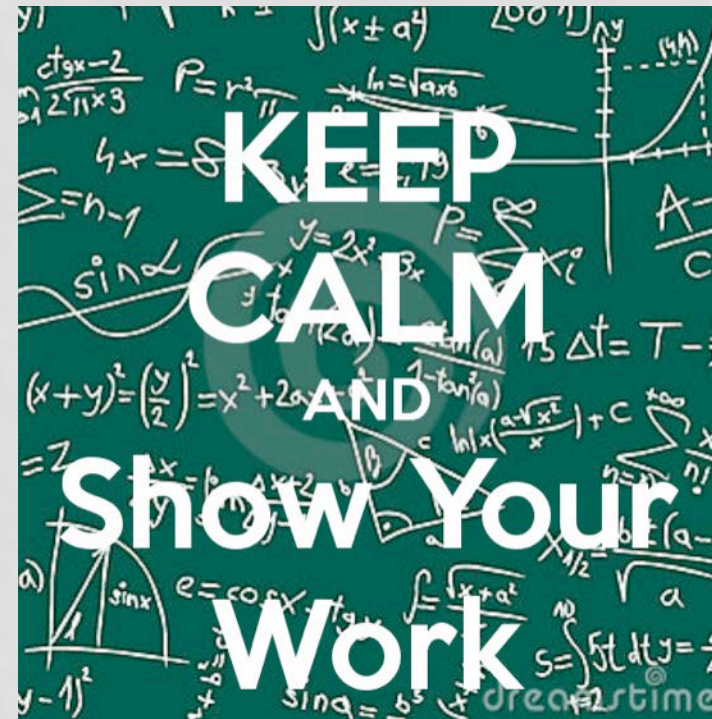
FORENSIC NECROPSY GOALS

2. Collect evidence

- Ex: Tissue, bullets, DNA, etc.

3. Document findings

- Photos
- Report



DIAGNOSTIC VS. FORENSIC NX

- **Diagnostic**

- Can be performed quickly
- Focuses on the internal exam
- A few select photos
- Report brief, focuses on lesions



- **Forensic**

- Often requires more time & extensive dissection
- External, SQ, & internal exam
- Many photos taken
- Report long, includes normal findings & not examined

The American Journal of Forensic Medicine and Pathology
Volume 2 Number 4
December 1981

Alan R. Moritz, M.D.

Classical mistakes in forensic pathology*

MISTAKES IN FORENSIC PATH

1. Not aware of **forensic Nx goals**

- Determining the cause of death
 - **Rule out other proffered causes (defenses)**
- Document the extent of the disease / injury
- Determine (opine) on degree & duration of pain & suffering
- Type of **weapon /forces**
 - Blunt, sharp, firearm, etc.

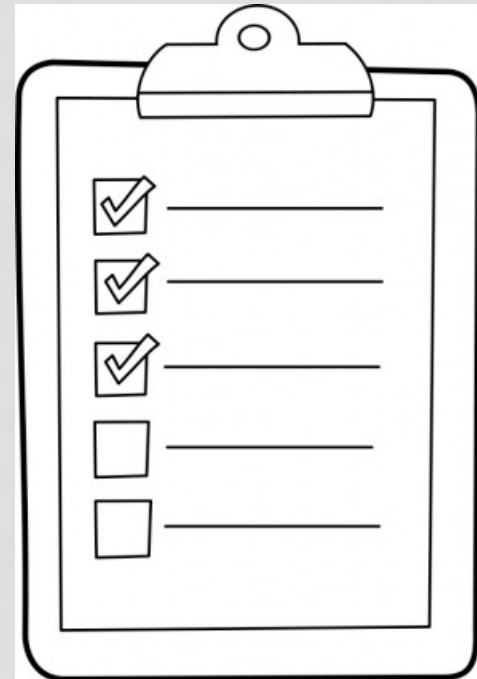


MISTAKES IN FORENSIC PATH

1. Not aware of **forensic Nx goals**

May also need to...

- Estimate post-mortem interval (**PMI**)
- **Timing** of injuries
 - Absolute (hours, days, weeks...)
 - Relative (1st injury, 2nd injury...)
- Determine **manner** of death



MISTAKES IN FORENSIC PATH

2. Performing an incomplete autopsy

- Find 1 COD → stop looking for others (BAD!)
- Inadequate training → incomplete Nx
 - Inadequate exposure of thorax & abdomen cavities
 - **Necropsy \neq Surgery**
 - Failure to examine brain
 - Failure to collect samples for add'l testing
 - Formalin fixed (Histo)
 - Frozen (Tox, Virology, DNA)



Photo courtesy Dr. Rob Reisman ASPCA



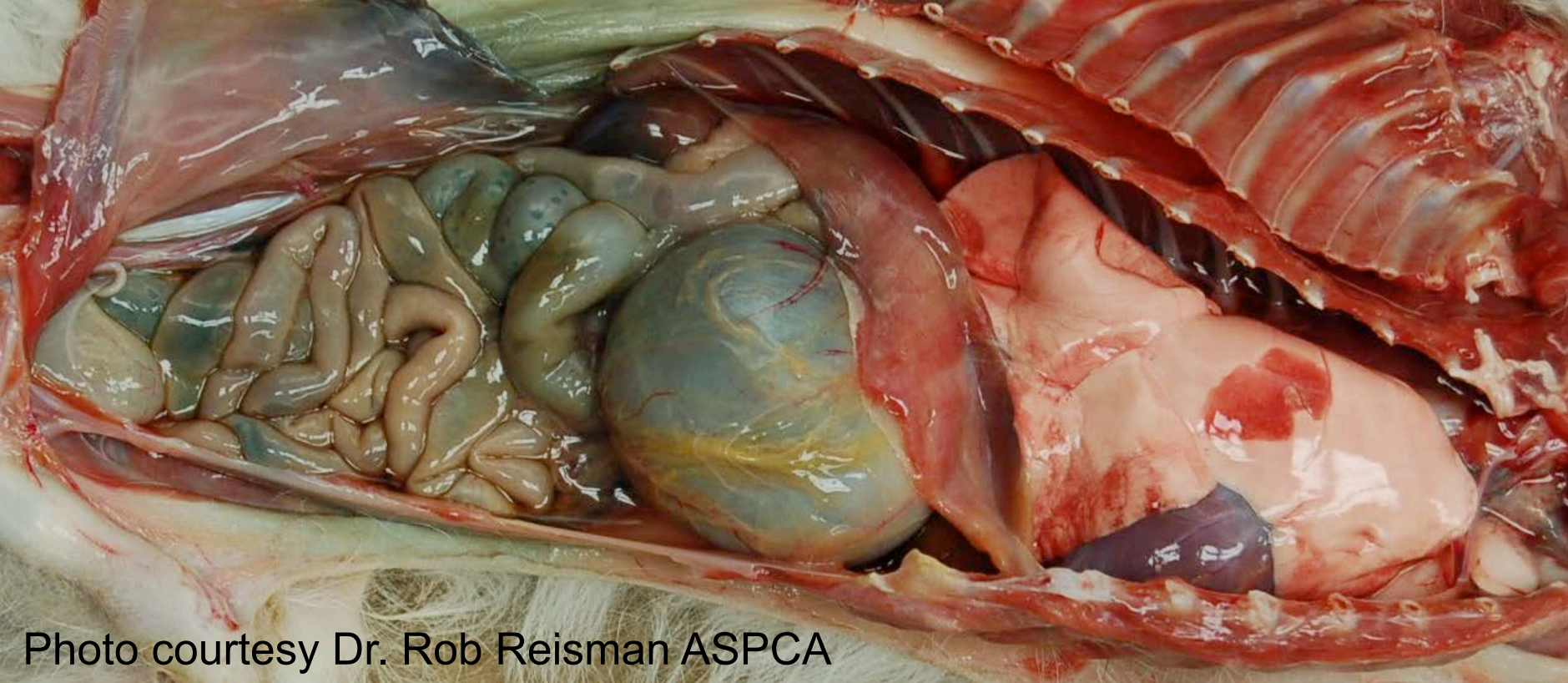


Photo courtesy Dr. Rob Reisman ASPCA

Photo courtesy Dr. Rob Reisman ASPCA

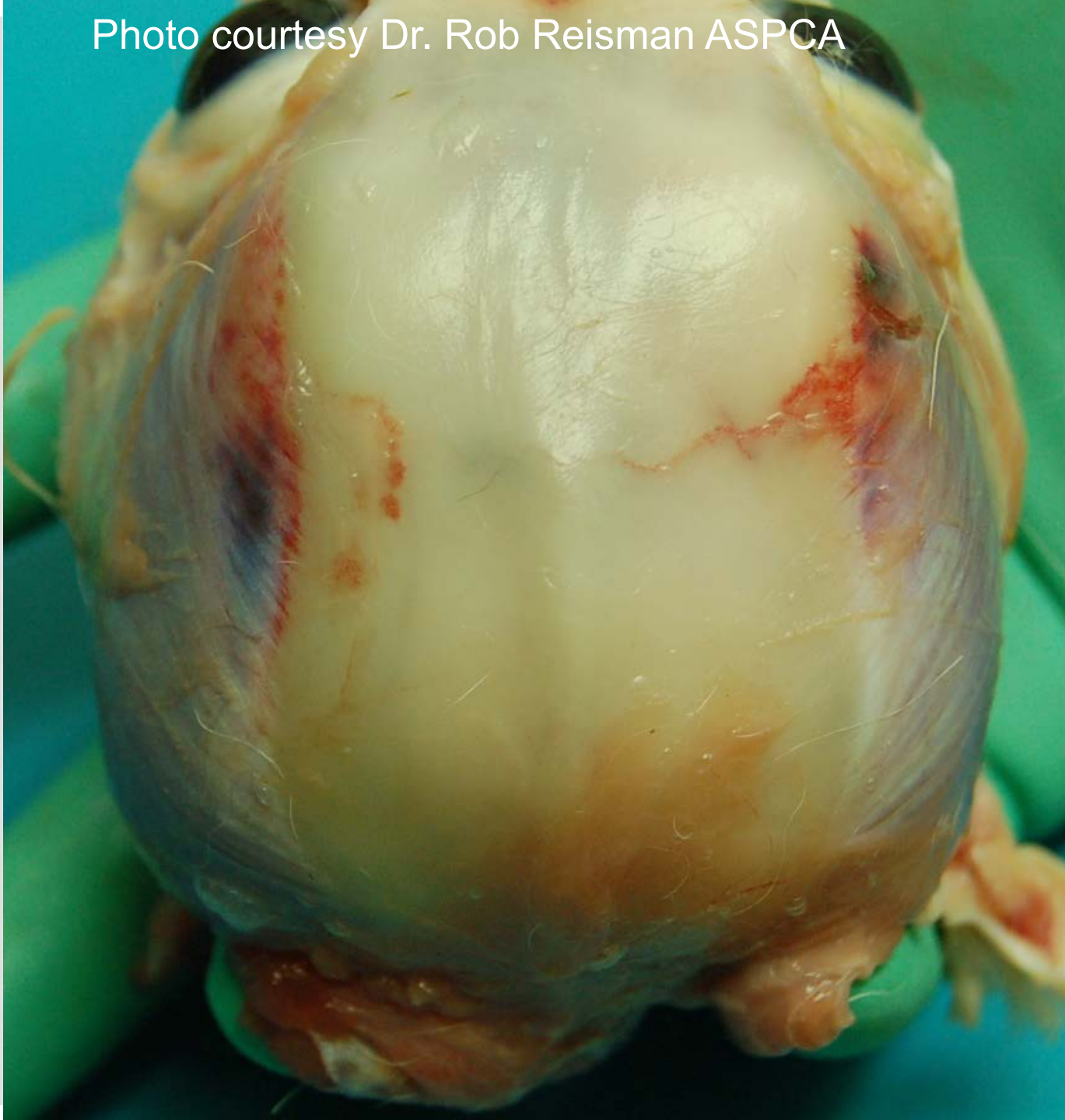
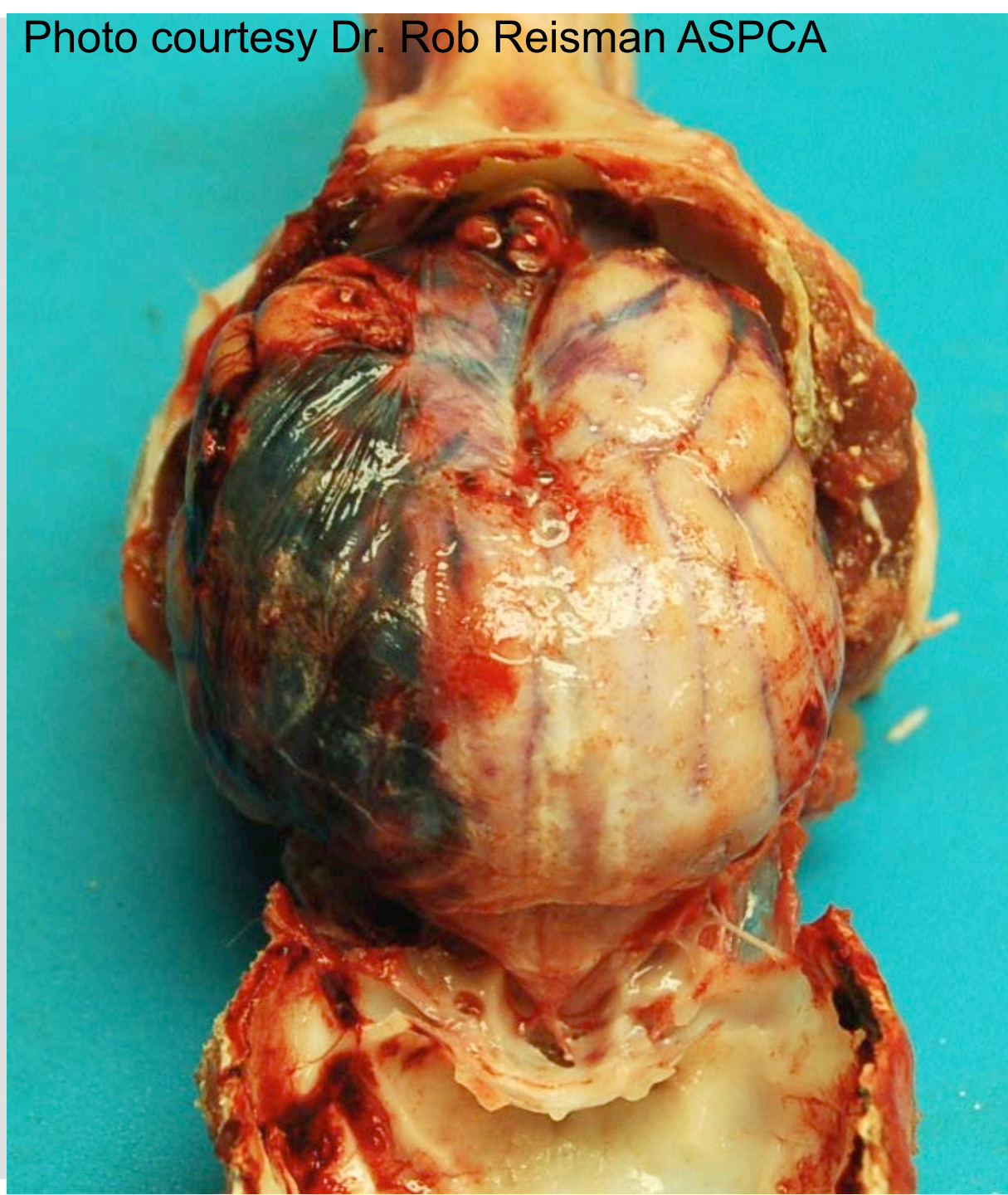


Photo courtesy Dr. Rob Reisman ASPCA



MISTAKES IN FORENSIC PATH

3. Thinking a decomposed body is useless

- No matter how putrid or fragmentary, careful exam almost always yields info about COD & manner
 - Ask a wildlife vet/ pathologist!



MISTAKES IN FORENSIC PATH

4. Failure to recognize / misinterpreting postmortem changes

- Stages of decomposition:
 1. Fresh
 2. Bloat
 3. Active decay
 4. Advanced decay
 5. Dry remains (Skeleton / mummy)



MISTAKES IN FORENSIC PATH

4. Failing to recognize the significance of ***non-uniform decomposition***

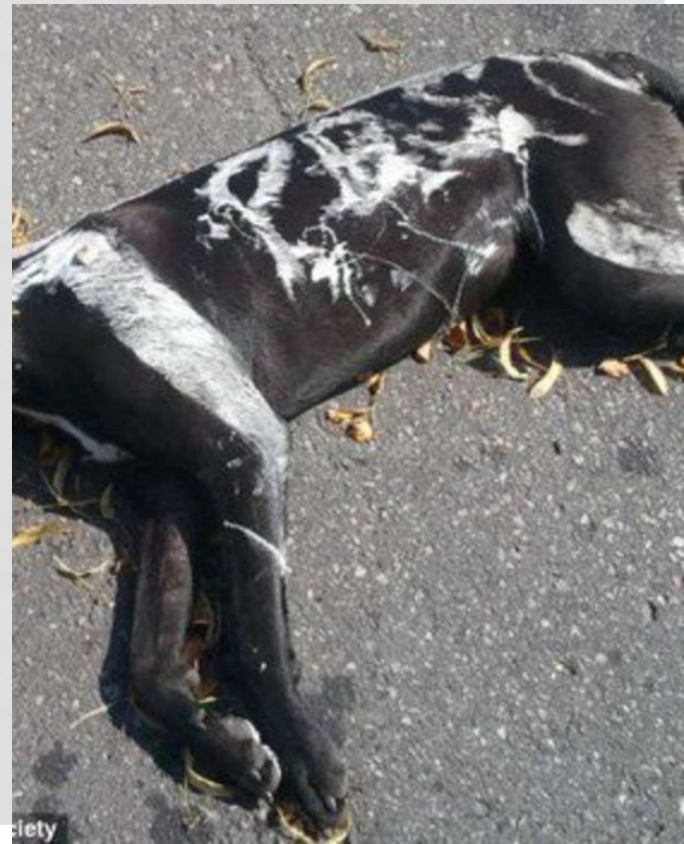
- Putrefaction accelerates where...
 - Skin is broken (O₂)
 - Hemorrhage in tissue (bacT media)
- **Putrefaction is disproportionately advanced at sites of injury**
- Thoroughly examine the rottenest areas



MISTAKES IN FORENSIC PATH

5. Failing to adequately examine & describe **external abnormalities**

- Condition of the haircoat (wet, dirty, blood-soaked) can reflect circumstances of death
- Wounds
- Evidence
 - DNA
 - Insect activity (-> time of death)



MISTAKES IN FORENSIC PATH

6. The mistake of not examining the body at the scene of the crime

- Evidence required for correct interpretation of Nx lesion may exist only at the scene
- Significance of some things may be apparent only to trained eye
- **Get photos of the scene if you can't go to the scene**



MISTAKES IN FORENSIC PATH

6. The mistake of not examining the body at the scene of the crime

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The Rape Stand





EXTERNAL EXAM

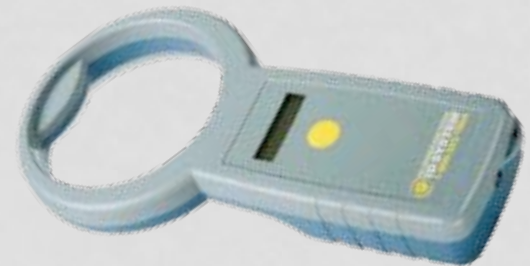
FORENSIC NECROPSY

The external exam is critical to a successful forensic Nx

EXTERNAL EXAM

1. Establish identity

- Species, Sex, ~ Age
 - **Age category:** Neonate, young adult, adult, geriatric
 - **“Consistent with reported age of X”**
- Breed
 - **“Appearance consistent with breed X”**
 - Others may deny or claim ownership based on your guess at the dog’s breed; avoid certainty
- Scan **whole body** for **microchip**
 - Multiple scanners; Multiple people



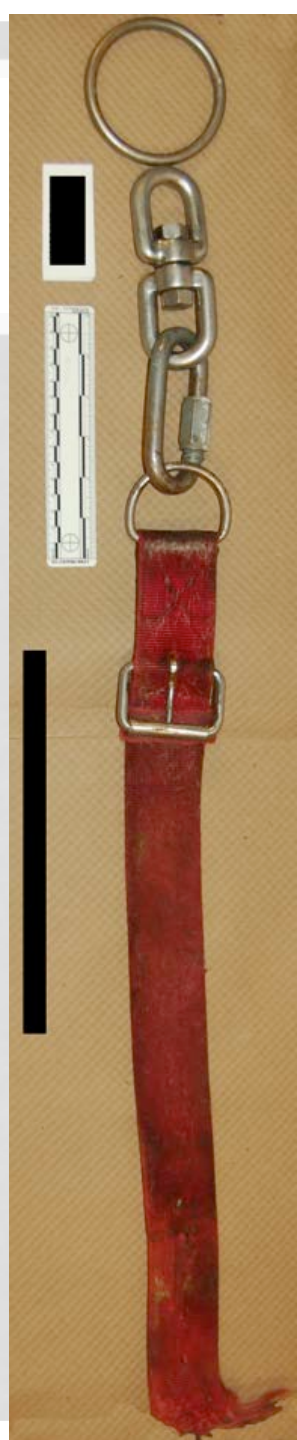
EXTERNAL EXAM

- Body Weight, Length & Height
- Coat color & pattern
 - Use general terms & basic colors
 - Specific terms only if 100% confident
 - Ex: “Grey with black spots” vs. “Merle” “Harlequin”
- Body condition score (BCS)
 - Use published system
 - Many available for many species
 - Google it



EXTERNAL EXAM

- Item(s) on or accompanying the body
 - Collars, blankets, toys, etc.
- Other ID marks
 - Tattoos, ear crop, tail dock, etc.
- Evidence of medical intervention (or lack thereof)
 - Catheters, bandages, shaved areas, etc.



EXTERNAL EXAM

- Postmortem changes
 - Ex: Skin slippage, bloating, corneal clouding, drying of tongue, etc.
- Insect activity
 - Blanch larvae in nearly boiling H₂O for 1-2 min,
→ 80% ethyl alcohol



EXTERNAL EXAM

Hair coat

- **General condition**
 - Matted, dull/ dry, areas of alopecia, etc.
- **“Spiked Hair”**
 - Indicates recently wet hair (including saliva)
 - Drowning, Bite wounds
- **Wounds**
 - Blood may be from another animal or person
 - Swab for DNA
- **Parasites**

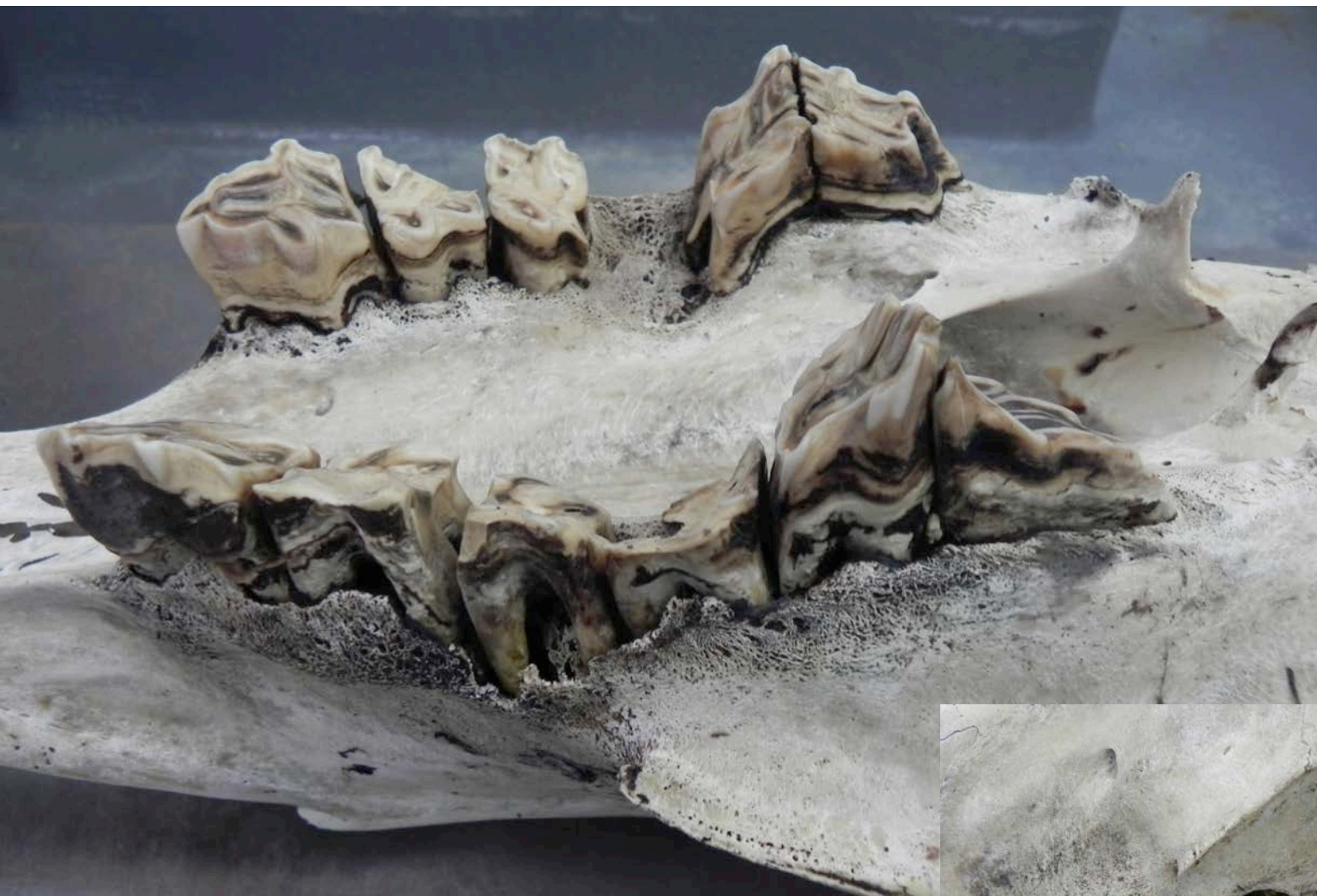


EXTERNAL EXAM

Oral cavity

- Tongue, under the tongue, & roof of mouth
 - Can be injured when an animal bites (aggression or defense)
 - Part of head trauma
 - Condition of the teeth key in starvation & neglect cases
 - Poor dentition (or not) may contribute to poor body BCS





Severe **“wave mouth”**
→ poor mastication
→ GI impaction
→ colic → death.



EXTERNAL EXAM

Ears

- Neglect cases: Parasites, matting, otitis
- Head trauma may → External canal hemorrhage

Eyes

- Scleral hemorrhage & Hyphema may occur with a variety of injuries &/or bleeding diathesis
- Coagulopathy, trauma, & strangulation, etc.



Diffuse scleral hemorrhage in a dog that was hanged.
Blood tinged ocular discharge & epistaxis were also present.



Photo courtesy
H. Chevalier

Photo courtesy
Rob Reisman



Blood in ear
of dog with
head trauma

EXTERNAL EXAM

Neck

- Hanging/ strangulation often does NOT leave a external mark
 - May see bruising of the SQ, assoc muscles
 - Look for congestion/ hemorrhage in head, eyes
 - Blood accumulates when venous drainage is inhibited



Photos courtesy H. Chevalier

Dog that was hanged, ventral aspect. No marks on neck. Scant hemorrhage in the superficial tissues, & hemorrhage in the muscle adjacent to the trachea.

EXTERNAL EXAM

Thorax & Abdomen

- Trauma
 - Usually do **NOT** appreciate bruising of external skin surface in vet species
- Penetrating wounds
 - Bites, stab wounds, arrows wounds, etc.



Congestion of caudal ventral abdominal vasculature:
A peri-mortem change due to hanging.

EXTERNAL EXAM

Digits/ Nails / Hooves

- Neglect → Long / misshapen
 - Significant if painful or interfere with ambulation
- Laminitis? Sagittal section- band saw **or** Xrays
- Cats scratch (aggressive or defensive) → abrade, tear, or split nails
- May trap fur /fiber/ DNA of opponent
- Common site of frost bite



Cow- Overgrown hooves& inter-digital dermatitis.
The foot has been washed.
(Photos prior to washing should have also been obtained.)



Black & white fur in the nail of an orange cat. The neighbor claimed the cat was attacked by his Jack Russell Terrier. The owner of the cat was concerned it was beaten or poisoned.

Necropsy, including the finding above, substantiated the neighbor's claim.

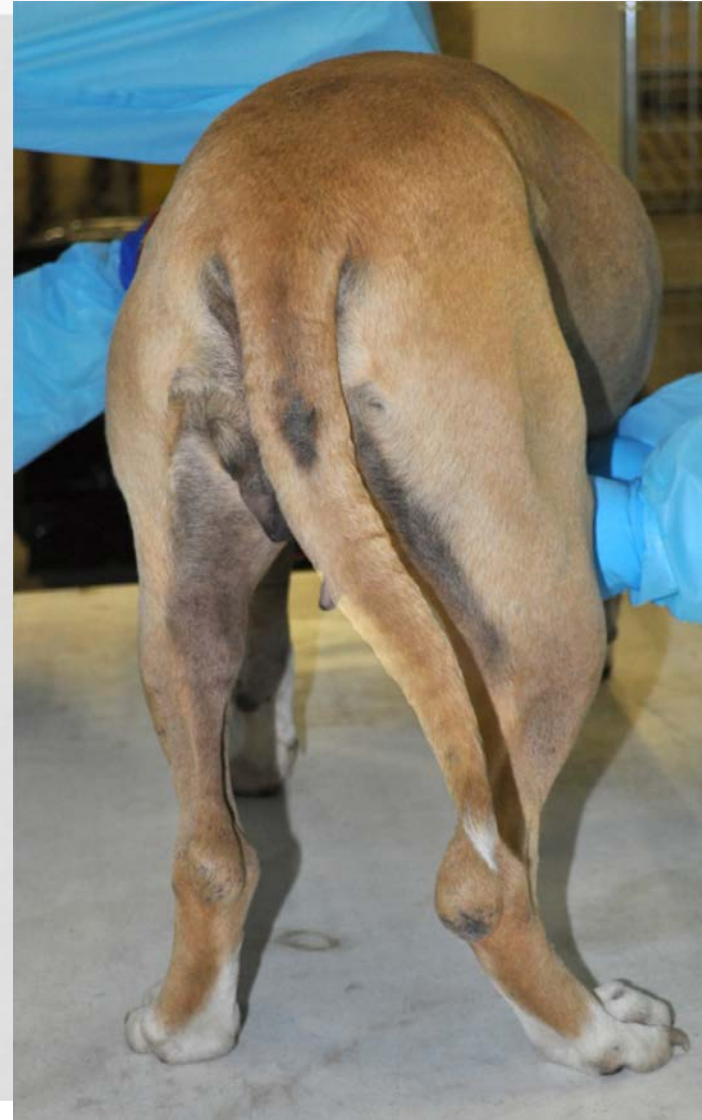
EXTERNAL EXAM

Tail, anus, & perineum

- Trauma & sexual abuse may result in:
 - Perineal & perianal SQ hemorrhage
 - Tail traction → dislocation & fractures

External genitalia

- Extrude the penis



EXTERNAL EXAM

Skeletal system

- Palpate & manipulate the entire body:
Crepitus (fractures) or **Instability** (luxations)
- **ESPECIALLY**
if you don't
have survey
Xrays



INTERNAL EXAM: REFLECT THE SKIN

Reflect the skin & examine the SQ

- **#1 DIFFERENCE** in technique between diagnostic & forensic Nx
 - Best performed after external exam & prior to internal exam
- If there is no evidence trauma upon reflection of the skin, skinning down to the hocks & elbows is sufficient (JG opinion)



PRE-NECROPSY RADIOGRAPHS

- Obtain orthogonal (2V) surveys of the **head, thorax & abdomen. Because radiographs...**
 - **#1 best way to detect fractures**
 - **Essential in Nx of projectile wounds**
 - for documentation
 - to help locate (→ retrieve) the projectile
 - **Make excellent evidence** in court
 - Xrays of bullets & broken bones are easily understood by laymen
 - Very difficult to capture the nature of a Fx at Nx due to presence of surrounding soft tissue to see it

SUMMARY

- **Scene info is essential** to correctly interpreting lesions in forensic cases
- The **goal** of a forensic Nx is to
 1. Answer the **court's questions** (~**client's** questions)
 2. Collect evidence
 3. Document the Nx
- External exam is critical to a successful forensic Nx
- Get pre-Nx rads whenever possible
- Reflect the skin & examine the SQ aspect
- Decomposed bodies can be informative & meaningful
- You do not determine if a crime was committed, the court does

REFERENCES & RESOURCES

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