

Heartworm: Why we should we care.

Andy Moorhead DVM, MS, Ph.D., Dip. ACVM



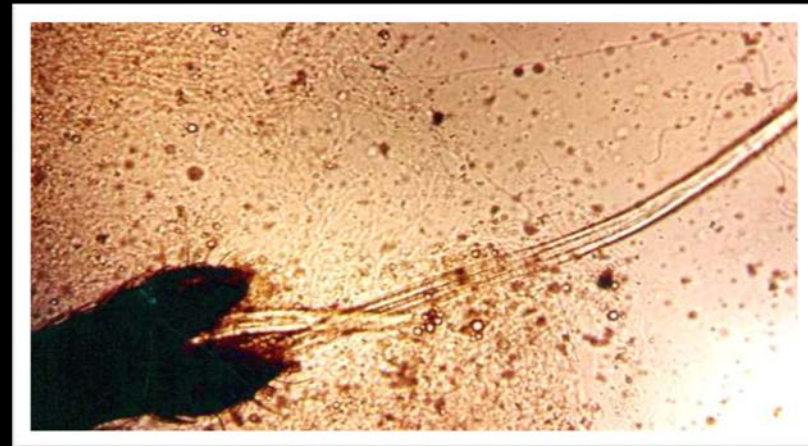
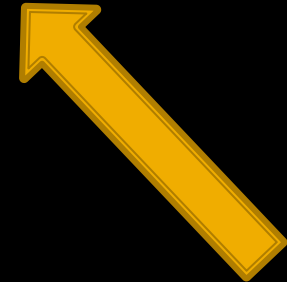
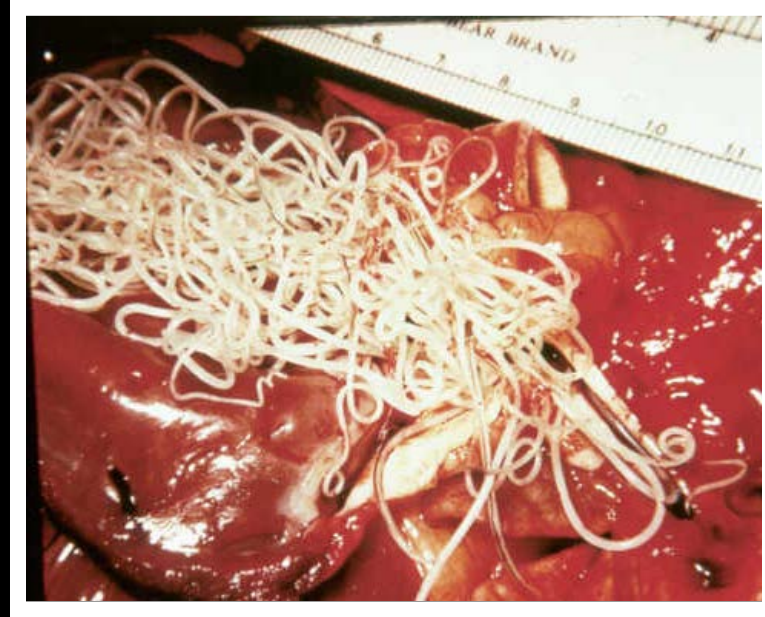
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All Ages Susceptible to Infection

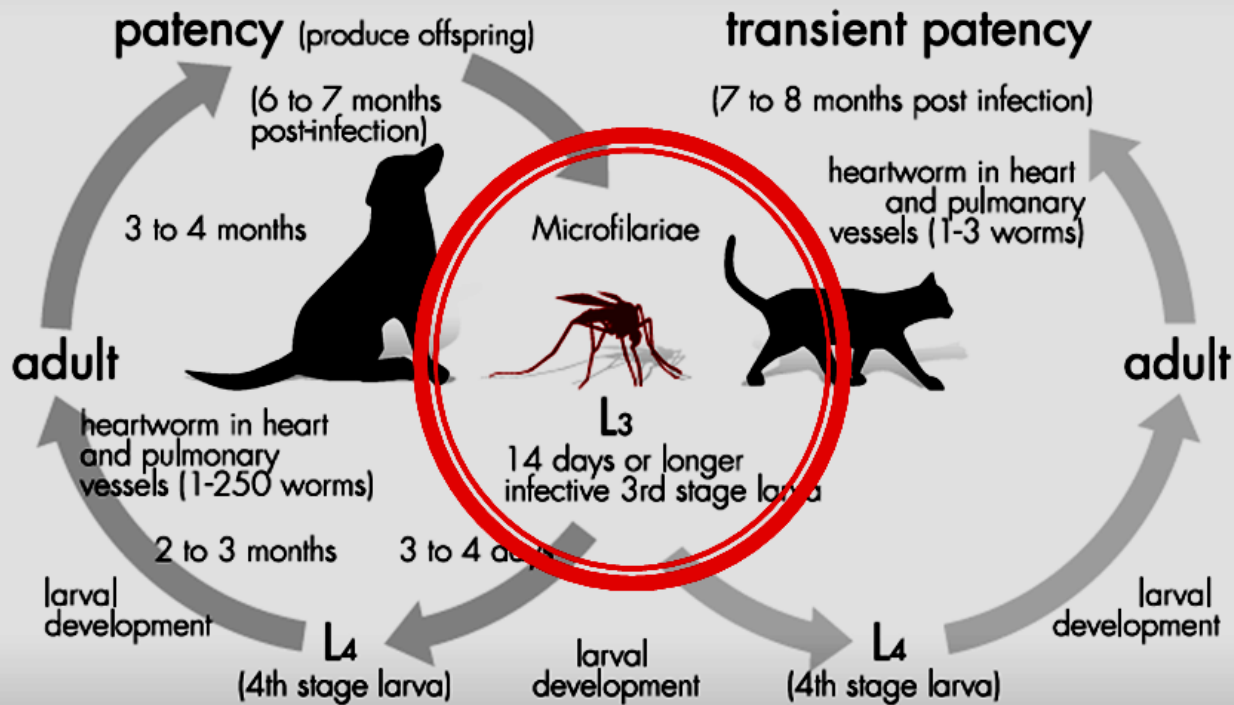


Dirofilaria immitis: Important Stages



Dirofilaria immitis Life Cycle

HEARTWORM LIFE CYCLE



BEGIN CYCLE

INFECTED DOG

MICROFILARIA →





L3 DOG

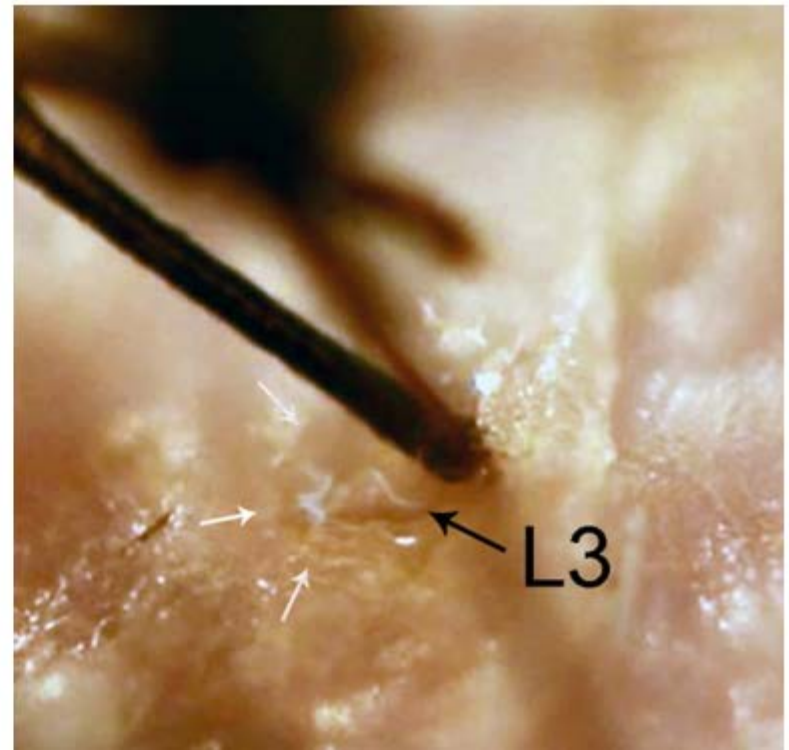
PENETRATES SKIN PUNCTURE



HEMOLYMPH
POOL

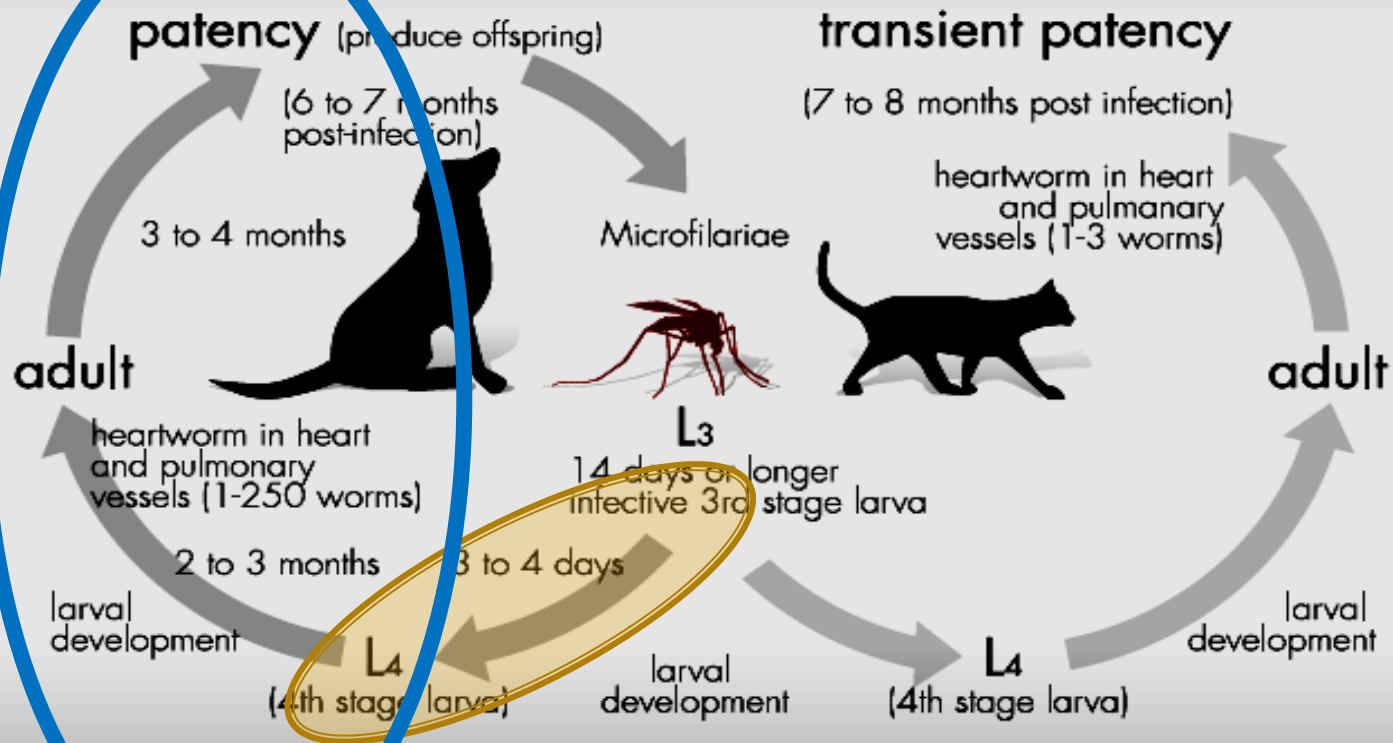
**MOLTS AFTER
10 DAYS**



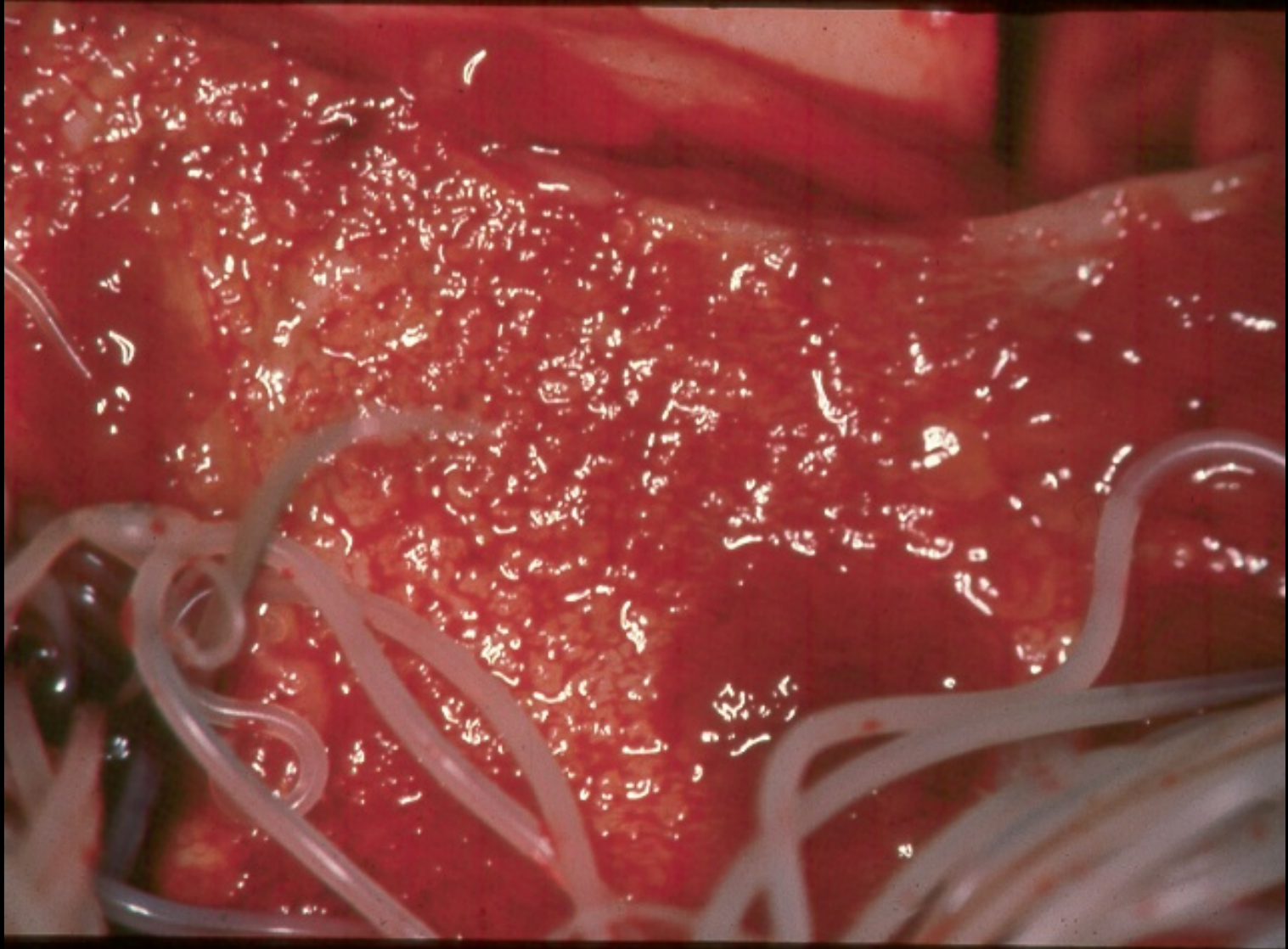


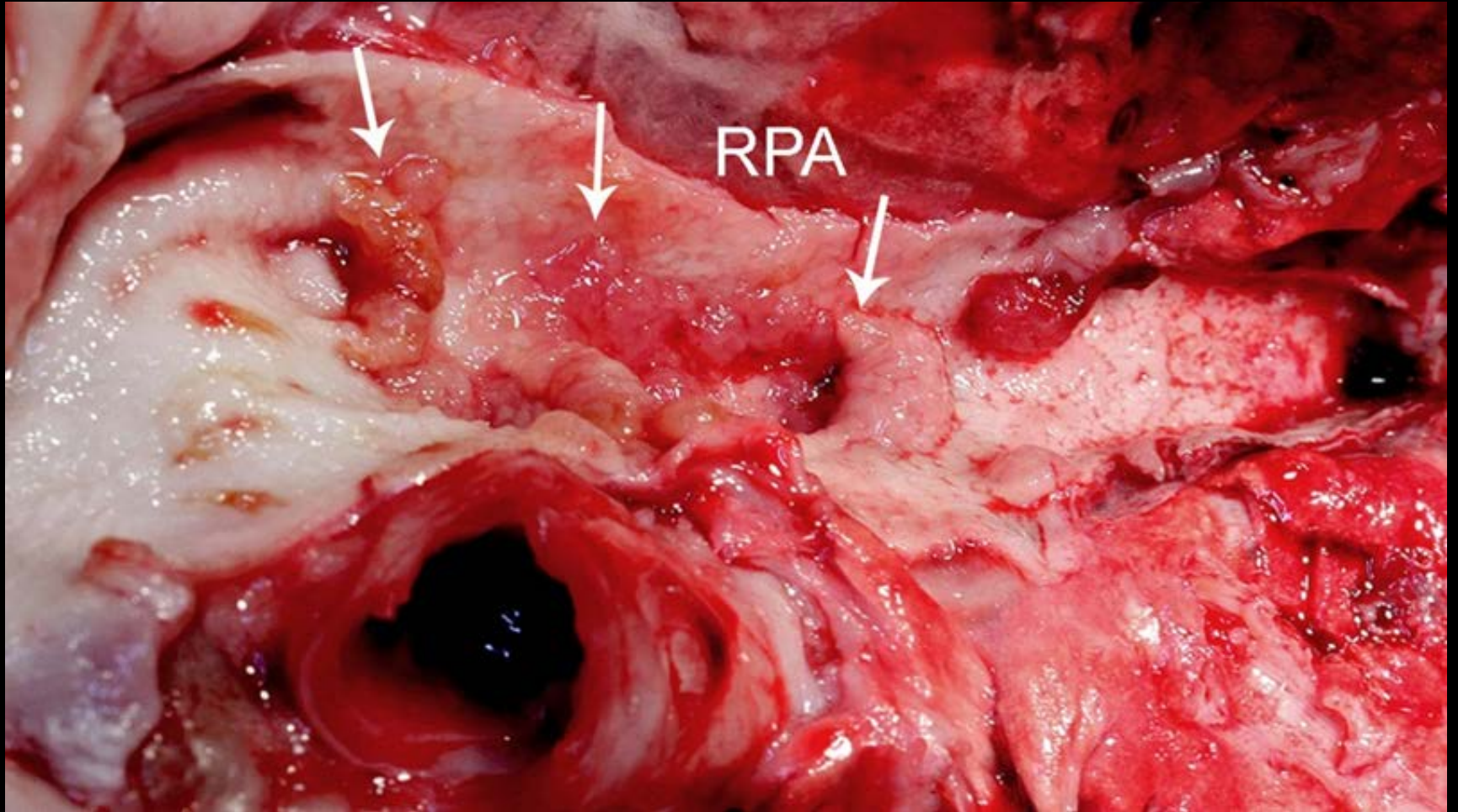
Courtesy of Dr. Steve Jones

HEARTWORM LIFE CYCLE

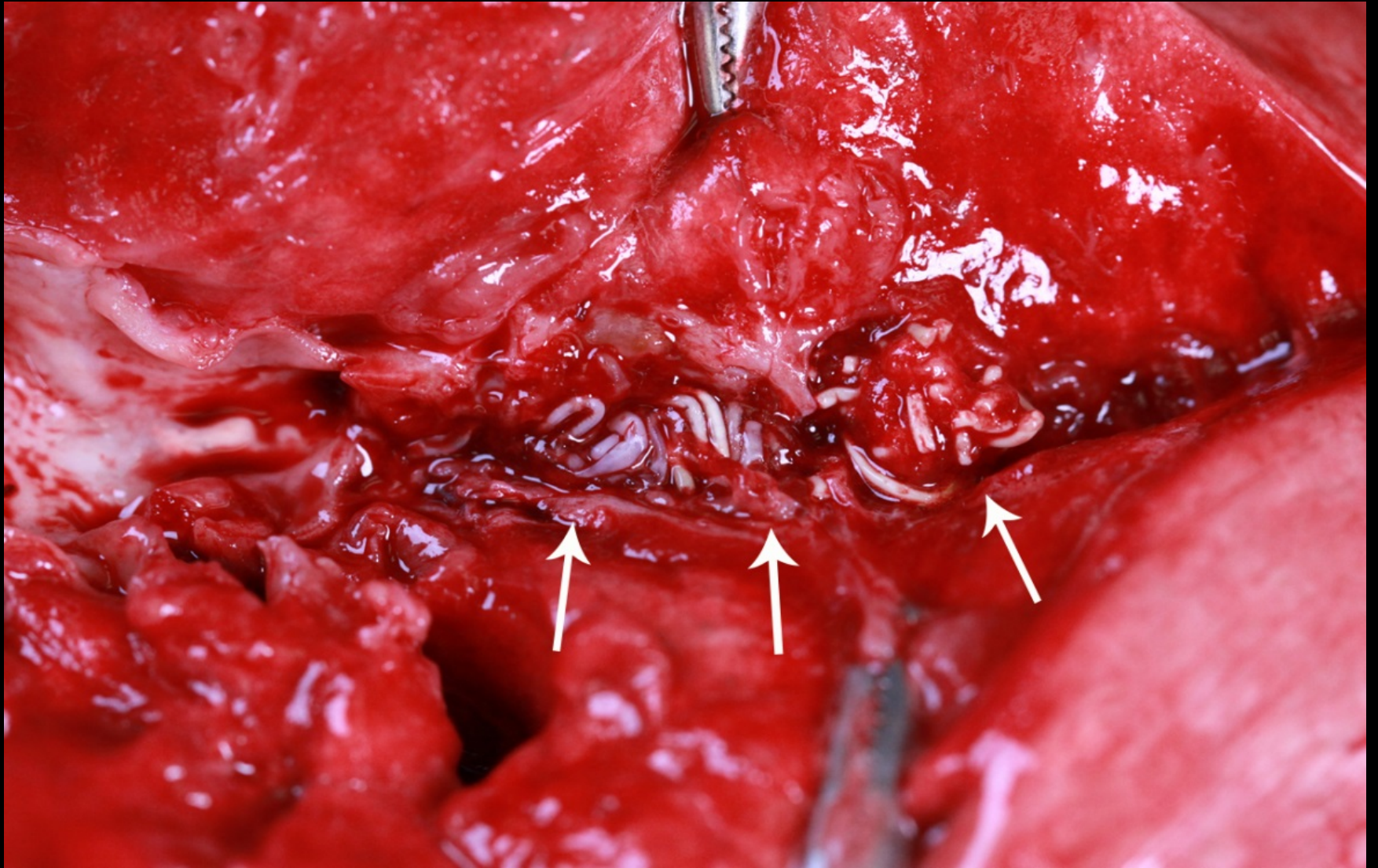


Pathology





Courtesy of Dr. Steve Jones



Courtesy of Dr. Steve Jones

Chronic HWD-Signs

- May be asymptomatic
- Symptomatic
 - **mild to moderate**
 - chronic cough
 - dyspnea
 - decreased exercise tolerance
 - **moderate to severe**
 - syncope
 - hemoptysis
 - **severe**
 - congestive heart failure

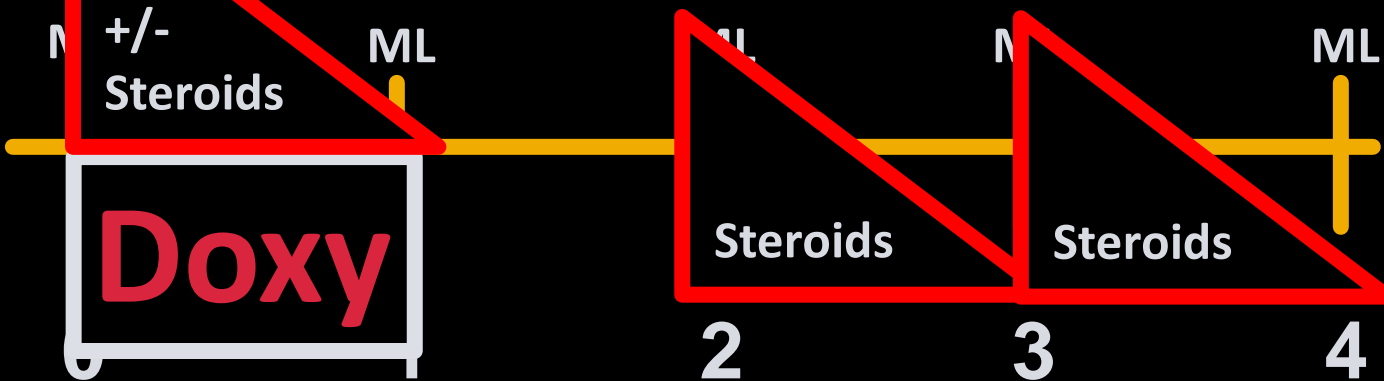


Heartworm Treatment Summary

Ag +
m test

Melarsomine

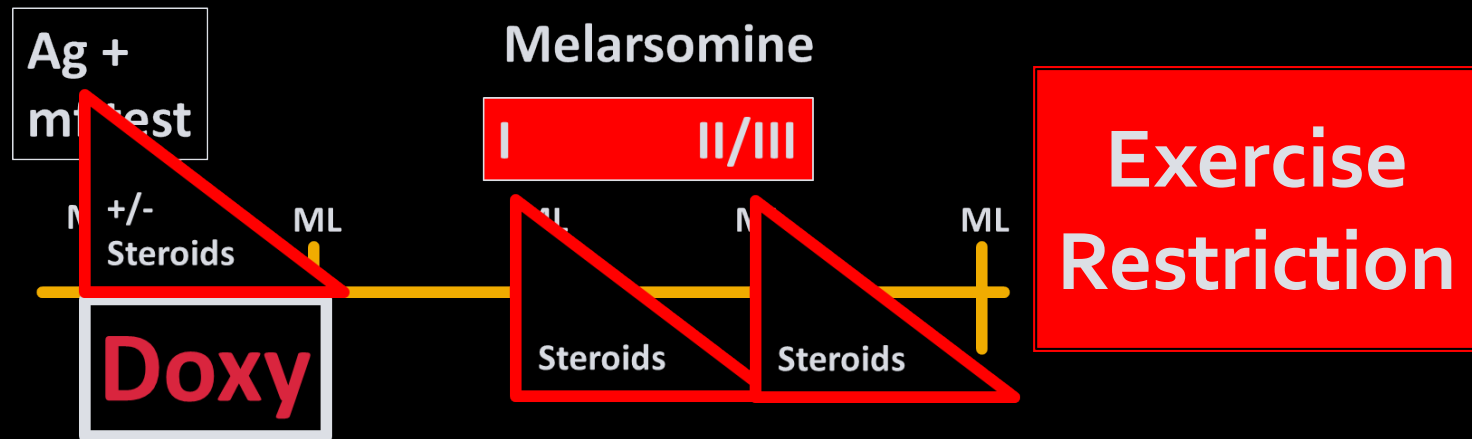
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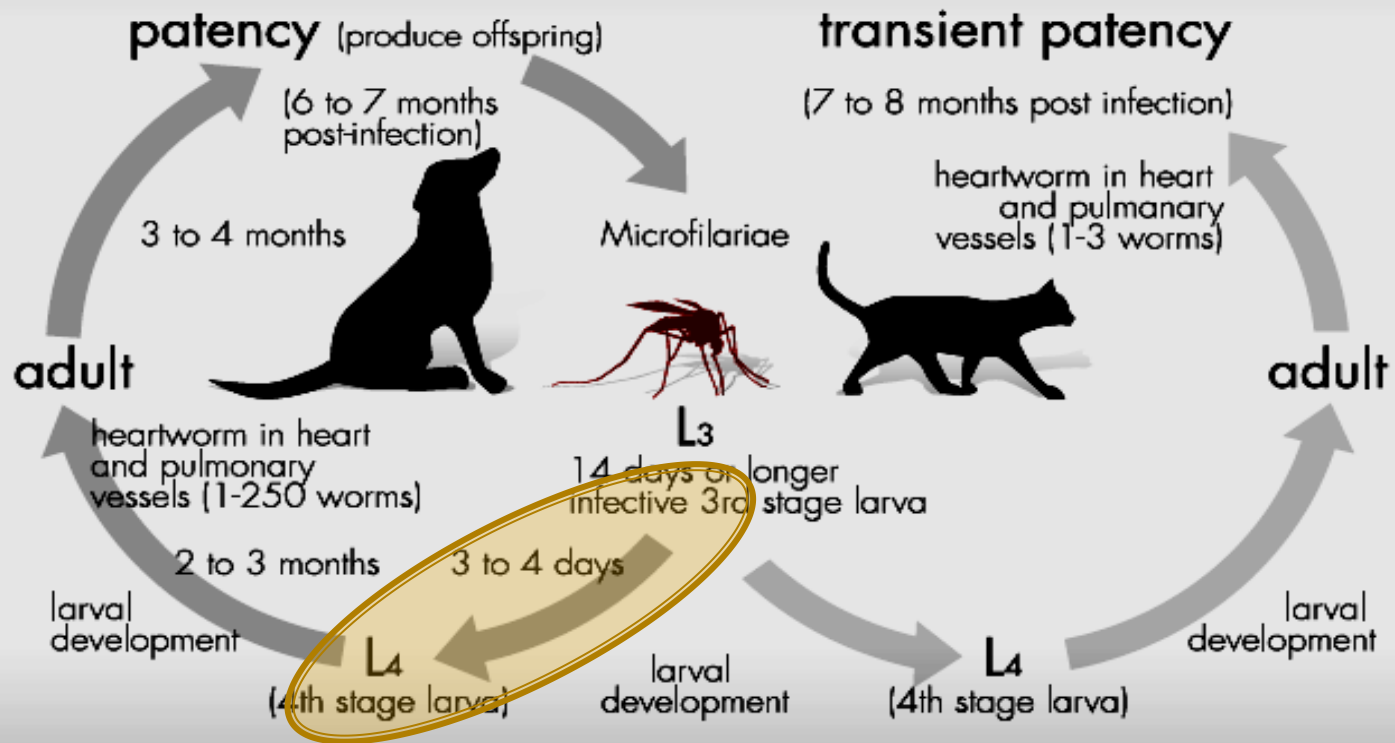
MONTHS

EXERCISE RESTRICTION

- Diagnosis
 - Reduced activity
- Treatment - 6-8 weeks post-Tx
- Recovery



HEARTWORM LIFE CYCLE



Macrocyclic Lactones

MILBEMYCINS

*Streptomyces
cyaneogriseus*

*Streptomyces
hydroscopicus*

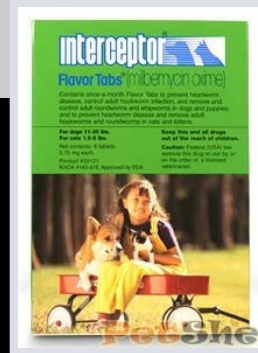


NEMADECTIN



MOXIDECTIN

MILBEMYCIN OXIME



AVERMECTINS

Genetic
mutation ←

*Streptomyces
avermitilis*



DORAMECTIN

ABAMECTIN



SELAMECTIN

EMAMECTIN

IVERMECTIN



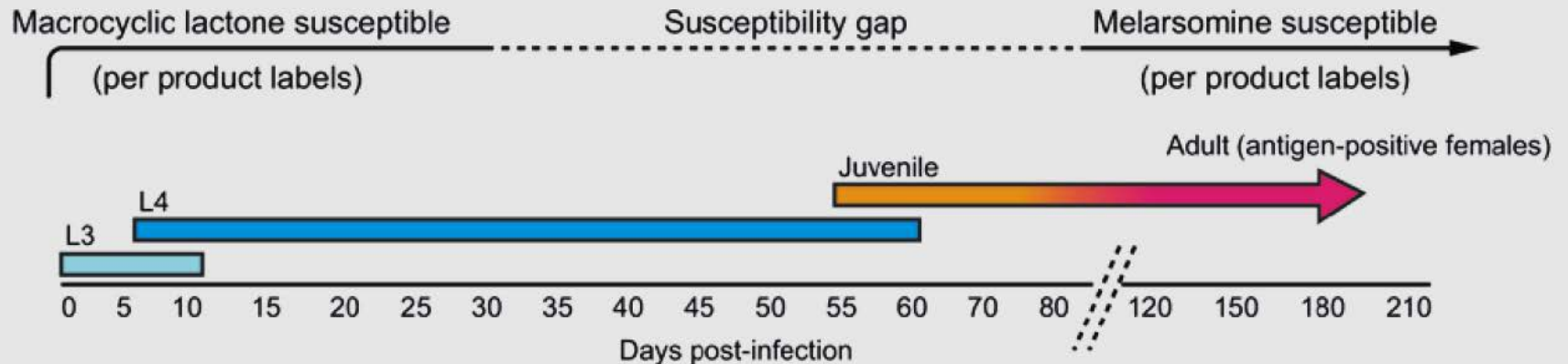
EPRINOMECTIN



Heartworm Prophylaxis

- Monthly ML treatments kill L₃ and L₄ stages

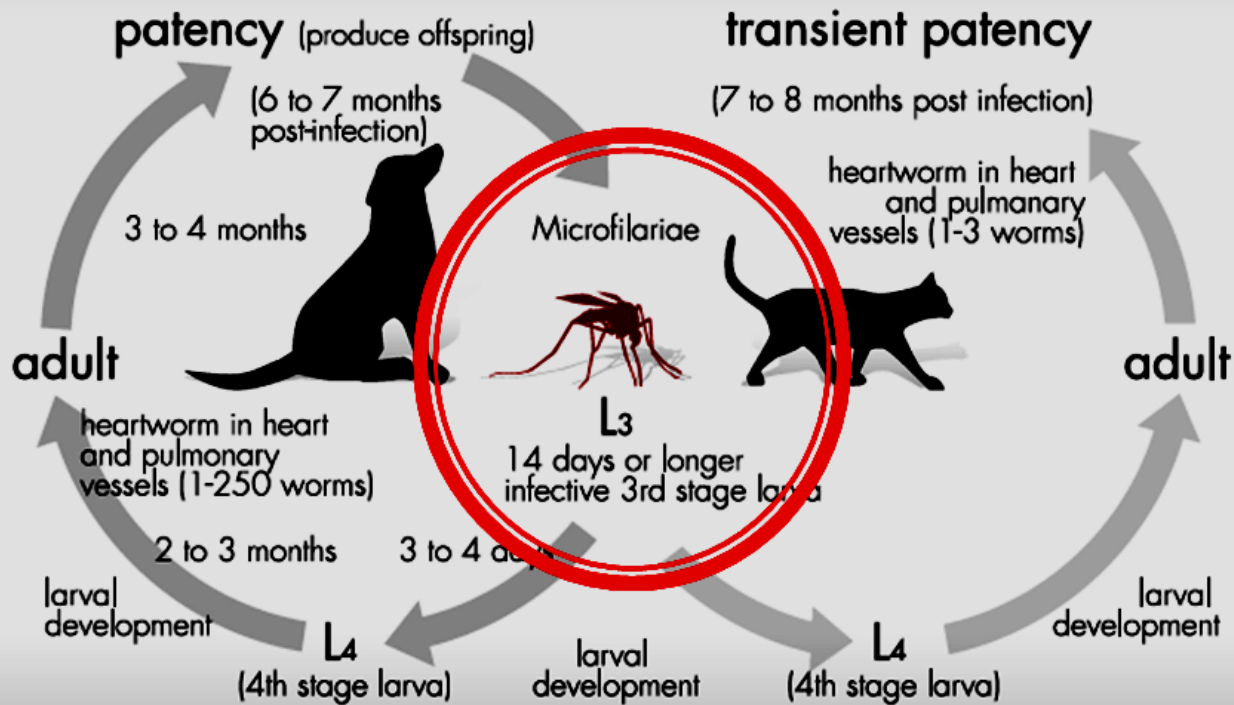
Timeline of *D. immitis* development, showing periods of susceptibility to macrocyclic lactones and melarsomine



The dotted line represents the “treatment gap”, when *D. immitis* are not considered to be susceptible to either treatment.

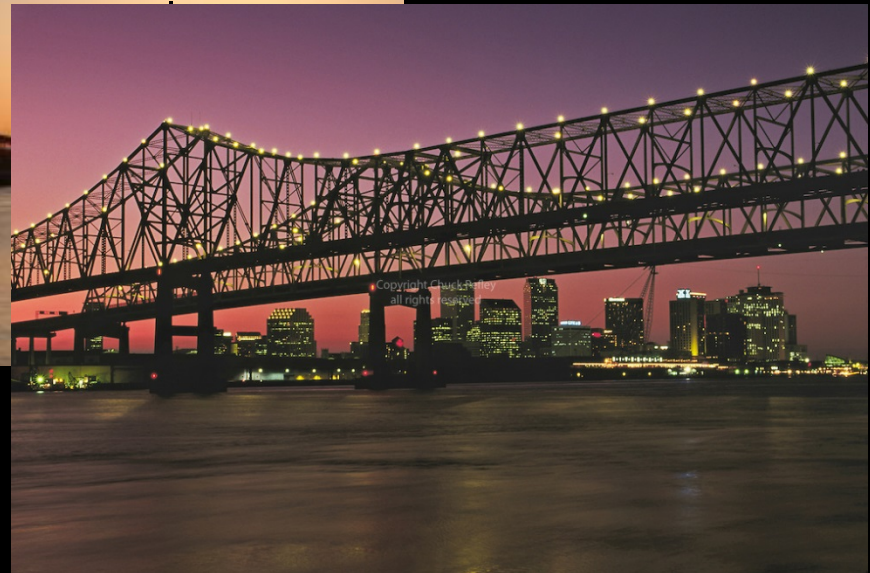
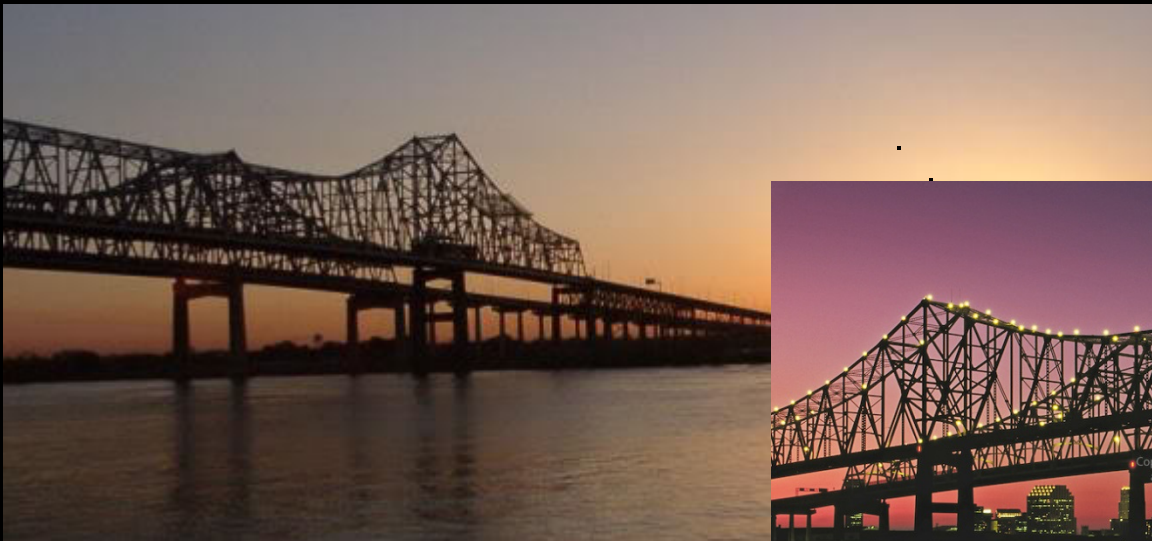
Dirofilaria immitis Life Cycle

HEARTWORM LIFE CYCLE



Mosquito Vectors

- > 70 species
- 10 - 12 species more important



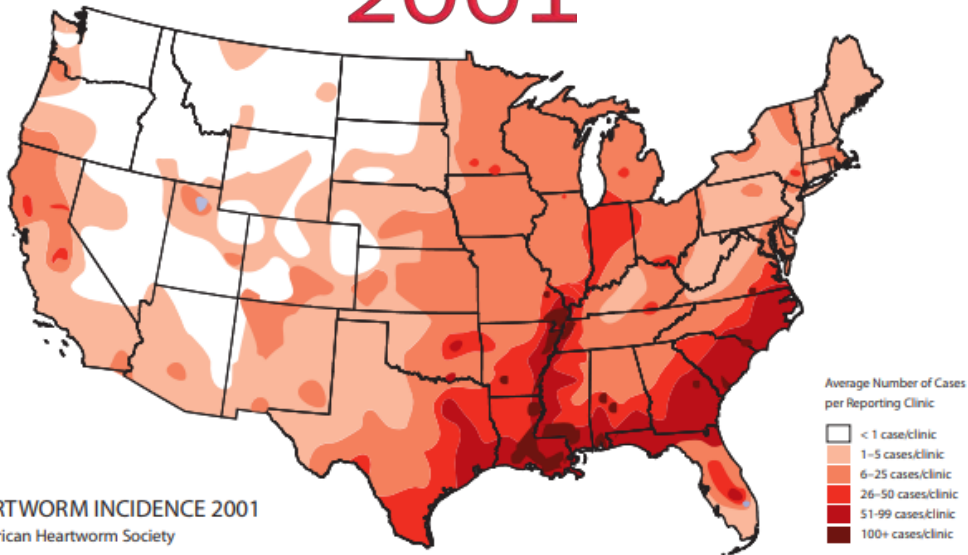
Mosquito Vectors

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2001

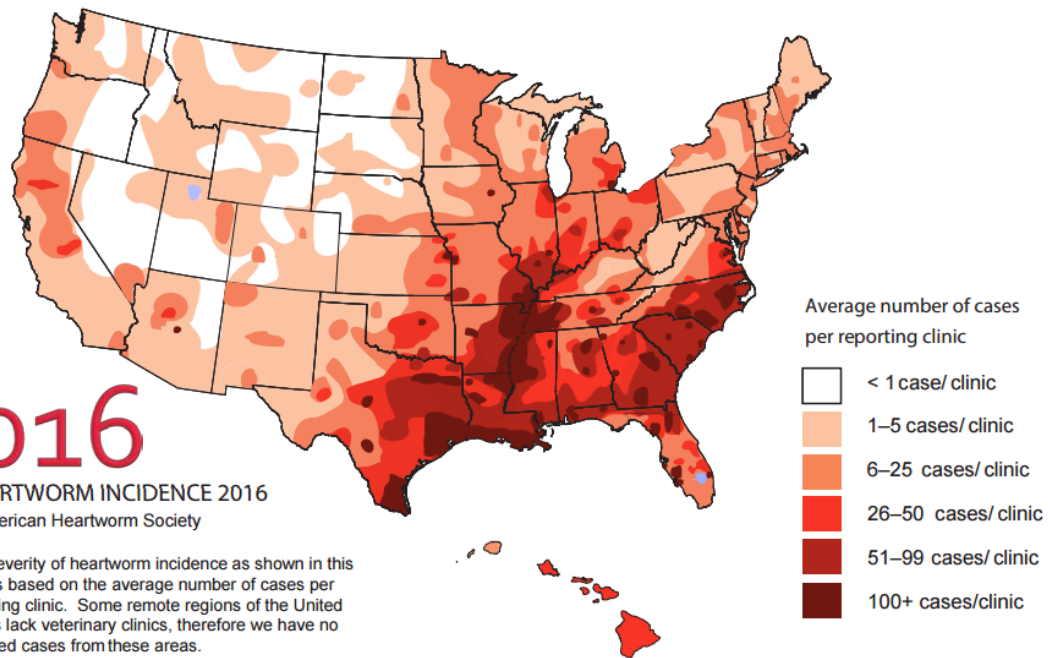


HEARTWORM INCIDENCE 2001

© American Heartworm Society

The severity of heartworm incidence as shown in this map is based on the average number of cases per reporting clinic. Some remote regions of the United States lack veterinary clinics, therefore we have no reported cases from these areas.

2016



HEARTWORM INCIDENCE 2016

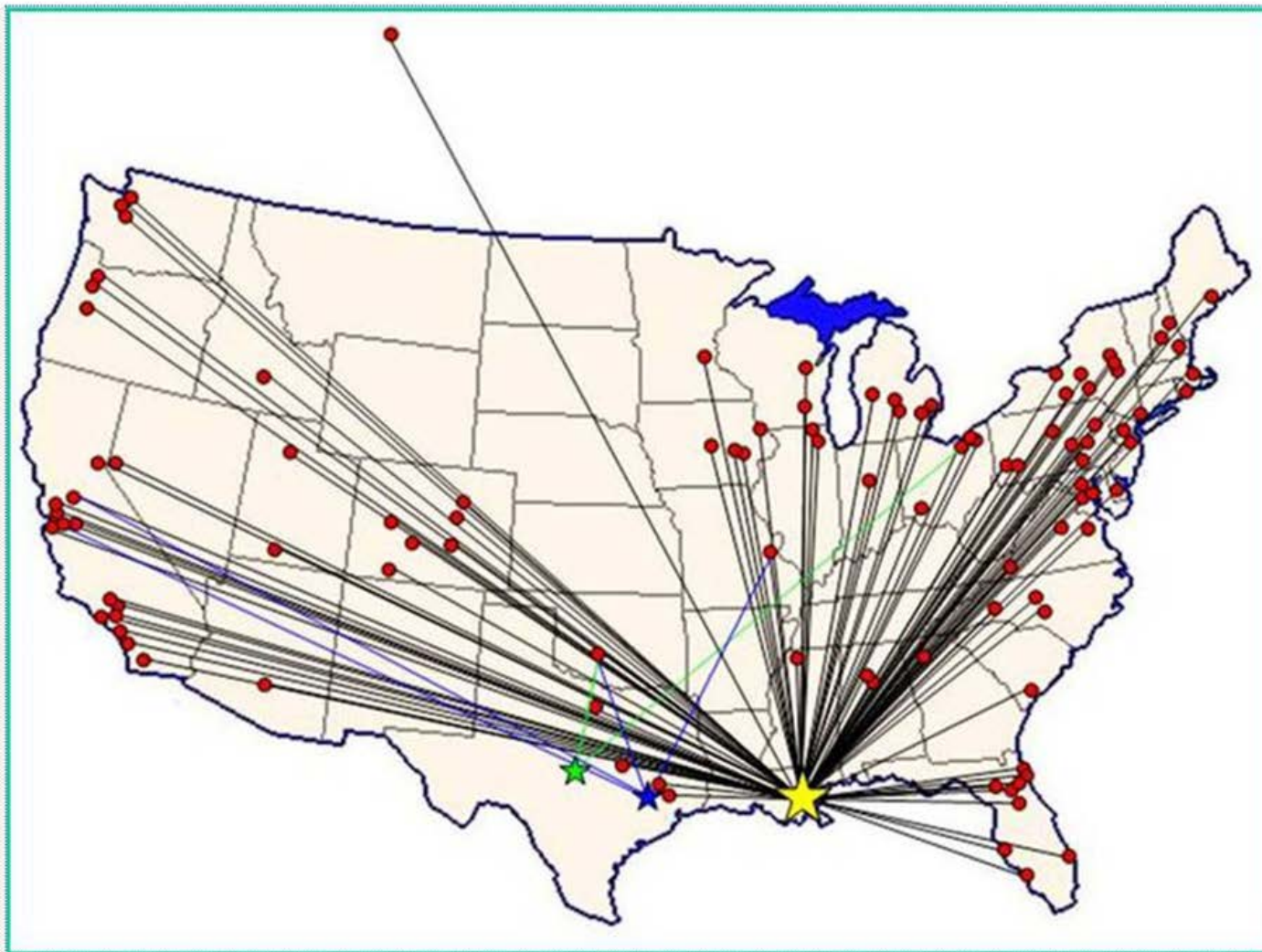
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American Heartworm Society's Photos - Wall Photos

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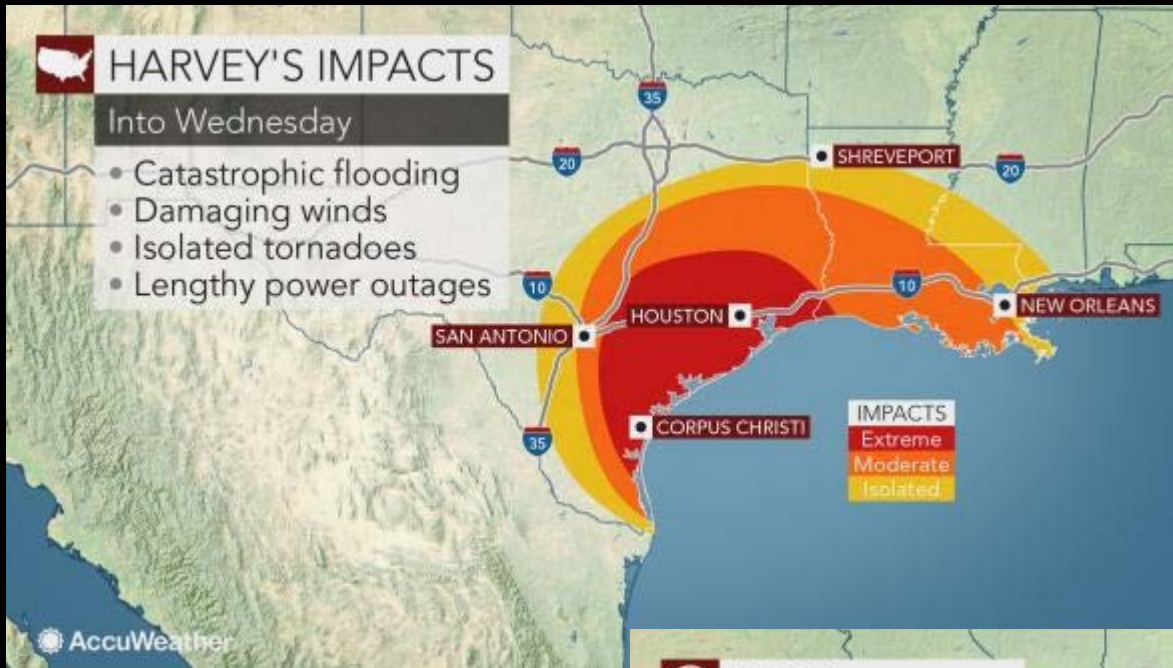




HARVEY'S IMPACTS

Into Wednesday

- Catastrophic flooding
- Damaging winds
- Isolated tornadoes
- Lengthy power outages



AccuWeather



IRMA

Sunday-Tuesday

- Flooding rainfall
- Coastal flooding
- Beach erosion
- Travel disruption
- Power outages



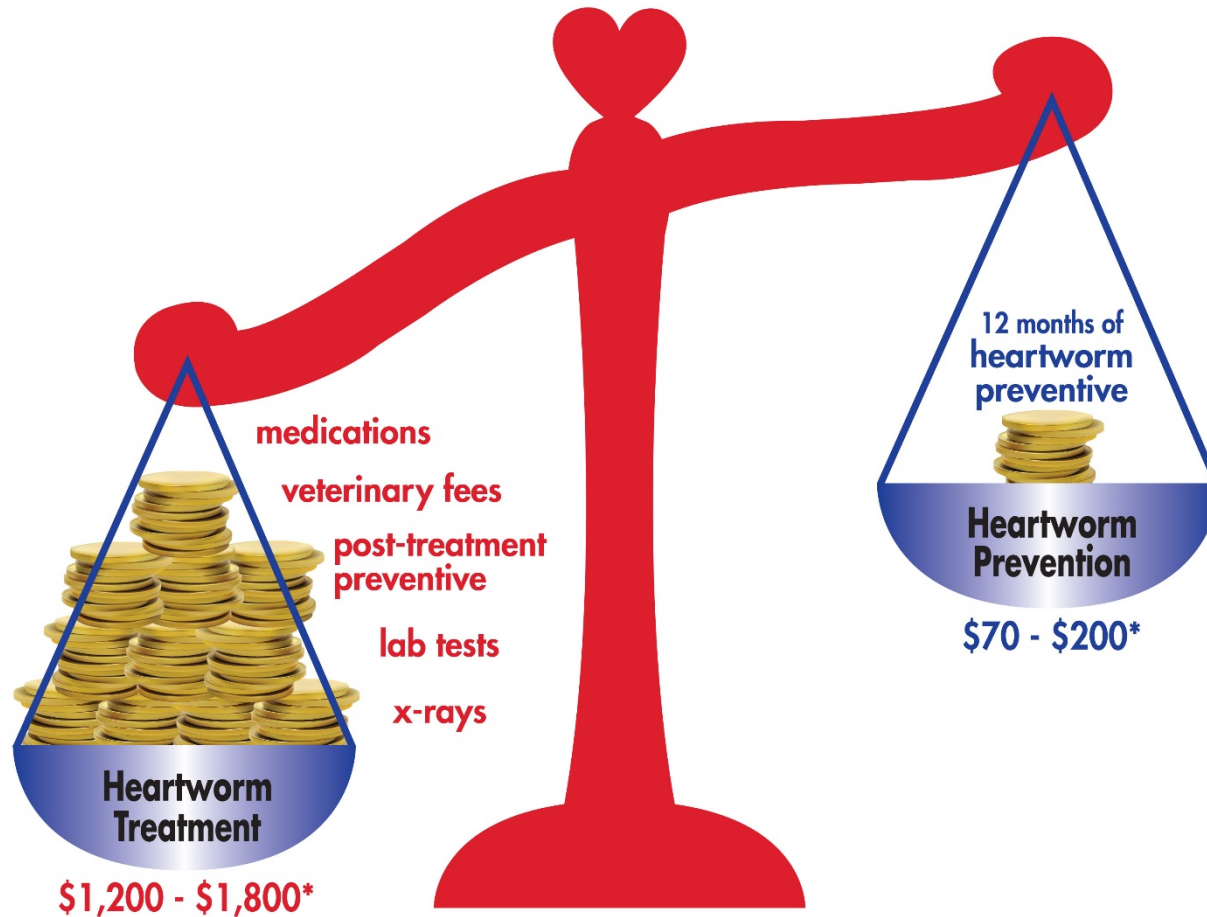
AccuWeather

Weigh the Costs

Heartworm Treatment vs Heartworm Prevention



AMERICAN
HEARTWORM
SOCIETY™
EST. 1974



*Average cost for a 40-lb dog

PROTECT YOUR PET FROM HEARTWORM **12** MONTHS A YEAR. TEST FOR HEARTWORM EVERY **12** MONTHS.

www.heartwormsociety.org

0 1 2 3 4 5 6 7 8 9 10 11 12
HEARTWORMS THAT LIVE IN A PET'S HEART, LUNGS OR BLOOD VESSELS CAN GROW MORE THAN 12 INCHES IN LENGTH >>>

PROTECT YOUR PET

Heartworm disease is prevalent in
ALL 50 STATES.



It is estimated that a **MILLION** dogs in the U.S. have heartworm disease today.



It only takes **1 bite** from an infected **MOSQUITO** to spread heartworm disease to a pet.

Pets should be **PROTECTED** from heartworm **12 MONTHS A YEAR.**

It takes approximately **6 months** after being bitten by an infected mosquito for a dog to test positive for heartworms.

DOGS SHOULD BE TESTED FOR HEARTWORM EVERY 12 MONTHS.

Heartworm **PREVENTION** is much less expensive than treatment. Treatment can **COST MORE THAN**

15x

that of a year's worth of heartworm preventive.

Once mature, heartworms can live up to **7 YEARS** in a dog.

There is only **ONE** approved treatment for heartworm in dogs.

There are **ZERO** approved treatments for heartworm in cats.



Visit heartwormsociety.org/think12 for more information.

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What can I take away from today?



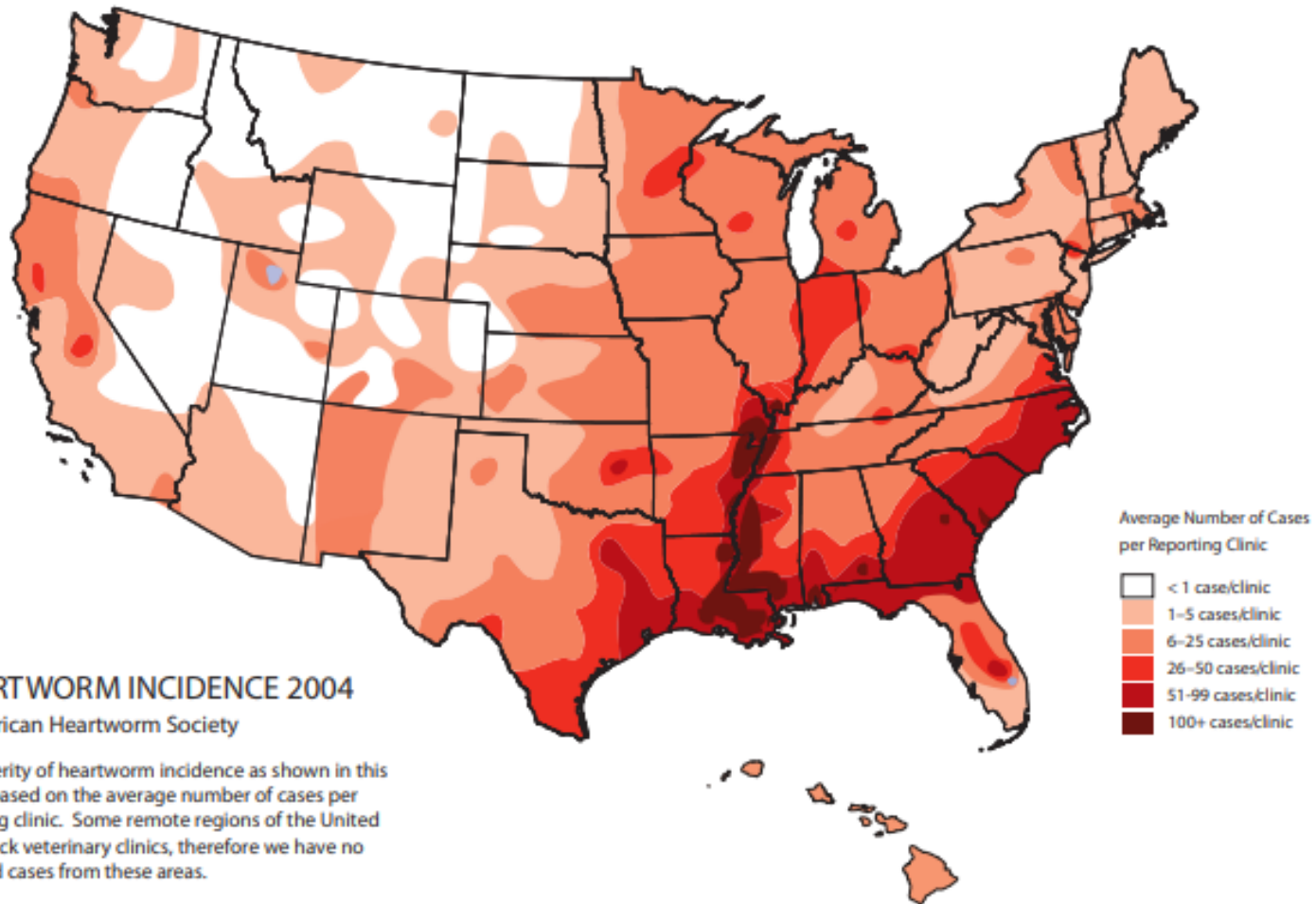


UNIVERSITY OF GEORGIA

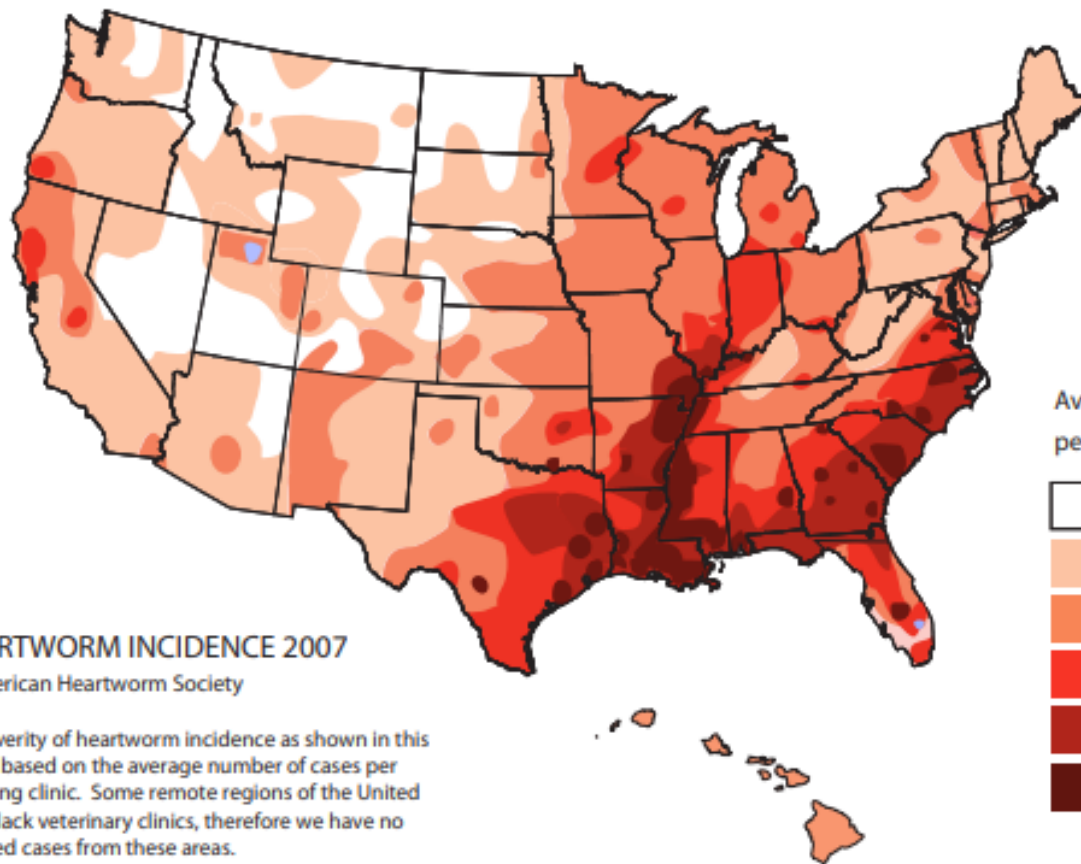
College of
Veterinary Medicine



2004



2007

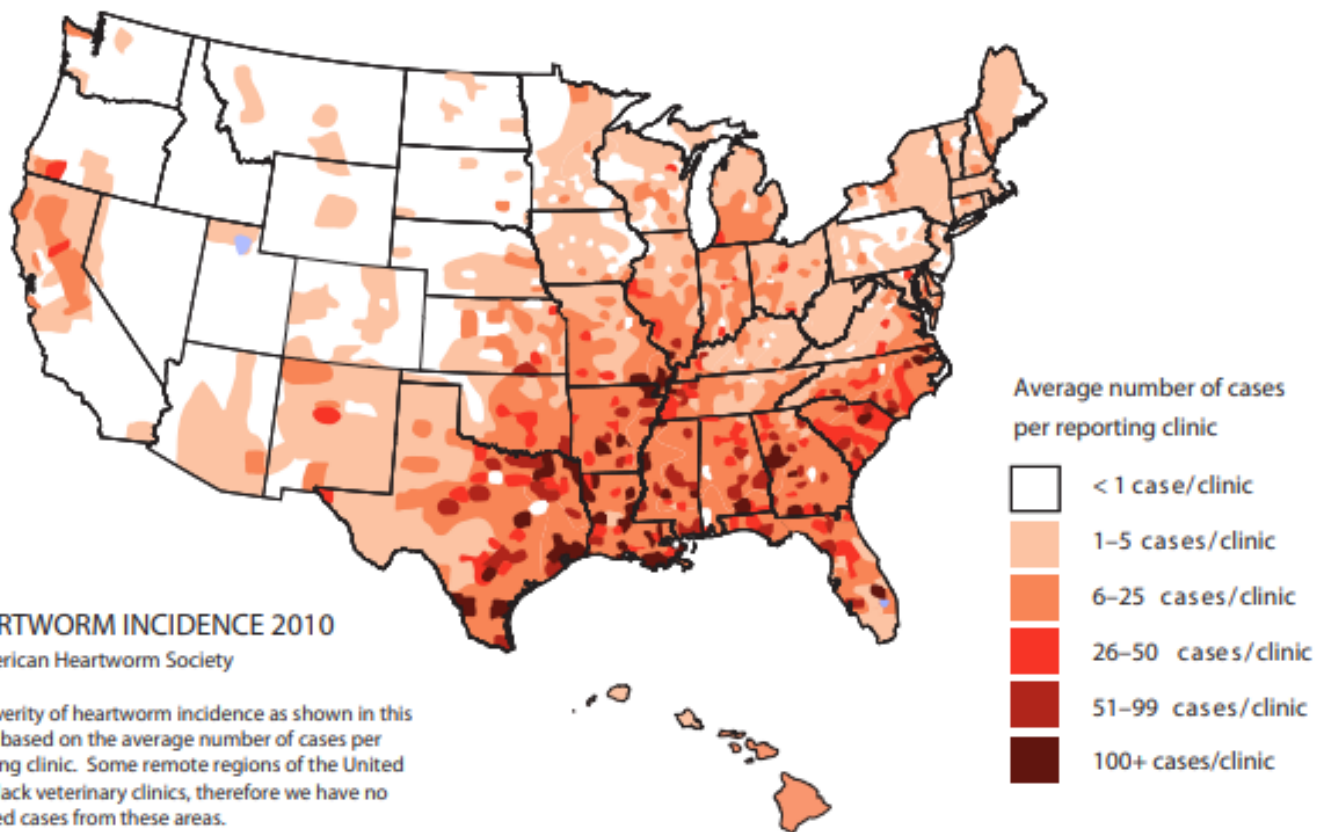


HEARTWORM INCIDENCE 2007

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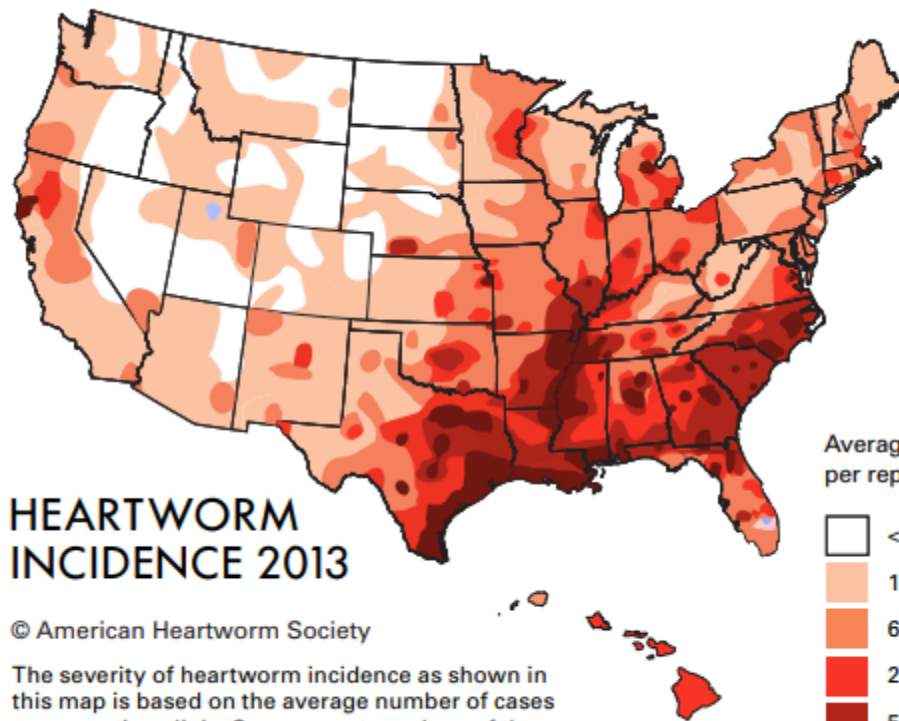
2010



HEARTWORM INCIDENCE 2010

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HEARTWORM INCIDENCE 2013

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The severity of heartworm incidence as shown in this map is based on the average number of cases per reporting clinic. Some remote regions of the United States lack veterinary clinics, therefore we have no reported cases from these areas.

Average number of cases
per reporting clinic

