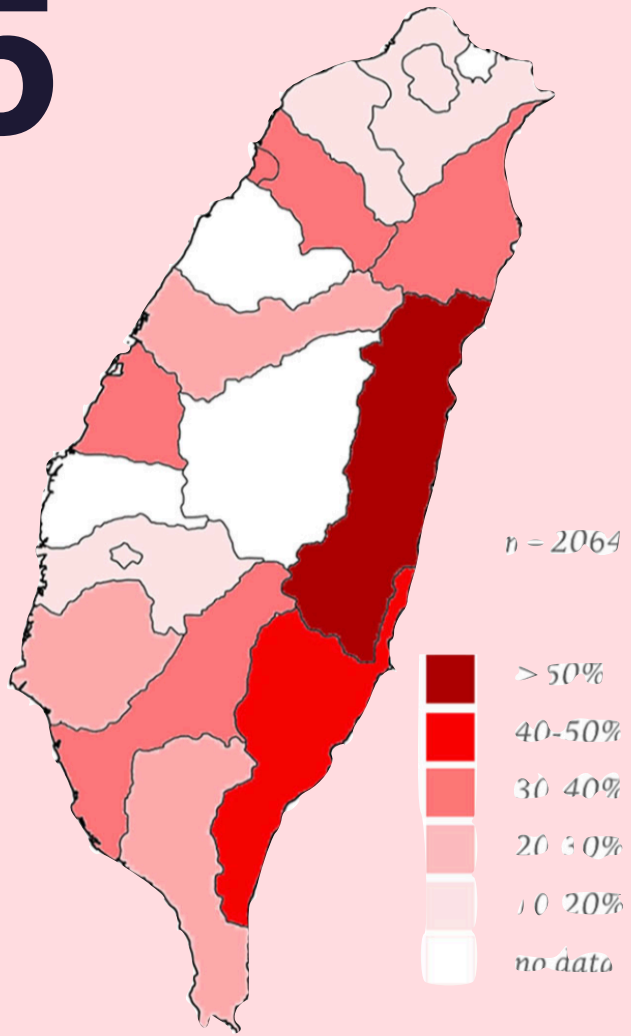
# 台灣最新
# 心絲蟲
## 臨床資訊更新
## Heartworm
## UPDATE

- 最新台灣盛行率
- AHS guideline 更新
- 治療到一半 沒藥了該怎麼辦？

# 2015



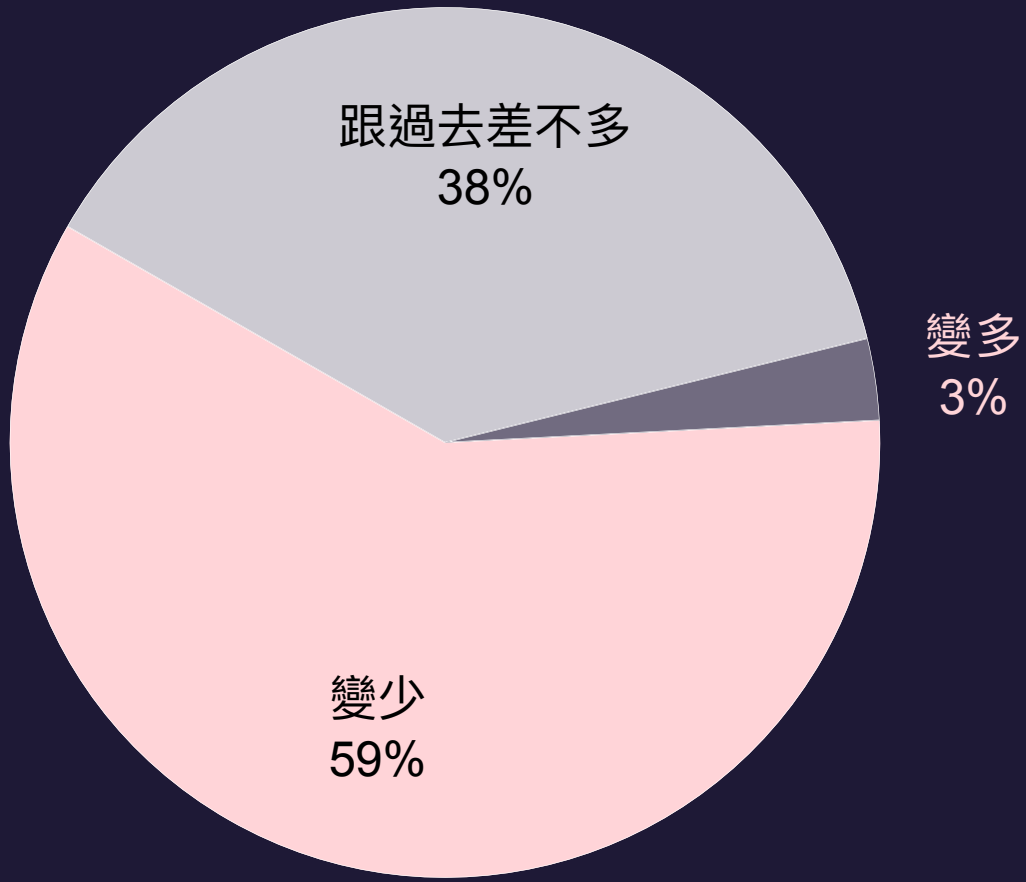

| 縣市 | 病例數 | 盛行率 |
|---|---|---|
| 花蓮縣 | 86 | 51% |
| 台東市 | 30 | 47% |
| 宜蘭縣 | 33 | 36% |
| 新竹縣 | 44 | 34% |
| 高雄市 | 316 | 33% |
| 彰化縣 | 44 | 32% |
| 台中市 | 280 | 25% |
| 台南市 | 237 | 25% |
| 屏東縣 | 35 | 20% |
| 桃園市 | 152 | 18% |
| 嘉義市 | 36 | 14% |
| 新北市 | 406 | 14% |
| 台北市 | 365 | 12% |
| **全台灣** | **2064** | **23%** |

每4.5隻沒有預防的狗狗
就有一隻會得到心絲蟲

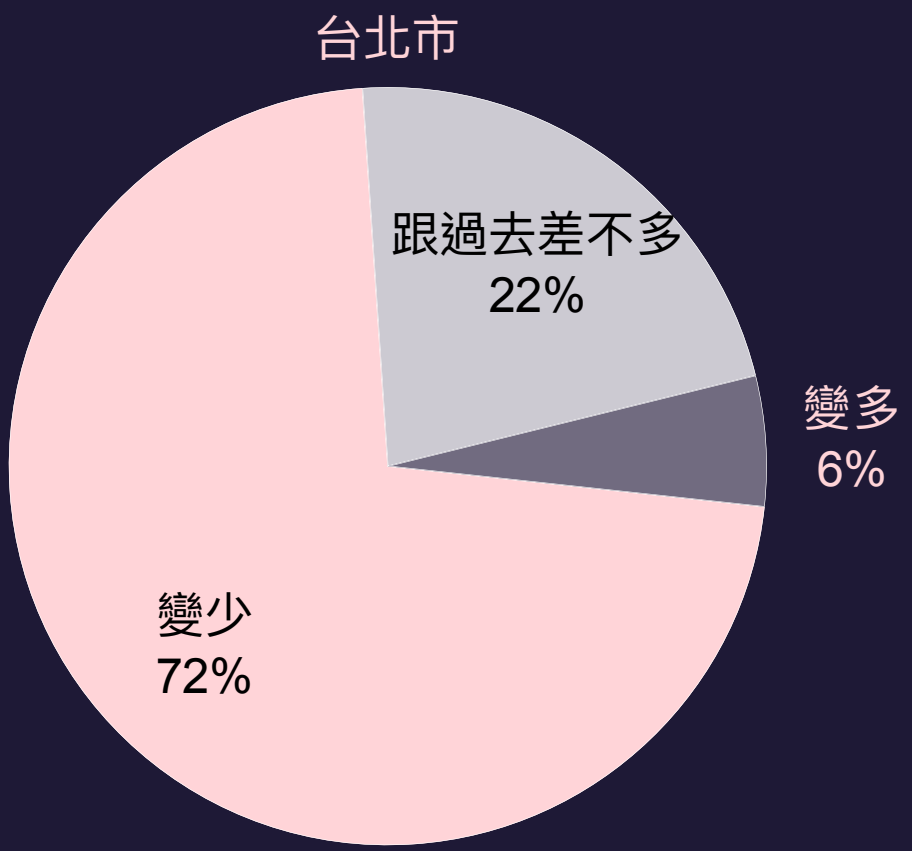
生活在室外沒有預防的狗狗
每兩隻就有一隻會得到心絲蟲

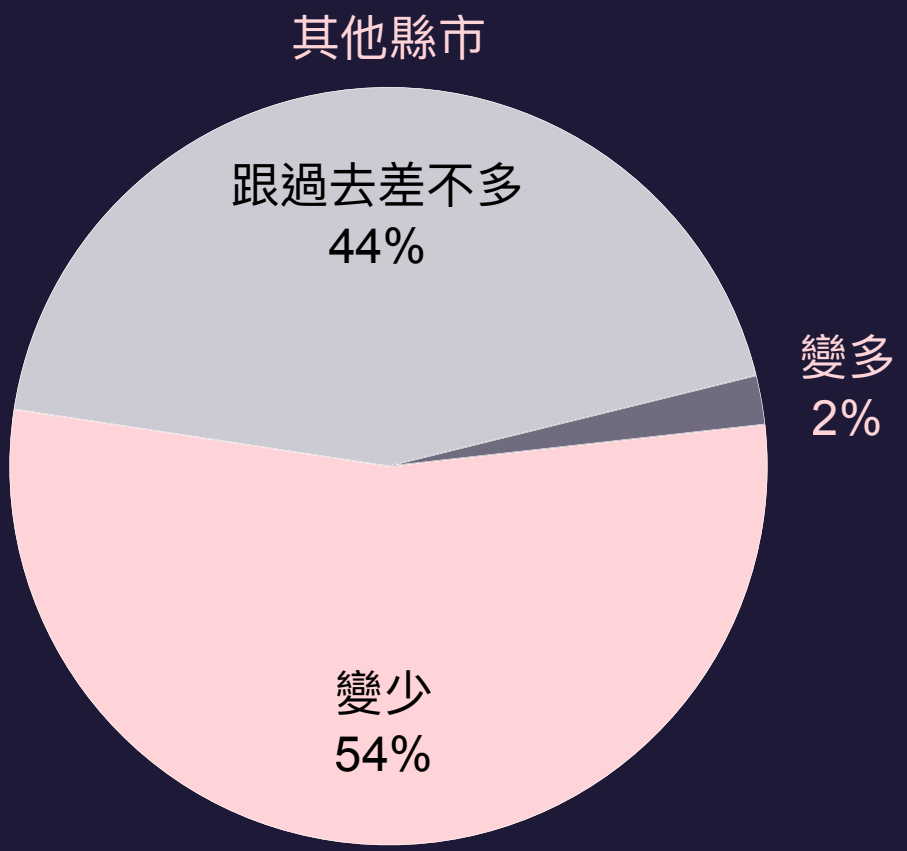

有這麼嚴重!?

# 過去一年，您主觀覺得心絲蟲的病例變化是？

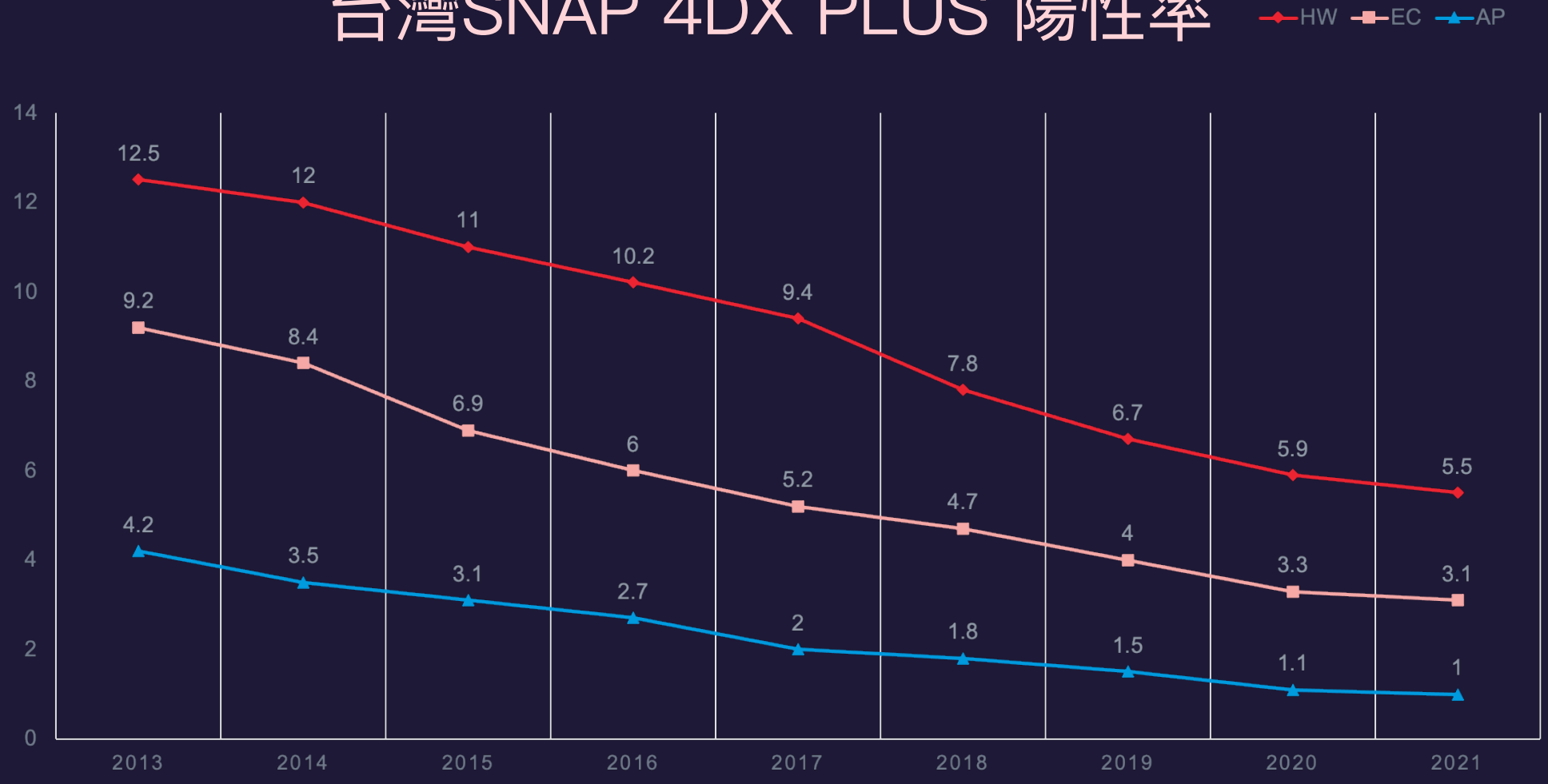


# 過去一年，您主觀覺得心絲蟲的病例變化是？



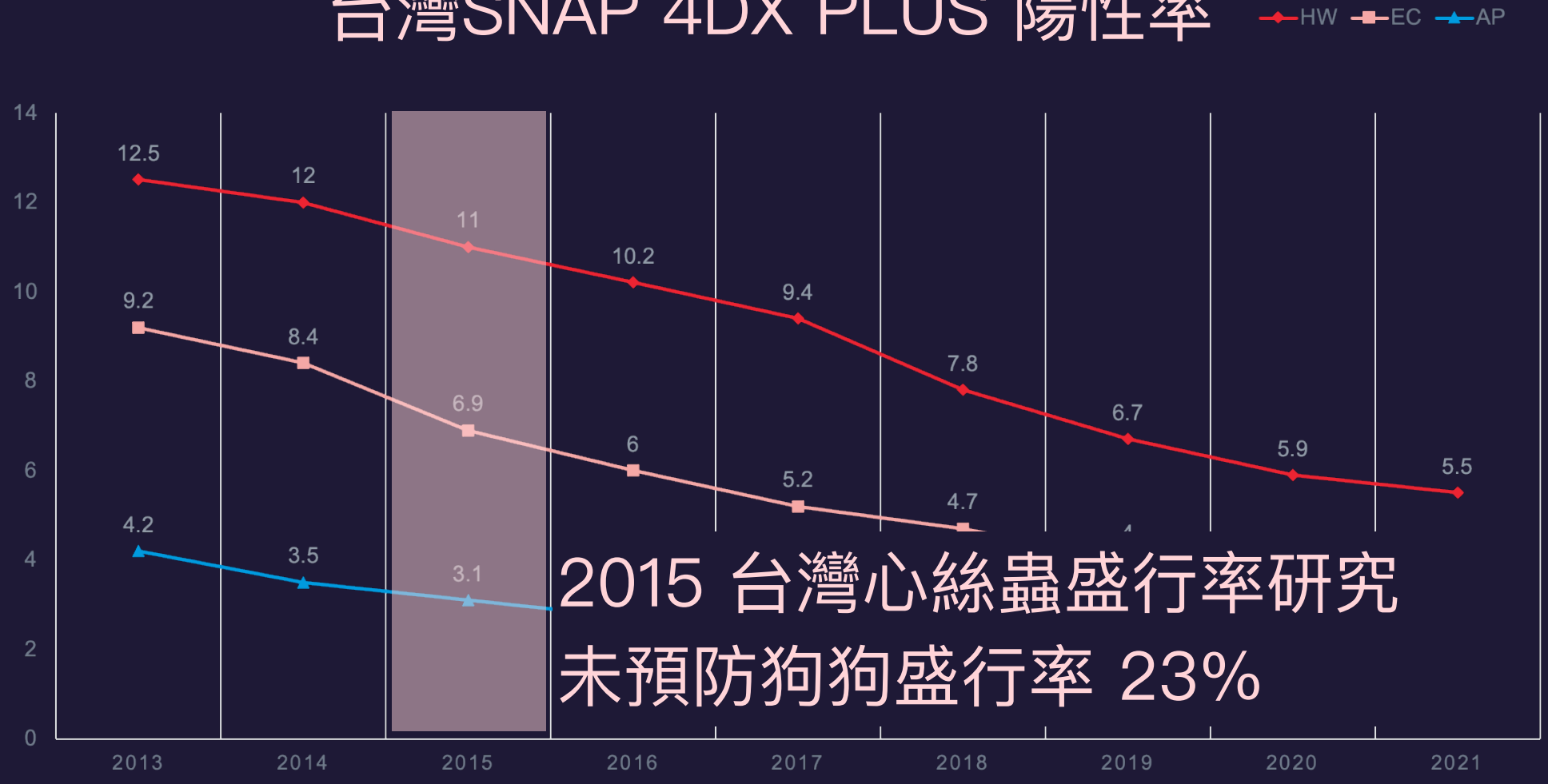
# 台灣SNAP 4DX PLUS 陽性率



GOOD JOB!!

陽性率等於 盛行率 嗎？

# 台灣SNAP 4DX PLUS 陽性率




## 2015 台灣心絲蟲盛行率研究

## 未預防狗狗盛行率 23%

# 2015

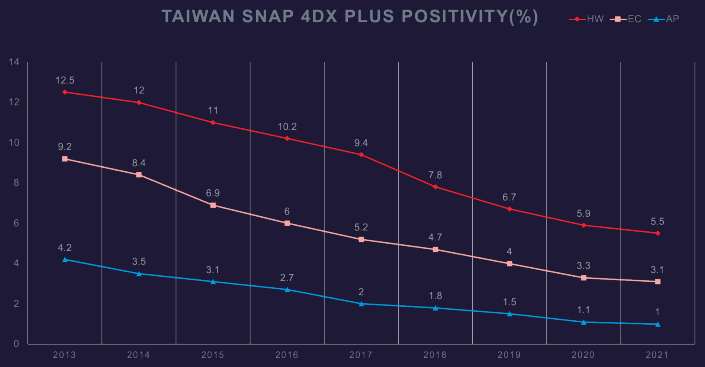
| 縣市 | 花蓮 | 台東 | 宜蘭 | 新竹 | 高雄 | 彰化 | 台南 | 台中 | 屏東 | 桃園 | 嘉義 | 新北 | 台北 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 未預防犬隻盛行率 | 51% | 47% | 36% | 34% | 33% | 32% | 25% | 25% | 20% | 18% | 14% | 14% | 12% |

# 2021



| 縣市 | 花蓮 | 苗栗 | 屏東 | 宜蘭 | 台東 | 雲林 | 桃園 | 南投 | 新竹 | 高雄 | 台南 | 彰化 | 台中 | 嘉義 | 新北 | 台北 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 抗原陽性率 | 15% | 15% | 14% | 11% | 10% | 8% | 8% | 8% | 7% | 6% | 6% | 5% | 5% | 5% | 3% | 3% |

陽性率下降就代表盛行率下降嗎？




圖表無法
告訴我們

- 病患背景
- 檢驗時機
- 檢驗量

# 陽性率下降就代表台灣難波萬嗎？

Asia-Pacific Serological Survey of **Canine Heartworm Disease** Based on In-clinic **SNAP® Heartworm RT** and **SNAP® 4Dx® Plus Test** Results, 2013-2017

Jennifer Braff[a], Li-Wen Chang[b], Ramaswamy Chandrashekar[a], and Jesse S. Buch[a]
[a]IDEXX Laboratories, Inc., Westbrook, Maine, USA; [b]IDEXX Laboratories, Inc., Taipei, Taiwan

## Introduction

Canine heartworm, caused by infection with mosquito-borne *Dirofilaria immitis*, poses a significant health risk for dogs throughout the world. Although chemoprophylactic medications can reduce the incidence of this serious disease, heartworm continues to be prevalent in many parts of the Asia-Pacific region.

The goal of this observational study was to evaluate Asia-Pacific regional geographic and temporal variation in canine heartworm antigen test results over a five-year period.

## Methods

Canine heartworm antigen test results spanning a period of five years (2013-2017) were obtained from an international database of SNAP® Heartworm RT and SNAP® 4Dx® Plus Test results from veterinary clinics. Repeat test results for a single patient and data from countries with less than one hundred available results were excluded. Data was included from at least 520 locations across twelve Asia-Pacific countries. Results are shown as proportion positive with 95% exact binomial confidence intervals.



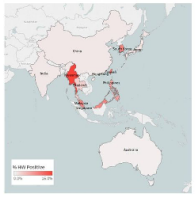
Results sourced from over 500 locations in twelve countries.

**SNAP® Heartworm Tests – validated accuracy**

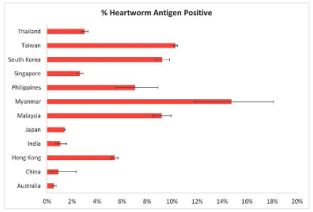
| Test | Sensitivity | Specificity |
|---|---|---|
| SNAP HW RT | 98.0% | 99.9% |
| SNAP 4Dx Plus | 99.0% | 99.3% |

## Results

In the Asia-Pacific region, **1** in **22** (4.5%) dogs tested positive for heartworm antigen (95% CI 4.4%-4.5%, n=479,738).

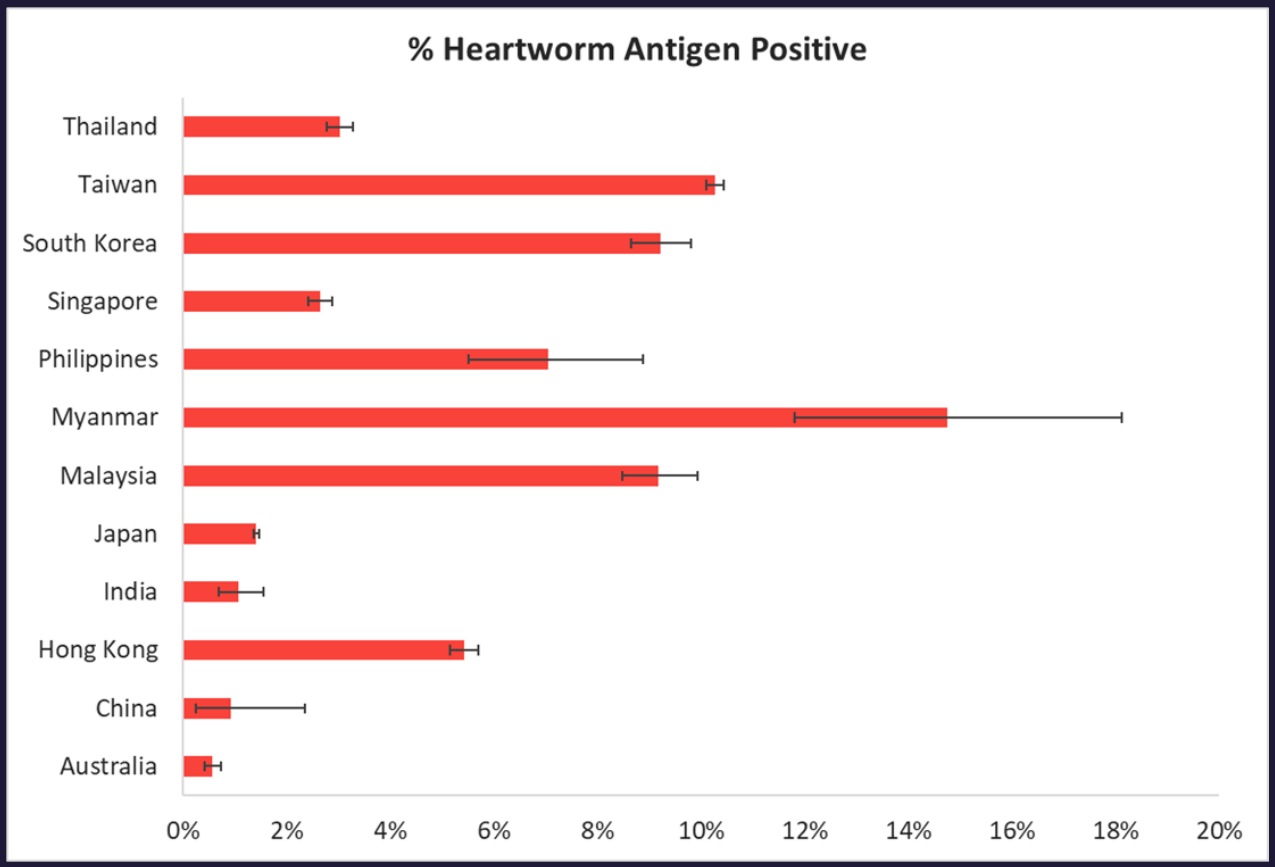


**Heartworm Results by Country**
2013-2017




## Conclusions

- Results from this study indicate that the proportion of positive heartworm antigen test results varies greatly by country, likely reflecting variation in both prevalence and testing practices.
- These findings underscore that dogs within the Asia-Pacific region are at risk for heartworm infection and the importance of regular screening and use of preventatives to mitigate this risk.

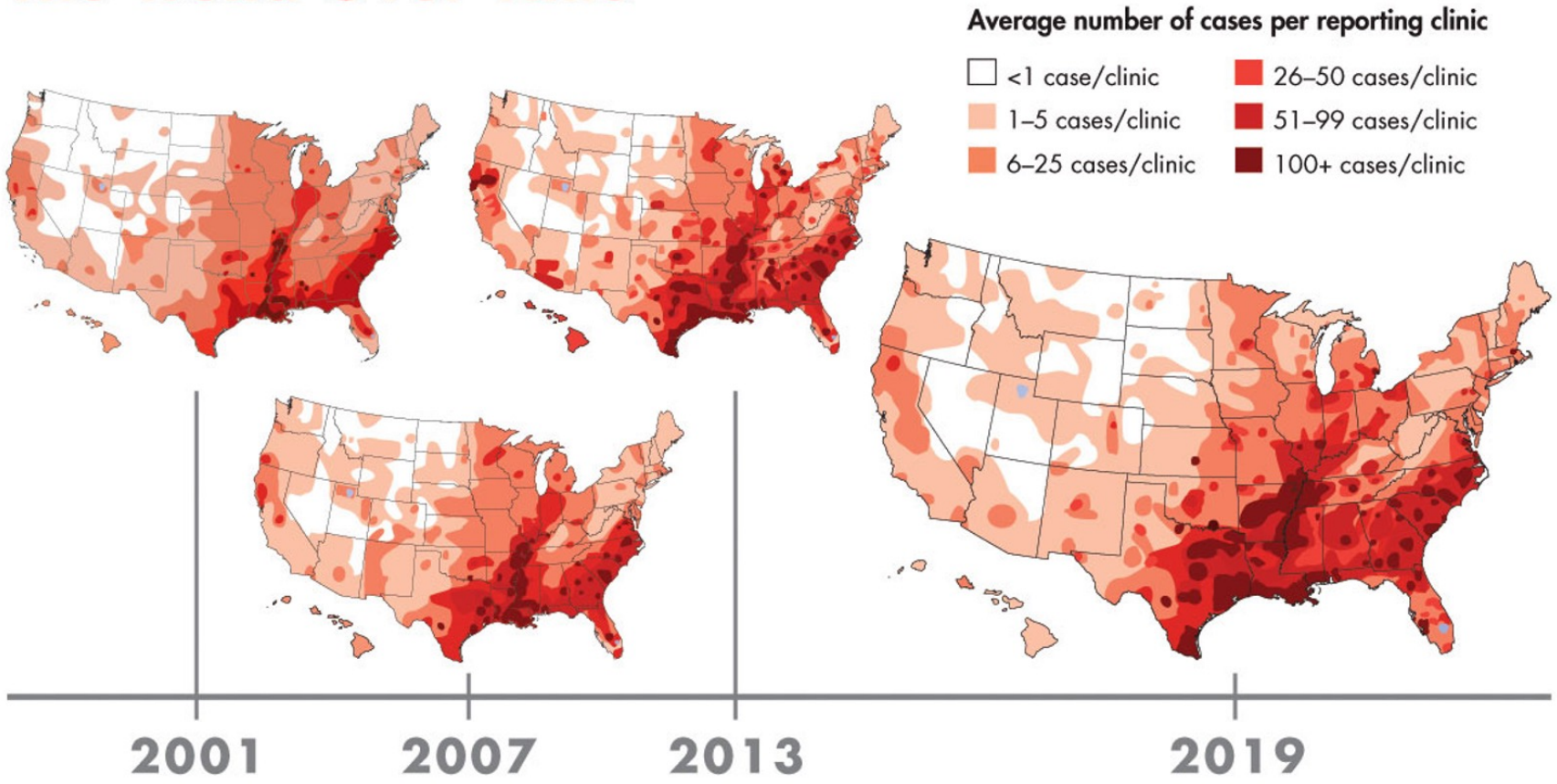



# 2017 在亞洲我們只贏過緬甸

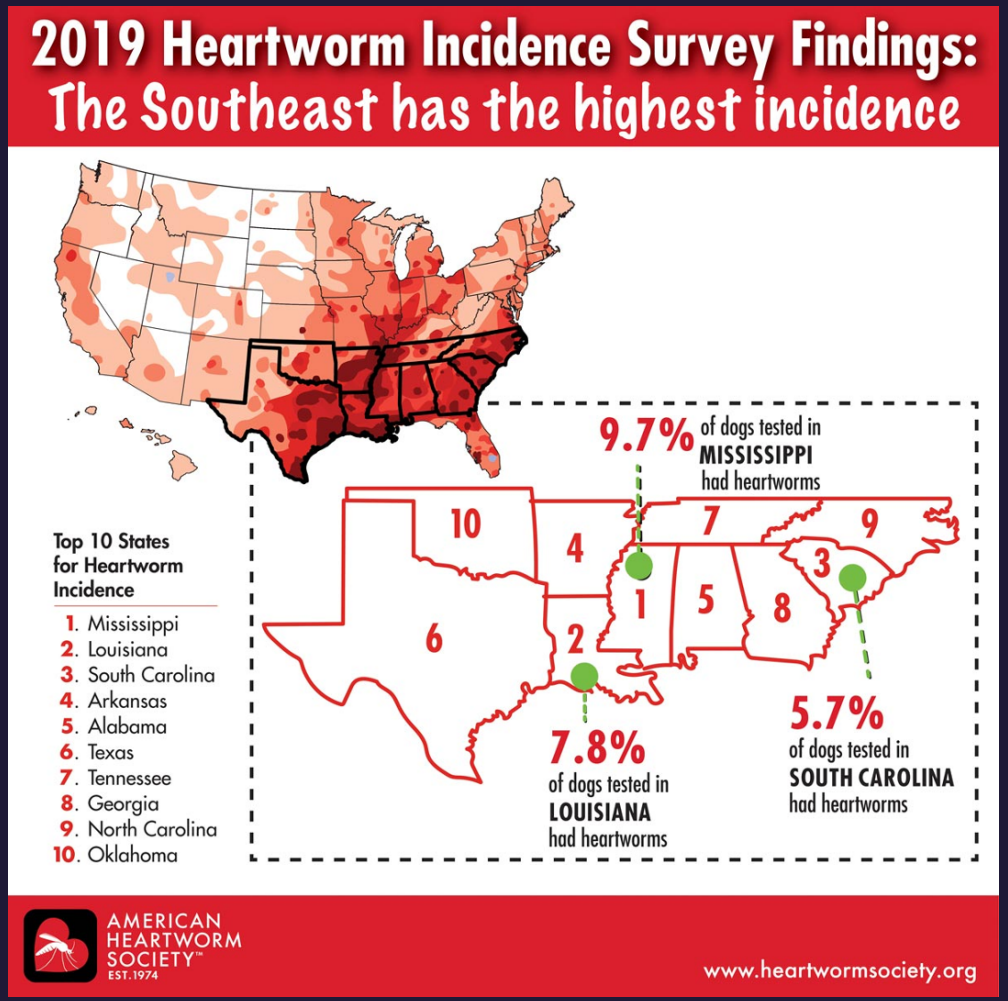
# U.S. HEARTWORM DISEASE INCIDENCE

AMERICAN HEARTWORM SOCIETY™
EST. 1974

## The Trend Over Time

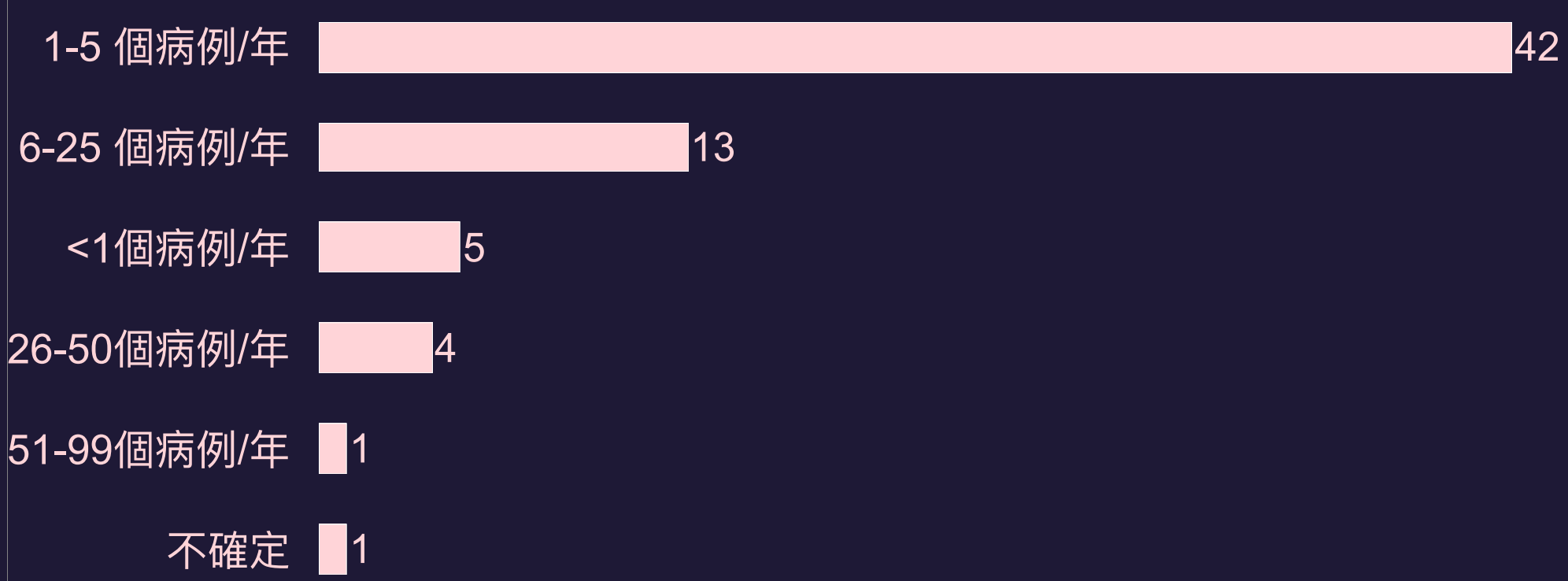


# 陽性率下降就代表感染數很低嗎？




南方每年
每間醫院
>50病例

在您執業的診所，過去一年的心絲蟲病例約幾例？



台灣跟美國南部
陽性率差不多
但每個醫院每年病例卻差很多

造成原因？

心絲蟲沒有消失

只是需要你更積極篩檢

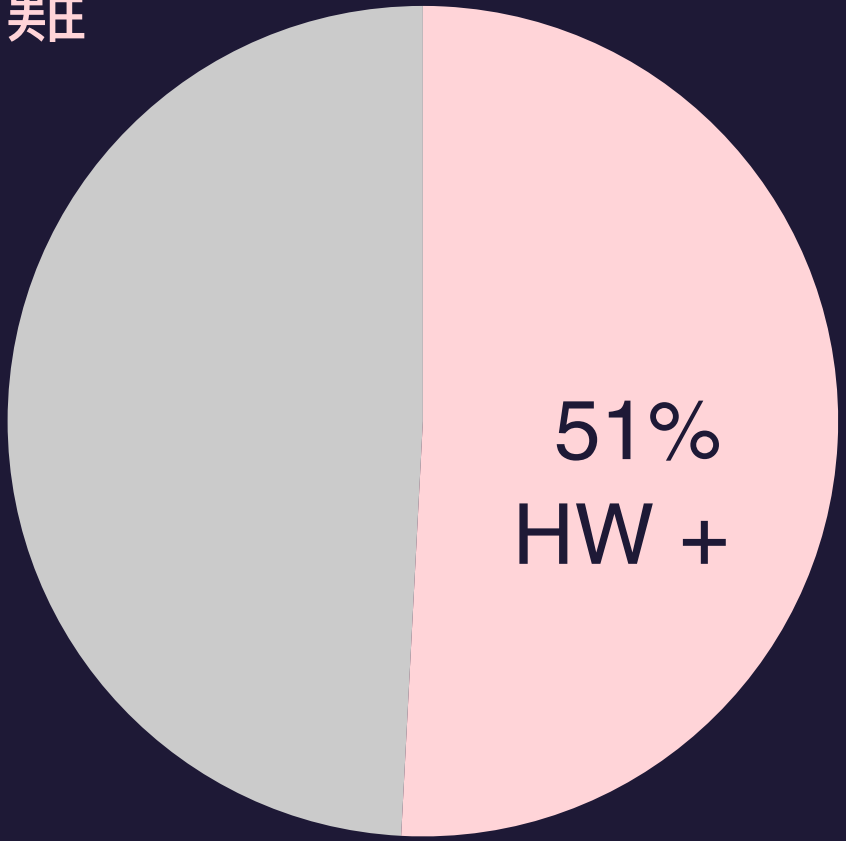
# 把他找出來

# 心絲蟲檢驗時機

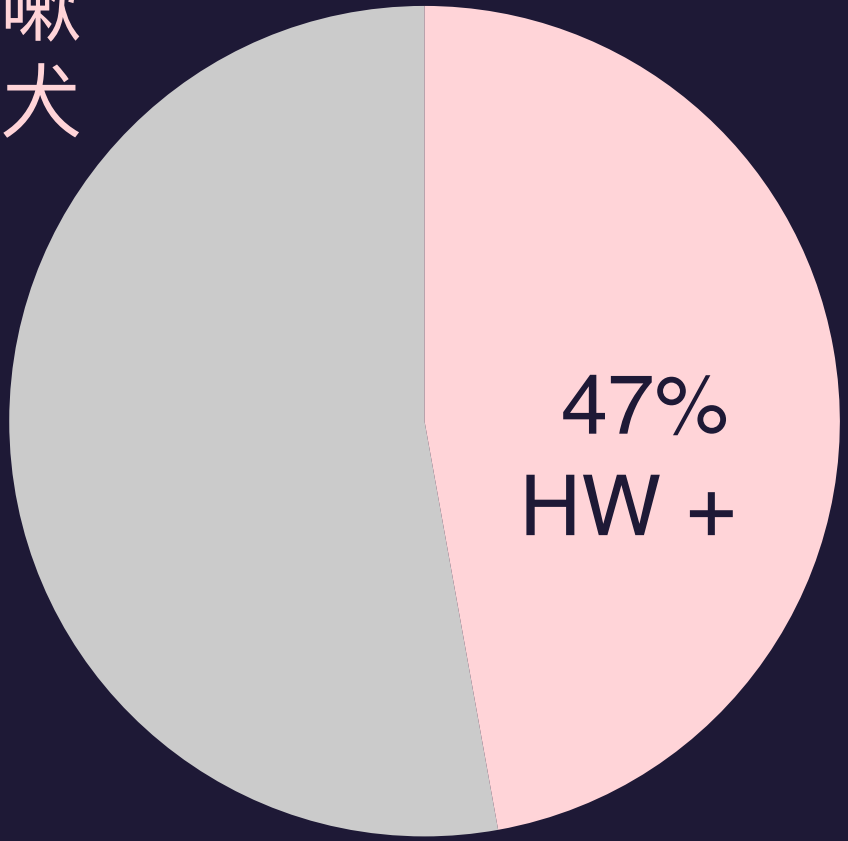
高度懷疑病例

① 未預防
② 住室外
③ 咳嗽
④ 呼吸困難
⑤ 肺高壓
⑥ 右心衰竭

120隻
呼吸困難
病犬




282隻
咳嗽
病犬



| | 咳嗽 | | 呼吸困難 | |
|---|---|---|---|---|
| | 室外 | 室内 | 室外 | 室内 |
| 病例數 | 135 | 147 | 74 | 46 |
| 心絲蟲陽性率 | **73%** | 24% | **73%** | 15% |

# 心絲蟲檢驗時機

- 高度懷疑病例
- 麻醉前
- 年度健檢


# AHS guideline 2020 更新版

# 重點提示

## 預防

- 多重預防策略：
  體內預防藥＋體外驅蚊藥
- 注射型預防藥：
  6–12個月間隔注射

## 篩檢

- 年度篩檢：
  不管是否有給予預防藥物都建議
- 轉換使用預防藥前後篩檢


篩檢
8
週
齡
7
月
齡
不用篩檢
投藥後
6個月
投藥前＆
投藥後
6個月
投藥後
年度篩檢

## 篩檢

- 加熱法：
  - 要做請送實驗室
  - 懷疑有偽陰性結果時做
  - 不建議例行每次都做

# 治療

| Day | Treatment |
|---|---|
| Day 0 | Dog diagnosed and verified as heartworm positive:<br>• Positive antigen (Ag) test verified with microfilaria (MF) test<br>• If no microfilariae are detected, confirm with 2nd Ag test from a different manufacturer<br>Begin exercise restriction.<br>• The more pronounced the signs, the stricter the exercise restriction<br>If the dog is symptomatic:<br>• Stabilize with appropriate therapy and nursing care<br>• Prednisone prescribed at 0.5 mg/kg BID 1st week, 0.5 mg/kg SID 2nd week, 0.5 mg/kg EOD 3rd and 4th weeks |
| Day 1 | Administer heartworm preventive.<br>• If microfilariae are detected, pretreat with antihistamine and glucocorticosteroid, if not already on prednisone, to reduce risk of anaphylaxis<br>• Observe for at least 8 hours for signs of reaction |
| Days 1–28 | Administer doxycycline 10 mg/kg BID for 4 weeks.<br>• Reduces pathology associated with dead heartworms<br>• Disrupts heartworm transmission |
| Day 30 | Administer heartworm preventive. |
| Day 60 | Administer heartworm preventive.<br>First melarsomine injection 2.5 mg/kg intramuscularly (IM)<br>Prescribe prednisone 0.5 mg/kg BID 1st week, 0.5 mg/kg SID 2nd week, 0.5 mg/kg EOD 3rd and 4th weeks.<br>Decrease activity level even further.<br>• Cage restriction/on leash when using yard |
| Day 90 | Administer heartworm preventive.<br>Second melarsomine injection 2.5 mg/kg IM |
| Day 91 | Third melarsomine injection 2.5 mg/kg IM<br>Prescribe prednisone 0.5 mg/kg BID 1st week, 0.5 mg/kg SID 2nd week, 0.5 mg/kg EOD 3rd and 4th weeks.<br>Continue exercise restriction for 6 to 8 weeks following last melarsomine injections. |
| Day 120 | Test for presence of microfilariae.<br>• If positive treat with a microfilaricide and retest in 4 weeks<br>Establish year-round heartworm prevention. |
| Day 271 | Antigen test 6 months after completion; screen for microfilariae. |

2014

| Day | Treatment |
|---|---|
| Day 0 | In a dog diagnosed and verified as heartworm positive:<br>• Positive antigen (Ag) test verified with microfilaria (MF) test<br>• If no MF are detected, confirm with second Ag test from a different manufacturer<br>• Apply an EPA-registered canine topical product labeled to repel and kill mosquitoes<br>• Begin exercise restriction—the more pronounced the signs, the stricter the exercise restriction<br>If the dog is symptomatic:<br>• Stabilize with appropriate therapy and nursing care<br>• Prednisone prescribed at 0.5 mg/kg BID first week, 0.5 mg/kg SID second week, 0.5 mg/kg every other day (EOD) for the third and fourth weeks |
| Day 1 | • Administer appropriate heartworm preventive<br>○ If MF are detected, pre-treat with antihistamine and glucocorticosteroids, if not already on prednisone, to reduce risk of anaphylaxis<br>○ Observe for at least 8 hours for signs of reaction |
| Days 1–28 | • Administer doxycycline 10 mg/kg BID for 4 weeks<br>○ Reduces pathology associated with dead heartworms<br>○ Disrupts heartworm transmission |
| Day 30 | • Administer appropriate heartworm preventive<br>• Apply an EPA-registered canine topical product to repel and kill mosquitoes |
| Days 31-60 | A one-month wait period following doxycycline before administering melarsomine is currently recommended as it is hypothesized to allow time for the *Wolbachia* surface proteins and other metabolites to dissipate before killing the adult worms. It also allows more time for the worms to wither as they become unthrifty after the *Wolbachia* endosymbionts are eliminated. |
| Day 61 | • Administer appropriate heartworm preventive<br>• Administer first melarsomine injection, 2.5 mg/kg intramuscularly (IM)<br>• Prescribe prednisone 0.5 mg/kg BID first week, 0.5 mg/kg SID second week, 0.5 mg/kg EOD for the third and fourth weeks<br>• Decrease activity level even further: cage restriction; on leash when using yard |
| Day 90 | • Administer appropriate heartworm preventive<br>• Administer second melarsomine injection, 2.5 mg/kg IM<br>• Prescribe prednisone, 0.5 mg/kg BID first week, 0.5 mg/kg SID second week, 0.5 mg/kg EOD for the third and fourth weeks |
| Day 91 | • Administer third melarsomine injection, 2.5 mg/kg IM<br>• Continue exercise restriction for 6 to 8 weeks following last melarsomine injections |
| Day 120 | • Test for presence of MF<br>○ If positive treat with a microfilaricide and retest in 4 weeks<br>• Continue a year-round heartworm prevention program based on risk assessment described in prevention section |
| Day 365 | • Antigen test 9 months after last melarsomine injection; screen for MF<br>• If still Ag positive, re-treat with doxycycline followed by two doses of melarsomine 24 hours apart |

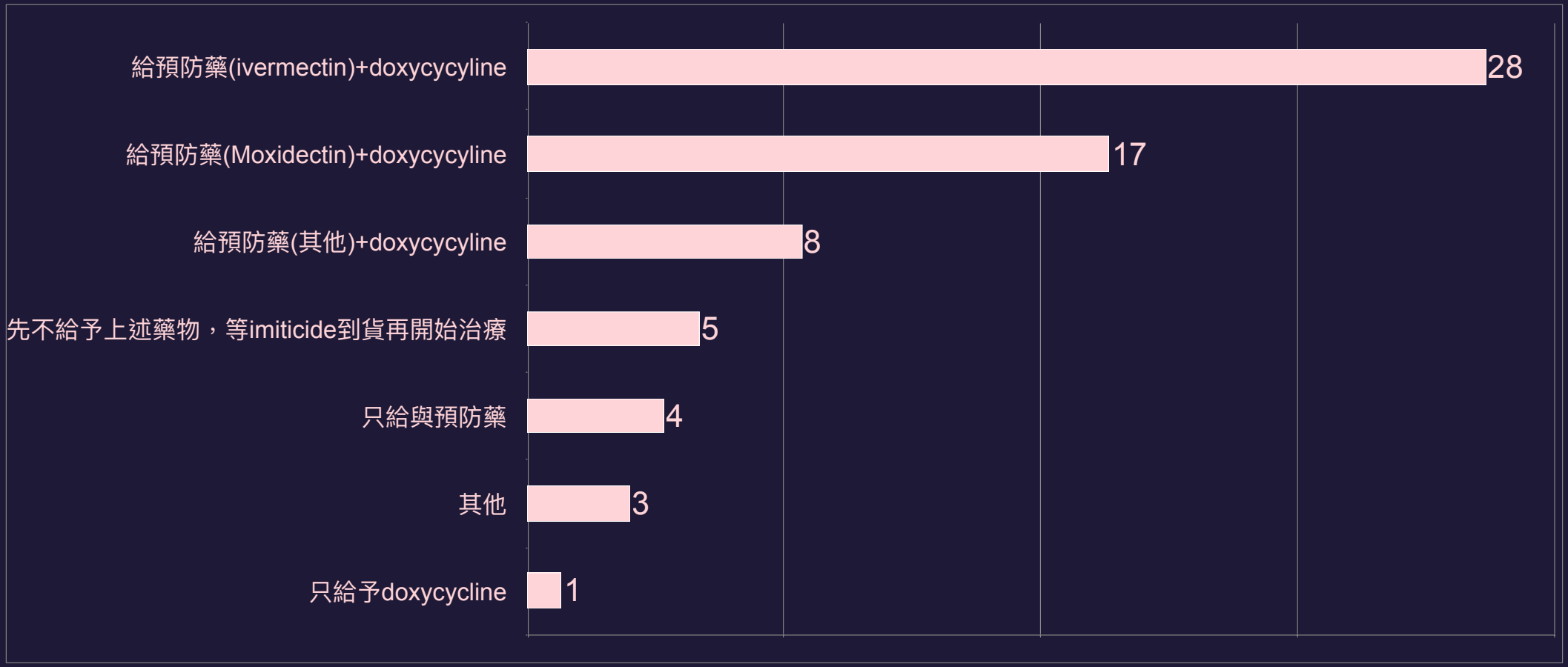
2020

## 治療

- 透過每月給心絲蟲預防藥殺死成蟲(緩殺法)：不管是哪種預防藥都不建議！

那治療到一半，
殺蟲針斷貨了，
該怎麼辦？

# 目前imitiicde缺貨，您都怎麼治療心絲蟲？



Decision–Making Considerations
for Heartworm Management in Shelter Dogs AHS


https://www.shelterhwtool.com/

# Heartworm Management

## Last Reviewed August 2019

## Resources Reviewed June 2020

Table 1. Adulticidal Protocol Comparison

| Protocol | Description | Adulticidal Efficacy | Treatment Duration | Advantages | Disadvantages | Materials Cost[a] | Cost of Care[b] | Total Cost[c] | References |
|---|---|---|---|---|---|---|---|---|---|
| Split dose melarsomine (3 inj.) + doxycycline | Melarsomine dihydrochloride 2.5 mg/kg intramuscular injection on Day 1, repeat on Days 30 and 31; doxycycline hyclate 10 mg/kg q12h orally x 30 days | *No data available.* | *N/A* | •Decreased severity of pulmonary pathology and reduced thrombi<br>•Reduced respiratory complications and disease-related deaths<br>•No risk of resistance | •2 months activity restriction | $145 | *N/A* | *N/A* | Kramer 2011<br>Nelson 2017 |
| | Melarsomine dihydrochloride 2.5 mg/kg intramuscular injection on Day 1, repeat on Days 30 and 31; intermittent doxycycline hyclate 10 mg/kg/day[d]; ivermectin 6 mcg/kg orally weekly | 93% | 9 mos. | •Decreased severity of pulmonary pathology and reduced thrombi<br>•Reduced respiratory complications and disease-related deaths<br>•No risk of resistance<br>•High adulticidal efficacy | •2 months activity restriction<br>•High cost of care (>$150) | $269 | $1,350 | $1,619 | McCall 2008<br>Kramer 2011<br>Nelson 2017 |
| Split-dose melarsomine (3 inj.) | Melarsomine dihydrochloride 2.5 mg/kg intramuscular injection on Day 1, repeat on Days 30 and 31 | 99% | 31 days | •No risk of resistance<br>•High adulticidal efficacy | •2 months activity restriction | $135 | $130 | $265 | Zoetis 2017,<br>Merial 2010 |
| | Melarsomine dihydrochloride 2.5 mg/kg intramuscular injection on Day 1, repeat on Days 30 and 31 | 100% | 31 days | •No risk of resistance<br>•High adulticidal efficacy | •2 months activity restriction | $135 | $130 | $265 | McCall 2008 |
| Standard dose melarsomine (2 inj.) + doxycycline | Melarsomine dihydrochloride 2.5 mg/kg intramuscular injection on Day 1, repeat on Day 2; doxycycline hyclate 10 mg/kg q12h orally x 30 days | *No data available.* | *N/A* | •1 month activity restriction<br>•No risk of resistance | •Less adulticidal efficacy compared to split-dose protocols | $100 | *N/A* | *N/A* | |
| Standard dose melarsomine (2 inj.) | Melarsomine dihydrochloride 2.5 mg/kg intramuscular injection on Day 1, repeat on Day 2 | 91% | 48 hrs. | •1 month activity restriction<br>•No risk of resistance<br>•Low materials costs (<$100)<br>•High adulticidal efficacy | •Decreased efficacy compared to split-dose protocols | $90 | $10 | $100 | Zoetis 2017,<br>Merial 2010 |
| Single dose melarsomine (1 inj.) | Melarsomine dihydrochloride 2.5 mg/kg intramuscular injection | 52% | Single treatment | •No risk of resistance<br>•Low materials costs (<$100)<br>•Single injection | •Poor adulticidal efficacy | $45 | $5 | $50 | Zoetis 2017,<br>Merial 2010 |
| Moxidectin + imidacloprid + doxycycline | Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg) applied topically once per month; doxycycline hyclate 10 mg/kg q12h orally x 30 days | 36% | 6 mos. | •Decreased upfront materials costs | •Prolonged activity restriction<br>•Poor adulticidal efficacy<br>•High cost of care (>$150) | $82 | $900 | $982 | Bendas 2017 |
| | Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg) applied topically once per month; doxycycline hyclate 10 mg/kg/day x 15 days | 62% | 11 mos. | •Decreased upfront materials costs | •Prolonged activity restriction<br>•Poor adulticidal efficacy<br>•High cost of care (>$150)<br>•Increased coughing during treatment compared to melarsomine protocols | $137 | $1,650 | $1,787 | Ames 2017 |
| | Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg) applied topically once per month; doxycycline hyclate 10 mg/kg q12h orally x 30 days | 96% | 10 mos. | •High adulticidal efficacy | •Prolonged activity restriction<br>•High cost of care (>$150) | $130 | $1,500 | $1,630 | Savadelis 2017 |
| | Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg) applied topically once per month; doxycycline hyclate 10 mg/kg q12h orally x 30 days | 100% | 9 mos. | •High adulticidal efficacy | •Prolonged activity restriction<br>•High cost of care (>$150) | $118 | $1,350 | $1,468 | Chandrashekar 2014 |
| Moxidectin + imidacloprid | Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg) applied topically once per month | *No data available.* | *N/A* | •Decreased upfront materials costs | •Prolonged activity restriction | *N/A* | *N/A* | *N/A* | |
| | Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg) applied topically every 2 weeks | *No data available.* | *N/A* | •Decreased upfront materials costs | •Prolonged activity restriction | *N/A* | *N/A* | *N/A* | |
| Ivermectin + doxycycline | Ivermectin (6 mcg/kg) orally once per month; doxycycline hyclate 10 mg/kg q 12h x 30 days | *No data available.* | *N/A* | •Decreased upfront materials costs | •Prolonged activity restriction<br>•Potential for increased risk of resistance | *N/A* | *N/A* | *N/A* | Bowman 2012 |
| | Ivermectin (6 mcg/kg) orally q 15 days; doxycycline hyclate 10 mg/kg q 12h x 30 days | 73% | 10 mos. | •Low materials costs (<$100) | •Prolonged activity restriction<br>•Potential for increased risk of resistance<br>•Poor adulticidal efficacy<br>•High cost of care (>$150) | $60 | $1,500 | $1,560 | Grandi 2010<br>Bowman 2012 |
| | Ivermectin (6 mcg/kg) orally weekly + intermittent doxycycline 10/mg/kg/day[d] | 78% | 9 mos. | •Decreased upfront materials costs | •Prolonged activity restriction<br>•Potential for increased risk of resistance<br>•Poor adulticidal efficacy<br>•High cost of care (>$150) | $134 | $1,350 | $1,484 | McCall 2008<br>Bowman 2012 |
| Moxidectin | Moxidectin (0.17 mg/kg) subcutaneous injection every 6 months | *No data available.* | *N/A* | •Single injection | •Prolonged activity restriction | $20 | *N/A* | *N/A* | |
| Ivermectin | Ivermectin (6 mcg/kg) orally once per week | 20% | 9 mos. | •Decreased upfront materials costs | •Prolonged activity restriction<br>•Potential for increased risk of resistance<br>•Poor adulticidal efficacy<br>•High cost of care (>$150) | $180 | $1,350 | $1,530 | McCall 2008<br>Bowman 2012 |
| | Ivermectin (6 mcg/kg) orally once per month | 56% | 16 mos. | •Low materials costs (<$100) | •Prolonged activity restriction<br>•Potential for increased risk of resistance<br>•Poor adulticidal efficacy<br>•High cost of care (>$150) | $80 | $2,400 | $2,480 | McCall 1998<br>Bowman 2012 |
| Doxycycline | Intermittent doxycycline 10 mg/kg/day[d] | 9% | 9 mos. | •Low materials costs (<$100) | •Prolonged activity restriction<br>•Potential for increased risk of resistance<br>•Poor adulticidal efficacy<br>•High cost of care (>$150) | $44 | $1,350 | $1,394 | McCall 2008<br>Bowman 2012 |

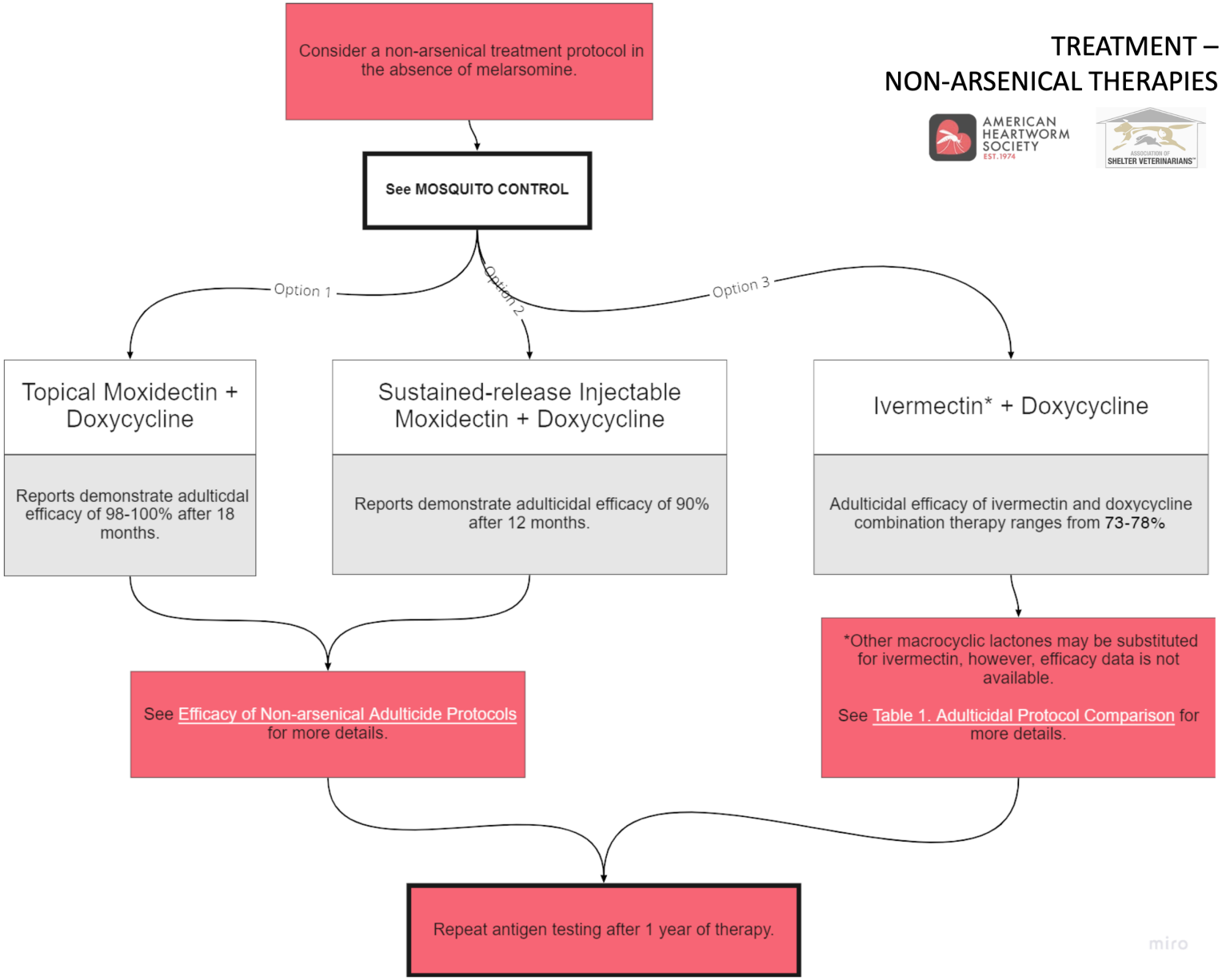
a = Cost for treatment of a 20kg dog at the following rates: melarsomine - $23/ml; doxycycline - $42/30 days; labeled monthly ivermectin heartworm preventive - $5/dose; topical moxidectin + imidacloprid - $12/dose

b = Cost of care estimated at $5 per day

c = Total cost = Materials cost + Cost of care

d = Intermittent doxycycline protocol = administration during weeks 1-6, 10-11, 16-17, 22-25, 28-33

# TREATMENT – NON-ARSENICAL THERAPIES



frontiers in Veterinary Science

REVIEW
published: 27 July 2021
doi: 10.3389/fvets.2021.702018

Check for updates

# An Accessible Alternative to Melarsomine: "Moxi-Doxy" for Treatment of Adult Heartworm Infection in Dogs

*Linda S. Jacobson*[1]* *and Brian A. DiGangi*[2]

[1] *Shelter Medicine Advancement, Toronto Humane Society, Toronto, ON, Canada,* [2] *Shelter and Veterinary Services, American Society for the Prevention of Cruelty to Animals, New York, NY, United States*

Moxi–Doxy= Moxidectin + Doxycycline

Moxi

## 皮膚滴劑 每月一次

Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg)

## 皮下針劑 半年一次

Moxidectin (0.5 mg/kg)

Doxy

## 口服抗生素 30天

Doxycycline 10mg/kg BID

| Moxi–Doxy | 清除感染效力 | |
| --- | --- | --- |
| 皮膚滴劑 每月一次<br>Moxidectin (2.5 mg/kg) + imidacloprid (10 mg/kg) | 治療12月後 | 73–100% |
| | 治療18月後 | 98–100% |
| 皮下針劑 半年一次<br>Moxidectin (0.5 mg/kg) | 治療9–12月後 | 90% |

Ciuca *et al. Parasites & Vectors* (2023) 16:54
https://doi.org/10.1186/s13071-023-05673-9

Parasites & Vectors

RESEARCH Open Access

# Efficacy of oral, topical and extended-release injectable formulations of moxidectin combined with doxycycline in *Dirofilaria immitis* naturally infected dogs

Lavinia Ciuca[1], Alice Vismarra[2*], Dario Constanza[1], Antonio Di Loria[1], Leonardo Meomartino[1], Paolo Ciaramella[1], Giuseppe Cringoli[1], Marco Genchi[2], Laura Rinaldi[1] and Laura Kramer[2]

**Abstract**

**Background** Several studies in both experimentally and naturally infected dogs have reported the adulticide effect of a combination of macrocyclic lactones and doxycycline against *Dirofilaria immitis*, showing that these protocols can be used as an alternative to melarsomine. The present study evaluated the efficacy of oral, topical and extended-release injectable formulations of moxidectin when combined with doxycycline in dogs naturally infected with *D. immitis* from a shelter located in southern Italy.

**Methods** Thirty dogs with naturally acquired *D. immitis* infection were divided in three groups (G) and treated with oral moxidectin (G1) once a month for 9 consecutive months, topical moxidectin (G2) once a month for 9 consecutive months or extended release moxidectin injectable (G3) at enrolment and again at 6 months (Day 180). All treatment groups received doxycycline for the first 30 days. Microfilarial concentrations in 1 ml (mff/ml) blood were determined monthly for 9 months with the modified Knott's test. A clinical scoring system was employed for each dog enrolled in the study based on thoracic radiography and cardiac ultrasound (CU) examinations performed at Day − 15 (before treatment) and at Day 180.

**Results** Results from the present study suggest that the majority of dogs from all treatment groups became antigen negative, as evaluated at Day 270: 9/10 dogs (90.0%) from G1, 6/10 dogs (60.0%) from G2 and 8/10 dogs (80.0%) from G3. Improvement of radiographic alterations was observed in all treatment groups, and almost all dogs were cleared of pulmonary abnormalities by 6 months from the beginning of treatment ($P = 0.000$). Cardiac ultrasound examination showed a progressive improvement of cardiac function in a limited number of animals (4/30).

**Conclusions** The combination of doxycycline and three different formulations of moxidectin leads to antigen-negative status in naturally infected dogs.

**Keywords** *Dirofilaria immitis*, Moxidectin, Doxycycline, Spot-on, Oral, Injectable

*Correspondence:
Alice Vismarra
alice.vismarra@unipr.it
[1] Department of Veterinary Medicine and Animal Production, University of Naples Federico II, Via Federico Delpino 1, 80137 Naples, Italy
[2] Department of Veterinary Medicine Sciences, University of Parma, Strada del Taglio, 10, 43126 Parma, Italy

## Background

Canine heartworm disease (HWD) is caused by the filarial nematode *Dirofilaria immitis*, a vector-borne parasite transmitted by several mosquito species, and is endemic in many parts of the world [1]. The presence of adult worms in the pulmonary arteries of infected dogs causes

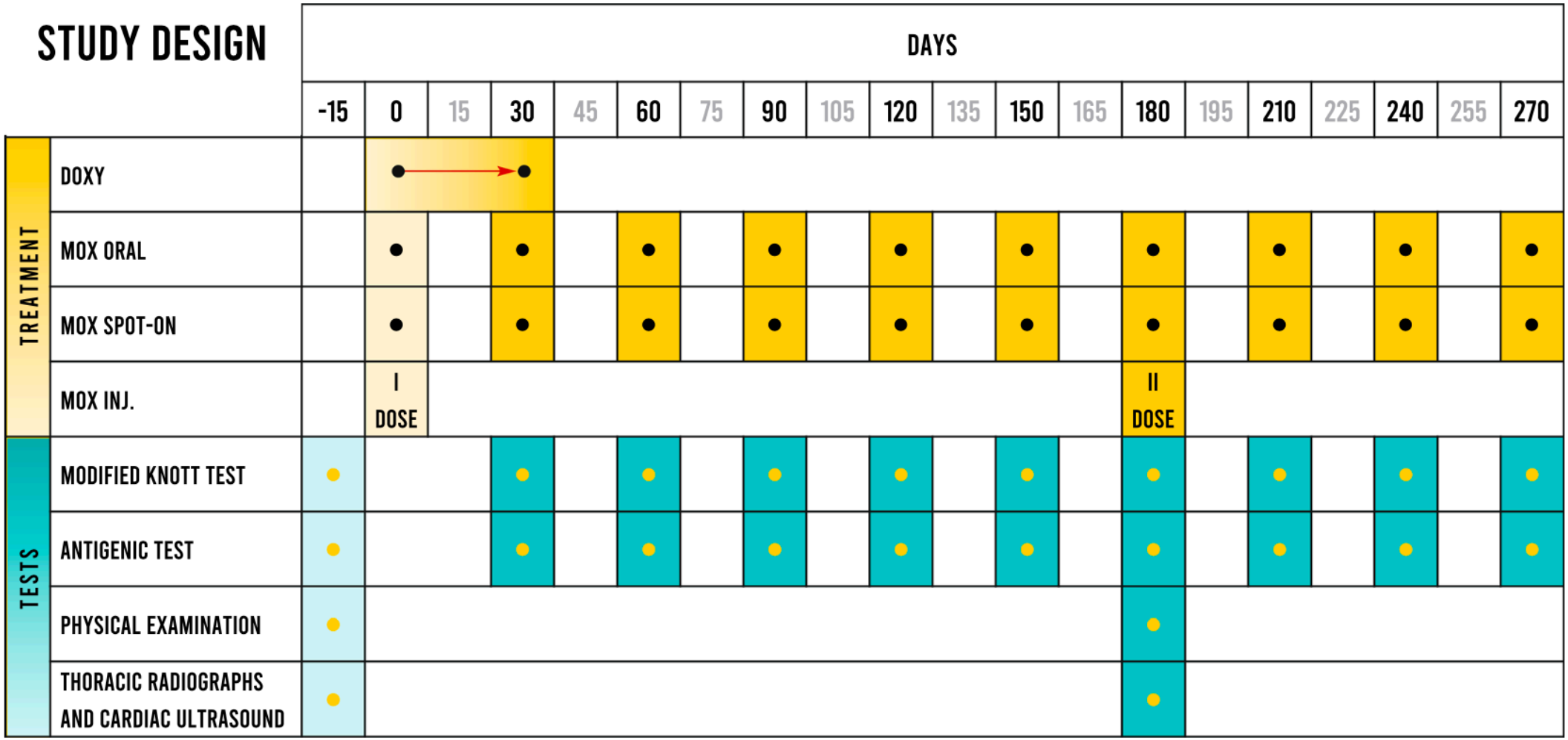


口服

滴劑

注射

# STUDY DESIGN



| Dog number | Moxidectin formulation | Days | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | –15 | 30 | 60 | 90 | 120 | 150 | 180 | 210 | 240 | 270 |
| **1** | Oral | ++ | ++ | + | ++ | - | ++ | - | - | - | - |
| **2** | Oral | ++ | - | - | ++ | - | + | - | - | - | - |
| **3** | Oral | ++ | ++ | ++ | ++ | ++ | ++ | ++ | + | ++ | ++ |
| **4** | Oral | ++ | ++ | + | + | + | - | - | - | - | - |
| **5** | Oral | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |
| **6** | Oral | ++ | ++ | ++ | ++ | ++ | ++ | + | + | + | ++ |
| **7** | Oral | ++ | ++ | ++ | ++ | - | + | ++ | ++ | ++ | - |
| **8** | Oral | ++ | ++ | ++ | ++ | + | - | - | - | - | - |
| **9** | Oral | ++ | - | - | - | ++ | - | + | - | - | ++ |
| **10** | Oral | ++ | ++ | ++ | ++ | - | + | - | - | - | ++ |
| **1** | Spot-on | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | - |
| **2** | Spot-on | ++ | ++ | ++ | + | + | + | - | - | + | - |
| **3** | Spot-on | + | - | ++ | ++ | - | - | - | - | + | - |
| **4** | Spot-on | ++ | ++ | ++ | ++ | ++ | + | - | - | - | - |
| **5** | Spot-on | ++ | ++ | + | + | - | + | ++ | - | - | - |
| **6** | Spot-on | ++ | ++ | ++ | ++ | ++ | + | - | - | - | - |
| **7** | Spot-on | ++ | + | ++ | + | + | + | - | - | n.d | ++ |
| **8** | Spot-on | ++ | + | + | ++ | ++ | + | ++ | - | - | - |
| **9** | Spot-on | + | - | - | - | ++ | + | - | - | - | - |
| **10** | Spot-on | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |
| **1** | Injectable | ++ | ++ | ++ | ++ | ++ | + | - | ++ | - | - |
| **2** | Injectable | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ | ++ |
| **3** | Injectable | - | - | ++ | + | n.d | n.d | - | - | n.d | - |
| **4** | Injectable | ++ | ++ | ++ | ++ | ++ | ++ | - | - | ++ | - |
| **5** | Injectable | - | + | + | - | + | - | - | - | - | - |
| **6** | Injectable | ++ | ++ | ++ | ++ | ++ | ++ | + | - | - | ++ |
| **7** | Injectable | ++ | - | ++ | + | + | + | - | - | - | - |
| **8** | Injectable | ++ | ++ | ++ | ++ | + | + | - | - | - | - |
| **9** | Injectable | ++ | - | - | - | - | - | - | - | - | - |
| **10** | Injectable | ++ | + | + | ++ | + | - | - | ++ | - | ++ |

# 治療9個月 清除感染效力

口服：60%

滴劑：80%

注射：90%

# 免費 心絲蟲治療

狗狗得到心絲蟲，但治療費用太高？
快加入心傳動物醫院最新心絲蟲研究計畫

CHUAN
Animal Hospital
心傳動物醫院

## 研究動機

心絲蟲是台灣最常見的狗狗傳染病之一，患病後致死率極高。目前的標準治療流程是按照美國心絲蟲協會的準則進行，雖然治療成功率將近100%，但過程中也有一定的風險且費用昂貴。近年開始有不同的治療方式被提出，此次研究目的是**<比較感染心絲蟲的狗狗使用新舊療法的成效>**。期許本試驗的研究結果可以幫助獸醫師在未來治療心絲蟲時有更多的選項。

## 參加條件

① 年齡大於1歲
② 正在感染心絲蟲的狗狗
③ 目前沒有使用任何藥物
④ 無症狀或輕微症狀

名額有限!!

## 報名網址

bit.ly/3vYg7Bk

# 持續收案中
# 懇請幫忙
# Orz

# Moxi–Doxy 跟緩殺法有什麼不同？

| | Moxi–Doxy | 緩殺法 |
|---|---|---|
| 藥物 | Moxidectin | Ivermectin |
| 親脂性 | 強 | 弱 |
| 半衰期 | 長 | 短 |
| 排除 | 慢 | 快 |
| 效力 | 殺蟲時間較短 成功率高 | 殺蟲時間較長 成功率不高 |

# Moxi–Doxy
# 要治療多久？

Doxycycline 28-30天
Moxidectin 一辈子都需要

# Moxi–Doxy
# 何時要檢驗？

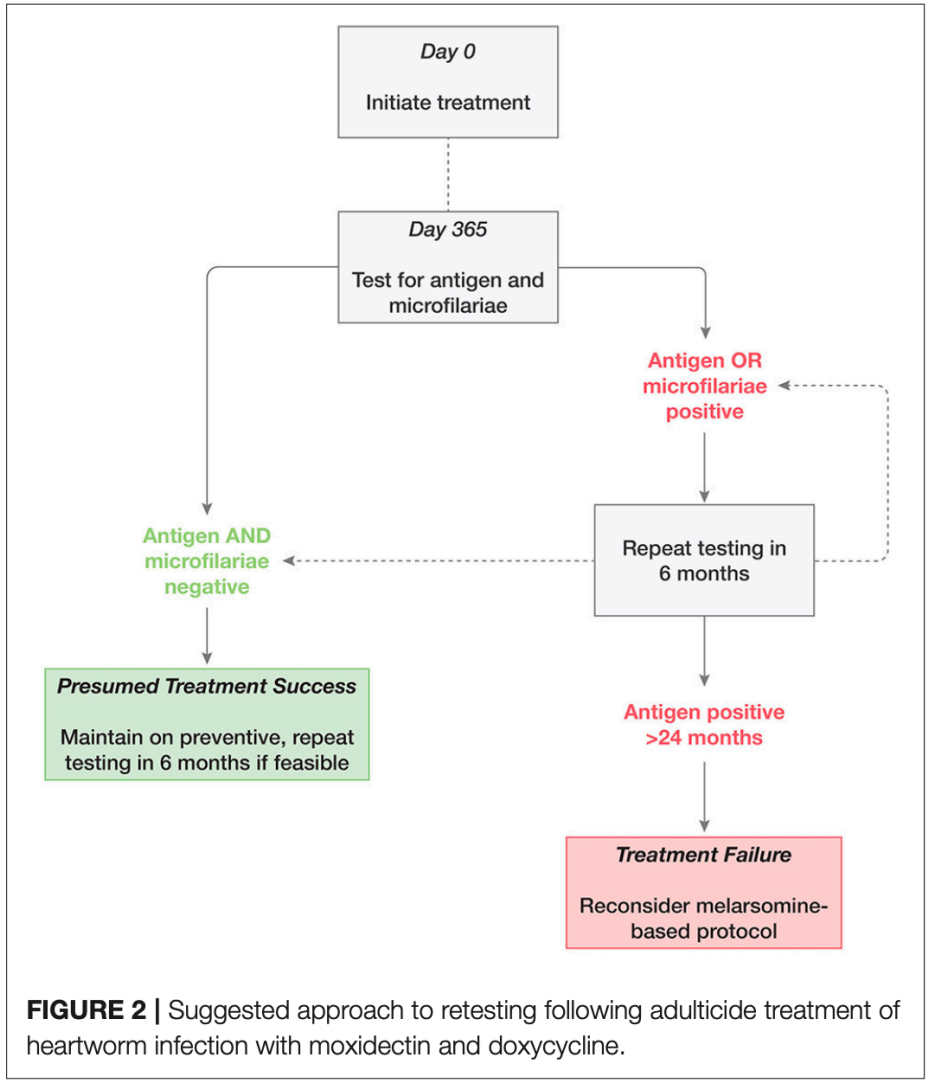



**FIGURE 2 |** Suggested approach to retesting following adulticide treatment of heartworm infection with moxidectin and doxycycline.

# 心絲蟲抗原+微絲蟲檢驗時機

1年後

1.5年後

還是陽性就要打回imiticide

# Moxi–Doxy
# 檢驗時血清要加熱嗎？

Moxi–Doxy

檢驗時血清”不建議“加熱


MARTY, I'VE SEEN
THE FUTURE
memegenerator.net

- 最新台灣盛行率
- AHS guideline 更新
- 治療到一半 沒藥了該怎麼辦？

預防勝於治療
預防前後請記得篩檢

# 免費 心絲蟲治療

狗狗得到心絲蟲，但治療費用太高？
快加入心傳動物醫院最新心絲蟲研究計畫

CHUAN
Animal Hospital
心傳動物醫院

## 研究動機

心絲蟲是台灣最常見的狗狗傳染病之一，患病後致死率極高。目前的標準治療流程是按照美國心絲蟲協會的準則進行，雖然治療成功率將近100%，但過程中也有一定的風險且費用昂貴。近年開始有不同的治療方式被提出，此次研究目的是**<比較感染心絲蟲的狗狗使用新舊療法的成效>**。期許本試驗的研究結果可以幫助獸醫師在未來治療心絲蟲時有更多的選項。

## 參加條件

① 年齡大於1歲
② 正在感染心絲蟲的狗狗
③ 目前沒有使用任何藥物
④ 無症狀或輕微症狀

名額有限!!

## 報名網址

bit.ly/3vYg7Bk

# 持續收案中
# 懇請幫忙
# Orz

# QA