Lifetime Cardiac Study

Mariellen Dentino, MD
Irish Wolfhound Foundation
Kathy Wilson
William Tyrrell, DVM, CVCA
Frances Abrams, PhD
IWF

Background

- Brownlee reported mild, asymptomatic cardiac disease in Irish Wolfhounds, 1986
- Phillippa Nielson initiated heart testing, 1988
- Dr. Neil Harpster ECG testing at Specialties 1992-2000 (except for 1996), reported annually in Harp & Hound, presented at 1994 ACVIM Forum
- Lifetime Cardiac Study started at 2000 IWCA Specialty Reported annually in H&H

Summary of Harpster Testing 1992-2000

Age (Mos)	Total Tested	Number Abnormal	% Abnormal	Number Atrial Fibrillation	% Atrial Fibrillation
1-12	131	15	11.45%	1	0.76%
13-24	185	26	14.05%	4	2.16%
25-36	152	27	17.76%	5	3.29%
37-48	115	32	27.83%	14	12.17%
49-60	76	23	30.26%	13	17.11%
61-72	56	18	32.14%	11	19.64%
73-84	48	23	47.92%	14	29.17%
85 & up	43	14	32.56%	9	20.93%
No age listed	15	5	33.33%	2	13.33%
Total	821	183	22.29%	73	8.89%

*Harp & Hound, 2000 Issue 2, p93

Harpster Conclusions

- Many “apparently healthy” Irish Wolfhounds have abnormal ECGs
- The incidence of ECG abnormalities increases with age
- The effects of some abnormalities is unknown
- Echocardiogram alone is not a good screening tool
- Preferred method is a long ECG tracing or holter

Lifetime Cardiac Study

- Initiated in May 2000
- Patterned after Framingham Study
- Enrollment closed in January 2005
- 1242 IWH enrolled with at least one EKG
  - Annual questionnaire
  - Annual ECG/exam-provided at multiple events
- COD and follow-ups available on 819 IWH

Annual Questionnaire

- Cardiac/medical history data
- Feeding/Supplements/Medications
- Exercise/Condition
- Familial Data
- Labs, X-rays & echoes requested

Like the Framingham study, data analysis will take years

Results

- "Hard data"
  - Test results (EKG, Urinalysis, Blood pressure, etc)
    - IWF acquired
    - Owner provided (labs, echoes, and X-rays)
  - Age of death
  - Some familial data (often relations were in study)
- Owner Reported Data
  - Diet
  - Exercise/Condition
  - Familial
  - Cause of Death

Urinalysis/Blood Pressure

- 29/66 hounds had abnormality
- Five of those needed to be referred for treatment
- Annual urinalysis is recommended
- Sighthounds reported to have higher BP
- Normal BP was established at 116/69
- Goes up slightly with age
- Dependent on anxiety level
- Blood Pressure Results published: **Bright JM; Dentino M, "Indirect arterial blood pressure measurement in nonsedated Irish wolfhounds: reference values for the breed"** J Am Anim Hosp Assoc. 2002 Nov-Dec; 38(6):521-6.

EKG Results: Conduction Abnormalities

Conduction abnormality	No of Dogs	Age at Death
Atrial Ventricular Block (AVB)	49	8.45
Left Anterior Fascicular Block (AFB)	15	7.61
Left Bundle Branch Block (LBBB)	2	9.25
Right Bundle Branch Block (RBBB)	18	8.44
All dogs in the study	819	7.46

This was only for dogs with a complete set of data, including DOB, DOD and COD

Which conduction abnormalities progress to heart failure?

- Only conduction abnormality that showed any progression was 1st Degree AV Block
- Progressed to APCs in some
- The average age of death for these dogs was actually greater than the average age at death of the entire population.
- Only atrial fibrillation was a predictor of IW-type cardiomyopathy

Arrhythmias of Concern

- VPCs- Intermittent so incidence is probably higher
  - None of the VPC dogs died of DCM
  - Incidence of sudden death is more than double that of general population
- APCs
  - Intermittent so difficult to detect
  - 58% were documented to progress to AF
- The most important arrhythmia in the IW is atrial fibrillation

Lifetime Cardiac Study (Atrial fibrillation)

- Mean age of AF onset in males: 5.14 years
- Mean age of AF onset in females: 5.64 years
- 61.7% of AF population had known close relative with AF
- Only 55.3% IWH in AF were on Rx

Lifetime Cardiac Study (Atrial fibrillation)

- 164/819 (20.02%) IWH affected with AF
- 42.6% died of cardiac related disease
  - Mean survival time post dx of AF=2.7 years (1-7 years)
  - Male 2.64 years (1-6)
  - Female 2.80 years (1-7)
  - If heart rate is >160 BPM at presentation, MST<1.0 yr
- 57.4% died of non-cardiac related ailments
  - Mean survival time post dx of AF=2.33 years (1-8 years)
  - Many of these IWH died > 7 years of age

Owners should routinely check resting heart rates at home

Effect of Cardiac Disease on Longevity

Normal

No Dogs	Average Age	Sex
470	7.15	All
263	7.28	Females
207	6.98	Male

Atrial Fibrillation

No Dogs	Average Age	Sex
164	7.71	All
81	8.18	Females
83	7.26	Male

Tachy

No Dogs	Average Age	Sex
38	7.67	All
22	7.70	Females
16	7.63	Male

VPCs

No Dogs	Average Age	Sex
73	8.46	All
42	8.92	Females
31	7.83	Male

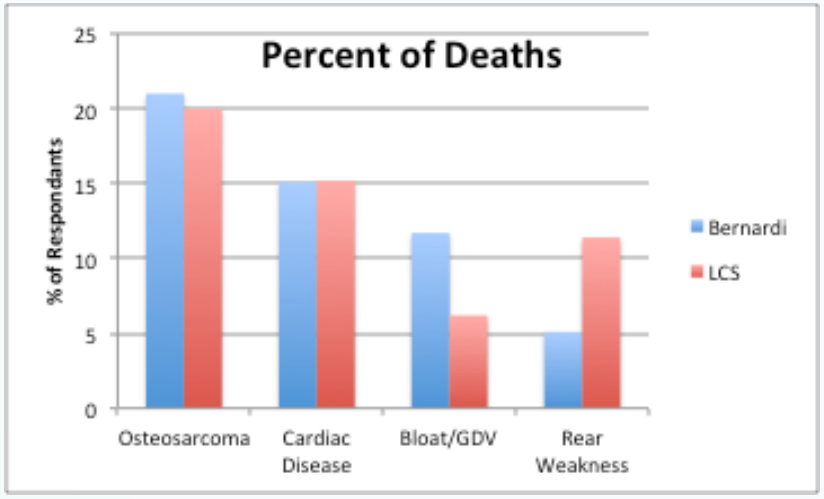
Improvements in detection and treatment during the study have made it increasingly more likely that owners will find the disease early and treat it when necessary

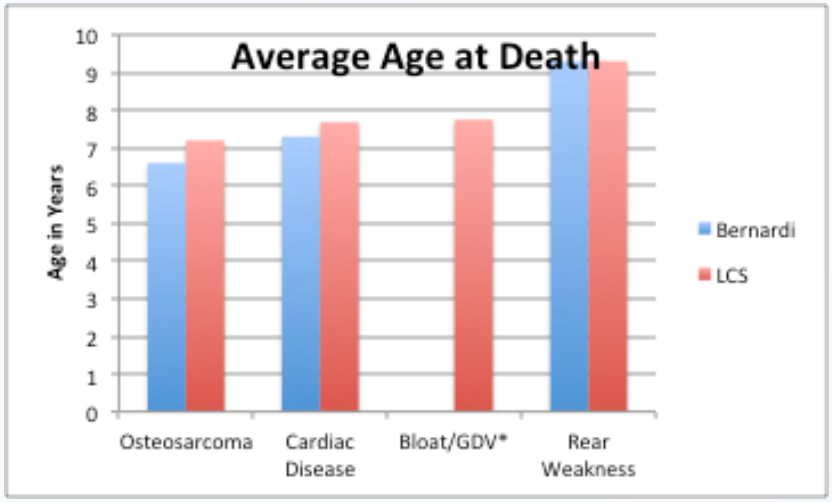
Longevity Studies Over the Years

- Comfort 1927-1945. 5.8 years
- Darling 1974 life span 5.8 years
- Bernardi 1966-1986 6.47 years
- LCS 2000-2015 7.45 years

Bernardi's study was a good comparison because we had details on process and similar population

Major Killers Over the Years:
Bernardi (1966-1986) & LCS (200-2015)





*Bernardi did not report an average age at death for Bloat/GDV

Both studies included sudden death as “cardiac” for this calculation

Killers of Our Dogs

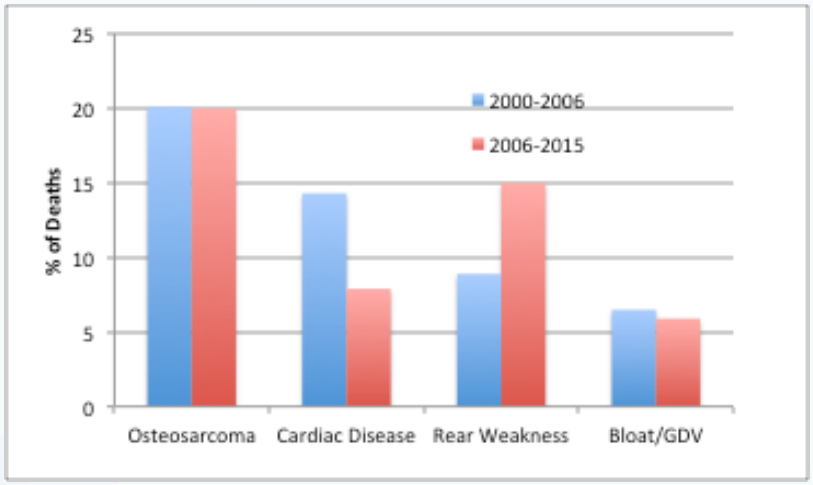
LCS/IWSTUDIES Data combined

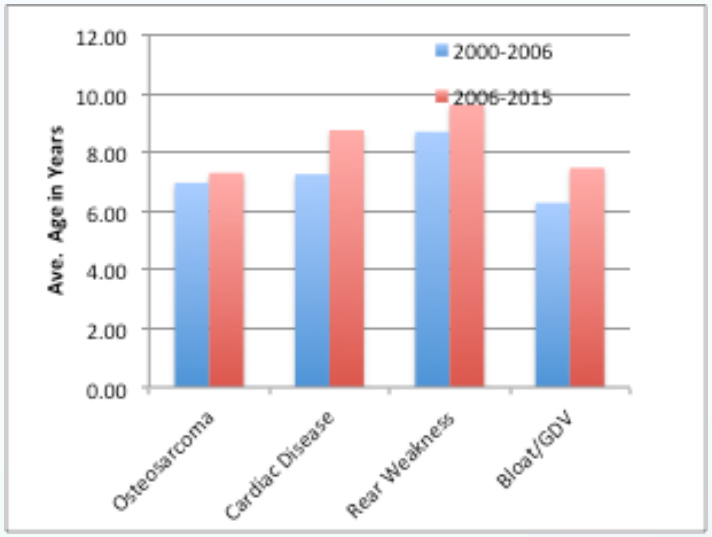
Cause of Death	N	%	Ave Age
Cancer-all	358	36.57	7.10
Heart	114	11.64	7.68
Rear Weakness	112	11.44	9.21
Other	103	10.52	7.54
Bloat/Torsion	61	6.23	6.75
Unknown	54	5.52	7.29
Respiratory-Pneumonia	44	4.49	6.70
Sudden Death	35	3.58	7.19
Infection	23	2.35	7.26
Renal Failure	22	2.25	7.05
Trauma	17	1.74	5.82
Bleeding	12	1.23	6.75
Megaesophagus	12	1.23	8.70
Seizure	12	1.23	4.70
Totals	979		

The most common cancers were osteosarcoma, lymphoma and hemangiosarcoma. Osteosarcoma alone killed more than any other disease.

About 80% of dogs were euthanized.

Changes During LCS





Increases in age at death are likely due to improved veterinary intervention, maybe even shifts in COD

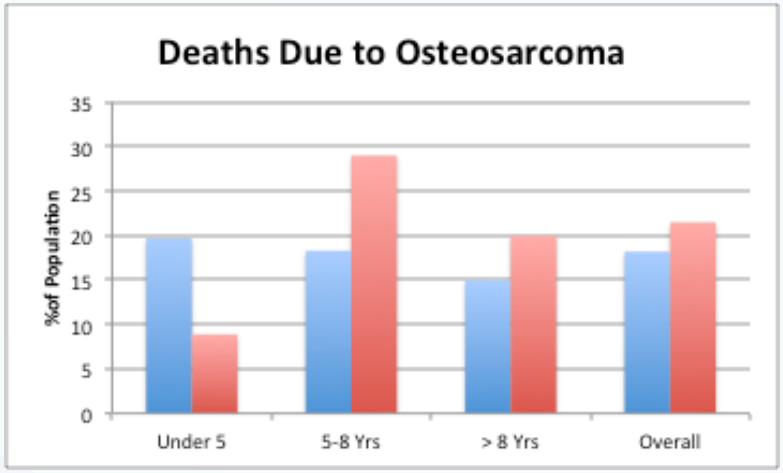
OTHER NOTES ON COD

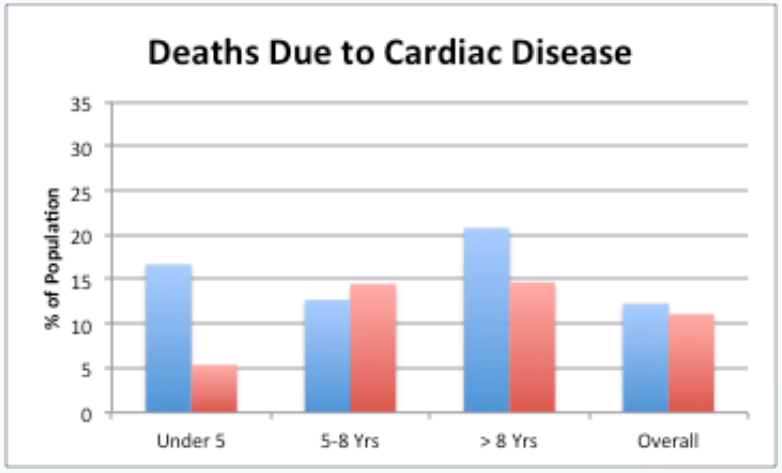
- Death from megaesophagus more than doubled from 2000-2006 to 2006-2015.
- Death from infection other than respiratory (pyometria, septicemia, etc.) also doubled
- Death from bleeding (post op or spontaneous) went from 1.7% (10 hounds) 2000-2006 to .5% 2006-2015
- Lymphoma tends to kill younger than hemangiosarcoma

All interesting but unknown if trend will continue.

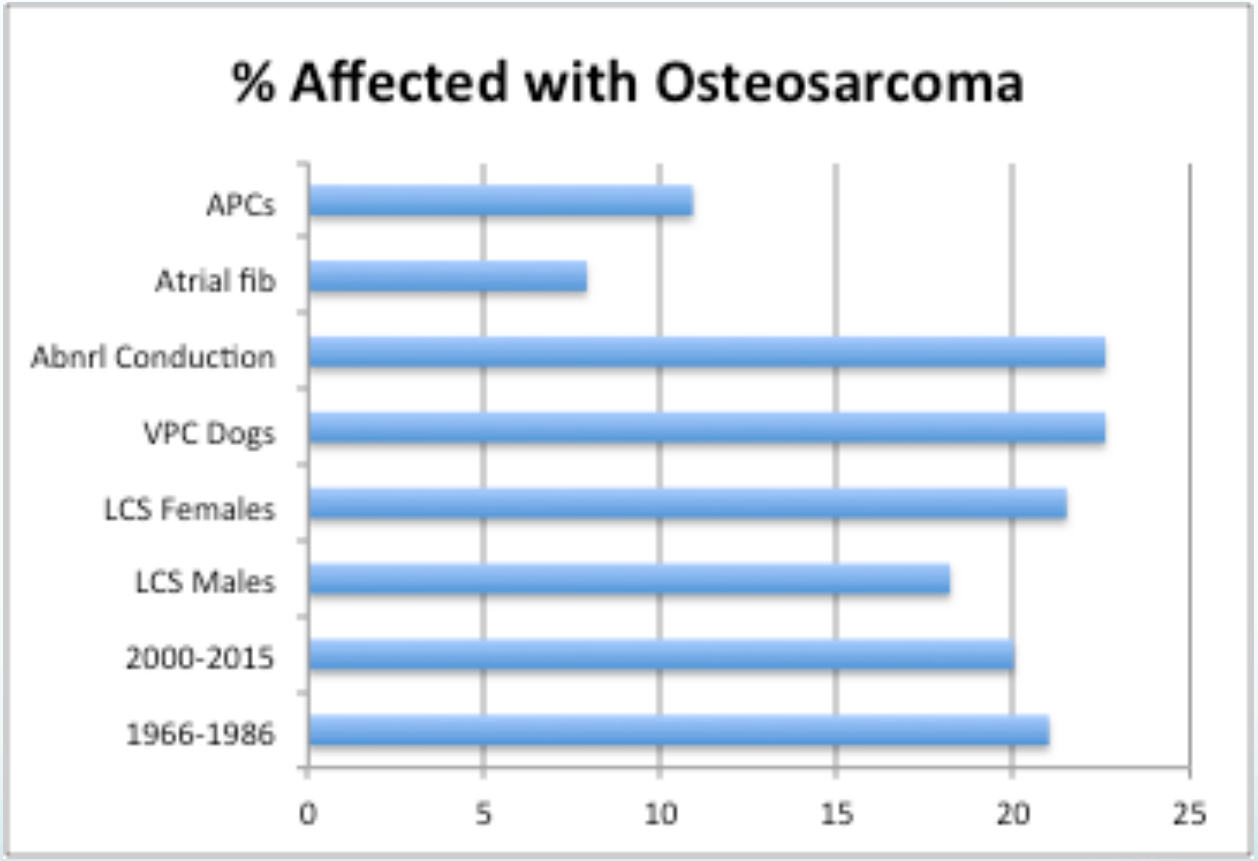
Effect of Age & Sex

Osteosarcoma & Cardiac Disease





Osteosarcoma: The Elephant in the Room



This effect was not just for osteosarcoma. The a fib group had a 18% occurrence of cancers, compared with 36% the total population.

Be careful what you wish for....

A Fib & Osteosarcoma- Additional Observations

- Afib dogs under 5 years protection from osteo not seen
- Incidence of osteo as cause of death in hounds with afib dying before 5 was 22.2% (but only 4/19 hounds in afib died in this age group.)
- 6-8 years osteo incidence 5.9%
- 8 years and older incidence was 6.4%
- A fib dogs who got osteosarcoma tended to be males
- Statistically significant but not an end point of study so not a robust finding.

Conclusions

- Only EKG findings that led to significant heart disease were arrhythmias
  - PVCs increased risk of sudden death
  - APCs –intermittent, often led to atrial fibrillation
  - Atrial Fibrillation-most important and often an early indicator of IW-type cardiomyopathy
- Lifespan has increased
  - May be largely explained by better care/intervention
  - Number 3 cause of death now euthanasia for rear weakness
  - Number 1 remains osteosarcoma

Limitations

- Population was solicited largely from show stock
- Owner submitted data
- A number of dogs had gaps in reporting

Thank you

- Irish Wolfhound Foundation
- Irish Wolfhound Club of America
- Delaware Valley Irish Wolfhound Association
- Rocky Mountain Irish Wolfhound Association
- Locust Grove Irish Wolfhound Association
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- Neil Harpster DVM (Data collection & Publications)

All the Owners and Dogs who participated in our studies.

Phillippa Crowe

July 11, 1940- August 9, 2002

There is no adequate way to thank Phillippa Crowe, who started organized health testing for US Irish Wolfhounds. We wish she were here today to see some of the benefits from her efforts.

And Thanks
to Our
Hounds