**Saturday, December 7th, 2024**

Hill's®
Transforming Lives™

# Small Animal Clinical Nutrition Symposium

## AGING CATS & DOGS

# AGENDA

Saturday
Dec. 7th
2024

| | |
|---|---|
| 7:30am — 8:30am | Registration |
| 8:30am — 8:35am | Welcome |
| 8:45am — 9:25am | Managing Common Senior Dog Health Conditions & Comorbidities with Nutrition<br>Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition) |
| 9:35am — 10:25am | Managing Common Senior Cat Health Conditions & Comorbidities with Nutrition<br>Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition) |
| 10:25am — 10:40am | Break |
| 10:40am — 11:30am | Senior Pet Diets<br>Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition) |
| 11:30am — 12:00pm | Morning Session Q&A<br>Camille Torres-Henderson, DVM, DABVP, DACVIM (Nutrition) |
| 12:00pm — 1:00pm | Lunch |
| 1:00pm — 1:30pm | Weighty Matters: Tackling Canine & Feline Obesity In Senior Pets - Insights from the Healthy Weight Clinic & Pet Health Center<br>Katherine Oakes, DVM |
| 1:30pm — 2:20pm | Canine Cognitive Dysfunction<br>Susan Nelson, DVM |
| 2:20pm — 2:40pm | Break |
| 2:40pm — 3:30pm | Nutrition Tips and Tricks for the Senior Patient: Diets and Esophageal Feeding Tubes<br>Ally Sptiz, DVM, (Residency Trained in Small Animal Clinical Nutrition)) |
| 3:30pm — 4:00pm | Afternoon Session Q&A |

Hill's®
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# Small Animal Clinical Nutrition Symposium

## AGING CATS & DOGS

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# Senior Pet Diets

**CAMILLE TORRES-HENDERSON, DVM, DABVP, DACVIM (NUTRITION)**

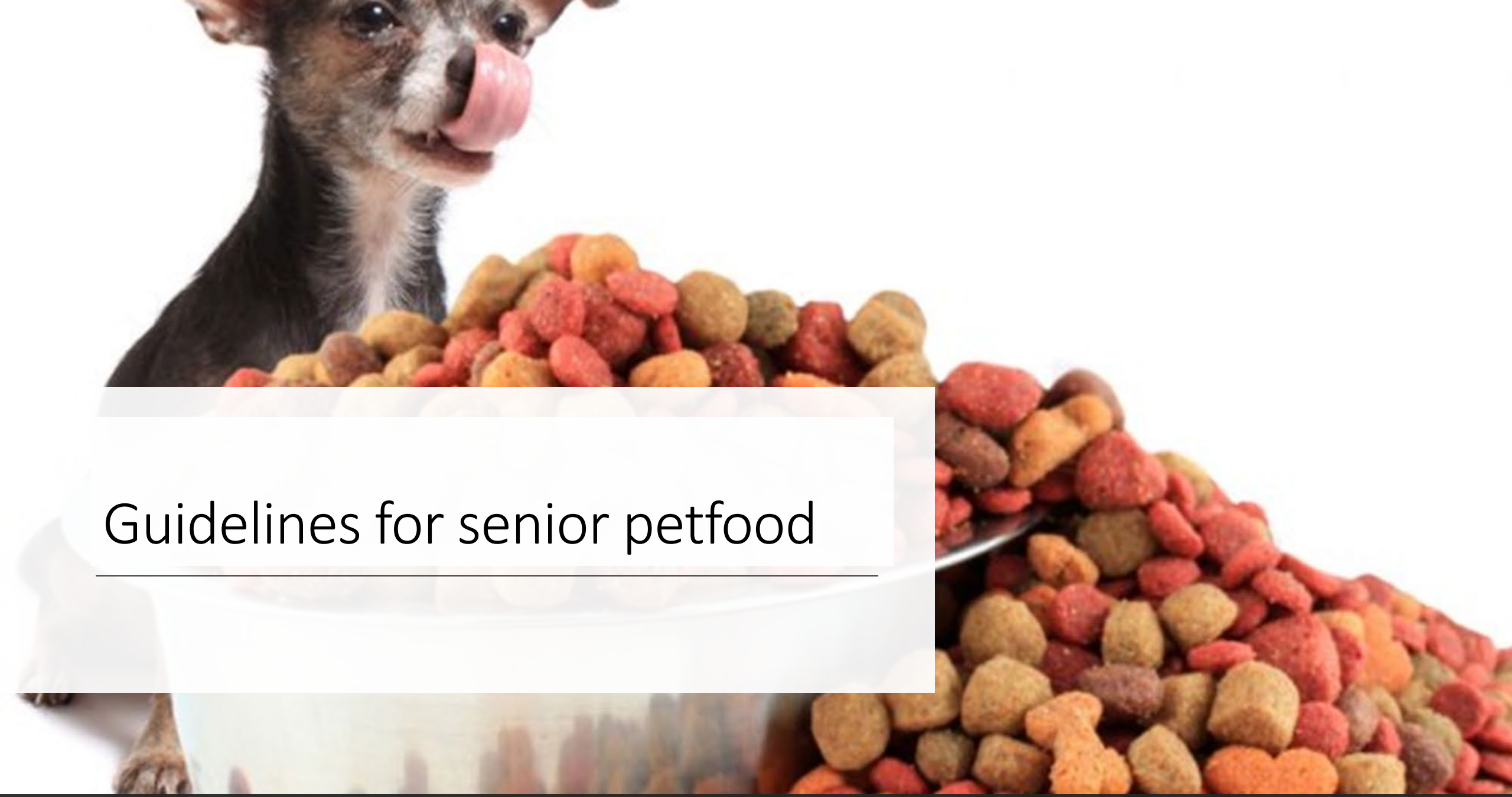
# Selecting a Diet for Your Senior Patient

CAMILLE TORRES DVM DABVP DACVIM (NUTRITION)

COLORADO STATE UNIVERSITY

# Goals

- Discuss guidelines for senior pet food
- Review how to use the label to select a diet
- Identify diets that meet unique needs



# Guidelines for senior petfood

# AAFCO Label requirements

Brand and Product Name

Name of Species for which the pet food is intended

Quantity Statement- net weight or net volume

**Nutritional Adequacy Statement- Statement that indicates the food is complete and balanced for a particular life stage.**

Ingredient Statement- Ingredients must be listed in order of predominance by weight.

**Guaranteed Analysis-The minimum percent of crude protein and crude fat, and the maximum percent of crude fiber and moisture are required.**

Feeding Directions

Name and address of manufacturer or distributor

# Nutritional Adequacy Statement

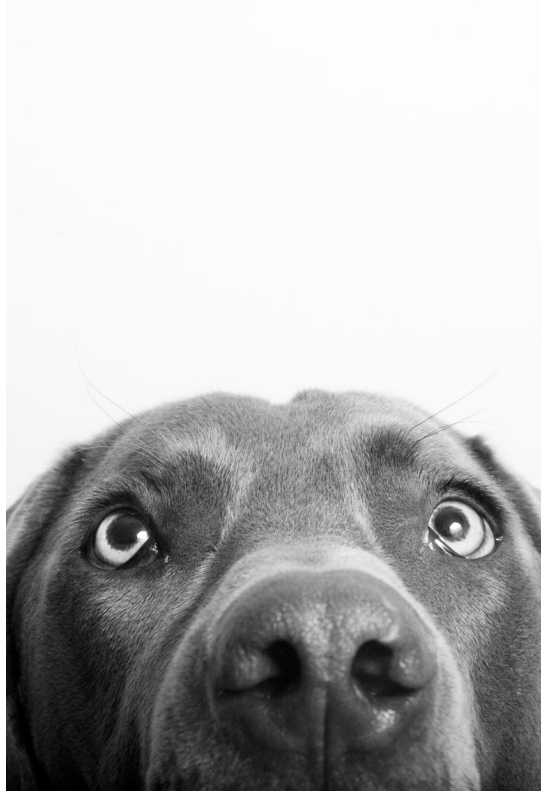
Maintenance

Growth

Growth for large breed dogs

All Life Stages

Supplemental or intermittent feeding only



# AAFCO- Senior pet food

We do not have specific guidelines for senior pet food

Diets labeled as “senior” that are complete and balanced are formulated to meet the requirements of:

- Adult maintenance
- All life stages

# All Life Stages:
# Nutrients with a higher requirement for growth compared to adult maintenance (AAFCO)

Dogs

- Protein
- Copper
- Fat
- Calcium
- Phosphorus
- EPA/DHA

Cats

- Protein
- Copper
- Calcium
- Phosphorus
- Vitamin A
- EPA/DHA

# Nutrients to consider for senior dogs and cats

Digestibility

Palatability

Energy density

Kibble size or texture

Nutrients for illness:

- Protein
- Fat
- Fiber
- Minerals


I want to feed my senior dog and cat the best food that is out there…

# Factors to consider when discussing nutrition

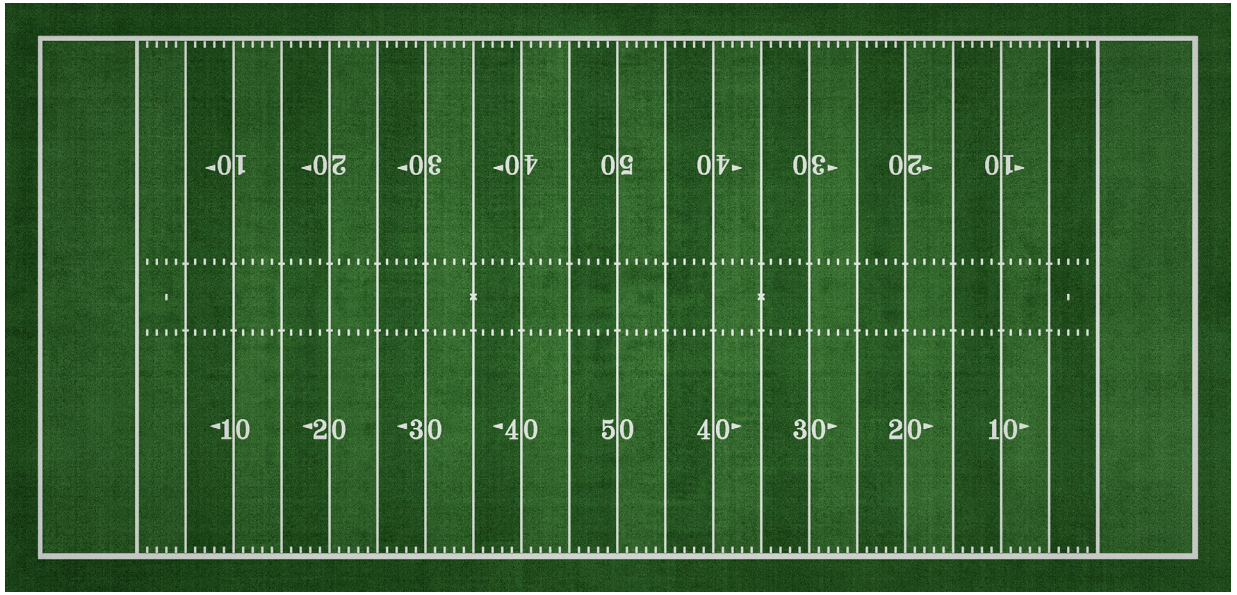
Individual patient need

Limitations

- Financial
- Time
- Family
- Other pets

Emotions

- Build a relationship
- Elicit owners perspective
- Ask for permission
- Check for understanding



# Nutrients of concern- gastrointestinal

| Condition | Nutrient of Concern | Examples |
|---|---|---|
| Pancreatitis- dog | Fat | Limit dietary fat intake, low-fat diets |
| Chronic Enteropathy | Type of Protein | Hydrolyzed protein, novel protein sources |
| | Amount of Fat | Low-fat or moderate-fat diets |
| | Fiber | Soluble fiber sources, such as psyllium or beet pulp |
| Adverse Reaction to Food | Type of Protein | Novel protein sources, limited ingredient diets |


# Nutrients of concern- renal

Protein

Digestibility

Phosphorus

Calcium phosphorus ratio

Fat- energy density

Omega 3 fatty acids

How do you select a diet that will meet the nutrient targets for your senior patient with and without illness?


# PET FOOD LABEL- FRIEND OR FOE?

# Thinking about what our patients need

Cats and dogs are fed to meet their energy requirements

Older patients with decreased energy requirements, will eat less food

This can be problematic when feeding a diet that is high in calories

- Feeding less food to prevent obesity may lead to restriction of nutrients while trying to restrict calories

# Diet selection

To make diet recommendations we need to be able to know how the nutrients of a product align with our nutrients of concern

- Protein
- Fat
- Fiber
- Phosphorus (when available)

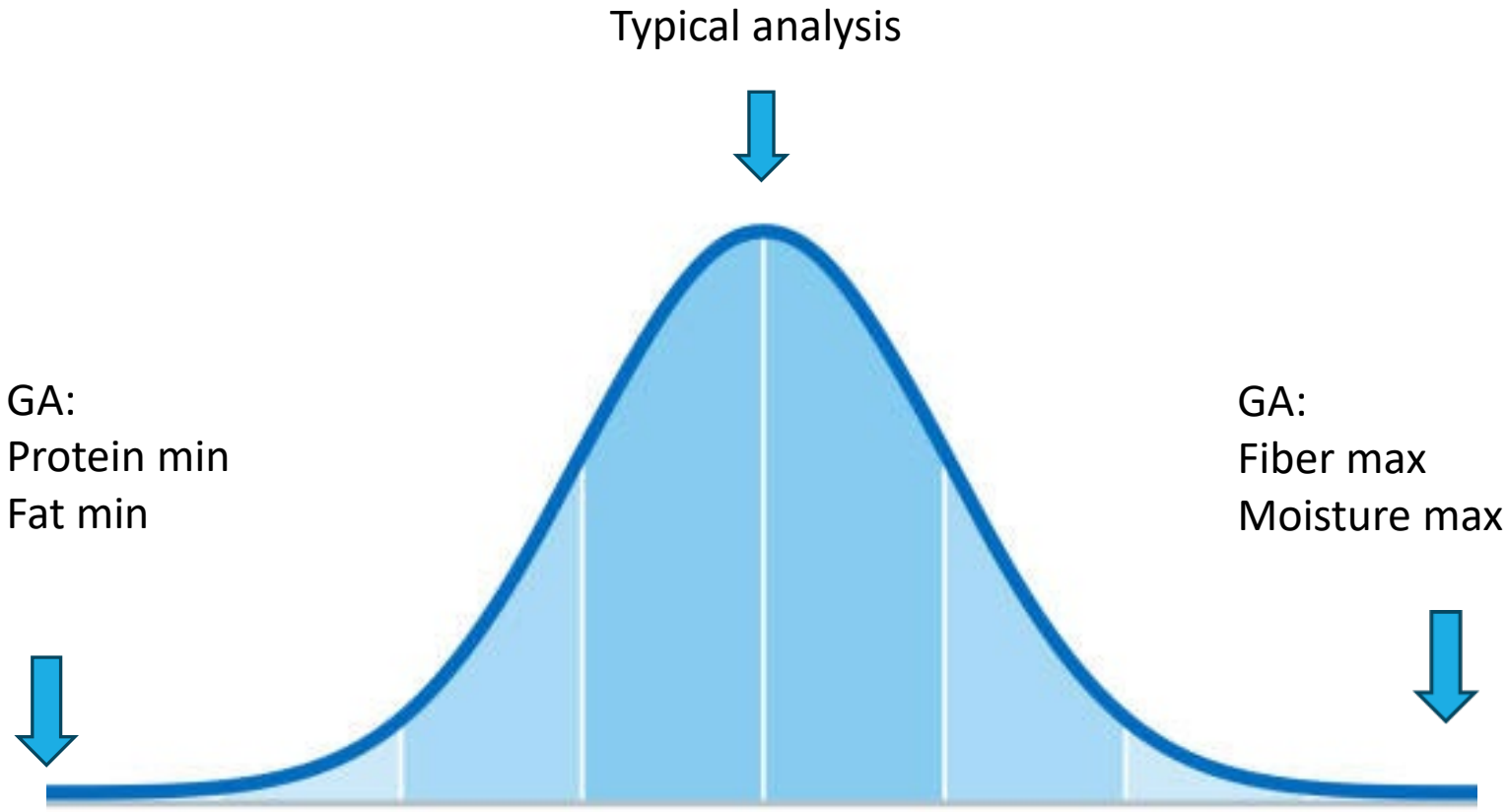

# Breaking down "The Back of the Bag"

To make diet recommendations we need to be able to know how if nutrients of a product align with our nutrients of concern

- Crude Fiber
- Crude Fat
- Crude Protein
- Phosphorus

- Types of fiber
- Types of fatty acid

# Keep in mind…




The guaranteed analysis represents minimum or maximum nutrient amounts

# What is the percent on the guaranteed analysis a percent of?

A) Percent of the nutrient per cup

B) Percent of the nutrient per 1000 calories

C) Percent of the nutrient on a dry matter basis

D) Percent of the nutrient per 100 grams

# We feed our patients to meet their caloric needs

Diets do not have the same amount of calories per 100 grams/per cup/per kg

Dog and cats will eat more or less of a diet on a weight basis based on the energy density of the diet

As the amount of food is adjusted on a weight or cup basis, the amount of nutrients consumed will change

**Question:**

Two diets have 9% crude protein- does that mean they provide the same amount of protein?

# How to answer this question

**Compare the nutrients on an energy basis**

- **Calorie content basis** (g/1000 kcal or g/100 kcal)
- **Metabolizable Energy** (% ME)

**Where can you find this information?**

**First option** (preferred option)- look at product guide

**Second option-** If a product guide isn't available: *Calculate it or convert it*


**Calculate it:** Calorie content basis

grams/1000 kcal
OR
grams/100 kcal

**Typical Analysis per 1000 Kcal:**

| Nutrient | Unit | Renal Support Early Consult dry | Renal Support Early Consult loaf in sauce | Renal Support A dry | Renal Support F dry | Renal Support S dry |
|---|---|---|---|---|---|---|
| Moisture | g | 14.4 | 766.6 | 13.9 | 13.8 | 13.1 |
| Protein | g | 73.2 | 84.1 | 58.3 | 65.1 | 58.5 |
| Fat | g | 36.6 | 49.5 | 43.1 | 42.6 | 51.3 |
| Omega-6 fatty acids | g | 9.1 | 6.9 | 9.2 | 9.0 | 10.9 |
| Omega-3 fatty acids | g | 3.5 | 2.5 | 1.9 | 2.1 | 2.1 |
| EPA + DHA | g | 2.0 | 1.7 | 1.0 | 1.0 | 1.0 |
| Carbohydrate (NFE) | g | 109.5 | 68.2 | 113.1 | 105.1 | 93.3 |
| Crude Fiber | g | 11.5 | 7.9 | 10.9 | 9.0 | 7.2 |
| Total Dietary Fiber | g | 33.2 | 19.8 | 27.1 | 26.8 | 23.9 |
| Calcium | g | 1.8 | 1.6 | 2.1 | 1.6 | 1.7 |
| Phosphorus | g | 1.3 | 1.2 | 1.1 | 1.1 | 1.0 |
| Potassium | g | 2.1 | 1.8 | 2.3 | 2.3 | 2.1 |
| Sodium | g | 1.0 | 0.9 | 0.9 | 1.0 | 1.0 |
| Magnesium | g | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 |
| Copper | mg | 3.9 | 3.1 | 3.8 | 3.8 | 3.6 |
| Zinc | mg | 55.9 | 53.4 | 60.1 | 52.6 | 49.7 |
| Vitamin D | IU | 209.1 | 178.0 | 202.8 | 225.3 | 167.1 |
| Taurine | g | 0.5 | 1.2 | 0.6 | 0.6 | 0.6 |

ROYAL CANIN® VETERINARY HEALTH NUTRITION

# FELINE VITAL SUPPORT

Grams of nutrients per 1000 kcal

| | per 100 kcal ME³ | | | | | | |
|---|---|---|---|---|---|---|---|
| | k/d Early Stage Cat Food | | k/d Cat Food | | | | |
| | Dry (with Chicken) | Stew (Chicken, Vegetable & Rice) | Dry (with Chicken) | Dry (with Ocean Fish) | Stew (Chicken & Vegetable) | Stew (Vegetable & Tuna) | Minced (with Chicken) |
| Protein | 7.9 g | 7.6 g | 6.7 g | 6.8 g | 6.8 g | 7.6 g | 6.8 g |
| Fat | 4.9 g | 5.3 g | 5.4 g | 5.4 g | 5.6 g | 6.5 g | 5.3 g |
| Carbohydrate / NFE | 8.9 g | 7.9 g | 8.7 g | 8.6 g | 8.7 g | 9.1 g | 9 g |
| Crude Fiber | 0.3 g | 0.6 g | 0.7 g | 0.7 g | 0.7 g | 0.7 g | 0.5 g |
| Total Dietary Fiber | 1.4 g | 1.7 g | 1.6 g | 1.5 g | 2 g | 2.1 g | 1.1 g |
| Calcium | 167 mg | 193 mg | 183 mg | 182 mg | 173 mg | 213 mg | 192 mg |
| Phosphorous | 130 mg | 130 mg | 119 mg | 120 mg | 110 mg | 127 mg | 110 mg |
| Sodium | 58 mg | 64 mg | 57 mg | 61 mg | 57 mg | 61 mg | 59 mg |
| Potassium | 174 mg | 210 mg | 171 mg | 171 mg | 250 mg | 304 mg | 253 mg |
| Magnesium | 19 mg | 13 mg | 18 mg | 17 mg | 13 mg | 15 mg | 12 mg |
| Total Omega-3 FA | 377 mg | 288 mg | 244 mg | 255 mg | 258 mg | 305 mg | 237 mg |
| Total Omega-6 FA | 1089 mg | 827 mg | 1212 mg | 1181 mg | 925 mg | 1150 mg | 870 mg |
| Vitamin C | 3.17 mg | 8.79 mg | 2.47 mg | 2.45 mg | 3.4 mg | 3.47 mg | 2.18 mg |
| Vitamin E | 26 IU | 17.71 IU | 18.79 IU | 18.7 IU | 17.05 IU | 23.64 IU | 22.77 IU |
| **CALORIC DISTRIBUTION:** | | | | | | | |
| Fat % | 41 | 46 | 46 | 46 | 47 | 49 | 45 |
| Protein % | 28 | 27 | 24 | 24 | 23 | 23 | 24 |
| Carbohydrates % | 31 | 28 | 31 | 30 | 30 | 28 | 31 |
| **Metabolizable Energy:** | | | | | | | |
| kcal per Cup | 526 | | 534 | 506 | | | |
| Ounces per Cup | 4.5 | | 4.5 | 4.3 | | | |
| Cups per Pound | 3.52 | | 3.52 | 3.74 | | | |
| kcal per 5.5 oz Can | | | | | | | 195 |
| kcal per 2.9 oz Can | | 79 | | | 70 | 70 | |

# Grams of nutrient per 100 kcal

# Back to the question:
# Do they have the same amount of protein?

| | |
|---|---|
| **Crude Protein** | 9.0% min |
| **Crude Fat** | 2.5% min |
| **Crude Fiber** | 1.0% max |
| **Moisture** | 82.0% max |
| **Ash** | 2.5% max |
| **Taurine** | 0.05% min |

Diet A: 825 kcal/kg

**Analysis:**

| | |
|---|---|
| Protein | 9.0% Min |
| Fat | 1.5% Min |
| Fiber | 1.0% Max |
| Ash | 2.0% Max |
| Moisture | 86.0% Max |

Diet B 1100 kcal per kg

# Calculate estimated grams of protein per 100 kcal

Information needed

- Calories per kg
- % crude protein

**Equation: (Nutrient on GA ÷ kcal per kg) X 1000 = grams of nutrient per 100 kcal**

(Crude protein/calories per kg) X 1000 = grams of protein per 100 kcal

| | |
|---|---|
| **Crude Protein** | 9.0% min |
| **Crude Fat** | 2.5% min |
| **Crude Fiber** | 1.0% max |
| **Moisture** | 82.0% max |
| **Ash** | 2.5% max |
| **Taurine** | 0.05% min |

825 Calories per kg

**Analysis:**

| | |
|---|---|
| Protein | 9.0% Min |
| Fat | 1.5% Min |
| Fiber | 1.0% Max |
| Ash | 2.0% Max |
| Moisture | 86.0% Max |

Diet B 1100 kcal per kg

# Math time

Crude protein 9%

Diet A 825 Calories per kg OR Diet B 1100 kcal per kg

(9/825) = 0.0109

0.0104 X 1000 = Diet A 10.9 grams of protein per 100 calories

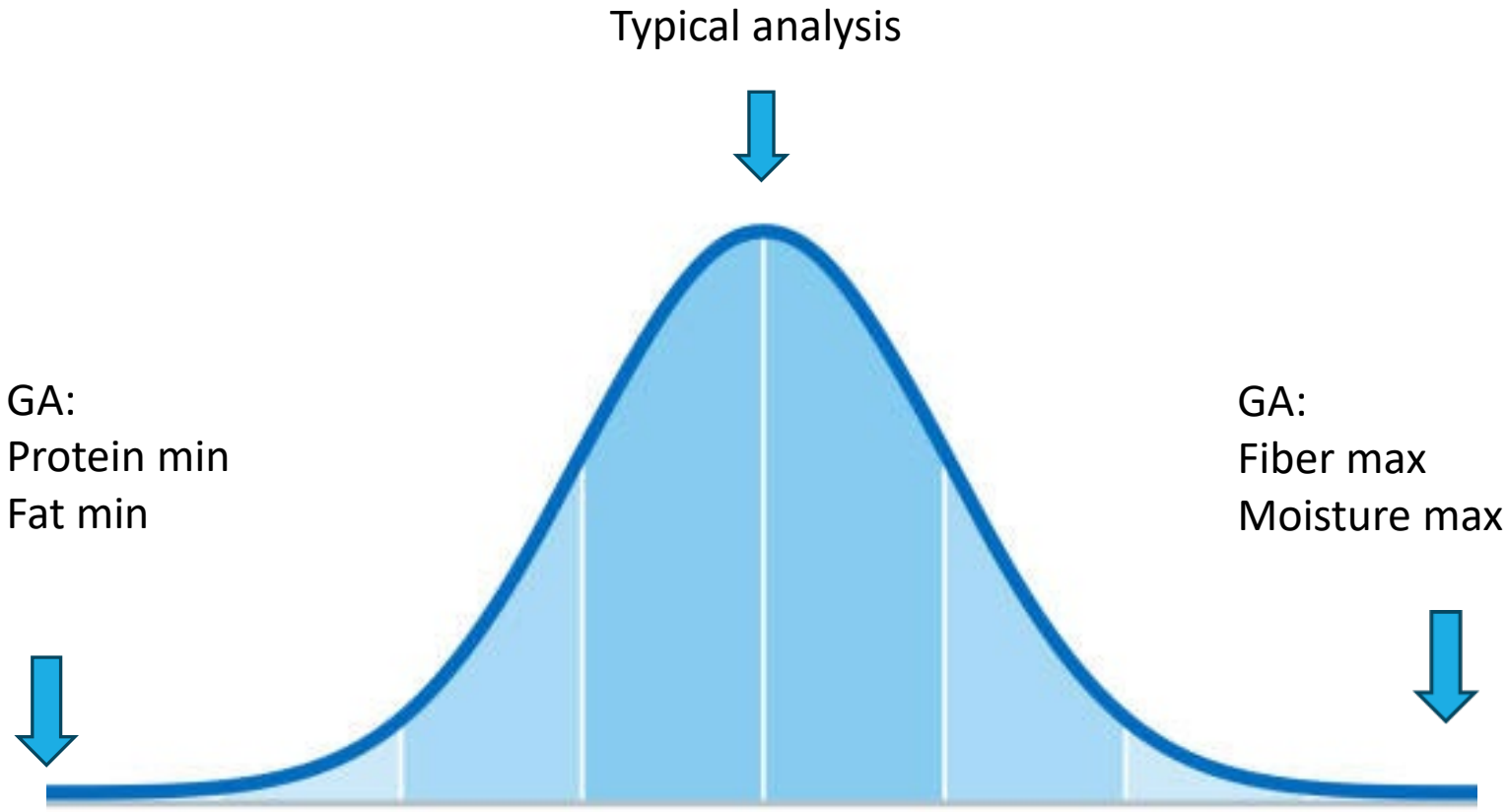
0.0104 X 10000 = 109 grams/1000 calories

(9/1100) = 0.0082

0.0082 X 1000 = Diet B 8.2 grams of protein per 100 calories

0.0082 X 10000 = 82 grams/1000 calories

# But remember…




The guaranteed analysis represents minimum or maximum nutrient amounts

## AVERAGE NUTRIENT CONTENT

| | DRY | | | CANNED | | |
|---|---|---|---|---|---|---|
| | PER 100 KCAL ME | AS FED | DRY MATTER | PER 100 KCAL ME | AS FED | DRY MATTER |
| Protein | 8.99 g | 36.32% | 39.07% | 9.45 g | 9.64% | 37.79% |
| Fat | 3.59 g | 14.52% | 15.62% | 4.38 g | 4.47% | 17.53% |
| Carbohydrate | 8.24 g | 33.29% | 35.81% | 8.32 g | 8.49% | 33.28% |
| Crude Fiber | 0.72 g | 2.90% | 3.12% | 1.94 g | 1.98% | 7.76% |
| Total Dietary Fiber | 2.75 g | 11.10% | 11.94% | 3.46 g | 3.53% | 13.84% |
| Soluble Fiber | 0.35 g | 1.41% | 1.52% | 0.54 g | 0.55% | 2.16% |
| Insoluble Fiber | 2.40 g | 9.69% | 10.42% | 2.92 g | 2.98% | 11.69% |
| Calcium | 0.17 g | 0.67% | 0.72% | 0.18 g | 0.18% | 0.72% |
| Phosphorus | 0.09 g | 0.37% | 0.40% | 0.10 g | 0.10% | 0.39% |
| Potassium | 0.35 g | 1.40% | 1.51% | 0.38 g | 0.39% | 1.54% |
| Sodium | 0.09 g | 0.36% | 0.39% | 0.09 g | 0.10% | 0.38% |
| Chloride | 0.32 g | 1.30% | 1.40% | 0.43 g | 0.44% | 1.72% |
| Magnesium | 0.02 g | 0.10% | 0.11% | 0.01 g | 0.01% | 0.04% |
| Copper | 0.41 mg | 16.66 mg/kg | 17.92 mg/kg | 0.33 mg | 3.39 mg/kg | 13.30 mg/kg |
| Zinc | 5.39 mg | 217.90 mg/kg | 234.40 mg/kg | 2.62 mg | 26.68 mg/kg | 104.61 mg/kg |
| Taurine | 0.05 g | 0.22% | 0.24% | 0.07 g | 0.07% | 0.29% |
| Vitamin A | 267 IU | 10,803 IU/kg | 11,621 IU/kg | 2,241 IU | 22,858 IU/kg | 89,640 IU/kg |
| Vitamin E | 16.44 IU | 664.20 IU/kg | 714.50 IU/kg | 17.54 IU | 178.92 IU/kg | 701.66 IU/kg |
| Total Omega-6 Fatty Acids | 0.36 g | 1.47% | 1.58% | 0.82 g | 0.84% | 3.27% |
| Total Omega-3 Fatty Acids | 0.13 g | 0.54% | 0.58% | 0.15 g | 0.15% | 0.61% |
| EPA+DHA | 0.10 g | 0.42% | 0.45% | 0.11 g | 0.11% | 0.45% |

## DIGESTION TEST RESULTS†

| DIGESTIBILITY: | DRY | CANNED |
|---|---|---|
| Total, % | 87.6 | 83.5 |
| Protein, % | 92.8 | 86.6 |
| Fat, % | 90.5 | 93.2 |
| Carbohydrate, % | 89.4 | 89.6 |
| Calorie, % | 89.4 | 85.9 |
| **PERCENTAGE OF METABOLIZABLE ENERGY FROM:** | | |
| Protein, % | 34.6 | 33.3 |
| Fat, % | 33.6 | 37.5 |
| Carbohydrate, % | 31.8 | 29.3 |

*†Based on digestion testing conducted at the Purina PetCare Technology Centers*

1 *Adjustments must be made for environmental conditions, activity level, and body condition. Provide fresh water in a clean container daily.*

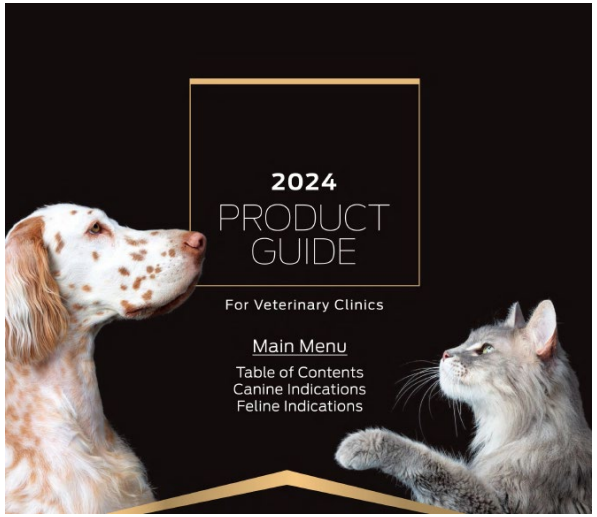
2 *Kilocalories of metabolizable energy (ME)*

3 *This daily amount should be divided into several small meals throughout the day.*

4 *For each additional pound of body weight, feed an additional 24 kilocalories.*

5 *Forrester SD, Kruger JM, Allen TA. Feline Lower Urinary Tract Diseases. In: Hand MS, Thatcher CD, Remillard RL, Roudebush P, editors. Small Animal Clinical Nutrition. 5th ed. Topeka (KS): Mark Morris Institute; 2010 p.932.*

# Preference: Use the product guide when available



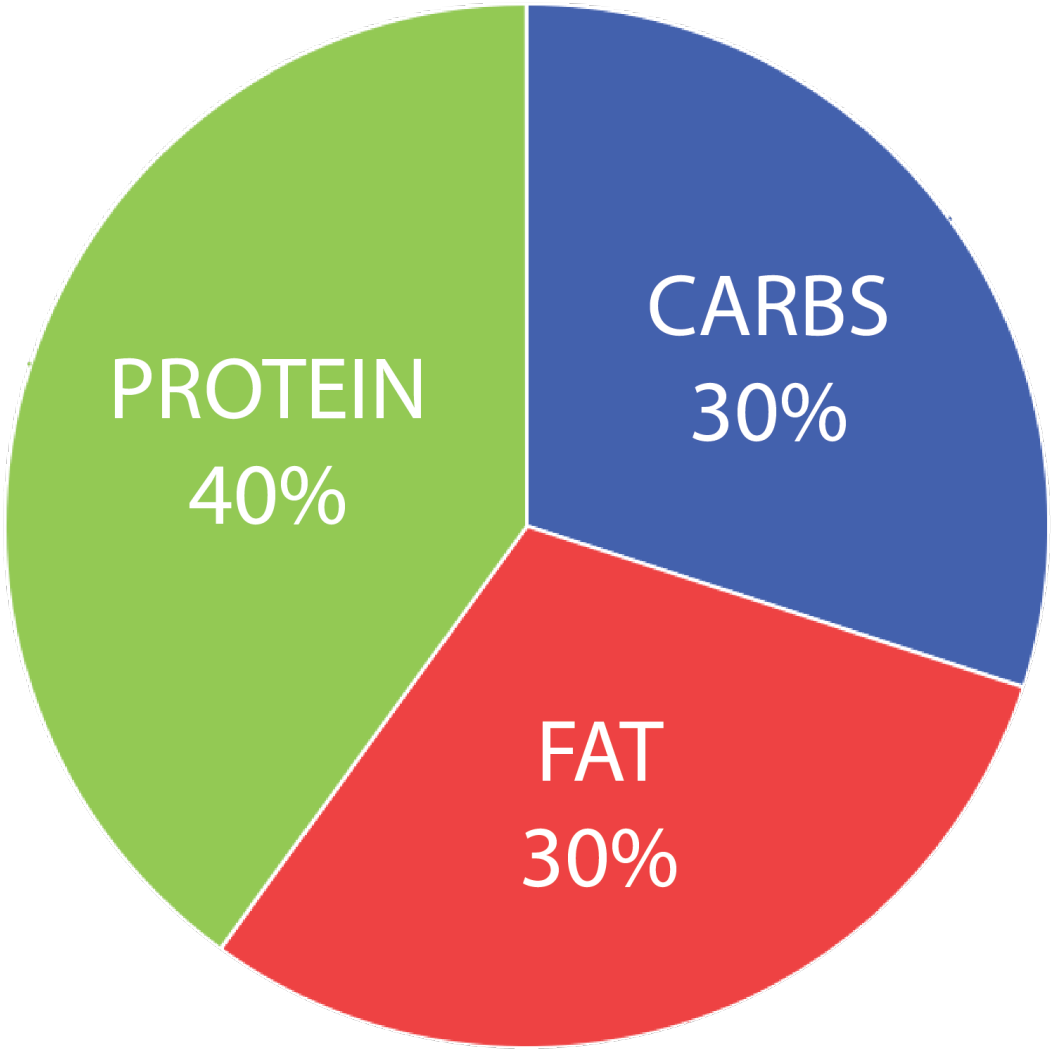
**Convert it:**

**Percent metabolizable energy**

**%ME**

**Caloric distribution**

The percent of calories coming from that macronutrient



| Nutrient | Modified Atwater Factor |
| --- | --- |
| Protein | 3.5 kcal/g |
| Fat | 8.5 kcal/g |
| Carbohydrate | 3.5 kcal/g |

# Modified Atwater Factors

Used to estimate how many calories are coming from protein, fat and carbohydrates

# Izzy- 14 year old, spayed female, Welsh Corgi

Age related changes

- Osteoarthritis
- Cognitive dysfunction
- Decreased ability to prehend food
- Hearing loss
- Decreased lean body mass

Disease related changes

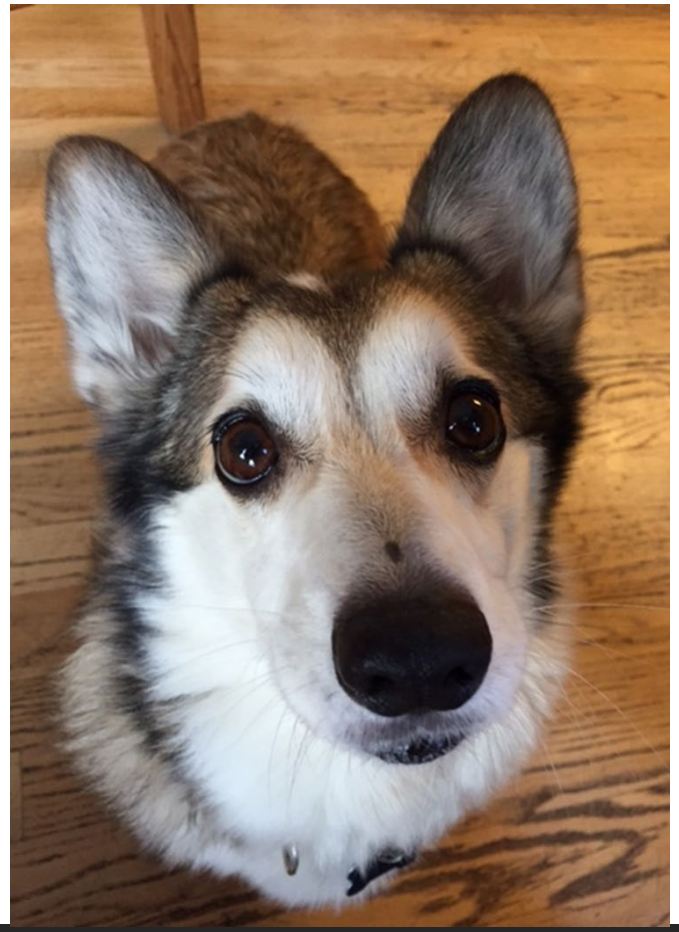
- Proteinuria (UPC- 2.3)
- Renal azotemia (BUN- 63, Creat- 2.3; USG- 1.022)
- Intermittent gastrointestinal signs, suspect chronic pancreatitis

# Nutrients of concern for Izzy

| Disease | Protein | Omega-3 Fatty Acids | Phosphorus | Digestibility | Fat | Energy Density | Palatability |
|---|---|---|---|---|---|---|---|
| **Proteinuria** | Low | Yes | Controlled? | | | | |
| **Renal Dysfunction** | Low | Yes | Low | High | High | High | High |
| **Gastrointestinal Disease/ Pancreatitis** | Type of protein | | | High | Low | High | High |
| **Underweight** | Moderate to high | Yes | | High | High | High | High |
| **Muscle Loss (Cachexia)** | High | Yes | | High | High | High | High |

# Izzy’s diet- Always start with the current diet

| Guaranteed Analysis | |
|---|---|
| Crude Protein % min | 16% |
| Crude Fat % min | 6% |
| Crude Fiber % max | 1% |
| Moisture % max | 66% |



# % Metabolizable Energy also called Caloric Distribution

| | per 100 kcal ME³ | | | | | |
|---|---|---|---|---|---|---|
| | k/d Dog Food | | | | | |
| | Dry (with Chicken) | Dry (with Lamb) | Stew (Chicken & Vegetable) | Stew (Beef & Vegetable) | Loaf (with Chicken) | Loaf (with Lamb) |
| Protein | 3.6 g | 3.6 g | 3.7 g | 3.6 g | 3.6 g | 3.5 g |
| Fat | 4.9 g | 5.1 g | 5.3 g | 5.4 g | 5.8 g | 5.8 g |
| Carbohydrate / NFE | 13.1 g | 12.6 g | 11.9 g | 11.8 g | 10.9 g | 11 g |
| Crude Fiber | 0.3 g | 0.4 g | 0.8 g | 0.8 g | 0.9 g | 0.9 g |
| Total Dietary Fiber | 1.3 g | 1.6 g | 2.2 g | 2.2 g | 2 g | 1.8 g |
| Calcium | 184 mg | 198 mg | 173 mg | 175 mg | 166 mg | 184 mg |
| Phosphorous | 75 mg | 76 mg | 71 mg | 61 mg | 55 mg | 61 mg |
| Sodium | 41 mg | 46 mg | 45 mg | 40 mg | 46 mg | 40 mg |
| Potassium | 174 mg | 190 mg | 225 mg | 233 mg | 193 mg | 199 mg |
| Magnesium | 25 mg | 27 mg | 35 mg | 32 mg | 33 mg | 32 mg |
| Total Omega-3 FA | 215 mg | 219 mg | 294 mg | 306 mg | 567 mg | 511 mg |
| Total Omega-6 FA | 1032 mg | 1016 mg | 864 mg | 846 mg | 897 mg | 854 mg |
| Vitamin C | 3.35 mg | 3.36 mg | 4.11 mg | 3.93 mg | 3.18 mg | 2.29 mg |
| Vitamin E | 16.77 IU | 16.78 IU | 22.16 IU | 20.15 IU | 16.2 IU | 18.29 IU |
| **CALORIC DISTRIBUTION:** | | | | | | |
| Fat % | 42 | 43 | 45 | 46 | 49 | 49 |
| Protein % | 12 | 13 | 13 | 13 | 12 | 12 |
| Carbohydrates % | 46 | 44 | 42 | 42 | 38 | 38 |
| **Metabolizable Energy:** | | | | | | |
| Kcal per Cup | 397 | 454 | | | | |
| Ounces per Cup | 3.5 | 4 | | | | |
| Cups per Pound | 4.6 | 3.99 | | | | |
| Kcal per large Can | | | 344 / 12.5 oz | 329 / 12.5 oz | 433 / 13 oz | 421 / 13 oz |
| Kcal per 5.5 oz Can | | | 152 | | | |

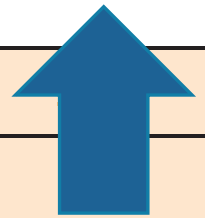
## Guaranteed Analysis Converter

It can be difficult to compare the protein, fat and carb levels between different foods by using the information on a package's label (especially in can vs dry food).

Note: the calculated values may be different from those used by the manufacturer since the actual digestibility of protein, fat, carb and ash must be estimated. Minimum values can also differ from the typical or actual value—so care should be used as protein and fat levels may be higher than the label indicates.

| Guaranteed Analysis Values | | | Caloric Distribution Estimate* |
|---|---|---|---|
| % Crude Protein, min | 0 | % | 0 % ME Protein |
| % Crude Fat, min | 0 | % | 0 % ME Fat |
| % Moisture, max | 0 | % | |
| % Fiber, max | 0 | % | |
| % Ash, max | 3 | % | |
| % CHO (by difference) | 97 | % | 100 % ME Carb |

| | | | | |
|---|---|---|---|---|
| Calcium | 184 mg | 198 mg | 173 mg | 175 mg |
| Phosphorous | 75 mg | 76 mg | 71 mg | 61 mg |
| Sodium | 41 mg | 46 mg | 45 mg | 40 mg |
| Potassium | 174 mg | 190 mg | 225 mg | 233 mg |
| Magnesium | 25 mg | 27 mg | 35 mg | 32 mg |
| Total Omega-3 FA | 215 mg | 219 mg | 294 mg | 306 mg |
| Total Omega-6 FA | 1032 mg | 1016 mg | 864 mg | 846 mg |
| Vitamin C | 3.35 mg | 3.36 mg | 4.11 mg | 3.93 mg |
| Vitamin E | 16.77 IU | 16.78 IU | 22.16 IU | 20.15 IU |
| **CALORIC DISTRIBUTION:** | | | | |
| Fat % | 42 | 43 | 45 | 46 |
| Protein % | 12 | 13 | 13 | 13 |
| Carbohydrates % | 46 | 44 | 42 | 42 |
| **Metabolizable Energy:** | | | | |
| Kcal per Cup | | 454 | | |
| Ounces per Cup | | 4 | | |
| Cups per Pound | 4.6 | 3.99 | | |



## Guaranteed Analysis

| | |
|---|---|
| Crude Protein % min | 16% |
| Crude Fat % min | 6% |
| Crude Fiber % max | 1% |
| Moisture % max | 66% |

### Guaranteed Analysis Values

| | | |
|---|---|---|
| % Crude Protein, min | 16 | % |
| % Crude Fat, min | 6 | % |
| % Moisture, max | 66 | % |
| % Fiber, max | 1 | % |
| % Ash, max | 3 | % |
| % CHO (by difference) | 8 | % |

* The following "modified Atwater" factors are used: 3.5 kcal/g protein, 8.5 kcal/g fat, and 3.5 kcal/g carbohydrate.

CALCULATE

# Guaranteed analysis converter: BalanceIT.com

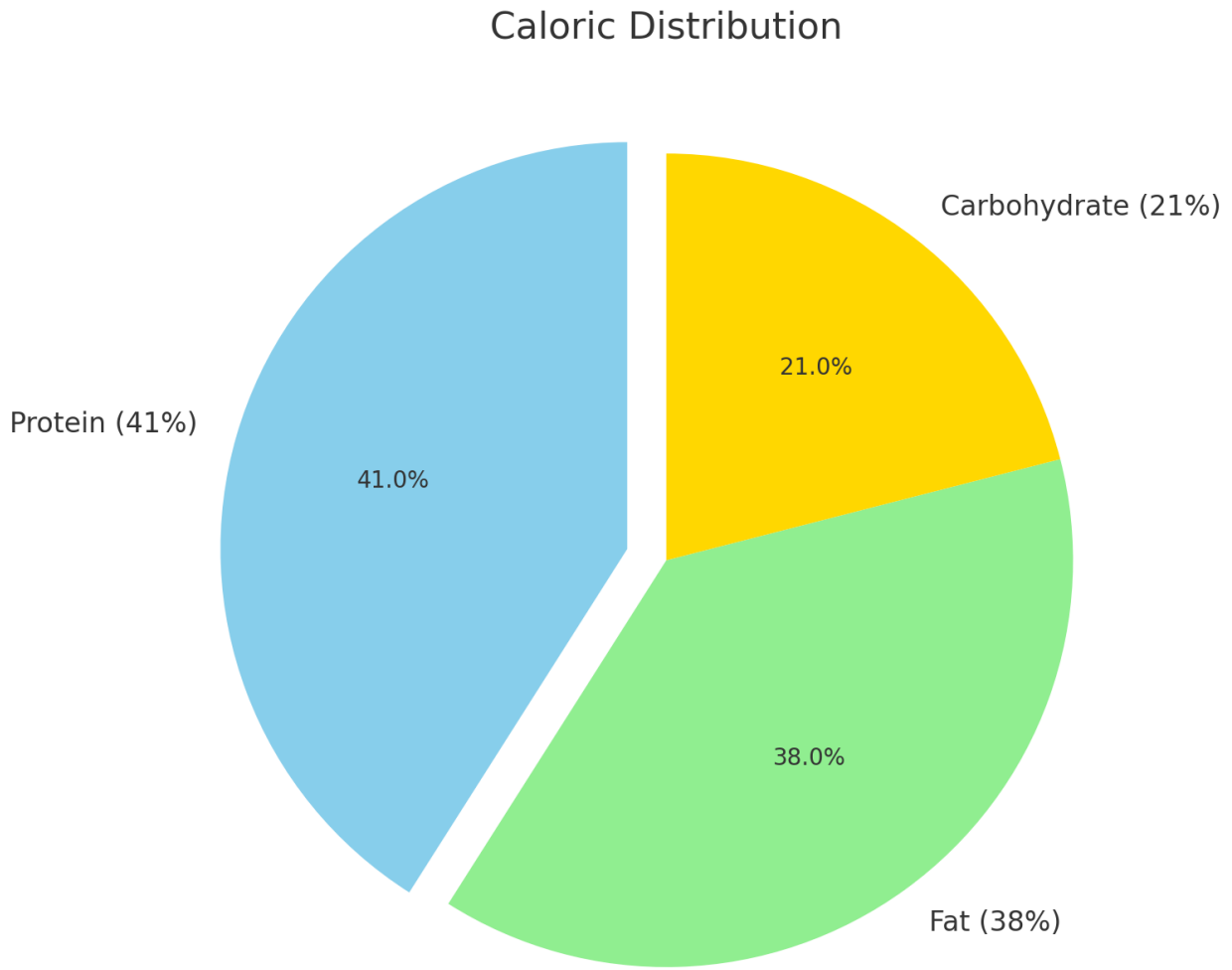
# Caloric distribution of Izzy's diet

Goals for renal disease

- Low protein:
  - 13-15% Protein ME

Goals for pancreatitis

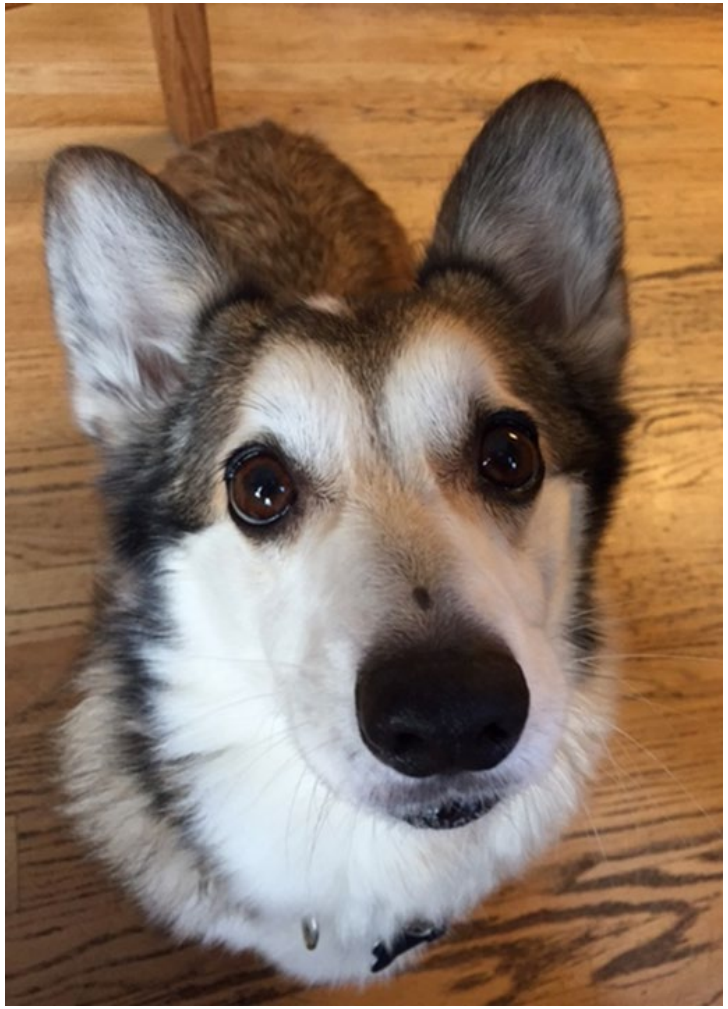
- Low fat:
- <20% Fat ME



# Concerns with Izzy's current diet

Higher in protein than recommended for renal disease

Higher in fat than recommended for fat intolerance (GI or pancreatitis)



# Protein- Dog % Metabolizable Energy and Grams/1000 kcal

| DOG | PROTEIN RANGE (% ME) | GRAM PROTEIN PER 1000 KCAL |
|---|---|---|
| Low Protein | <15% | <37g |
| Moderate Protein | 20-30% | 50 -75g |
| High Protein | 40-60% | >90 g |

# Protein- Cat
# % Metabolizable Energy and Grams/1000 kcal

| Cat | Protein Range (% ME) | Gram Protein per 1000 kcal |
|---|---|---|
| Low Protein | <26% | 47-75g |
| High Protein | 40-60% | >90 g |

# Fat- Dogs
# % Metabolizable Energy and Grams/1000 kcal

| | FAT RANGE (% ME) | GRAM PER 1000 KCAL |
|---|---|---|
| Low Fat | <20% | <26 g |
| Moderate Fat | 25-35% | 27- 45 g |
| High Fat | 40-60% | 45 – 60 g |

# Common comorbidity challenge in dogs

Need for limited ingredient or hydrolyzed protein

AND

Need low fat

# Solution:

## 18% > 20% >22% > 24% (fat ME)





Challenge:

What if you need more **fiber**

# Solution: Limited ingredient or hydrolyzed canine diets that have more fiber but still lower in fat

| Dog food | Total dietary fiber g/1000 kcal | Fat grams/1000 kcal |
|---|---|---|
| Royal Canin Hydrolyzed Protein canned | 57 | 41 |
| Purina HA Chicken Flavor canned | 48 | 33 |
| Royal Canin Selected Protein PW Moderate Calorie dry | 47 | 30 |
| Royal Canin Vegetarian dry | 32 | 28 |
| Hill's z/d Low Fat canned | 27 | 25 |
| Hill's z/d Low Fat dry | 26 | 21 |

# Common challenge in cats: Renal disease and gastrointestinal disease

Need low protein for renal disease:

- <75 g/1000 kcal

Need low phosphorus for renal disease:

- 0.8-1.3 g/1000 kcal

Novel or hydrolyzed protein

| Feline Diet | Protein type | Protein g/1000 kcal | Phosphorus g/1000 kcal |
|---|---|---|---|
| Royal Canin Renal Support Hydrolyzed Protein | hydrolyzed soy | 63 | 1.1 |
| Royal Canin Hydrolyzed Protein | hydrolyzed soy | 63 | 1.5 |
| Royal Canin Ultamino | hydrolyzed poultry by-products | 63 | 1.3 |
| Hill's z/d canned | hydrolyzed chicken liver | 88 | 1.6 |
| Hill's z/d dry | hydrolyzed chicken liver | 83 | 1.6 |

# Solution: Gastrointestinal diets that are lower in protein and phosphorus

Low protein cats:
<75 g/1000 kcal
Phosphorus for renal disease:
0.8-1.3 g/1000 kcal

# Summary

Senior dogs and cats can benefit from an individualized diet plan

Selecting a diet starts with knowing what the nutrient profile is of the current diet

By using product guides or converting the numbers on the label to an energy basis we can compare diets to our nutrients of concern

In cases of comorbidities there are several diets that can meet the needs of our patients

# Thank you!

CAMILLE TORRES DVM
DABVP CANINE FELINE
DACVIM NUTRITION

CTORRES@COLOSTATE.EDU

Hill's®
Transforming Lives™

# Weighty Matters: Tackling Canine and Feline Obesity In Senior Pets – Insights from the Healthy Weight Clinic and Pet Health Center

**KATHERINE OAKES, DVM**

# WEIGHTY MATTERS: TACKLING CANINE & FELINE OBESITY IN SENIOR PETS

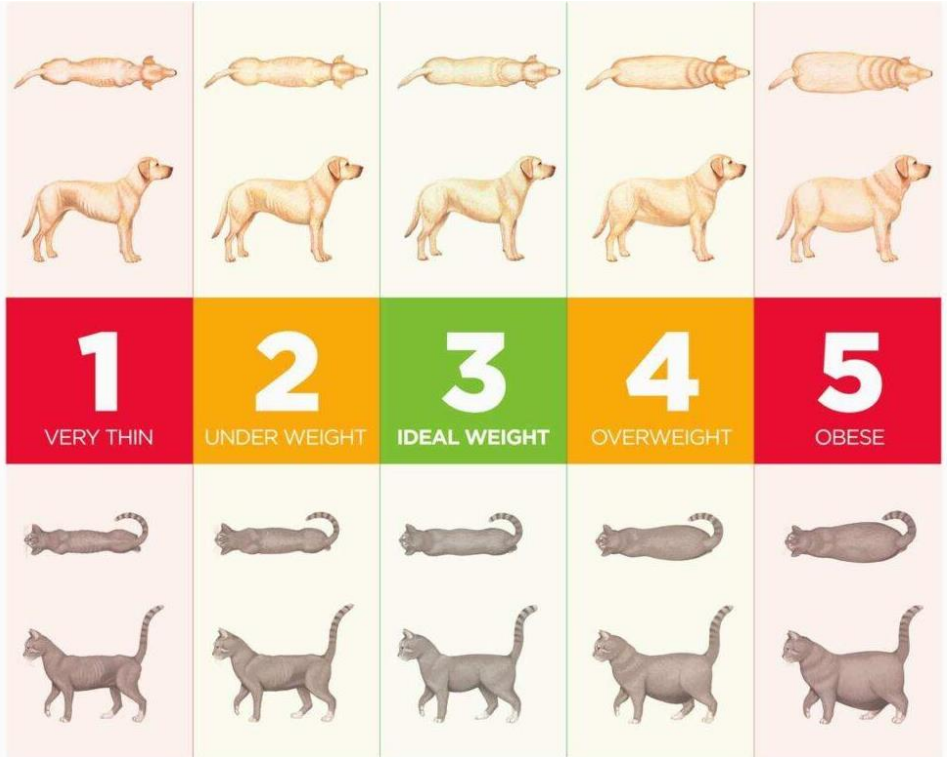
KATHERINE OAKES, DVM

DECEMBER 7TH, 2024

CLINICAL NUTRITION SYMPOSIUM

# DEFINITIONS

- Obesity: excess white adipose tissue (body fat) that contributes to disease
- BCS: diagnosed via physical examination
  - 1-5 or 1-9
  - Evaluation of subQ fat



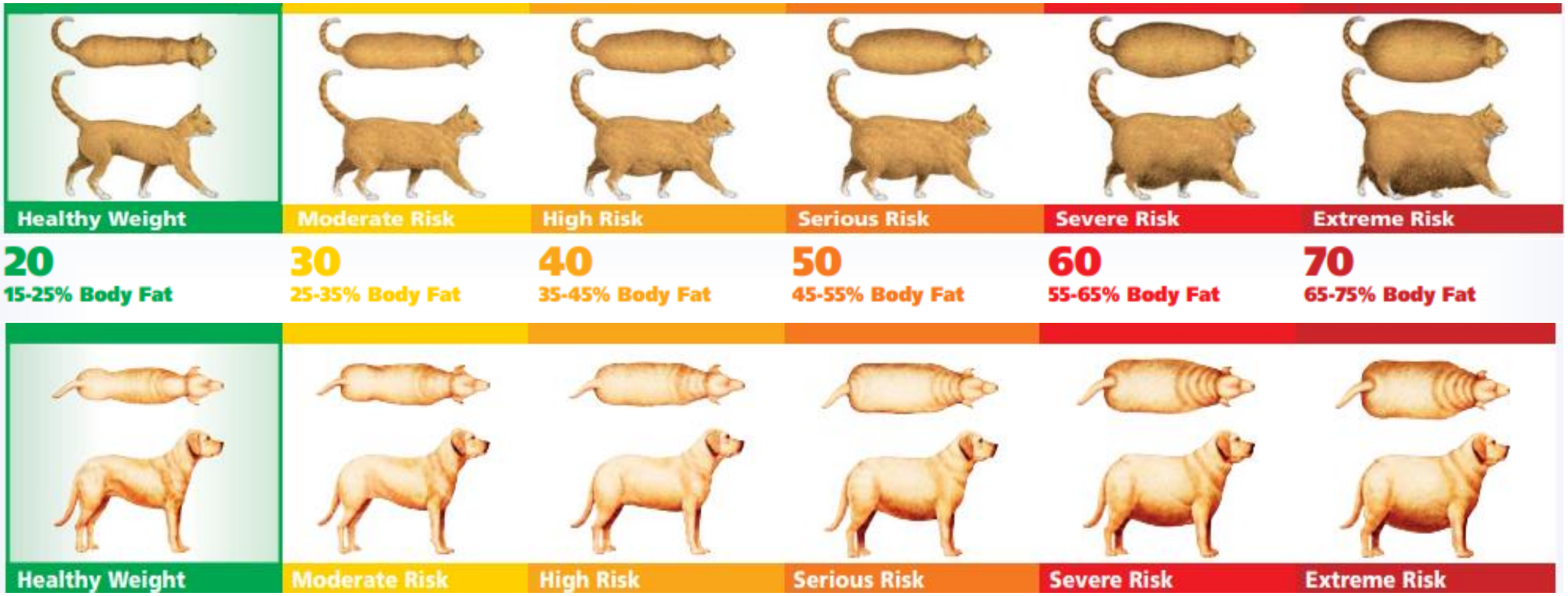

Salt, et. al (2018); Laflamme, et. al (2012); Chiang, et al (2022); Hill's Pet Nutrition

# BODY CONDITION SCORE



Association for Pet Obesity Prevention

# BODY FAT INDEX (BFI) RISK CHART




Hill's Pet Nutrition

# DEFINITIONS


AAFP-AAHA Feline Lifestage Guidelines (2021)

# DEFINITIONS

**Table 2. The 14 breeds with the highest median age at death (>13.5 years) showing the Kennel Club breed group that these breeds belong to, the published values for average "ideal" bodyweight (Alderton, 1993), number of deaths in each breed and median age at death**

| Breed group | Breed | Average bodyweight (kg) | Median age at death (year) | Number of deaths |
|---|---|---|---|---|
| Small | Lakeland terrier | 5·5 | 15·46 | 14 |
| Small | Irish terrier | 11·5 | 14·83 | 2 |
| Medium | Canaan dog | 20·5 | 14·63 | 2 |
| Toy | Toy poodle | 5·0 | 14·63 | 20 |
| Small | Swedish vallhund | 13·0 | 14·42 | 17 |
| Small | Tibetan spaniel | 5·5 | 14·42 | 125 |
| Small | Lhasa apso | 6·5 | 14·33 | 84 |
| Toy | Australian silky terrier | 4·5 | 14·25 | 5 |
| Small | Border terrier | 6·0 | 14·00 | 177 |
| Small | Cairn terrier | 7·0 | 14·00 | 124 |
| Small | Miniature poodle | 13·0 | 13·92 | 23 |
| Small | Basenji | 10·0 | 13·54 | 46 |
| Medium | Bearded collie | 22·5 | 13·50 | 278 |
| Toy | Italian greyhound | 4·0 | 13·50 | 46 |

**Table 3. The 11 breeds with the lowest median age at death (<8 years) showing the Kennel Club breed group that these breeds belong to, the published values for average "ideal" bodyweight (Alderton, 1993), number of deaths in each breed and median age at death**

| Breed group | Breed | Average bodyweight (kg) | Median age at death (year) | Number of deaths |
|---|---|---|---|---|
| Large | Bullmastiff | 50·0 | 7·46 | 96 |
| Giant | Leonberger | 42·0 | 7·08 | 47 |
| Giant | Irish wolfhound | 47·5 | 7·04 | 112 |
| Giant | St Bernard | 70·0 | 7·00 | 53 |
| Small | Shiba Inu (Japanese) | 11·5 | 7·00 | 3 |
| Giant | Mastiff | 83·0 | 6·83 | 80 |
| Giant | Bloodhound | 43·0 | 6·79 | 82 |
| Giant | Great Dane | 50·0 | 6·50 | 171 |
| Medium | Bulldog | 24·0 | 6·29 | 180 |
| Medium | Shar pei | 18·0 | 6·29 | 60 |
| Large | Dogue de Bordeaux | 47·5 | 3·83 | 5 |

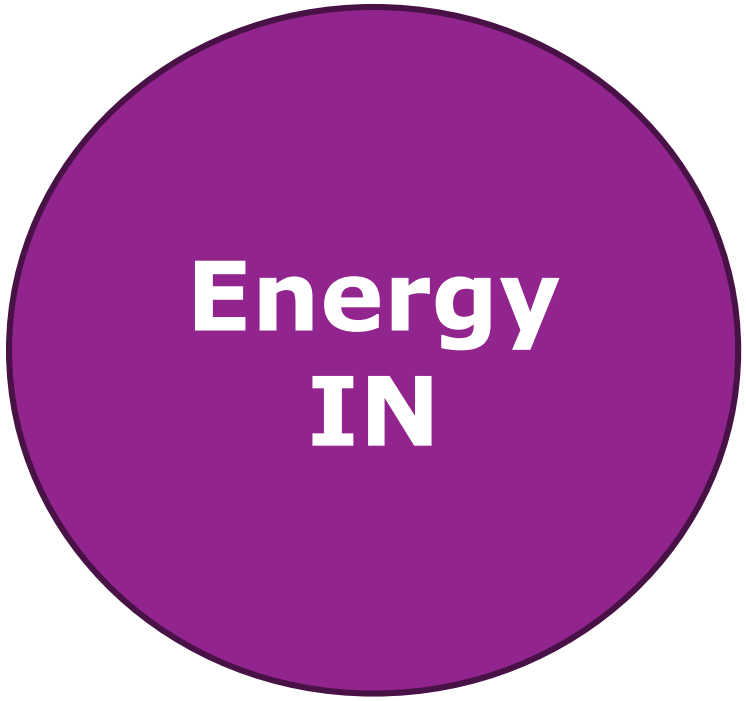
Adams, et al (2010)
The Institute of Canine Biology

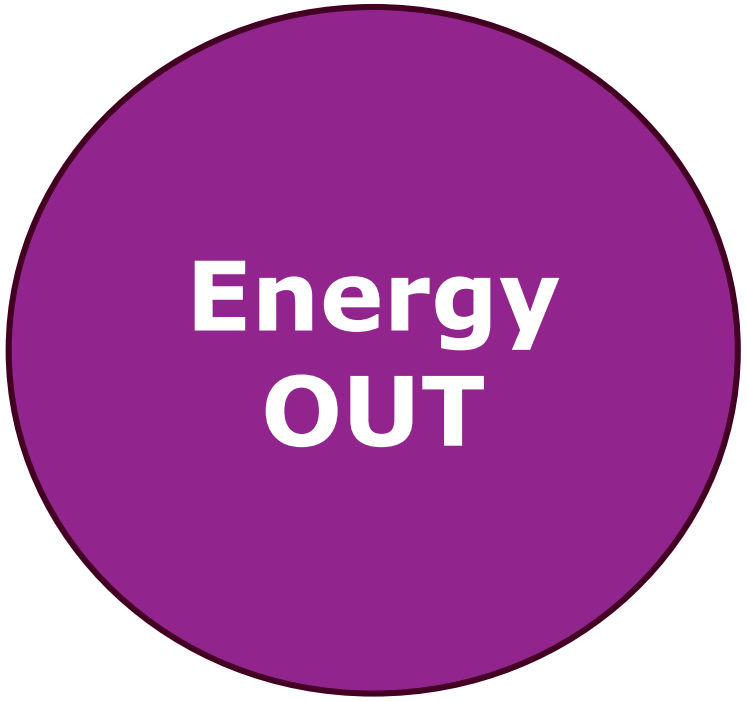
# PREVALENCE


**Most common form of malnutrition**

Association for Pet Obesity Prevention (2022); Blanchard, et. al (2024); Buffington (2014)

# PATHOPHYSIOLOGY



# PATHOPHYSIOLOGY

- **Overall: EXCESS CALORIES**
  - Over-feeding
  - Behavioral
  - Medical conditions
  - Sedentary lifestyle

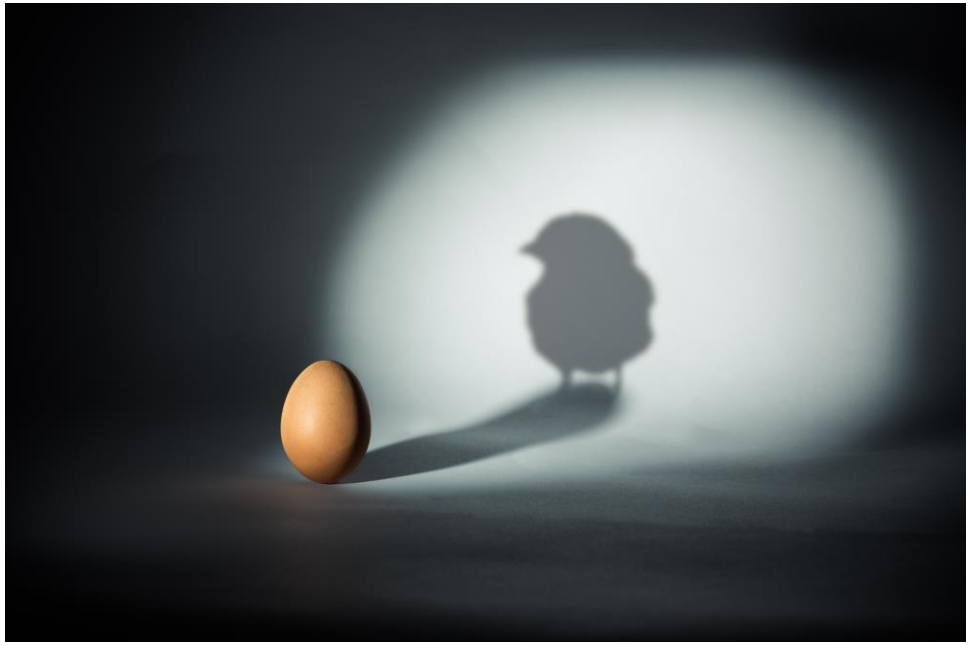
- **Aging pets:**
  - ↓ energy requirements
  - ↑ protein requirements
    - Diet-induced thermogenesis

**RER = 70 * (ideal $BW_{kg}$)$^{0.75}$**
**MER = RER x adjustment factor**

Laflamme et al, (2012); Churchill & Eirmann, (2021)

# MEDICAL FACTORS

- Polyphagia
  - Cushing's disease
  - Iatrogenic - steroid administration
- Altered metabolism
  - Hypothyroidism
- Hyperlipidemia
- Osteoarthritis



Chiang et. al (2022); Blanchard et. al (2024)

# OTHER FACTORS

- Age
- Breed
- Neuter status
- Sex?
- Owner perception of weight


Chiang et. al (2022); Blanchard et. al (2024); Association for Pet Obesity Prevention

# CONSEQUENCES & CO-MORBIDITIES

- State of chronic inflammation
- Osteoarthritis
- Neoplasia
- Diabetes mellitus & insulin resistance
- Shortened life span
- Higher anesthetic risk
- Respiratory disorders/dyspnea
- Metabolic disease
- Dermatopathy/inability to groom
- Dental disease
- Urinary tract infections

Lund et al (2005)

# CONSEQUENCES & CO-MORBIDITIES

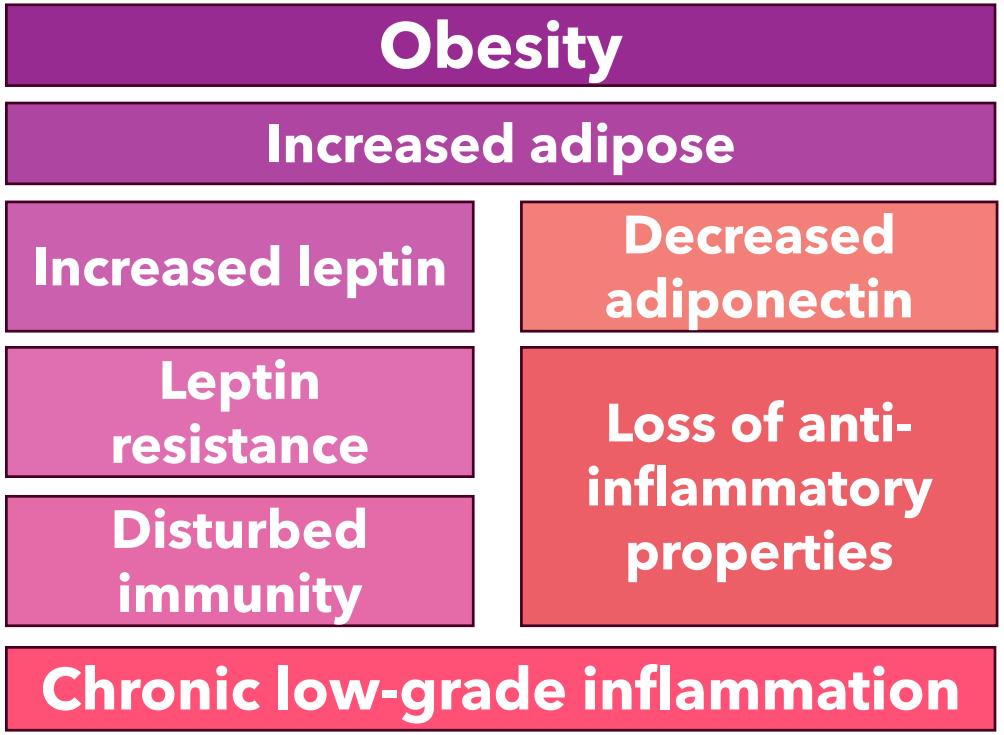
- **State of chronic inflammation**
- **Osteoarthritis**
- **Neoplasia**
- **Diabetes mellitus & insulin resistance**
- **Shortened life span**

- Higher anesthetic risk
- Respiratory disorders/dyspnea
- Metabolic disease
- Dermatopathy/inability to groom
- Dental disease
- Urinary tract infections

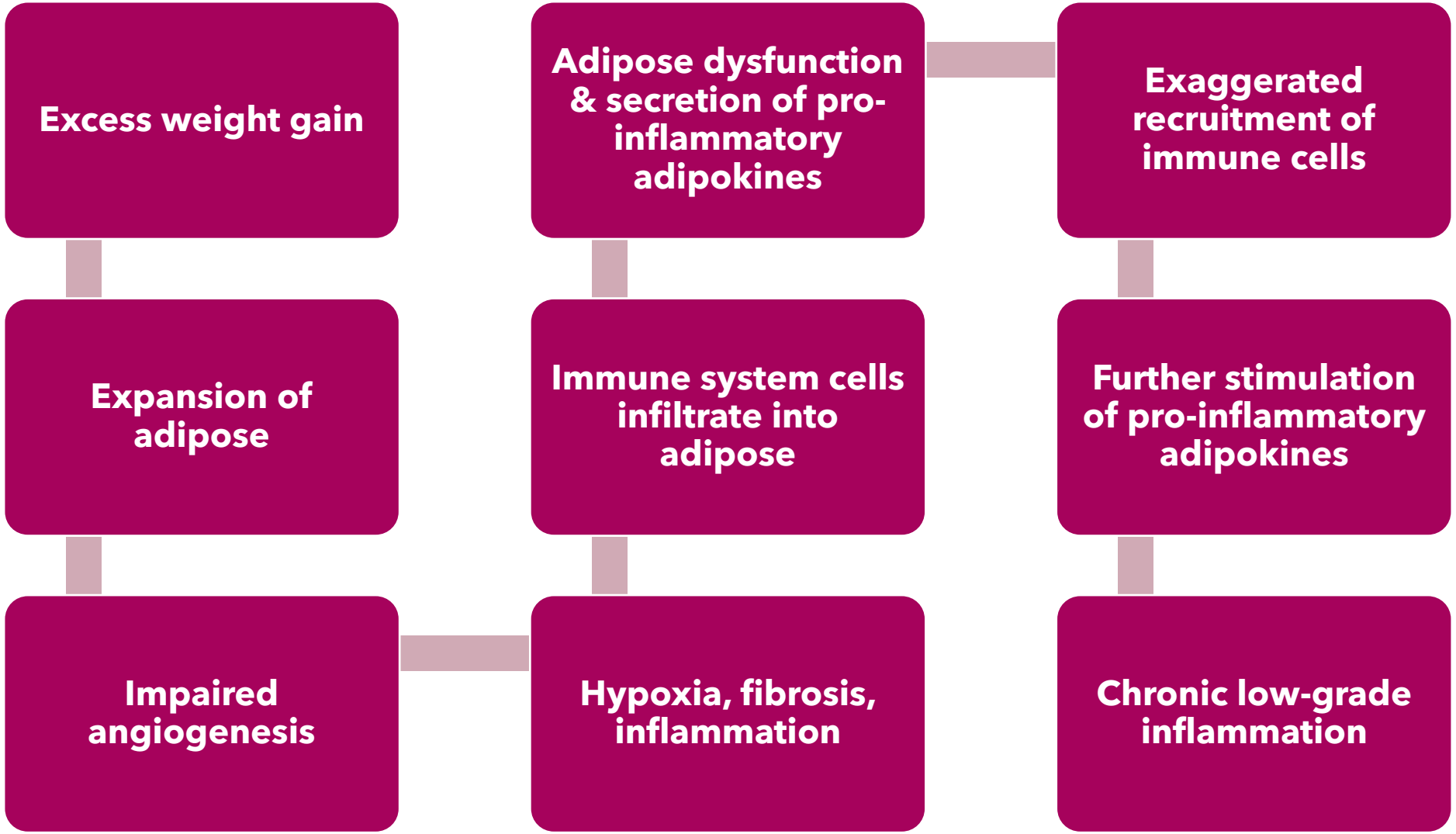
Lund et al (2005)

# CHRONIC INFLAMMATION

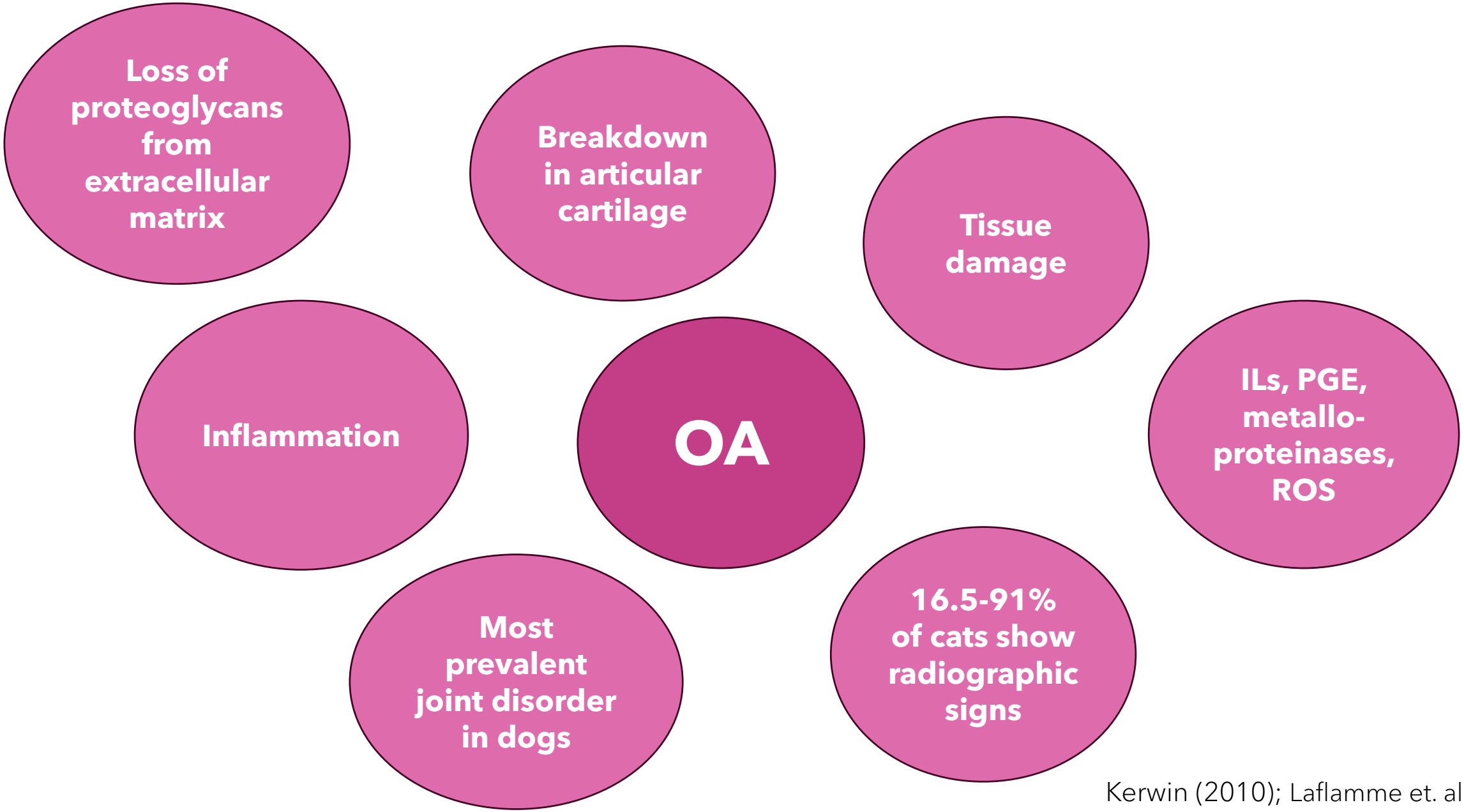
- Adipose = metabolically active endocrine organ
  - Active producer of:
    - Hormones
      - Leptin
      - Resistin
    - Inflammatory cytokines
      - TNF-α (tumor necrosis factor alpha)
      - Interleukins
      - C-reactive protein (CRP)
  - Downregulates adiponectin




Laflamme et al (2012); Marchi et al (2022)




Marchi et al (2022)




Kerwin (2010); Laflamme et. al (2012)

# OSTEOARTHRITIS

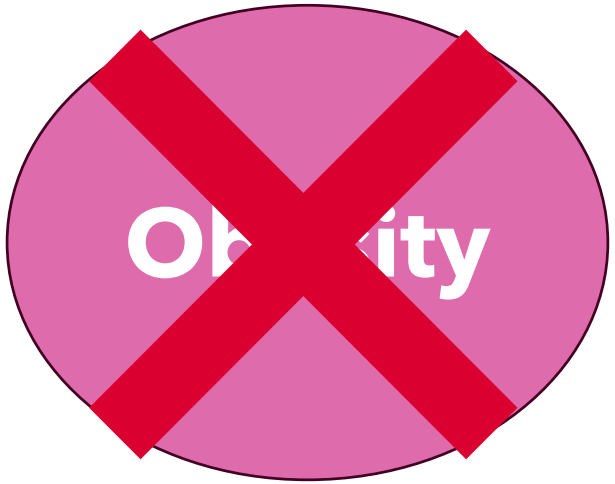
**Obesity**

- Added weight = stress on joints
- ↑ Oxidative stress (ROS)
- ↑ Inflammatory mediators

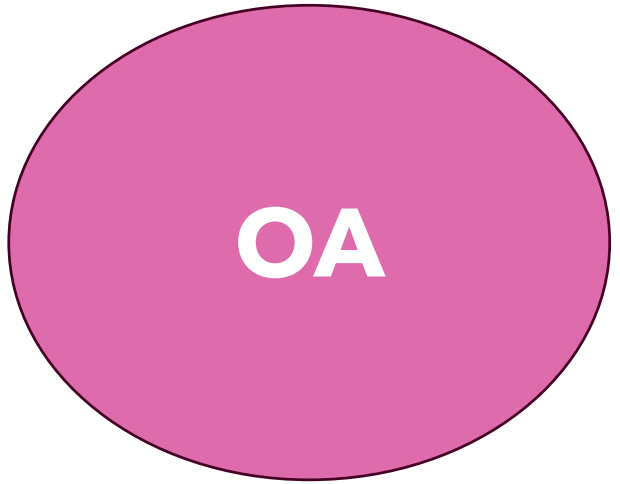
**OA**

Laflamme et. al (2012)

# OSTEOARTHRITIS




- ↑ Joint mobility
- ↓ Lameness/pain




Laflamme et. al (2012)

# OSTEOARTHRITIS

- Paired feeding study
  - 48 Labrador retrievers
  - Paired by sex and weight within litters
  - Control fed: free fed, then ideal weight energy requirements
  - Restricted/limit fed: 75% of control group
  - 8 year study

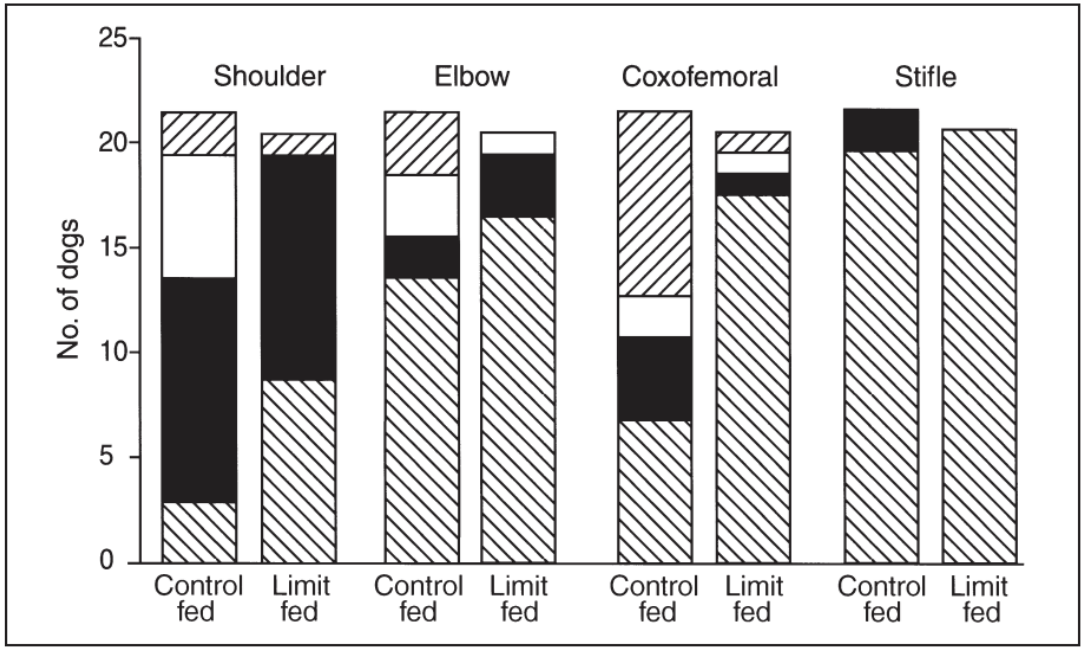



Figure 1—No. of dogs with severe (▨), moderate (□), mild (■), or no (▧) radiographic lesions of osteoarthritis in various joints.

Kealy et al (2000)

# OSTEOARTHRITIS

| Radiographic OA prevalence | |
|---|---|
| Multiple joints | Control-fed > restricted-fed |
| Hip joint | Control-fed: 15/22<br>Restricted-fed: 3/21 |
| Shoulder joint | Control-fed: 19/22<br>Restricted-fed: 12/21 |
| Elbow joint | Increased severity in control-fed |

Kealy et al (2000)

# OSTEOARTHRITIS

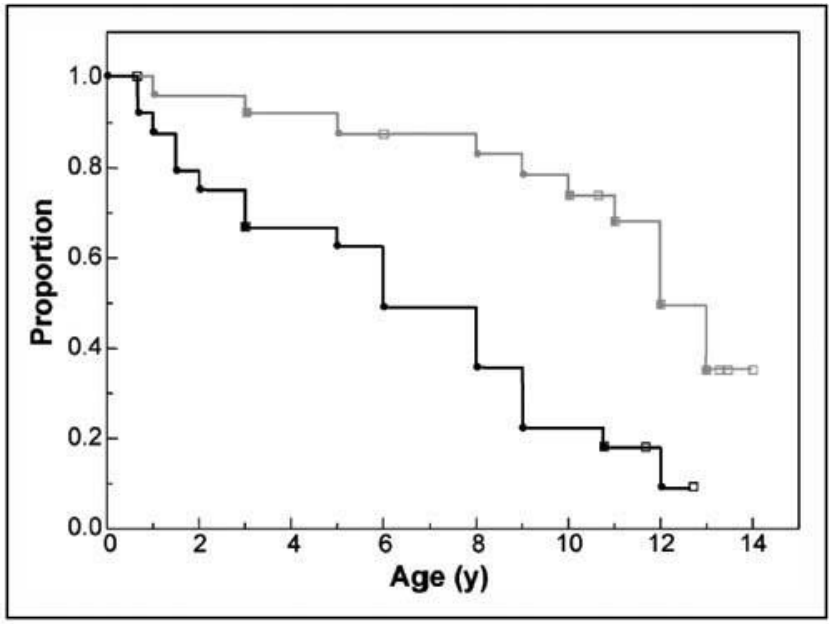



Figure 1—Results of Kaplan-Meier analysis for proportion of Labrador Retrievers (gray line = restricted-fed dogs [n = 24]; black line = control-fed dogs [24]) without radiographic evidence of hip joint osteoarthritis.

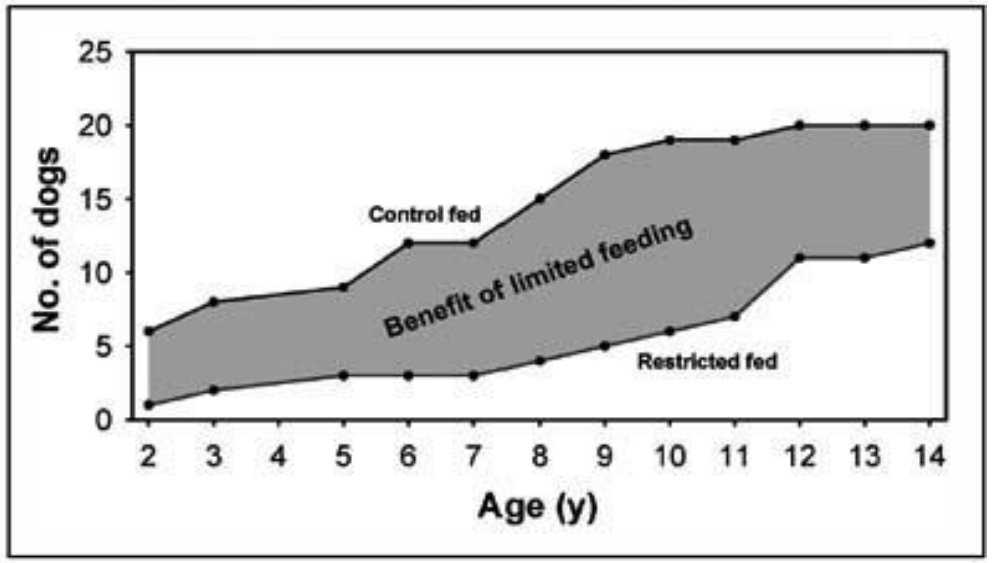
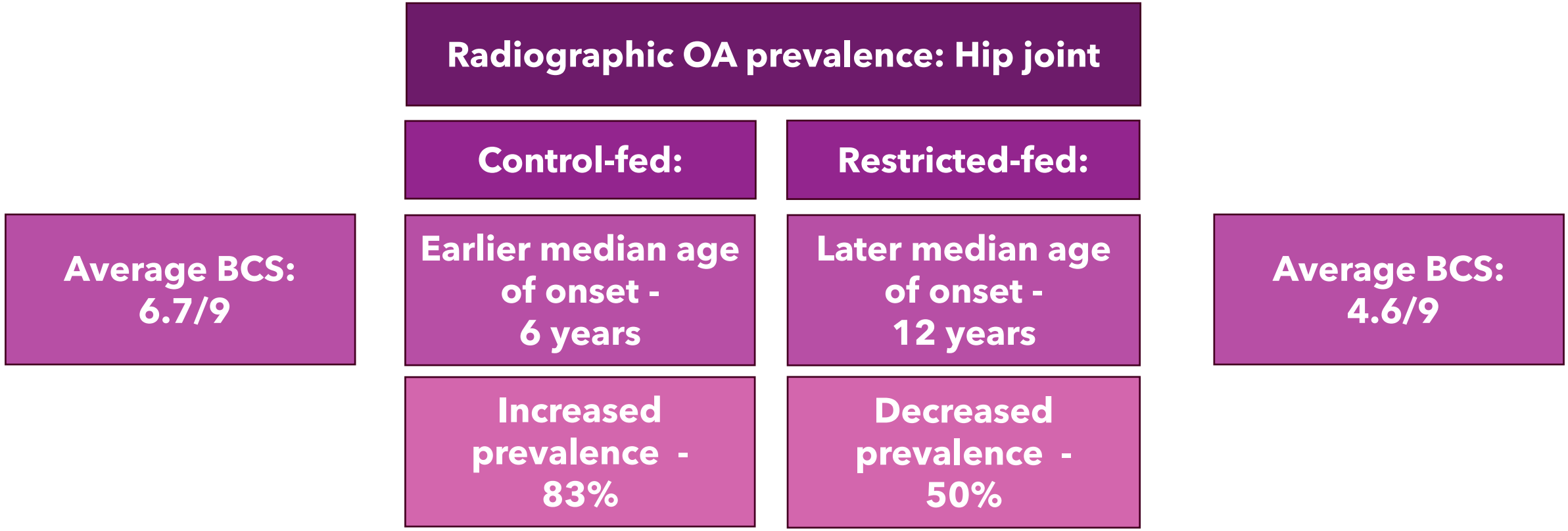



Figure 2—Cumulative prevalence of hip joint osteoarthritis in the same dogs as in Figure 1.

Smith et al (2006)

# OSTEOARTHRITIS




Smith et al (2006)

# OSTEOARTHRITIS

- Prospective study - 14 client-owned dogs
  - Clinical & radiographic OA
  - 20%+ above ideal body weight
  - Therapeutic weight-loss diet – 16 weeks
  - Six follow-up visits assessed:
    - Body weight
    - Pelvic circumference
    - Severity of lameness

**8.6% initial BW lost**
**6.92% pelvic circumference lost**

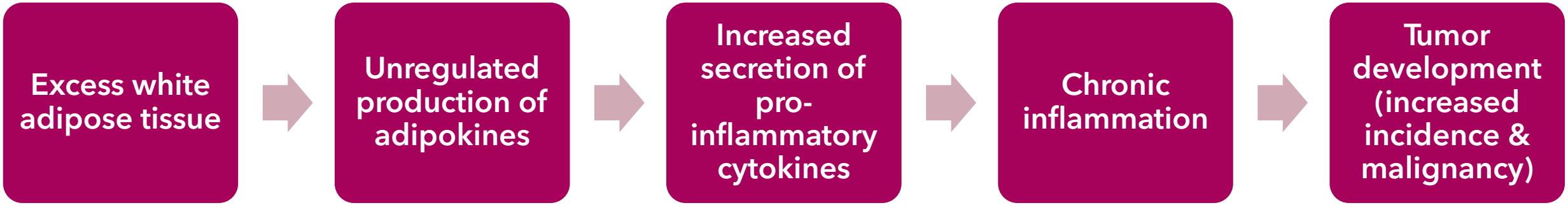
**6.10%+ BW loss caused significant decrease in lameness**

**8.85%+ BW loss caused ground reaction forces measured in worst affected limb to increase**

**BW reduction causes a decrease in clinical signs of lameness**

Marshall et al (2010)

# NEOPLASIA




Marchi et al (2022)

# Hormonal carcinogenesis

## In humans

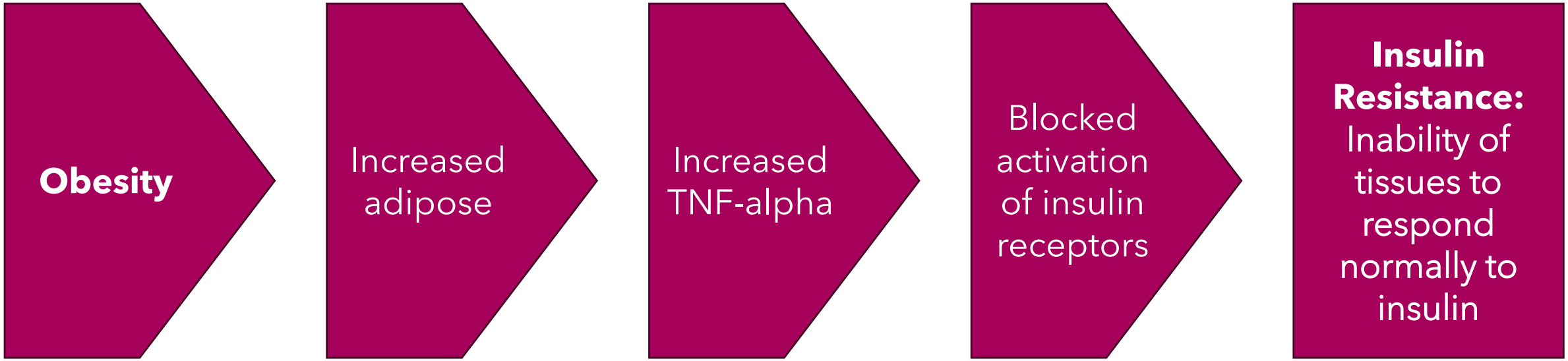
- Adipose tissue dysfunction
- High estrogen
- Post-menopausal breast cancer
- Inflammatory state
- Estrogen signaling dysfunction
- Mutagenesis, DNA damage, cell proliferation, angiogenesis

## In animals

- Prolactin & steroid hormones
- Canine mammary cancer
- Adipose secretion of aromatase
- Conversion of androgen hormones into estrogen

Lund et al (2005); Marchi et al (2022)

# INSULIN RESISTANCE




Laflamme et al (2012)

# INSULIN RESISTANCE


Laflamme et al (2012)

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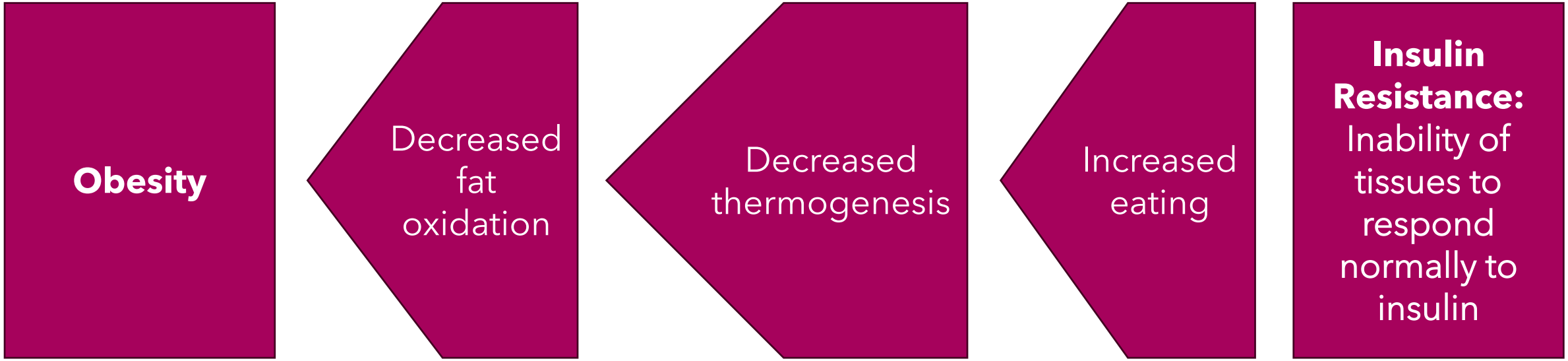
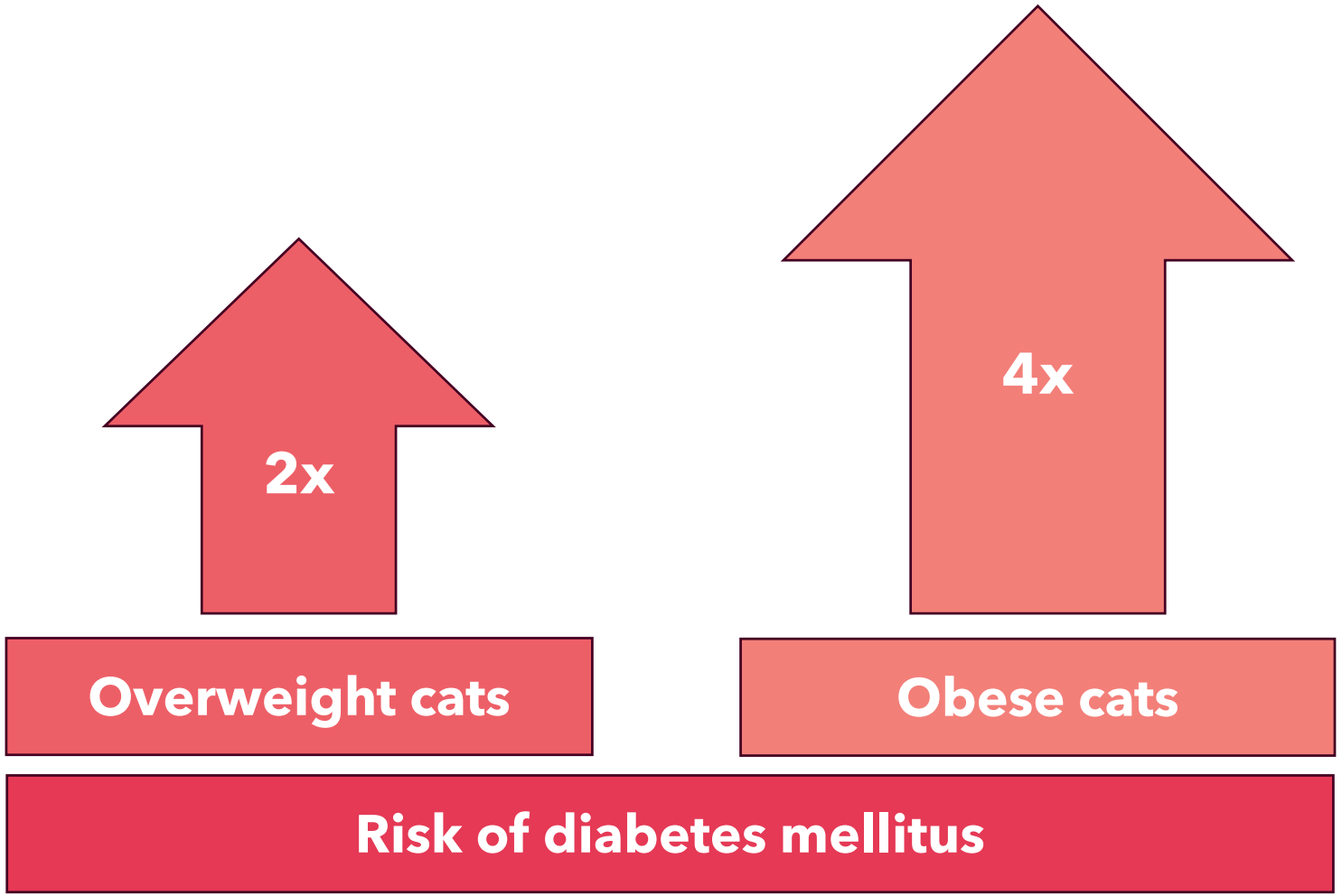



Laflamme et al (2012)

# A QUICK NOTE ON DIABETES




Lund et al (2005);
Laflamme et al (2012)

# SHORTENED LIFE SPAN

- Overweight dogs:
  - ↑ Risk of instantaneous death
  - ↓ Lifespan in all breeds and ages

**13 years** **11.2 years**

- Indirect associations with lifespan
  - Predisposition or exacerbation of disease
    - Lean dogs have delayed onset for requiring long-term treatment of chronic diseases, including OA
  - Decreased quality of life

Kealy et al (2002); Salt et al (2018)

# SHORTENED LIFE SPAN

- Overweight dogs:
  - ↑ Risk of instantaneous death
  - ↓ Lifespan in all breeds and ages
- Indirect associations with lifespan
  - Predisposition or exacerbation of disease
    - Lean dogs have delayed onset for requiring long-term treatment of chronic diseases, including OA
  - Decreased quality of life

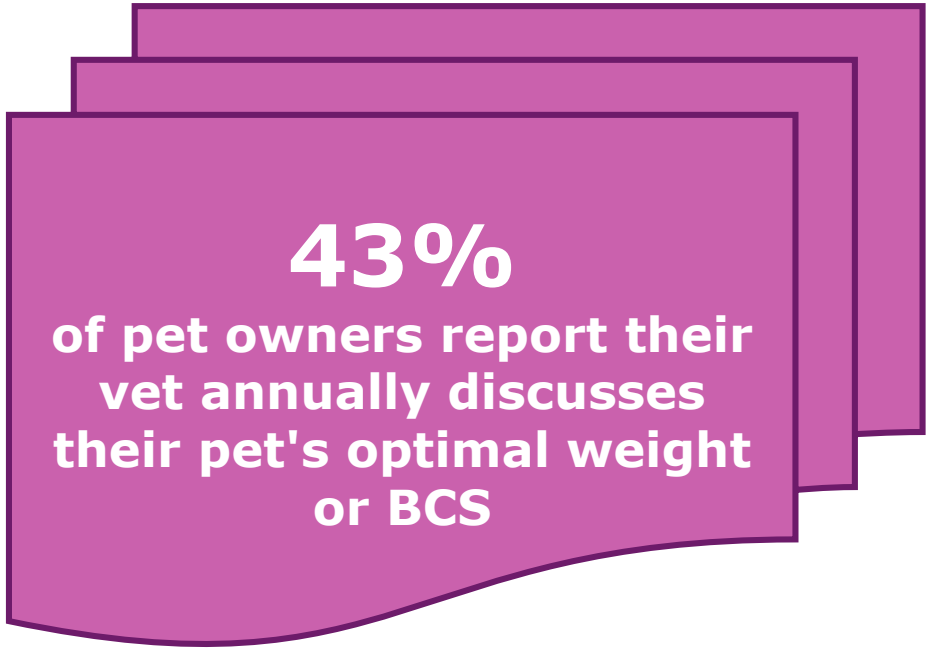
**#1 reason**

**why dog & cat owners would participate in a weight management program for their pet**

Kealy et al (2002); Salt et al (2018);
Davies et al (2024); Sutherland et al (2024)

# HOW CAN WE HELP?

- Obese/overweight **IS** a diagnosis!
  - Not consistently recorded
  - Discuss ideal weight
- Complete physical exam & records
  - Body weight **and** body condition score
  - Muscle condition score
  - Diet history
- Client education
- Feel comfortable making a weight loss plan




Chiang et al (2022); Association for Pet Obesity Prevention 2023 Survey Data

# DEVELOPING A WEIGHT LOSS PLAN

- Negative energy balance
  - Therapeutic weight loss food
    - Reduction in calories
    - ↑ Protein
    - ↑ Fiber
  - ↑ Exercise
- Treats: 10% of total diet
- Consistent monitoring
- Client education

- **Aging pets:**
  - Consider comorbidities
  - Taste preferences/aversions
  - Remember higher protein requirements
  - Omega-3's & antioxidants

**Cats: 0.5-1% BW lost per week**

**Dogs: 1-2% BW lost per week**

# "BETTY"

- 12 y/o FS Beagle mix
- Starting weight: 33 lbs
- Starting BCS: 8/9
- Enrolled May 2023

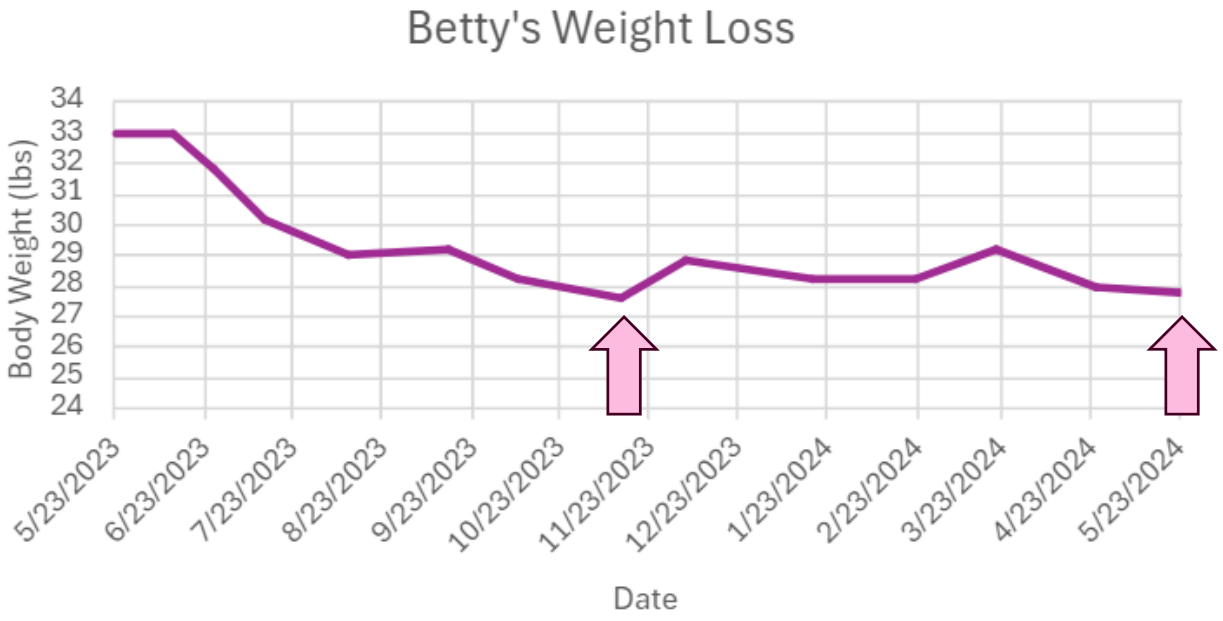

20
15-25% Body Fat
30
25-35% Body Fat
40
35-45% Body Fat
50
45-55% Body Fat
60
55-65% Body Fat
70
65-75% Body Fat
Healthy Weight
Moderate Risk
High Risk
Serious Risk
Severe Risk
Extreme Risk

| Current Weight | Ideal Body Weight [lbs] | | | | | |
|---|---|---|---|---|---|---|
| | Body Fat % 20 | Body Fat % 30 | Body Fat % 40 | Body Fat % 50 | Body Fat % 60 | Body Fat % 70 |
| 10 | 10 | 8.8 | 7.5 | 6.3 | 5.0 | 3.8 |
| 11 | 11 | 9.6 | 8.3 | 6.9 | 5.5 | 4.1 |
| 12 | 12 | 10.5 | 9.0 | 7.5 | 6.0 | 4.5 |
| 13 | 13 | 11.4 | 9.8 | 8.1 | 6.5 | 4.9 |
| 14 | 14 | 12.3 | 10.5 | 8.8 | 7.0 | 5.3 |
| 15 | 15 | 13.1 | 11.3 | 9.4 | 7.5 | 5.6 |
| 20 | 20 | 17.5 | 15.0 | 12.5 | 10.0 | 7.5 |
| 25 | 25 | 21.9 | 18.8 | 15.6 | 12.5 | 9.4 |
| 30 | 30 | 26.3 | 22.5 | 18.8 | 15.0 | 11.3 |
| 35 | 35 | 30.6 | 26.3 | 21.9 | 17.5 | 13.1 |
| 40 | 40 | 35.0 | 30.0 | 25.0 | 20.0 | 15.0 |
| 45 | 45 | 39.4 | 33.8 | 28.1 | 22.5 | 16.9 |
| 50 | 50 | 43.8 | 37.5 | 31.3 | 25.0 | 18.8 |
| 55 | 55 | 48.1 | 41.3 | 34.4 | 27.5 | 20.6 |
| 60 | 60 | 52.5 | 45.0 | 37.5 | 30.0 | 22.5 |
| 65 | 65 | 56.9 | 48.8 | 40.6 | 32.5 | 24.4 |
| 70 | 70 | 61.3 | 52.5 | 43.8 | 35.0 | 26.3 |
| 75 | 75 | 65.6 | 56.3 | 46.9 | 37.5 | 28.1 |
| 80 | 80 | 70.0 | 60.0 | 50.0 | 40.0 | 30.0 |
| 85 | 85 | 74.4 | 63.8 | 53.1 | 42.5 | 31.9 |
| 90 | 90 | 78.8 | 67.5 | 56.3 | 45.0 | 33.8 |
| 95 | 95 | 83.1 | 71.3 | 59.4 | 47.5 | 35.6 |
| 100 | 100 | 87.5 | 75.0 | 62.5 | 50.0 | 37.5 |
| 105 | 105 | 91.9 | 78.8 | 65.6 | 52.5 | 39.4 |
| 110 | 110 | 96.3 | 82.5 | 68.8 | 55.0 | 41.3 |
| 115 | 115 | 100.6 | 86.3 | 71.9 | 57.5 | 43.1 |
| 120 | 120 | 105.0 | 90.0 | 75.0 | 60.0 | 45.0 |
| 130 | 130 | 113.8 | 97.5 | 81.3 | 65.0 | 48.8 |
| 140 | 140 | 122.5 | 105.0 | 87.5 | 70.0 | 52.5 |
| 150 | 150 | 131.3 | 112.5 | 93.8 | 75.0 | 56.3 |
| 160 | 160 | 140.0 | 120.0 | 100.0 | 80.0 | 60.0 |

# "BETTY"

- 1 year later... (May 2024)

- Ending weight: 27.8 lbs
- Ending BCS: 5/9



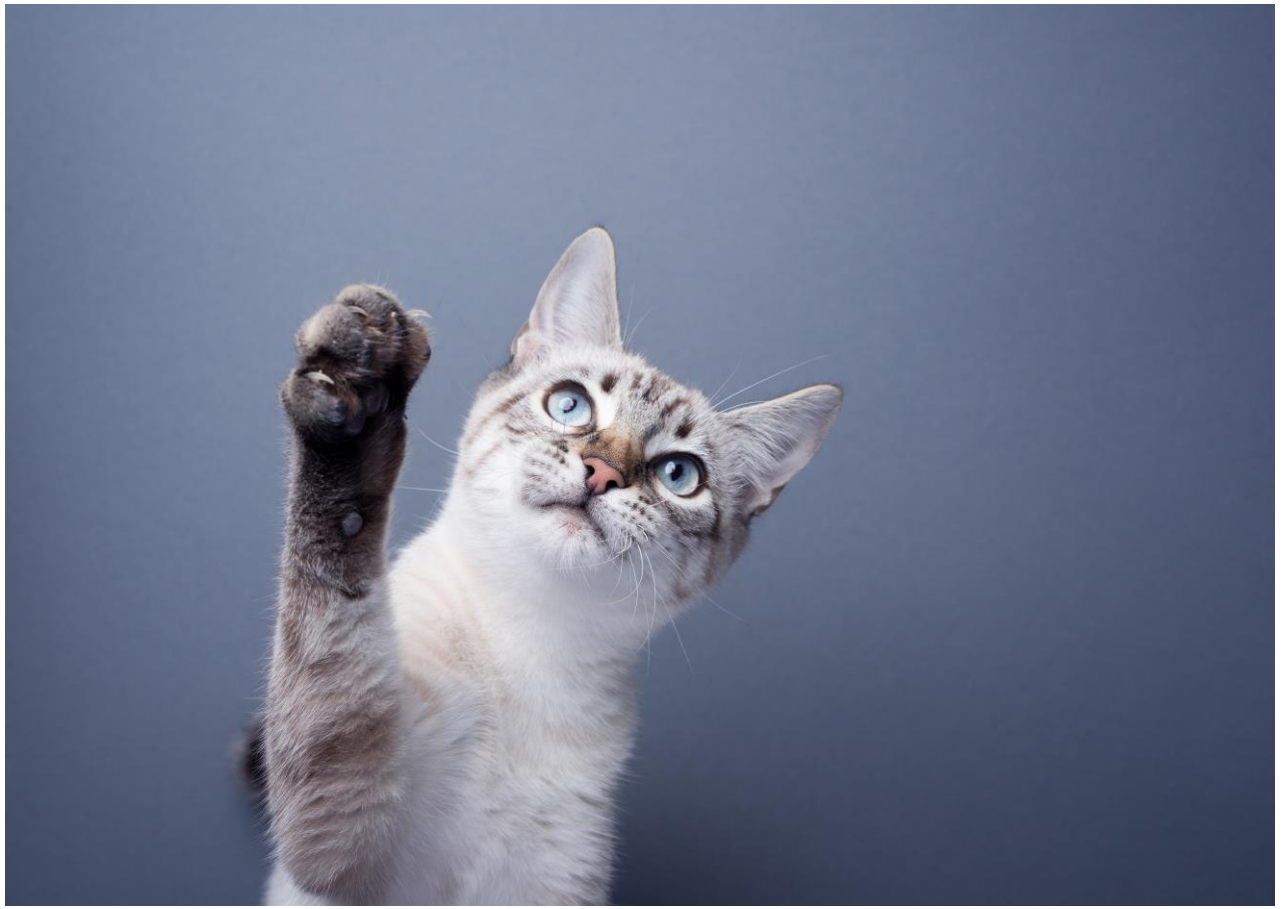

# ONE LAST THING...

This information is for educational purposes only.

Clinical Nutrition Internship is funded by Hill's Pet Nutrition.

Thank you to Dr. Nelson & Dr. Getty! ☺

# QUESTIONS?



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