



Overweight Pets: What's the big deal?



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Much attention has been given to the current obesity epidemic that is affecting people in the United States. In 1999, almost two-thirds of adults in the United States were overweight or obese. In people, being overweight or obese is associated with heart disease; certain types of cancer; type-2 diabetes; stroke; arthritis; breathing problems and psychological disorders, such as depression. Although the published rates vary, the estimated prevalence of overweight or obese dogs and cats ranges from 25 percent to 50 percent.

Are Banfield Pets at the same risk for the diseases that affect overweight or obese people? And what about other diseases? To answer these questions, we conducted a case-control analysis using canine and feline records from the Banfield Medical Database. The results provide evidence that veterinarians can use to make weight management a more compelling issue for clients with overweight or obese Pets.

Methods

For our case-control analysis of overweight or obese Pets and associated diseases, we reviewed Banfield hospital records from a one-year period: January 1, 2005, to



DataSavant's mission is to:

- Explore the health and well-being of Pet populations
- Evaluate new clinical treatments
- Monitor Pets as sentinels of zoonotic disease in family environments
- Transform Pet medical data into knowledge, *i.e.*, open new windows into Pet health care using the Banfield medical caseload and database.

Evidence-Based Medicine Toolkit

Odds ratio: A measure of the degree of association (e.g., the odds of exposure among the cases compared with the odds of exposure among the controls). The odds ratio is the ratio of the odds of an event in one group divided by the odds in another group. When the event rate in the control group is small (less than 20 percent), then the odds ratio approximates the relative risk.

Matching: A method used to ensure that two study groups are similar in regard to factors that might distort or confound a relationship that is being studied.

Confounding: The distortion of the effect of one risk

factor by the presence of another. Confounding occurs when an additional risk factor for a disease is also associated with the risk factor being studied but acts separately. Age, breed and gender are often confounding factors as Pets with different signalment often have different risk of disease.

Case-control analysis: An observational study (often based on secondary data) in which the proportion of cases with a potential risk factor are compared to the proportion of controls (individuals without the disease) with the same risk factor. The common association measure for a case-control study is the odds ratio.



December 31, 2005. Overweight or obese Pets were identified in the Banfield Medical Database using the following criteria:

- A coded diagnosis of excess weight or obesity from PetWare®, Banfield's proprietary software

- A "heavy" assessment listed under the nutrition evaluation in the physical examination screen.

To create a sample of control Pets (*i.e.*, Pets with normal weights) that would be at a similar risk for comparable diseases, we randomly chose equal numbers of canine and feline Pets from the Banfield Medical Database (for the same time period but *without* the criteria listed above) and matched them by age (± 1 year), which is often a risk factor for disease.

Using data from both affected and control populations helped us discern the excess weight or obesity risk for *all* Pets seen in clinical practice, and it allowed us to explore associations with other comorbidities.

In the analysis, we characterized the age, gender and breed of each Pet in both groups as well as the prevalence of diseases of interest. We also examined the associations between excess weight and obesity and the following:

- Arthritis
- Respiratory disease
- Heart disease
- Dermatologic disease
- Heat intolerance
- Urinary disease
- Constipation
- Diabetes
- Hyperadrenocorticism
- Ruptured cruciate ligament
- Hypothyroidism
- Lower urinary tract disease
- Oral disease

Table 1: Canine Prevalence and Relative Risk for Excess Weight or Obesity by Breed (Most Common Breeds)

Breed	Overweight or obese dogs	Normal-weight dogs	Relative risk*
Pug	2.3%	0.8%	2.8
Beagle	4.4%	2.0%	2.3
Golden Retriever	6.3%	3.3%	2.0
Labrador Retriever	17.8%	10.9%	1.8
Dachshund	4.4%	2.9%	1.6
Dalmatian	1.5%	1.1%	1.5
Shetland Sheepdog	2.2%	1.4%	1.5
Australian Shepherd	1.8%	1.3%	1.4
Rottweiler	4.1%	3.4%	1.2
American Cocker Spaniel	5.5%	4.8%	1.1
Border Collie	1.2%	1.3%	0.9
Chihuahua	3.1%	3.4%	0.9
Fox Terrier	2.1%	2.6%	0.8
German Shepherd	4.7%	5.8%	0.8
Mixed Breed	3.5%	4.1%	0.8
American Eskimo	1.3%	1.8%	0.7
Pomeranian	1.5%	2.3%	0.7
Boxer	1.1%	1.8%	0.6
Chow Chow	1.6%	3.2%	0.5
Lhasa Apso	1.0%	2.0%	0.5
Standard Poodle	1.6%	3.4%	0.5
Pit Bull	1.0%	2.2%	0.4
Shih Tzu	1.6%	3.8%	0.4
Yorkshire Terrier	1.0%	2.4%	0.4

*Estimated using the OR (Odds Ratio)

Table 2: Feline Prevalence and Relative Risk for Excess Weight or Obesity by Breed (Most Common Breeds)

Breed	Overweight or obese cats	Normal-weight cats	Relative risk*
DSH	65.7%	59.3%	1.3
DMH	12.8%	12.4%	1.0
Maine Coon	1.2%	1.2%	1.0
Manx	0.5%	0.5%	0.9
DLH	10.9%	12.3%	0.9
Siamese	4.3%	5.1%	0.8
Himalayan	1.1%	2.2%	0.5
Persian	1.0%	3.7%	0.3

*Estimated using the OR (Odds Ratio)

- Pancreatitis
- Neoplasia.

To quantitate risk, we used the odds ratio (OR) for the association between excess



Table 3: Canine Prevalence of and Relative Risk for Concurrent Disease by Weight Status

	Overweight or obese dogs	Normal-weight dogs	Relative risk*
Hypothyroidism	3.9%	0.8%	5.3
Hyperadrenocorticism	0.6%	0.1%	5.1
Diabetes mellitus	0.7%	0.2%	3.4
Eyelid margin tumors	0.6%	0.2%	3.1
Arthritis	7.1%	2.7%	2.8
Mast cell tumors	0.5%	0.2%	2.7
Oral disease	71.4%	50.2%	2.5
Skin tumors	6.4%	2.9%	2.3
Osteoarthritis	0.8%	0.3%	2.3
Perianal gland tumors	0.1%	0.04%	2.2
Ruptured anterior cruciate ligament	1.0%	0.5%	2.0
Pancreatitis	1.2%	0.6%	1.9
Oral tumors	0.4%	0.2%	1.9
Urinary disease	6.3%	3.8%	1.7
Respiratory disease	3.9%	2.6%	1.5
Mammary neoplasia	0.3%	0.2%	1.4
Dermatologic disease	45.7%	37.9%	1.4
Constipation	0.34%	0.25%	1.3
Cardiovascular disease	5.2%	4.4%	1.2

*Estimated using the OR (Odds Ratio)

Table 4: Feline Prevalence of and Relative Risk for Concurrent Disease by Weight Status

	Overweight or obese cats	Normal-weight cats	Relative risk*
Arthritis	0.8%	0.2%	3.6
Diabetes mellitus	1.8%	0.6%	3.1
Oral disease	70.6%	45.5%	2.9
Skin tumors	0.9%	0.4%	2.4
Ruptured anterior cruciate ligament	0.09%	0.04%	2.3
Constipation	1.3%	0.7%	1.8
Osteoarthritis	0.07%	0.04%	1.7
Urinary disease	11.7%	7.9%	1.5
Oral tumors	0.2%	0.1%	1.4
Respiratory disease	2.5%	1.8%	1.4
Cardiovascular disease	2.5%	1.9%	1.4
Dermatologic disease	27.5%	27.1%	1.0

*Estimated using the OR (Odds Ratio)

weight or obesity and diseases of interest. A relative risk greater than 1.0 suggests a positive association between an outcome and a factor, whereas a relative risk equal to 1.0 reflects no association. A relative risk less than 1.0 suggests an inverse relationship between a study factor and a disease outcome. It is important to remember that a positive risk estimate does not necessarily reflect a causal relationship (*i.e.*, obesity causes arthritis).

Results

We identified 16,013 overweight or obese cats (5.8 percent) from a total of 278,363. We identified 41,236 overweight or obese dogs (4.0 percent) from a total of 1,036,024. On average, canine Pets were 5.5 years old and weighed 54.6 pounds when they were diagnosed as overweight or obese. Feline Pets, on average, were 5.5 years old and weighed 13.7 pounds. In the control Pets, these averages were 5.1 years and 8.8 pounds for cats and 4.9 years and 38.5 pounds for dogs.

Pugs, Beagles, Golden Retrievers, Labrador Retrievers, Dachshunds, Dalmatians and Shetland Sheepdogs were at the greatest risk for excess weight or obesity compared with the control dogs (*Table 1*, page 17). Only Domestic Shorthair cats showed an increased risk for excess weight or obesity (*Table 2*, page 17). Neutered males were more likely to be diagnosed with excess weight or obesity in both the canine and feline Pet populations; spayed female canines were also at greater risk (*Figures 1 and 2*, page 19). Finally, *Tables 3 and 4* detail the most prevalent diseases of overweight or obese dogs and cats. Although every disease or condition studied was positively associated (> 1.0) with excess weight or obesity, overweight or obese dogs were at greatest risk (≥ 1.5) for 15 diseases, with



Figure 1: Canine Relative Risk of Excess Weight or Obesity by Gender

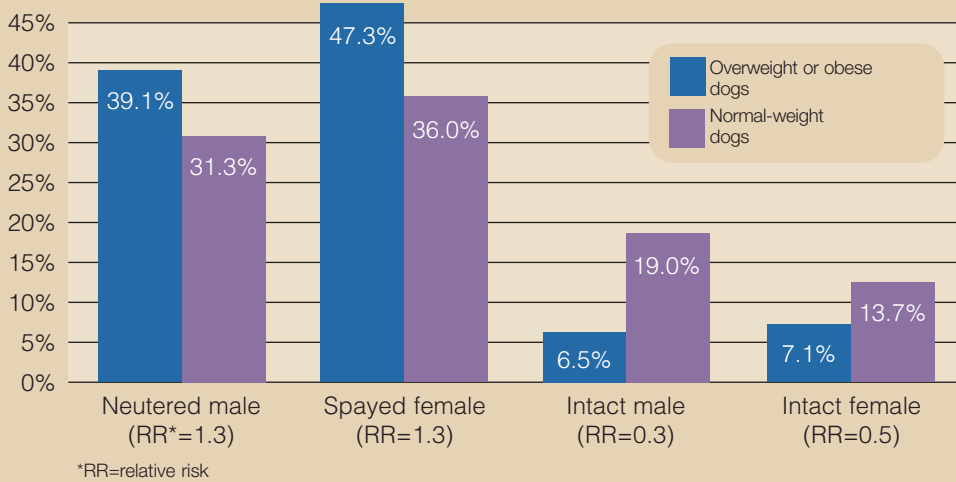
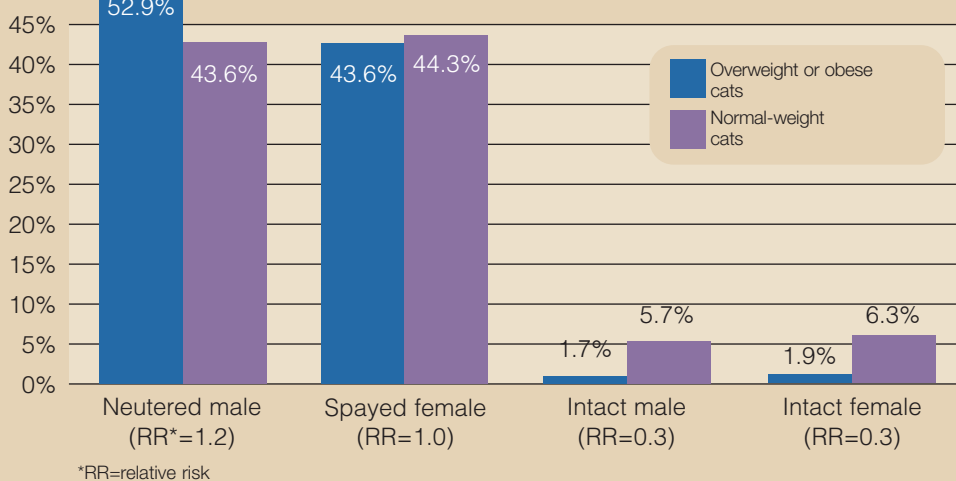


Figure 2: Feline Relative Risk of Excess Weight or Obesity by Gender



hypothyroidism, hyperadrenocorticism, diabetes mellitus, eyelid margin tumors and arthritis composing the top five. Overweight or obese cats were at greatest risk (≥ 1.5) for eight diseases, with arthritis, diabetes mellitus, oral disease, skin tumors, ruptured anterior cruciate ligaments and constipation leading the pack. Dermatologic disease was the only category

that had no association (1.0) with excess weight or obesity in cats.

Discussion

In this analysis, we discovered strong, positive associations between overweight or obese Pets and concurrent disease. Although further research is needed to understand these associations more

Body Condition Scores Help Doctors Take the Lead

Veterinarians have another powerful tool to help them convey the importance of weight management to Pet owners. In fact, obtaining a body condition score (BCS) may be just as important as capturing respiratory and heart rates. Veterinarians can analyze weight issues and explain them more effectively to clients with a BCS than a simple weight reading. Think about it: Is using a simple weight reading the easiest way to assess the body condition of a Dachshund when the weight range for Dachshunds varies from 4 to 48 pounds? BCSs provide standardization and comparability across breeds. Plus, veterinarians can teach clients the five- or nine-point BCS assessment to engage them in the process.

If we can prevent excess weight and obesity in Pets, we can have a tremendous impact on the health of our companion animal patients.

completely, veterinarians can use the evidence to present clients with a compelling case for weight management. In the human population, preventive strategies are often implemented to address public health threats before the etiology of the association is fully understood (*e.g.*, intravenous drug use and AIDS). Prevention should be the goal. If we can prevent excess weight and obesity in Pets, we can have a tremendous impact on the health of our companion animal patients.

An important caveat is that these findings are the results of a case-control analysis, which is just above a case series in the evidence-based pyramid. The case-control analysis approach can be susceptible to bias because of the study design and retrospective timeframe. Further analyses using multivariate methods to control confounding are essential. Similar findings in other types of studies (*e.g.*, cohort studies) would also

strengthen the weight of the evidence.

However, compared with published rates, the prevalence of overweight and obese animals in Banfield hospital populations are underestimated—and for several reasons. For one, practitioners do not consistently perceive excess weight or obesity as ailments to be entered as a diagnosis in the electronic medical record, as they would with something like a fracture. Also, clients may be sensitive to a diagnosis of a Pet's excess weight or obesity, and veterinarians feel uncomfortable broaching the subject because it may threaten an owner's care of the Pet (see *How to talk with clients about Pet obesity*, page 8). With this compelling evidence, we may be able to truly convince clients that overfeeding is just a way of killing Pets with kindness! 🐾

Elizabeth Lund, DVM, MPH, PhD, joined Banfield in April 2006 as senior director of research for DataSavant. As an epidemiologist, her professional experience over the last 18 years has included research in academia, industry and public health. In addition to her veterinary degree, Dr. Lund has a master's degree in public health and a PhD in epidemiology/informatics. She and her husband, Jim, have four children (Jessica, Alyssa, Will and Nick) and four Pets (a dog, cat, chinchilla and hamster).