Congratulations!

You're about to uncover the story of your dog's ancestry.

In this report, you will find detailed results from **Josie's** *Wisdom Panel® Professional* DNA analysis.

In the following pages, you will learn about:

BREED DETECTION

APPEARANCE, BEHAVIOR & HISTORY

BREED APPEARANCE

SHARING YOUR DOG'S STORY

It is important to carefully review your entire report and discuss the results with your veterinarian to gain the most valuable insight into **Josie**.

Owner Name: **Jennifer Smith**
Test Report Code: **4000049620**
Date Printed: **June 29, 2014**

What's Your Dog's Tale?

JOSIE

Wisdom Panel®

Professional

Canine Genetic Analysis

June 29, 2014

Dear Jennifer,

The **Wisdom Panel**® Purebred computer algorithms have performed a variety of analyses and Josie's results may be consistent with the purebred American Staffordshire Terrier samples in the Wisdom Panel database, however, the results of these tests are not completely conclusive. This may occur with dogs from a foreign or rare family line which have been bred away from the American Staffordshire Terrier families represented in the Wisdom Panel database.

This is due to the following observed results:

- In a Principal Component Analysis (PCA), Josie's DNA sample appears within the American Staffordshire Terrier cluster.

- In a PCA, Josie's DNA sample appears within the American Staffordshire Terrier cluster when also compared to an outgroup.

- In a PCA, Josie's DNA sample appears within the American Staffordshire Terrier cluster when compared to samples of the two next best matched breeds in the Wisdom Panel Ancestry analysis.

- The American Staffordshire Terrier is detected as the major breed in a Wisdom Panel ancestry analysis but does not perfectly match the genetic profile of purebred samples of that breed.

- The American Staffordshire Terrier is the top matching breed in a pairwise comparison analysis between Josie's DNA data and all the purebred dogs in the Wisdom Panel database.

- The American Staffordshire Terrier is detected most frequently in the top 20 best matched dogs in an individual pairwise comparison analysis with all of the nearly 10,000 dogs in the Wisdom Panel database.

- The observed homozygosity of Josie's DNA data is within the expected range for this breed.

A more detailed explanation of the specific tests performed on Josie's DNA data are explained in the Further Analysis section at the end of the report.

If you have any questions about the information enclosed, please contact our customer care team at **customercare@marsveterinary.com**.
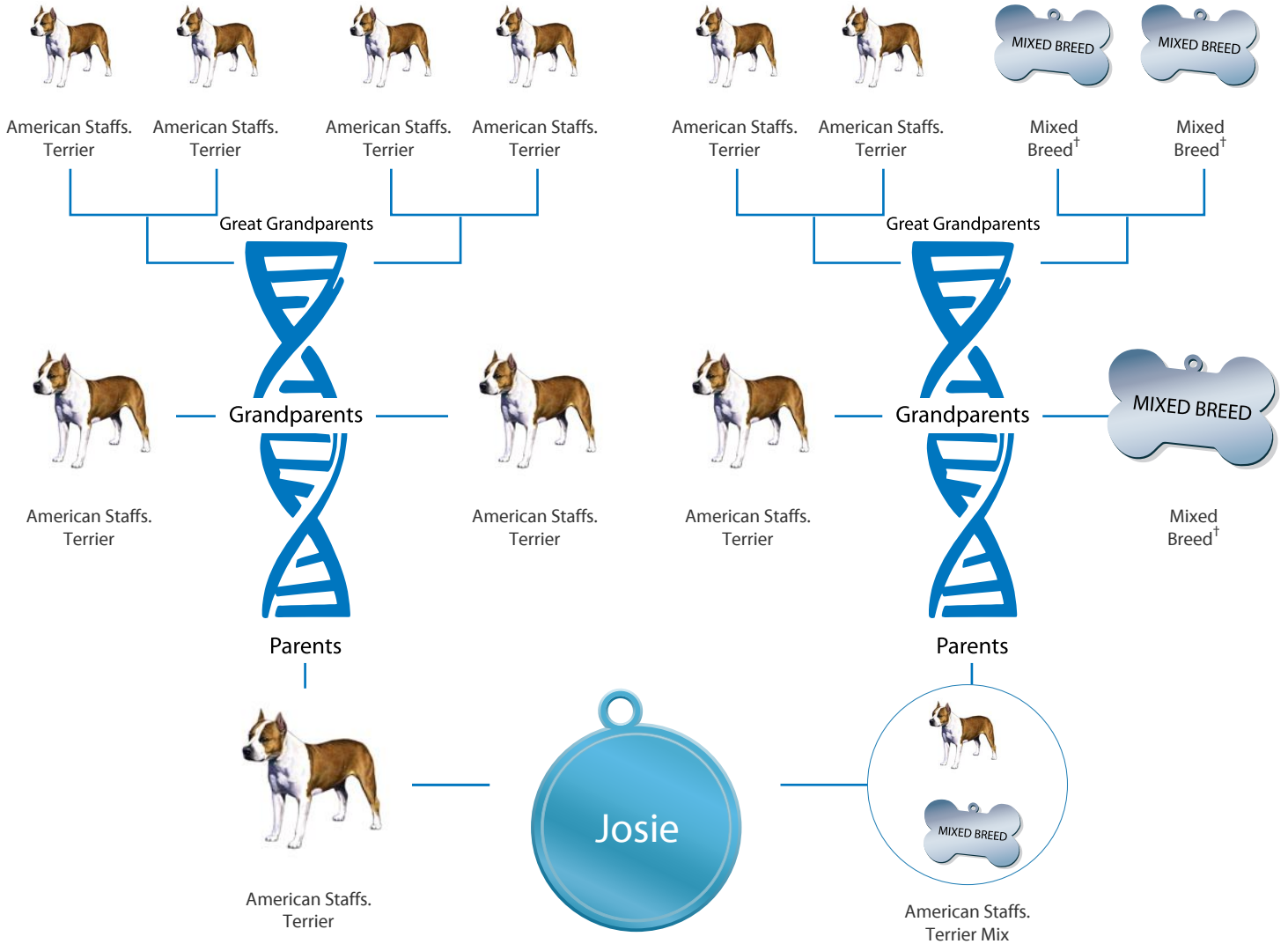
Regards,

DR. NEALE FRETWELL
Research & Development Director

You have a American Staffordshire Terrier Mix!

The chart below summarizes the predicted last three generations of Josie's ancestry based on the Wisdom Panel ancestry analyses performed on Josie's DNA data. The summary of the data supports the observation that Josie's genetic profile may match that of a purebred American Staffordshire Terrier, however, it is not completely conclusive. This may occur with dogs from a foreign or rare family line which have been bred away from the purebred American Staffordshire Terrier families represented in the Wisdom Panel database or it may be that Josie has some recent ancestry from other breeds.

American Staffs. Terrier | American Staffs. Terrier | American Staffs. Terrier | American Staffs. Terrier | American Staffs. Terrier | American Staffs. Terrier | Mixed Breed[†] | Mixed Breed[†]

Great Grandparents

Great Grandparents

Grandparents

Grandparents

American Staffs. Terrier

American Staffs. Terrier

American Staffs. Terrier

MIXED BREED

Mixed Breed[†]

Parents

Parents

American Staffs. Terrier

Josie

American Staffs. Terrier Mix

MIXED BREED [†] Interested in the Mixed Breed ancestry? Look for the Mixed Breed Signatures page later in the report!

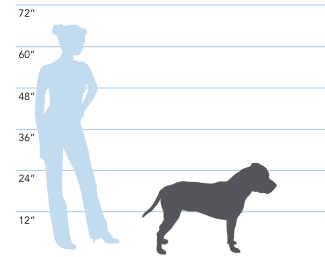# American Staffordshire Terrier

American Staffordshire Terrier

Height:

17 - 19 in

Weight (Show):

40 - 60 lb

Weight (Pet):

38 - 68 lb

72"
60"
48"
36"
24"
12"

Ears:

Muzzle:

Tail:

The American Staffordshire Terrier can trace its roots all the way back to the nineteenth century in England. The English Staffordshire Terrier was created when various terriers were crossed with the Bulldog. The crossbreeding resulted in the active and powerful breed that came to the attention of the United States public in 1870. American breeders then focused their attention and efforts to increasing the size and weight of the American Staffordshire Terrier. These breeding efforts resulted in a Staffordshire Terrier that was recognized as a separate breed by the American Kennel Club in 1936. In 1972, the current name of "American Staffordshire Terrier" was adopted. The American Staffordshire Terrier was once used primarily for fighting. That practice, however, was banned in the early 1900's and two separate variations of the breed were gradually developed.

The American Staffordshire Terrier can be any color, with solid, particolor, or patched black, brown, tan, brindle (black and brown striped), liver, red or fawn. Black or blue mask, brindle or tan points are commonly seen traits in this breed. Ears may also appear different due to cropping.

Do you recognize any of these American Staffordshire Terrier traits in Josie?

○ Intelligent, hard-working, and stoic dogs.

○ American Staffordshire Terriers seem to enjoy dog sports such as agility, flyball, rally and competitive obedience.

○ Very loyal to family and usually good with children. May not get along well with other dogs.

○ There have been reported incidents of American Staffordshire Terriers being aggressive with other pets or people.
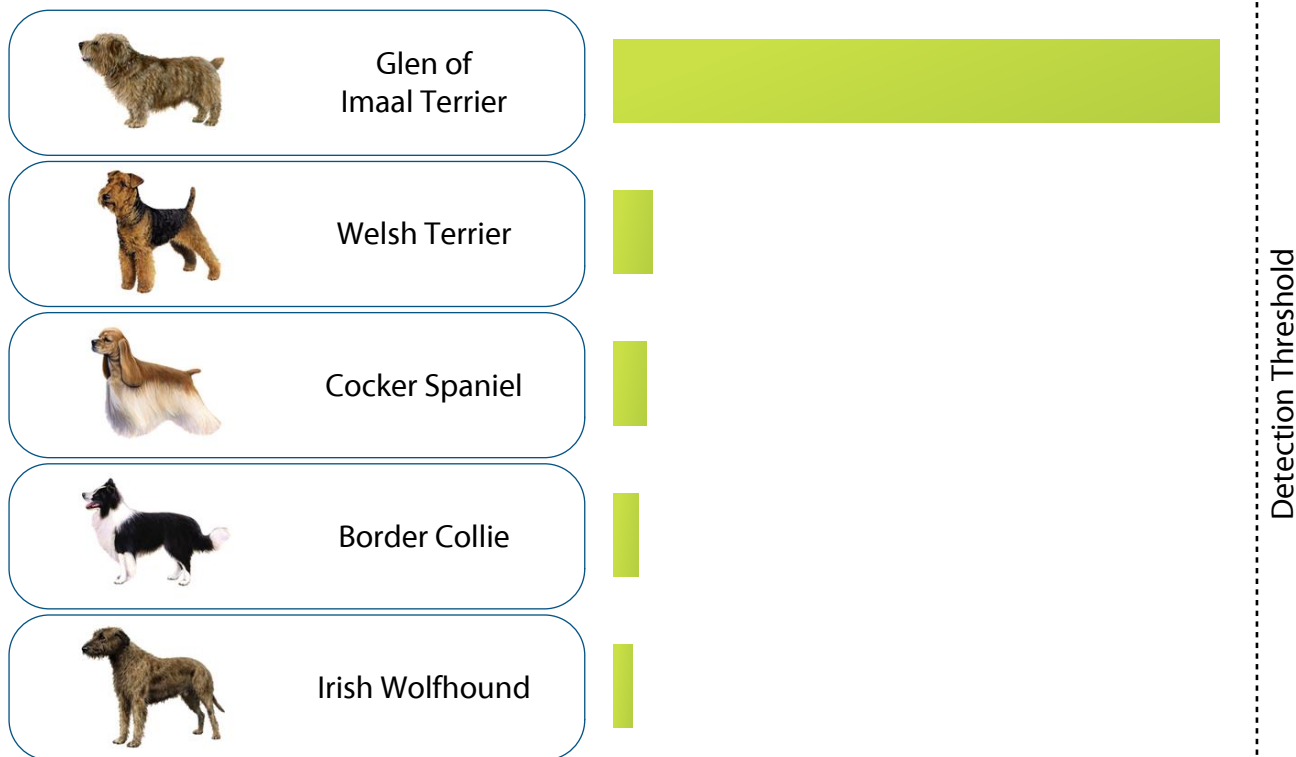
What does the Mixed Breed Ancestry mean for Josie?

A portion of Josie's ancestry was predicted to be mixed beyond 3 generations. While it is difficult to identify strong breed signals in this mixed portion, the 5 breeds with the strongest statistical likelihood identified in the analysis of your dog's DNA are listed below.

The breeds are listed by the relative strength of each result in the analysis with the most likely at the top of the list. One or more of these breeds **could have** contributed to the genetic makeup of the ancestors indicated by the mixed breed icon. Note that it is highly unlikely that all these breeds are present in Josie's ancestry.

There could also be a breed or breeds present in the mixed breed component that cannot be detected with the current database of over 250 breeds, types and varieties.

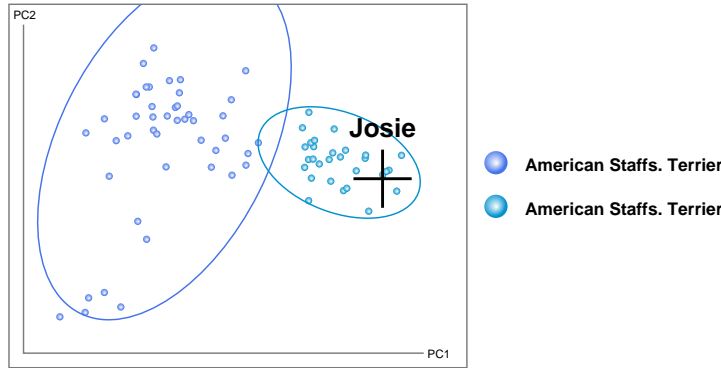| Breed	
Glen of Imaal Terrier	
Welsh Terrier	
Cocker Spaniel	
Border Collie	
Irish Wolfhound	

Detection Threshold

How Wisdom Panel Professional works

The process started when you sent a sample to our laboratory, where the DNA was extracted from the cells and examined for the 321 markers that are used in the test. The results for these markers were sent to a computer, that evaluated them using a program designed to consider all of the pedigree trees that are possible in the last three generations. The trees considered include a simple pedigree with a single breed (a likely pure-bred dog), two different breeds at the parental level (a first-generation cross), all the way up to a complex tree with eight different great-grandparent breeds allowed.

Our computer used information for over 250 breeds, varieties, and types from our breed database to fill these potential pedigrees. For each of the millions of combinations of ancestry trees built and considered, the computer gave each a score representing how well that selected combination of breeds matched to your dog's data. The pedigree with the overall best score is the one which is shown on the ancestry chart. Only breeds that reached our set confidence threshold for reporting are reported in the ancestry chart.
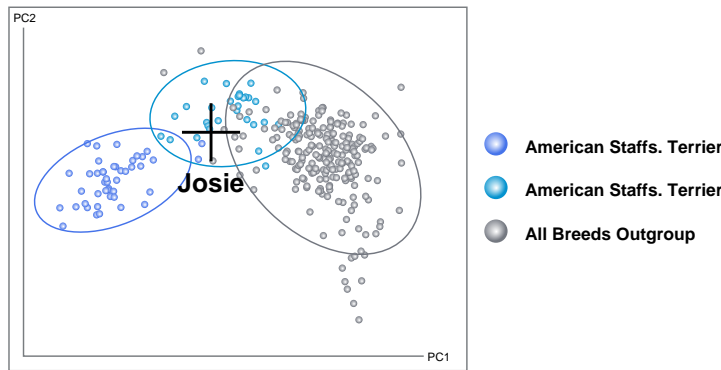
Wisdom Panel
Professional
Canine Genetic Analysis

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veterinary

PCA Analysis of Josie's DNA sample and American Staffordshire Terrier samples from the Wisdom Panel database:

Principle Component Analysis (PCA) allows us to see how similar samples are. Closely related samples, like dogs from the same breed, will be expected to be closer together than samples from other breeds. This tends to create a cluster of points for each breed or sub-population within a breed. If a sample is within the cluster for the breed, this is a very good indication that it is likely a pure member of this breed. The PCA below shows Josie's data compared to American Staffordshire Terrier samples from the Wisdom Panel database. The sample falls within the American Staffordshire Terrier cluster indicating that its genetic profile is consistent with other dogs from this breed.
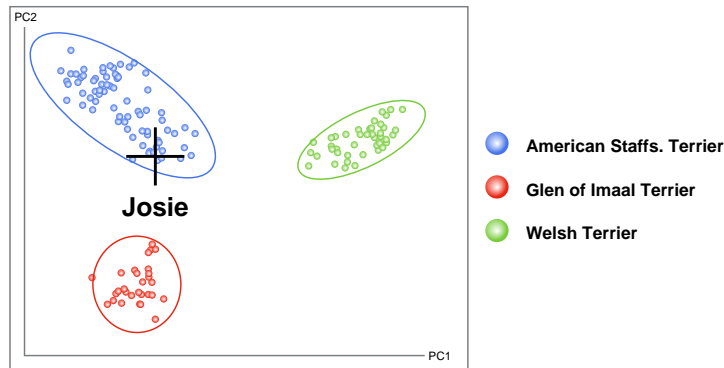

PCA Analysis of Josie's DNA data including American Staffordshire Terrier samples and an All Breeds outgroup:

The PCA below shows Josie's data compared to samples of American Staffordshire Terrier, as well as an All Breeds outgroup comprised of a single representative sample from the other breeds in the Wisdom Panel database. This is another means of verifying that Josie's data is more consistent with the American Staffordshire Terrier than with any other breed and here the sample is clustering closely with the purebred American Staffordshire Terrier cluster.

PCA Analysis of Josie's DNA sample, American Staffordshire Terrier and the two next closest matching breeds in the Wisdom Panel analysis:

The PCA below shows Josie's data compared to American Staffordshire Terrier samples, as well as samples of the next two best matched breeds from the Wisdom Panel Ancestry analysis. Josie's DNA sample clusters tightly with the purebred American Staffordshire Terrier cluster. This is what we would expect from a purebred American Staffordshire Terrier.

Pairwise Comparison Testing for the Best Overall Breed Match:
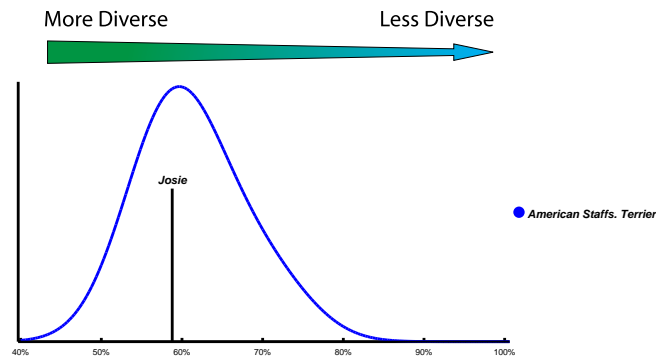
A pairwise comparison test was performed between Josie's DNA data and that of each of nearly 10,000 dogs in the Wisdom Panel purebred dog database. In this analysis the top matching breed detected is the American Staffordshire Terrier.

Pairwise Comparison Testing for Match to the Top 20 Database Samples:

A pairwise comparison test was performed between Josie's DNA profile and that of each of nearly 10,000 dogs in the Wisdom Panel purebred dog database. Looking at individual samples, the American Staffordshire Terrier occurred most often in the top 20 ranked sample matches in this analysis. This is what we would expect from a purebred American Staffordshire Terrier.

Homozygosity Profile:

Homozygosity is a measure of how many of Josie's genetic markers are identical because both the sire and dam passed down the same marker variant. Purebred dogs tend to have a higher homozygosity than most mixed breed dogs. Each breed within the Wisdom Panel database has a specific range of homozygosity scores. Josie's homozygosity score falls within the range that is seen for purebred American Staffordshire Terrier samples.

More Diverse   Less Diverse

Josie

● *American Staffs. Terrier*

40%   50%   60%   70%   80%   90%   100%

Further Information

You may wish to research more information regarding the breeds found in Josie. The following links provide useful information into breed characteristics, training and health.

- The American Kennel Club (AKC) provides information on AKC registered and Foundation Stock Service breeds at **www.akc.org**.

- The United Kennel Club (UKC) has a range of information on UKC registered breeds at **www.ukcdogs.com**.

- The Kennel Club is the major British registry and their website contains information about the breeds they register at **www.thekennelclub.org.uk**.

- The free encyclopedia Wikipedia contains a range of information on most breeds, including breed histories, at **www.wikipedia.org**.

- The Dog Breed Info Center has information on most breeds at **www.dogbreedinfo.com**.

- The US Pedigree website provides information about dog breeds and many US breeders at **www.pedigree.com**.

- The Australian Pedigree website has a very detailed breed library which includes temperament and what breeds are like to live with at **www.pedigree.com.au**.

- The Wisdom Panel website contains additional information about the breeds, as well as our Photo Gallery at **www.wisdompanel.com**.

Breed standards may vary between registries and can result in ambiguity of breed traits, which may be acceptable with some registries but not others. Additionally, the requirements of registration may differ between registries. Please check with the specific kennel club or registry to determine their registration requirements.

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Canine Genetic Analysis

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Thank you for choosing *Wisdom Panel® Professional* to uncover the story of your dog's ancestry!

Congratulations on taking the steps to learn about your dog's ancestry and to understand what breeds are in your mixed breed dog using *Wisdom Panel Professional*! Knowing your dog's breeds is more than a novelty - it is a medical necessity. Each breed in your pooch's genetic paw print has unique health concerns you should know about so that you can provide a lifetime of excellent care.

Visit **www.Genesis4Pets.com** to find out more about your dog's health-care needs: you'll feel better knowing that you're doing everything you can to keep your pal happy and healthy. In addition to loads of free, easy-to-understand information based on the latest medical research, you will receive a 50% discount on all downloadable health-care booklets that explain the common health concerns for individual breeds. Simply enter promotional code **WISDOM** when you check out to receive your discount (expires 30 days after you receive your Wisdom Panel report).

Predicted Adult Weight Profile for Josie:

Based upon the breeds detected in Josie's ancestry and the genetic markers analyzed by *Wisdom Panel Professional*, as well as the information provided that Josie is **Female**, we have calculated the likely weight that Josie should reach when an adult. The *Wisdom Panel Professional* target weight profile is presented as a range based on the unique mix and proportion of breeds detected.

- If Intact, the adult weight is predicted to be between 32 - 52 lbs.
- If Spayed, the adult weight is predicted to be between 36 - 57 lbs.

Many factors can influence an adult dog's weight, including sex and neuter status. Both of these factors have been used to calculate the predicted weight profile. Another major influence on canine weight is body condition score, which is a factor of your dog's lifetime nutrition and exercise regimen. If your dog's body condition is different from the ideal body condition score, we anticipate that your dog might be under (if underweight) or over (if overweight) the weight predicted by *Wisdom Panel Professional*.

To learn more about assessing body condition score please use the Royal Canin™ Body Condition Score Chart.

More information on this can be found at: **http://www.wisdompanelpro.com/sizeprediction/**

Tell Your Dog's Tale

Join our online community of mixed-breed dog owners and share your dog's *Wisdom Panel Professional* story with the world. At **WisdomPanel.com** you can:

- Register your dog and upload photos into our Wisdom Panel photo gallery
- Get help to show off your dog's breed profile on your blog, Dogster page, Facebook and Myspace profiles
- Access your report online with our Test Status Checker.

This will also allow you to access Mixed-Breed Genesis health reports provided by VetThink™ which are designed to assist you to take the best possible care of your dog throughout its life.

Visit **www.wisdompanel.com/photos** and use these details to create your dog's profile:

Owner: **Jennifer Smith**
Report Code: **4000049620**

Each dog is unique and their physical and behavioral traits will be the result of multiple factors, including genetics, training, handling and environment. *Wisdom Panel® Professional*'s proprietary genetic analysis is intended to provide owners insight to potential predispositions to physical and behavioral traits in breeds which have been identified in your dog and is not intended to predict disease or behavior in any particular dog.

As part of the *Wisdom Panel Professional* service, Mars Veterinary performs thirteen disease screening tests for known genetic mutations using a high throughput genotyping panel. Each test is run twice on the genotyping panel in opposite orientation to ensure that results are consistent and as accurate as possible. Occasionally due to variations in DNA sample quality it may not be possible to provide a result for a specific mutation test if the marker fails to give a DNA genotype call in testing. Mars Veterinary and Mars, Incorporated are not associated with and do not endorse or sponsor the commercial tests being conducted by VetGen, Washington State University, University of Minnesota, The Animal Health Trust or Optigen.

Wisdom Panel Professional is used to help determine the breed makeup of a dog. Validation testing has resulted in an average accuracy* of 90% in first-generation crossbred dogs of known parentage. The breeds in this validation study represent 45% of AKC registrations.

In the unlikely event that it is not possible to determine breed history or that an error in the breed analysis, disease mutation screening, size prediction, or health indicator analysis occurs, liability by Mars Veterinary or related companies and individuals is disclaimed and damages in any event are limited to the payment actually received by Mars Veterinary for the individual specified analysis at issue.

The *Wisdom Panel Professional* product is designed and intended to be used solely to identify the genetic makeup and predict the adult size and breed-related health risks of a mixed breed dog and no other purpose is authorized or permitted. Consult your veterinarian for information regarding your particular dog's physical and behavioral condition.

Many countries and provinces have breed-specific ordinances and laws that may require special handling or prohibit the ownership of some dogs with a particular breed in their genetic background. *Wisdom Panel Professional* is not intended to be used by regulatory or animal control officials to determine whether a particular breed is legislated or banned in a particular country or province. Nor is *Wisdom Panel Professional* intended to be used in any judicial proceedings. Rather, it is intended to be used as a tool or resource in determining a dog's genetic history. Neither Mars Veterinary nor any related company is responsible for compliance or notification regarding these matters.

*Accuracy was determined by average Positive Predictive Value across breeds studied. Breeds detected at low levels of certainty were not included in accuracy calculation.

Breed Ancestry Certification

Wisdom Panel® Professional certifies that:

Josie

is a genetic mixture of the following canine breeds:
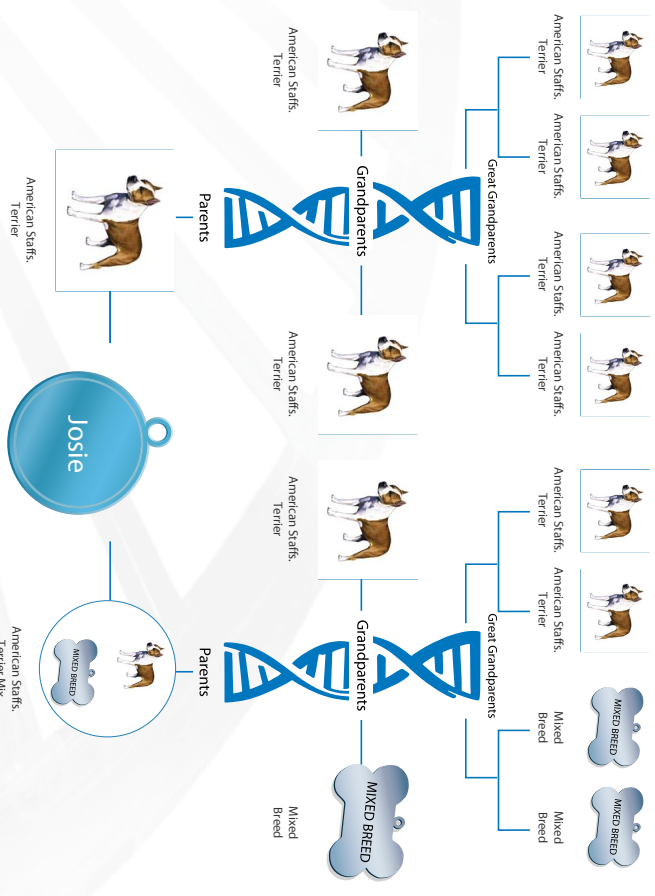
American Staffordshire Terrier.

June 29, 2014

Statement of Authenticity

This certifies the authenticity of Josie's canine genetic background as determined following careful analysis of more than 300 genetic markers using **Wisdom Panel Professional.** The purebred dog breed signature matches included in this analysis are those that were detected in the last three generations of Josie's ancestry using the proprietary breed detection algorithm at Mars Veterinary.

Dr. Neale Fretwell

Research & Development Director

Wisdom Panel™
Professional
Canine Genetic Analysis

MARS veterinary

Josie is a American Staffordshire Terrier Mix

Josie

American Staffs. Terrier Mix

Parents

American Staffs. Terrier

American Staffs. Terrier

Grandparents

American Staffs. Terrier

American Staffs. Terrier

MIXED BREED

Mixed Breed

Parents

American Staffs. Terrier

American Staffs. Terrier

Grandparents

MIXED BREED

Mixed Breed

Great Grandparents

American Staffs. Terrier

American Staffs. Terrier

American Staffs. Terrier

American Staffs. Terrier

American Staffs. Terrier

American Staffs. Terrier

Mixed Breed

Mixed Breed