

SHELTER MEDICINE: A COMPARISON OF VISUAL AND DNA IDENTIFICATION OF BREEDS OF DOGS

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We are all aware of the newspaper articles, magazine stories, and TV segments that show pictures of dogs and then reveal DNA breed analyses of the dogs. Surprise – the DNA results are not what were expected based on the appearance of the dogs or the owners' beliefs. Those of us who walk through shelters and animal control facilities compare the posted breed descriptions of the dogs to what they look like to us – with frequent differences of opinions. Those who have worked at shelters and similar facilities are aware that as dogs move through the steps in admission or during their stay that their breed descriptions may change. It is my impression, when visiting animal control or adoption agencies, that most medium to large size dogs with straight, short/ medium length brown hair coats are cast as German shepherds or shepherd mixes, dogs with a black spot on their tongues are designated Chow mixes, and most medium sized, stocky, broad headed, small eared dogs with a short hair coats are pit-bulls or pit-bull mixes.

It is not easy to visually identify the breeds of dogs of unknown parentage accurately. Sometimes dogs just don't look like either parent. Scott and Fuller's work on the genetics and social behavior of dogs involved studying purebred dogs, F1 crosses of purebreds, backcrosses and F2 crosses.¹ Photographs of some of these F1 and F2 puppies depict that they do not resemble either purebred parent, nor do the photographs of the F2 generations dogs look like their mixed breed parents. We don't know how many of the offspring did look like their purebred ancestors, but clearly not all resembled parents or grandparents.

Shelter dog breed assignments may be based on what the dogs look like to someone at the shelter or because owners relinquishing their dogs have identified the dogs as a specific breed. Newborn and young puppies may be identified as a certain breed because the mother dog resembled a purebred dog. In the latter case, the sire of the litter could have been any breed or several dogs could have fathered puppies in the same litter. When the puppies grow up they don't look anything like their mother or littermates. These breed or mixed breed identifications may eventually find their way into data bases – be it through population data, dog bites, serious dog attacks, behavior problems, or disease statistics.

Rarely are owners permitted to simply fill out forms that ask about the breed by only stating that the dog is a mixed breed or of unknown parentage. If they do so, the follow-up question often is “What is it mostly?”, or “What is its most predominant breed?”, or “What does it look like mostly?” This information may be solicited by insurance companies, landlords, housing associations, licensing agencies, mandatory dog bite reports, veterinary medical records, the media, and researchers trying to determine the likelihood of involvement of specific breeds in study populations. For example, in the methodology of one elegantly designed study, owners were asked “ what breed they considered their dog: if more than one breed was specified, they were asked which breed they considered to be predominant.”² This article became part of the impetus for many recommendations and restrictions intended to reduce dog bites.

High profile articles in JAMA and JAVMA have reported dog bite fatalities and listed breeds involved in such attacks.^{3,4} The data used was obtained by “combining data from the National Center for Health Statistics and computerized searching of news stories. Karen Delise has presented compelling arguments in her recent book, *The Pit Bull Placebo*, that undermines conclusions and implications of these reports.^{5,6}

A short report in press in the Journal of Applied Animal Welfare Science indicates low agreement between the identification of breeds of dogs by adoption agencies and DNA identification.⁷ The dogs in this study were of unknown parentage and had been acquired from adoption agencies. In only a quarter of these dogs was at least one of the breeds proposed by the adoption agencies also detected as a predominant breed by DNA analysis. (Predominant breeds were defined as those comprised of the highest percentage of a DNA breed make-up.) In 87.5% of the adopted dogs, breeds were identified by DNA analyses that were not proposed by the adoption agencies. A breed must have been detected at a minimum of 12.5% of a dog’s make-up to be reported in the DNA analysis.

Reports of DNA analyses of percentages of purebred dog breed ancestry, while accurate most of the time, are not infallible. The laboratories providing such analyses may have qualifiers in their reports stating that there is an 85% or 90% validity of the results and indicate which results have lower confidence levels. Different testing laboratories may report different results depending on which dogs were used to develop their standards and how the laboratories analyze the samples.⁸ As the tests are refined, the same laboratory may report slightly different results at different points in time.

The discrepancy between breed identifications based on opinion and DNA analysis , as well as concerns about reliability of data collected based on media reports, draws into question the validity and enforcement of public and private polices pertaining to dog breeds.

Dr Amy Marder, Animal Rescue League of Boston and Director for the Center for Shelter Dogs, has proposed that dogs adopted from shelters in the U.S. simply be identified as “American Shelter Dogs”. This might solve a lot of problems, as well as promote pride and ownership of an “American Shelter Dog.”

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