Pit Bull Identification in Animal Shelters

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Introduction:
Breed identification is used in dog adoption, lost and found, and regulation. In animal shelters, staff members usually assign breed according to what relinquishing owners report their dogs to be or based on appearance alone since most dogs arrive without a known pedigree.¹ Today, there is a negative public perception of pit bulls and labeling a dog as a pit bull can have a negative impact on its adoptability. Sometimes these negative impressions have resulted in bans on owning pit bulls in hopes of guarding public safety. To date, there is no universally accepted definition of a pit bull, nor is there a universally accepted method of breed identification.²

Hypothesis and Objective:
Shelter staff members and veterinarians routinely make subjective breed assessments, but the reliability and repeatability of their conclusions is unknown. The objective of this study was to test the hypothesis that agreement among shelter staff members regarding identification of pit bulls would be poor and there would be poor agreement between visual breed identification and DNA breed signatures.

Methods:
In this prospective cross-sectional study, 4 staff members at 4 different shelters each recorded the suspected primary breed of 30 dogs, for a total of 16 observers and 120 dogs. In this study, the terms American pit bull terrier, American Staffordshire terrier, Staffordshire bull terrier, and pit bull were included in the study definition of pit bull-type breeds. Blood was collected from each dog for DNA breed signature. Dogs were coded as “pit bull” if American Staffordshire terrier or Staffordshire bull terrier were identified to comprise at least 25% of the breed signature. Agreement among individual shelter staff members regarding identification of pit bulls was determined with the kappa statistic. The sensitivity and specificity of each staff member’s identification of pit bulls with DNA breed signature as a gold standard was calculated.

Results:
1. 120 total dogs: 25 ‘true’ pit bulls by DNA analysis + 95 ‘non-pit bulls’
2. Shelter staff identified 55 out of the 120 dogs to be pit bull type breeds
3. Only 36% of these dogs actually were true pit bulls by DNA analysis.
4. Shelter staff missed identifying 5 (20%) of the true pit bulls.
5. Only 8 (32%) of the 25 pit bulls were identified as a pit bull by all staff.
6. Accuracy in breed assignment varied among individuals, with sensitivity for pit bull-type breed identification ranging from 33% to 75% and specificity ranging from 52% to 100%.
7. The shelter staff agreement had a kappa value that was poor to fair (0.093-0.324).

Conclusions:
1. DNA analysis failed to confirm pit bull-type breeds in the pedigree in more than half of the dogs identified as pit bulls by shelter staff at the time of the study.
2. One in 5 dogs genetically identified as pit bulls were missed by shelter staff.
3. One in 2 dogs labeled pit bulls by shelter staff lacked DNA breed signatures that signature identification of pit bulls is unreliable.
4. Lack of consistency among shelter staff in breed assignment suggests that visual identification of pit bulls is unreliable.
5. Focusing on other attributes of dogs such as personality, behavior, and history instead of breed may help predict safety of individual dogs towards people and other animals.³,⁴
6. Public safety may be better preserved by recognition and mitigation of risk factors for dog attacks and on identification and management of individual dangerous dogs, rather than on exclusion of particular breeds.⁵

Figure 1: Shelter staff sensitivity in identifying true pit bulls

<table>
<thead>
<tr>
<th>Shelter 1</th>
<th>Observer 1</th>
<th>67%</th>
<th>Observer 2</th>
<th>67%</th>
<th>Observer 3</th>
<th>67%</th>
<th>Observer 4</th>
<th>67%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observer 5</td>
<td>50%</td>
<td>Observer 6</td>
<td>50%</td>
<td>Observer 7</td>
<td>50%</td>
<td>Observer 8</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Observer 9</td>
<td>50%</td>
<td>Observer 10</td>
<td>50%</td>
<td>Observer 11</td>
<td>50%</td>
<td>Observer 12</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Observer 13</td>
<td>60%</td>
<td>Observer 14</td>
<td>60%</td>
<td>Observer 15</td>
<td>60%</td>
<td>Observer 16</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Observer 17</td>
<td>60%</td>
<td>Observer 18</td>
<td>60%</td>
<td>Observer 19</td>
<td>60%</td>
<td>Observer 20</td>
<td>60%</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Examples of staff breed designations and genetic breed designations for several study dogs

<table>
<thead>
<tr>
<th>Dog</th>
<th>Photo</th>
<th>Staff 1</th>
<th>Staff 2</th>
<th>Staff 3</th>
<th>Vet</th>
<th>DNA breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dog 1</td>
<td>Lab/Am. Staff</td>
<td>Am. Staff/ Lab</td>
<td>Am. Staff/ Lab</td>
<td>Pit Bull/ Lab</td>
<td>Hh Water Spaniel 25%; Siberian Husky, 25%; Boston Terrier, 25%</td>
<td></td>
</tr>
<tr>
<td>Dog 2</td>
<td>Boxer/ Lab</td>
<td>Am. Staff/ Chow</td>
<td>Boxer/ Lab</td>
<td>Am. Staff/ Greyhound</td>
<td>Boxer, 25%; Alaskan Malamute, 25%</td>
<td></td>
</tr>
<tr>
<td>Dog 3</td>
<td>Am. Staff</td>
<td>Am. Staff Mix</td>
<td>Pit Bull</td>
<td>Am. Pit Bull Terrier</td>
<td>Am. Bulldog, 50%; Am. Staff, 50%</td>
<td></td>
</tr>
<tr>
<td>Dog 5</td>
<td>Pit Bull Mix</td>
<td>Pit Bull</td>
<td>Am. Pit Bull Terrier Mix</td>
<td>Pit Bull Mix</td>
<td>Am. Bulldog, 50%; Am. Staff, 50%</td>
<td></td>
</tr>
<tr>
<td>Dog 6</td>
<td>Jack Russell Terrier/ Hound</td>
<td>Basenji/ Lab</td>
<td>Shar-Pei/ Rat Terrier</td>
<td>Chihuahua Mix</td>
<td>Chow, 25%; Am. Staff, 25%; Siberian Husky, 25%</td>
<td></td>
</tr>
</tbody>
</table>

Acknowledgements:
The authors would like to thank the Maser Slater Scholars Research and the Maddie’s Shelter Medicine Program at the University of Florida. Maddie’s Shelter Medicine Program is underwritten by a grant from Maddie’s Fund®, The Pet Rescue Foundation (www.maddiefund.org), helping to fund the creation of a no-kill nation. We thank the four animal shelters that participated in this study, Jacksonville Animal Care and Protective Services, the Jacksonville Humane Society, Marion County Animal Services, and Tallahassee Animal Services. Thank you Michael Crandall, Sylvia Tucker, Niora Fabian, and Jaime Willson for their hard work and making this study possible.

References: