

1 **The incidence and impact of dog attacks on guide dogs in the UK: An update**

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8

9 **Abstract**

10 Data on dog attacks on Guide Dogs' stock were reviewed to investigate the

11 characteristics of the attacks. An average of 11.2 attacks occurred each month.

12 Nearly all of the attacks occurred in public areas, 68.4% of victim dogs were

13 qualified guide dogs and 55.5% of victim dogs were working in harness when they

14 were attacked. Guide Dogs' stock were injured in 43.2% of attacks and veterinary

15 costs for attacks were estimated at £34,514.30. Over 40% of qualified guide dogs'

16 working ability was affected and more than 20% of qualified guide dogs required

17 some time off from working after a dog attack. Twenty dogs were permanently

18 withdrawn from the Guide Dogs' programme as a result of dog attacks, 13 of which

19 were qualified and working with guide dog owners at the time of the withdrawal; this

20 resulted in a financial cost of over £600,000 to the charity. More importantly

21 perhaps, temporary and permanent withdrawals have a significant impact upon the

22 mobility and independence of guide dog owners and in many cases significantly

23 impacted their emotional wellbeing.

24

25

1 **Keywords: guide dogs, intraspecific aggression, dog attack, canine**
2 **aggression**

3

4 **Introduction**

5 A study published in the Veterinary Record in 2010 detailed the number, severity
6 and consequences of reported dog attacks on guide dogs in the UK along with the
7 characteristics of the aggressors and victims and details of the attacks (Brooks and
8 others 2010). The data were based on 100 attacks on Guide Dogs' stock that had
9 been reported between November 2006 and April 2009. Other published studies
10 have investigated dog aggression, but more commonly that directed towards
11 humans, especially children (Lockwood 1995; Reisner and Schofer 2008; Casey
12 and others 2014). Existing studies into inter-dog aggression have examined risk
13 factors and characteristics of the dogs and their owners (Roll and Unshelm 1997,
14 Shamir and others 2002, Baranyiova and others 2003, Řezáč and others, 2011).
15 Casey and others (2012) reported findings from a questionnaire of dog owners and
16 found that more than 20% of 3,897 dogs had shown, or were currently showing,
17 aggression to unfamiliar dogs when outside of the house.

18

19 Guide Dogs has continued to record dog attacks on their stock and has used this
20 information to successfully campaign for changes in the law. In March 2014 the Anti-
21 Social Behaviour, Crime and Policing Act was passed which means that a dog
22 attack on a trained assistance dog will be treated as an aggravated offence with
23 sentences of up to three years imprisonment for the attacking dog's owner (Guide
24 Dogs 2014a).

25

1 There are approximately 4,900 working guide dogs in the UK, each of which is
2 supported by Guide Dogs. Attacks on working guide dogs can markedly affect the
3 guide dog owner, leading to a loss of their mobility, a reduced quality of life, and a
4 negative impact on their wellbeing (Godley and Gillard 2011; Marquès-Brocksopp
5 2015) and attacks can also have financial implications for the charity; the lifetime
6 investment in each guide dog is approximately £50,000. This study aimed to provide
7 up to date information on the number of dog attacks on Guide Dogs' stock in the UK
8 and investigate the characteristics of the attacks, focussing specifically on the
9 injuries to dogs and the financial implications for Guide Dogs.

10

11 **Materials and methods**

12 Data have been reviewed for all dog attacks on Guide Dogs' stock (8,750 dogs
13 correct as of 08 April 2015) reported between 01 June 2010 and 28 February 2015.
14 A dog attack for the purposes of this study was defined as 'When a dog sets upon
15 another dog in a forceful, violent, hostile or aggressive way, involving physical
16 contact'. Dog attacks were reported to Guide Dogs by the victim dogs' handlers
17 using a specially designed report form. Extensive data were gathered for each
18 attack using the report form and included: (a) attack details: location, whether
19 witness details were obtained and the cause of the attack as determined and
20 described by the victim dog's handler; (b) the aggressor(s): breed, gender, age and
21 details of owner control of the aggressor prior to the attack; (c) the victim: breed,
22 gender, age, colour, stage of training or work and activity prior to the attack; (d)
23 impacts on the victim dog reported by the victim dog's handler: injuries, whether
24 veterinary attention was required, the locations of injuries to dogs and the effects on
25 working life; (e) impacts on people: injuries and whether medical attention was

1 required and effects on the emotional well-being of the victim's handler; and (f)
2 veterinary costs and (g) estimated costs of dogs withdrawn from the programme.

3

4 The proportions of victims that were each breed, sex and colour were compared to
5 the data for the whole Guide Dogs' population correct as of 08 April 2015 (n=8,750
6 dogs) and any large variations were highlighted. Comparisons of victim and
7 aggressor breed, sex and colour were carried out to identify factors impacting the
8 severity of attacks, as measured by injury presence. Injury locations were grouped
9 (muzzle, head and ears, neck, forelegs, thorax and abdomen, fore legs, hind legs
10 and tail). The frequency of injuries in each location was compared to establish if
11 biases in attack location occurred. To visualise the words used to describe the
12 handlers emotional reaction following the attack a word cloud was used; the larger
13 the word the more times it was mentioned. Veterinary costs were recorded, or when
14 data were missing were estimated by calculating the average reported cost. Costs
15 for dogs withdrawn from the Guide Dogs' programme were calculated for dogs that
16 were still in training as the total cost to breed, puppy walk and train the dog (based
17 on the weeks it had been in training) and the cost of a replacement dog trained to
18 the same stage. The costs for dogs withdrawn once qualified were based on a loss
19 of return on investment assuming a working life of 7 years.

20 Data were analysed using XLStat (Addinsoft, USA) and R version 3.0.2 (R core
21 team, 2013). Count data were analysed using chi-squared tests with Yates'
22 correction, if required. A mixed effect model with binomial error structure was run to
23 identify factors affecting whether an attack had resulted in physical injuries to the
24 victim dog. Dog identification number was included as a random variable to account
25 for multiple attacks on the same individual. Significance was detected using chi-

1 squared tests for the change in deviance on removing each term independently and
2 by the Akaike Information Criterion (AIC). Data were reported as mean \pm s.e and
3 values were considered statistically significant when $P < 0.05$.

4

5 **Results**

6 A total of 629 attacks occurred during the 56 month period between 01 June 2010
7 and 28 February 2015 (mean 11.2 attacks per month). The mean number of attacks
8 per month (2011 to 2014) were 8.3, 11.6, 14.3 and 11.3. Fifty attacks involved two
9 or more aggressors; therefore results analysis for aggressors was based on data
10 from 689 dogs.

11

12 *Attack details*

13 Attacks occurred in public areas on 96.8% of occasions; these were recreation
14 areas for 26.8% of attacks (where dogs might be expected to be free running) and
15 other public areas for 73.2% of attacks (where dogs might be expected to be on a
16 lead). Other than the victim dog's handler and aggressor dog's owner, there were
17 other people present at 74.2% of attacks. Details of witnesses were obtained after
18 34.5% of the attacks where there were other people present. Attacks were
19 described by the victim dogs' handlers' as being unprovoked (18.8%), caused by the
20 aggressor dog (22.3%) and caused by a lack of control (29.3%).

21

22 *Aggressors*

23 The aggressor dog breeds which were represented by more than 10 individual
24 aggressors were Staffordshire Bull Terriers or Staffordshire Bull Terrier types
25 (n=182, 26.4%), cross breeds (n=95, 13.9%), German Shepherd Dogs (n=39,

1 5.7%), Jack Russell Terriers (n=18, 2.6%), Boxers (n=16, 2.3%), Labradors (n=15,
2 2.2%) and Rottweillers (n=11, 1.6%). Breed was unknown for 18.6% of aggressors.
3 Aggressor gender was reported for 197 attacks and 123 were male (62.4%).
4 Aggressors were reported to be with their owner but off the lead in 46.1% of attacks,
5 with their owner and on the lead in 30.7% of attacks and not with their owner in
6 21.8% of attacks. Of the guide dogs that were attacked while working in harness
7 (n=349), 36.4% were attacked by aggressors that were with their owner but not on a
8 lead, 34.4% by aggressors on a lead and with their owner and 26.4% by aggressors
9 that were not with their owner.

10

11 *Victims*

12 Fifty four dogs were attacked more than once during the study period; 46 dogs were
13 attacked twice, 7 dogs were attacked three times and one dog was attacked four
14 times. Victims were male (n=326, 51.8%) and female (n=303, 48.2%) (compared to
15 a proportion of male dogs in the Guide Dogs' population of 50.3%). Victims were
16 aged between 0.2 and 13.3 years (mean age 3.66 ± 0.11 years) and were mainly
17 black or yellow in colour (46.6% and 40.5% respectively), consistent with the two
18 most common colours within Guide Dogs' stock (41.1% black and 45.2% yellow).
19 There were fewer light coloured dogs attacked and more dark coloured dogs
20 attacked than might be expected (Table 1). Victims were qualified guide dogs
21 (68.4%, age range 1.6 to 10.3 years), dogs in puppy walk (19.7%, age range 0.2 to
22 1.5 years), dogs in training (8.1%, age range 1.0 to 4.5 years), retired guide dogs
23 (1.9%, age range 5.0 to 10.9 years), breeding stock (1.7%, age range 1.5 to 5.9
24 years) and buddy dogs (Guide Dogs, 2015) (0.2% aged 8.6 years).

25

1 INSERT TABLE 1 NEAR HERE

2 When the attacks occurred, 55.5% of victims were working in harness, 25.8% were
3 on a lead and 18.0% were free running. Of the qualified guide dogs that were
4 attacked (n=430), 72.8% were working in harness when the attack occurred.

5

6 *Impacts on the victim dog*

7 Guide Dogs' stock were injured in 43.2% (n=272) of attacks; these were 153
8 qualified guide dogs, 83 dogs in puppy walk, 20 dogs in training, 11 retired guide
9 dogs, 4 breeding stock and one buddy dog. The injuries received were most
10 commonly puncture wounds (37.1%; Table 2). Veterinary attention was required for
11 76.5% (n=208) of the 272 dogs with injuries and a further 4.6% (n=29) of dogs
12 visited a veterinarian for a check-up although they were found to have no physical
13 injuries.

14

15 INSERT TABLE 2 NEAR HERE

16

17 A mixed effect model with binomial error structure was run to establish the effect of
18 victim breed, colour, sex, training stage, number of aggressors and aggressor breed
19 group on whether injuries were received during an attack. Dog identification number
20 was included as a random variable. Training stage at the time of attack significantly
21 impacted injuries received (AIC 862.17 vs 871.24 dev = 51.289, $P < 0.001$; Figure 1).
22 Pairwise post hoc comparisons showed that although not different from each other
23 ($P = 0.15$) retired dogs and dogs in puppy walking received injuries more frequently
24 during attacks compared to training dogs (retired $P < 0.01$; puppy walking $P < 0.01$),
25 working dogs (retired $P < 0.01$; puppy walking $P < 0.01$) and breeding stock (retired P

1 = 0.01; puppy walking $P = 0.09$). All other variables tested did not significantly
2 impact whether injuries were received by a victim during an attack.

3

4 INSERT FIGURE 1 NEAR HERE

5

6 For dogs which spend time in harness (training and qualified guide dogs), the
7 number of attacks resulting in injuries was significantly higher when the victim was
8 free running prior to the attack compared to being in harness or on a lead ($n = 478$,
9 Chi Squared = 29.68, $DF = 2$, $p < 0.001$; Figure 2).

10

11 INSERT FIGURE 2 NEAR HERE

12

13 The locations of the injuries sustained were reported for 257 of the 272 injured dogs.
14 The frequency of injuries to each body location varied significantly (Chi Squared =
15 155.74, $DF = 7$, $p < 0.001$) with the highest frequency of injuries occurring to the head
16 and ears (36.0%), the neck (19.9%) and to the muzzle (17.3%). There were no
17 significant differences in the locations of injuries between the sexes ($DF = 7$,
18 $P = 0.145$, $Chi = 10.862$).

19

20 Forty-two percent of the 430 attacks on qualified guide dogs resulted in a negative
21 impact on working ability and after 21.6% of the 430 attacks dogs were unable to
22 work for a period of time. Twenty dogs were permanently withdrawn from the Guide
23 Dogs' programme as a result of dog attacks; 13 qualified guide dogs, six dogs in
24 training and one dog in puppy walking. Thirteen of the dogs that were withdrawn had
25 been injured in the dog attacks. Dogs were withdrawn because the dog attack

1 impacted their behaviour and their ability to safely guide a person that is blind or
2 partially sighted.

3

4 *Impacts on people*

5 The dog attacks resulted in physical injuries to 87 people (13.8% of attacks), of
6 which 59 (67.8%) were guide dog owners and 41 (47.1%) required medical
7 attention. The victim dog handlers' reported that their emotional wellbeing had been
8 affected after 70.7% of attacks. Handlers' reported that their emotional reactions to
9 the attacks included being anxious (38.7%); shaken (34.6%) and upset (30.1%,
10 Figure 3). Six handlers reported sleeplessness, two reported having nightmares and
11 five reported feeling vulnerable. Two guide dog owners were considering not
12 retraining with another dog as a result of the attacks, one wanted to move house
13 and one did not want to work their guide dog following the attack.

14 INSERT FIGURE 3 NEAR HERE

15

16 *3.6 Financial implications for Guide Dogs*

17 Total veterinary costs for the 237 attacks (for 208 dogs that were injured and 29
18 dogs that were not) which resulted in veterinary attention were calculated to be
19 £34,514.30. The mean veterinary costs for dogs that were injured were £160.10
20 (range (£9.58 to £1,219.26) and for dogs that were not injured were £41.87 (range
21 £23.40 to £97.00). Veterinary costs were paid by the aggressor dogs' owners in six
22 cases and vets provided treatment free of charge in five cases. The costs to Guide
23 Dogs for the 20 dogs permanently withdrawn were based on Guide Dogs 'The cost
24 of a guide dog 2014' document and were calculated to be £627,086.92.

25

26

1 **Discussion**

2 This study provides updated data on dog attacks on Guide Dogs' stock. In addition,
3 more detailed analysis of the injuries to victim dogs is reported. The number of
4 reported attacks has increased from a mean of three per month (Brooks and others
5 2010) to 11.2 attacks per month. It is not clear whether this reflects higher levels of
6 reporting or a real trend.

7

8 The current data shows consistencies with findings previously reported in that the
9 majority of aggressors, where gender was reported, were male and the majority of
10 attacks occurred in public areas (Sherman and others 1996; Roll and Unshelm
11 1997; Brooks and others 2010). In contrast, Casey and others (2012) reported no
12 effect of dog gender on the risk on intra-specific aggression in dogs that were
13 aggressive, however their study was based on questionnaire responses from dog
14 owners. Roll and Unshelm (1997) reported that victim dogs were more commonly
15 male and this was found within the first study into dog attacks on guide dogs
16 (Brooks and others 2010), however in the present study the gender of victims was
17 not different to the Guide Dogs' population. The proportion of dark coloured victims
18 was overrepresented compared with the Guide Dogs' population. Studies directly
19 examining the impact of coat colour on dog communication are rare and so the
20 reasons for higher numbers of dark coloured attack victims remain unclear. Within
21 the dataset there were reports for 54 dogs which had been the victims of dog
22 attacks on more than one occasion. Information for risk factors, such as victim dog
23 handler and dog behaviour would be useful for further investigation of these dogs.
24 However this was not available for this study.

25

1 Most of the victims were qualified guide dogs, with almost three quarters working in
2 harness when the attacks occurred. Overall, including dogs in training, 55% of the
3 total number of victims were working in harness when attacked. The guide dog
4 harness is designed to be visible and should have been apparent to the owners of
5 aggressors who were present in 76.8% of attacks. It is feasible that a proportion of
6 these attacks could have been avoided if the aggressor was put on a lead when the
7 owner saw the guide dog in harness. Injuries were less common when guide dogs
8 were in harness potentially because of greater intervention from the guide dog
9 owners or trainers. Victims were injured in 42% of attacks and injuries were more
10 frequently located towards the front of the body. The costs of veterinary treatment
11 and replacement dogs were estimated to be over £650,000.00 but the impacts of the
12 attacks on the guide dog owner are more important (Marquès-Brocksopp 2015).
13 More than 70% of the victim dogs' handlers reported effects on their emotional
14 wellbeing, whilst a small number of guide dog owners did not want to work their
15 dogs or train with a new dog, and, in some cases, experienced sleeplessness and
16 nightmares. As well as a long-term holistic support mechanism in the period
17 following an attack (Marquès-Brocksopp, 2015), guide dog owners that have to visit
18 a veterinarian with their guide dog can be further supported by the veterinary
19 practice by ensuring that their needs are understood and met during their visit
20 (England and others 2014).

21

22 Many authors have reported the benefits of pet dog, assistance dog and guide dog
23 ownership (Friedmann 1995; Lane and others 1998; Refson and others 1999;
24 Whitmarsh 2005; Guest and others 2006; McConnell and others 2011; Ramírez and
25 others 2014). Guide dogs have been found not only to provide the benefit of

1 enhanced physical wellbeing mobility and independence to their guide dog owner,
2 but also social, spiritual and emotional benefits. These include increased
3 confidence, companionship, purpose in life and improved social connectedness
4 (Refson and others 1999; Whitmarsh 2005). It is not surprising that Nicholson and
5 others (1995) reported that when guide dogs are withdrawn guide dog owners
6 experience high levels of stress, feelings which can be similar to the loss of a
7 relative or friend, or the death of a pet. Within the current study, 20 dogs were
8 withdrawn from the Guide Dogs programme as a direct result of a dog attack, 20%
9 of qualified guide dogs required time off from working and 13 dogs were withdrawn
10 from working as a guide. The implications for the guide dog owners of these dogs
11 are likely to be long-term and complex affecting not only their mobility and physical
12 health, but also their social and emotional wellbeing.

13

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16 assistance with dog attack reporting.

17

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1 Table 1. The breeds, colours and work stages for dogs that were attacked (n=629) and dogs that
 2 were in the Guide Dogs' population (n=8,750) correct as of 08 April 2015.

Characteristic	Number and percentage of dogs in population (%)	Number and percentage of dogs that were attacked (%)
Breed		
Border collie	3 (0.0%)	2 (0.3%)
Border collie x golden retriever	27 (0.3%)	1 (0.2%)
Curly coated retriever x golden retriever	11 (0.1%)	1 (0.2%)
Flat coated retriever x golden retriever	23 (0.3%)	3 (0.5%)
German shepherd dog	303 (3.5%)	22 (3.5%)
Golden retriever	698 (8.0%)	41 (6.5%)
Golden retriever x flat coated retriever	150 (1.7%)	11 (1.7%)
Golden retriever x German shepherd dog	253 (2.9%)	18 (2.9%)
Golden retriever x Labrador	2982 (34.1%)	196 (31.2%)
Golden retriever x Labrador*	11 (0.1%)	1 (0.2%)
Irish water spaniel x Labrador	6 (0.1%)	2 (0.3%)
Labrador	2292 (26.2%)	184 (29.3%)
Labrador x curly coated retriever	13 (0.1%)	5 (0.8%)
Labrador x golden retriever	724 (8.3%)	47 (7.5%)
Labrador x golden retriever*	867 (9.9%)	69 (11.0%)
Labrador x Labrador*	144 (1.6%)	19 (3.0%)
Standard poodle x Labrador	100 (1.1%)	4 (0.6%)
Colour		
Dark	3649 (41.7%)	298 (47.4%)
Light	4665 (53.3%)	299 (47.5%)
Mixed	387 (4.4%)	28 (4.5%)
Other	49 (0.56%)	4 (0.6%)
Stage		
Buddy dog	112 (1.3%)	1 (0.2%)
Puppy walking	1509 (17.2%)	124 (19.7%)
Qualified	4956 (56.6%)	430 (68.4%)
Retired	708 (8.1%)	12 (1.9%)
Breeding stock	374 (4.3%)	11 (1.7%)
In training	588 (6.7%)	51 (8.1%)

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1 Table 2. The types of injuries reported for the 272 victim dogs that were injured as a
2 result of dog attacks

Description of injury	Frequency	Proportion (%)
Bite	40	14.7
Bruising or soreness	38	14.0
Crush injury	1	0.4
Cut, tear, laceration, open wound	55	20.2
Graze or abrasion	38	14.0
Not stated	36	13.2
Perforated ear drum	1	0.4
Puncture	101	37.1

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8 Figure 1. Number of attacks at each training stage resulting in injuries

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11 Figure 2. Frequency of attacks resulting in injury on training and working dogs while
12 working in harness, free running and on a lead.

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15 Figure 3. The word cloud shows the most common words used by victims' handlers
16 to describe how they were affected emotionally following a dog attack. The larger
17 the word the more frequently it was mentioned.

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19