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Using civil claim enquiry data to understand the context and impact of dog-related injuries in England and Wales between 2017 and 2024

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ABSTRACT

Background Dog-related injuries, particularly bites, are a growing public health concern, yet context for effective prevention remains limited. This study takes a novel approach by analysing civil claims enquiry data to describe the context and impact of dog bite and non-bite incidents in England and Wales.

Methods Descriptive analysis of anonymised civil claims enquiry data from 2017 to 2024. Demographic and injury consequences were compared between bite and non-bite incidents using Chi-squared and Mann-Whitney U tests.

Results 816 incidents were analysed; 91.3% were dog bites, 6.7% dog strikes. Bites (n=745) occurred at private residential properties (52.8%) or on public highways or pavements (22.8%). Non-bite incidents (n=70) were in public spaces (48.6%) or public highways or pavements (25.7%). Delivery workers accounted for 28.1% of victims. Most dogs were off lead at the time of injury (78.8% bites, 85.7% non-bites). Fractures occurred in 72.7% (40/55) of non-bite incidents. Mental illness followed in 15.1% of bite cases and 10.0% of non-bites; 6.5% of individuals were clinically diagnosed with specific phobias, 4.1% with post-traumatic stress disorder. Work absence was reported in 59.5% of bites, while 54.3% reported lost earnings.

Discussion Civil claims data offer valuable insights into the burden and context of dog-related injuries. Dog strikes, although less common, often result in severe injury. Most public incidents involved unrestrained dogs. This work provides emerging evidence of the psychological impact of dog-related injuries.

Conclusions We present a novel methodology for contextual injury research and highlight the need to assess enforceable dog lead use on highways and public spaces.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Dog-related injuries, particularly bites, are recognised as a growing public health concern. Contextual information critical for prevention strategies is limited, with a focus on injuries within the home. This study proposes a new methodology of analysing legal claims data to identify contextual injury information.

WHAT THIS STUDY ADDS

⇒ We now know that many personal injury claims involving dogs arise when the animal is unrestrained in a public space. Dog strike-related injuries are likely to be more severe than previously thought. For the first time, we show the degree of psychological trauma resultant of these injuries.

HOW MIGHT THIS STUDY AFFECT RESEARCH, PRACTICE, OR POLICY

⇒ This study supports an exploration of legislative change to mandate lead usage in certain public spaces, reducing off-lead incidents and improving public safety. More research is needed into the psychological consequences of dog-related trauma and what patient support is needed.

BACKGROUND

The United Kingdom (UK) has a growing dog population; an estimated 12.6 million dogs in 2019,[1] 13.6 million in 2024.[2] Despite the benefits that dogs bring to society,[3] there is always the potential risk of injury due to dog bites and strikes. Hospitalisations due to dog bites and strikes have risen across Great Britain.[4–7] In England, they have increased from 4.76 hospital admissions per 100 000 population in 1998 to 18.7 in 2023,[4 5] while in Wales, they have risen from 16.3 per 100 000 in 2014 to 23.7 in 2022.[6] Dog-related deaths in England and Wales averaged three per year between 2001 and 2021, showing little change over time.[8]

Medical records analysis shows that children have the highest incidence of dog-related injuries, but rising adult admissions drive the national increase with injuries more common in socioeconomically deprived areas.[4 6 7 9] Adults mainly sustain limb injuries, children head/neck injuries, and direct hospital costs reached £70.8 million in England (2017/2018) and £2.2 million in Scotland (2022).[4 7] Medical records have contextual limitations. Since cases are identified through the ICD-10 Code 'Bitten or struck by dog' it is challenging to differentiate between a dog bite and a dog strike.[10] Attempts have been made to differentiate, with estimates that 95% of child admissions and at least 77.5% of adult admissions are due to bites.[4] Incidence estimates likely underestimate the burden of dog-related injuries as people may attend emergency departments without being admitted, may attend a primary care physician or self-treat their injuries.[11 12] Hospital data indicate most bites occur at home, often during interaction with a known dog.[4 7 11–13] However, these records provide limited context or limited long-term impact, highlighting the need for alternative data sources to inform effective prevention

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strategies. Unique data sources could offer deeper insights into how dog bites occur and their impact on victims.

In English and Welsh law, The Animals Act 1971 makes the owner of a dog strictly liable for any injuries caused by the dog.[14] For liability of damage to be proven the following statements must be proven: (1) the damage must be of a kind which, unless the animal was restrained was likely to be severe; (2) the damage must have been caused by atypical characteristics for the species or those that appear only in certain situations; (3) the keeper must have known about these characteristics. To establish these criteria, solicitors gather extensive data on injury context, impact and subsequent ability to work. One could explore such cases by analysing those taken to civil court. They could be analysed, but would likely reflect more affluent defendants, as claims are only pursued when assets exist to cover damages and legal costs. Most solicitors' firms will collect initial contextual and impact data before making a judgement on whether the case can be adopted. If these data were collated and analysed, they would remove the inherent socioeconomic bias of analysing court records.

This study aimed to understand whether analysing civil liability claim enquiry data could provide substantial contextual information about dog bites and strikes to inform the development of effective intervention strategies.

METHODS

Anonymised civil claims enquiry data were provided by law firm Slee Blackwell Solicitors LLP who provide legal services throughout England and Wales.[15] They have a range of expertise and are seen as industry leaders in animal law.[16] This firm routinely collects personal injury enquiry data regarding dog-related incidents as part of their screening process for case adoption. The firm compiled such data from 1 January 2017 to 31 March 2024. The data were subsequently cleaned, with sensitive and identifiable information removed. When fully anonymised by the firm the data were securely shared with the research team.

These enquiry data contained information about injured person (IP) demographics (sex and age), incident details (date, location/land use,[17] context of incident), dog details (breed, level of restraint), and consequences to IP (physical injuries, psychological injuries, medical treatment, absence from work and loss of earnings). Data were stratified between incidents involving dog bites or those that did not (for analytical purposes referred to as 'non-bite incidents').

Temporal and spatial trends of incidents were analysed descriptively. Sex and age differences in bite or strike IPs were assessed using Chi-squared and Mann-Whitney U tests respectively. Incident and dog details were analysed descriptively. IP consequences were analysed descriptively, except a comparison between medical treatments between the two incident types, compared using Chi-squared tests. Time off work and resultant loss of earnings were compared between incident types using Chi-squared tests.

The data in this study were originally generated for legal purposes, not research. These data were provided by individuals seeking representation by Slee Blackwell Solicitors LLP for personal injury claims to the legal firm following General Data Protection Regulations (GDPR) and the explicit consent that they could be shared to third parties. Data were cleaned and anonymised by the legal firm before sharing with the research team. This project therefore involves the secondary analysis of data and adheres to ethical principles of research integrity, data protection and responsible use. As such, the University of Liverpool Research Ethics team confirmed that no ethical approval was needed. All statistical analyses were carried out using R language (version 3.2.0; R Core Team 2015). The results were deemed statistically significant where $p<0.05$.

RESULTS

A total of 816 dog-related incidents (842 individual claims) were recorded. Most incidents involved one claimant (97.3%). Most incidents occurred in England (93.7%), with the largest proportion of claimants being in the South-East (19.2%) (online supplemental Table S1). Incidents primarily involved dog bites (91.3%), 6.7% were dog strikes (table 1).

Potential seasonality of dog bites was identified, with 32.7% of bites occurring during the summer (online supplemental fig. S1). Seasonal trends for non-bite injuries appeared to be complex and further investigation is warranted. No trend for day of the week was seen (online supplemental fig. S2). Incidents peaked within regular working hours (ie, 9am-5pm) (online supplemental fig. S3).

Half of dog bite victims were male (52.7%), whilst non-bitten IPs were mainly female (69.9%). Women were more than twice as likely to be involved in a non-bite incident than a bite incident compared with men (online supplemental table S2). There was a significant difference in age profile, with non-bite IPs (mean=50) being significantly older than bite IPs (mean=39) (Mann-Whitney $U=18\,568$, $p<0.001$). Most individuals did not know the dog involved (80.3%) nor were they aware of any previous incidents involving the dog (89.5%).

Most dog bite incidents occurred on private residential properties (52.8%) (table 2). The three most prevalent specific bite locations were in front of a private residential property (34.2%), on a highway or pavement (17.7%), and inside a private residential property (11.1%). Non-bite incidents mainly occurred in public spaces (48.6%). The most prevalent specific locales were outdoor recreational areas (34.3%), highway or pavement (22.9%), and 'forestry, open land and water' (11.4%).

Injuries to IPs frequently occurred outside of work; 55.6% of bite, and 82.9% of non-bite incidents (table 3). Delivery workers made up 28.1% of all bite incidents. The most common context for bites was: delivery workers delivering at a private residential property, the door opens and an unrestrained dog comes out (12.2%); walking, exercising, playing in public without a dog (11.4%); and walking with own dog (10.6%). The common contexts for non-bite incidents were walking, exercising, playing in public with own dog (34.3%); walking, exercising, playing in public without a dog (27.1%); and a dog escaping from a private property (10.0%).

Table 1 Injury mechanism in dog-related personal injury claim incidents (from 2017 to 2024)

Injury mechanism	Percentage of incidents (n=816)
Involves a dog bite to a person	745 (91.3%)
Bite	732 (89.7%)
Bite and strike	13 (1.6%)
Not involving a dog bite to a person	71 (8.7%)
Strike	42 (5.1%)
Dog on dog attack (no/minor human injury)	14 (1.7%)
Pulled over/Fall/Trip	8 (1.0%)
Other	7 (0.9%)

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Table 2 Locations, and levels of restraint, of dog bite and non-bite incidents in dog-related personal injury claims

Location	Bite incidents percentage (n=745)	Percentage of biting dogs that were un-restrained in each location	Non-bite incidents percentage (n=70)	Percentage of non-bite incident dogs that were un-restrained in each location
Overall		**587 (78.8%)**		**60 (85.7%)**
Private residential property	393 (52.8%)	368 (93.6%)	10 (14.3%)	8 (80.0%)
Front of property	255 (34.2%)	239 (93.7%)	8 (11.4%)	6 (75.0%)
Inside property	83 (11.1%)	79 (95.2%)		
Rear garden/yard	49 (6.6%)	46 (93.9%)	2 (2.9%)	2 (100.0%)
Unknown	6 (0.8%)	4 (66.7%)		
Highways	170 (22.8%)	102 (60.0%)	18 (25.7%)	14 (77.8%)
Highway/pavement	132 (17.7%)	78 (59.1%)	16 (22.9%)	12 (75.0%)
Footpath/bridleway	38 (5.1%)	24 (63.2%)	2 (2.9%)	2 (100.0%)
Public space	83 (11.1%)	60 (72.3%)	34 (48.6%)	31 (91.2%)
Outdoor recreation (ie, park, nature reserve)	65 (8.7%)	45 (69.2%)	24 (34.3%)	22 (91.7%)
Agricultural land	10 (1.3%)	9 (90.0%)	2 (2.9%)	2 (100.0%)
Forestry, open land and water	8 (1.1%)	6 (75.0%)	8 (11.4%)	7 (87.5%)
Community buildings	11 (1.5%)	6 (54.5%)	2 (2.9%)	2 (100.0%)
Commercial	74 (9.9%)	44 (59.5%)	4 (5.7%)	4 (100.0%)
Dog-related businesses (ie, vets, groomers, kennels)	17 (2.3%)	6 (35.3%)	1 (1.4%)	1 (100.0%)
Food business	12 (1.6%)	4 (33.3%)	2 (2.9%)	2 (100.0%)
Industrial estate	12 (1.6%)	11 (91.7%)	1 (1.4%)	1 (100.0%)
Agricultural business (ie, farm, livery yard	12 (1.6%)	8 (66.7%)		
Hotels and accommodation	11 (1.5%)	9 (81.8%)		
Retail	10 (1.3%)	6 (60.0%)		
Other	4 (0.5%)	2 (50.0%)		
Unknown	10 (1.3%)	5 (50.0%)	2 (2.9%)	1 (50.0%)

The majority of dogs involved in a bite (68.6%), or non-bite (77.5%) incident were reported to be with their owner. Most dogs were not restrained at the time of bite (78.8%) and non-bite incidents (85.7%) (table 2). The level of restraint varied by location. Regarding bites, 6.4% of dogs were restrained in private properties, while 37.3% were restrained in non-residential locations (ie, highways, public space, community buildings, commercial settings). For non-bite incidents, 20% of dogs were restrained in private residential properties, while 12.1% were in non-residential locations. Incidents were reported to the police for 72.5% of bites and 60.3% of non-bite incidents. Results about the dog's breed, and their subsequent discussion, are found within the supplementary material (online supplemental table S3).

Ninety-eight percent (97.9%) of bite and 78.1% of non-bite incidents resulted in a physical injury. Injuries from bites were primarily described as 'bite(s) wounds' (46.7%), puncture wounds (39.7%), and lacerations (15.0%) (online supplemental table S4). Fractures amounted to 3.6% of injuries, while tissue loss or amputations were 3.1%. For non-bite incidents, these were primarily described as fractures (72.7%), muscle/tendon/ligament damage (9.1%), and soft tissue damage (9.1%). The predominant anatomy injured by bites were wrist and hands (33.0%), knee and lower legs (18.9%), and elbow and forearm (18.9%) (table 4). Moreover, 1 in 7 bite injuries were to the head. Non-bite injuries occurred mainly to the knee and lower leg (47.4%), and shoulder and upper arm (26.3%). Over 12% of non-bite injuries resulted in tibial plateau fractures.

The majority of bite (90.3%) and non-bite (75.7%) IPs self-reported psychological injuries (table 5). 15% of bitten IPs, and 10% of non-bitten IPs were provided with a clinical diagnosis, by a physician, of a mental illness as defined by the Diagnostic and Statistical Manual of Mental Disorders (DSM-5).[18] Overall, 6.5% of IPs were diagnosed with a specific phobia and 4.1% were diagnosed with post-traumatic stress disorder (PTSD). The most prevalent symptoms for bitten and non-bitten IPs were phobia, anxiety, disturbed sleep and avoidance.

The majority of dog bite (86.0%) and non-bite (74.0%) IPs reported that the physical injury sustained resulted in hospital attendance. A quarter of bitten IPs (25.9%) and 30.2% of non-bitten IPs required surgical treatment. Few IPs mentioned length of stay within the hospital. Thirty bitten IPs had a median length of stay of 3 days (range: 2–7 days), while eight non-bitten IPs had a median stay of 3.5 days (range: 1–11 days). Thirty-one percent (31.0%) of bitten IPs visited their primary care physician, while 26.3% of non-bitten IPs did. A minority of IPs required ongoing treatment (13.6% of bitten, 43.3% of non-bitten); non-bitten IPs were more than four times more likely to need ongoing treatment than bitten IPs (OR=4.83, 95% CI 2.75–8.43, p<0.) (online supplemental table S5). In a legal-medical context, ongoing treatment refers to the sustained provision of medical care or therapeutic intervention beyond initial diagnosis or acute management, before maximum medical improvement is reached.

Of the claimants still working when the injury took place, 59.5% of bite and 56.1% of non-bite incidents were absent from work (online supplemental table S6). Few reported the length of time off work; the maximum recorded for a bitten IP was 5 years, and for a non-bitten IP was 5 months. Over half of bitten IPs (54.3%) and 41.4% of non-bitten IPs reported a loss of earnings resultant of their injuries. Significantly more bitten

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Table 3 Context of dog bite and non-bite incidents in dog-related personal injury claims

Context	Percentage of bite incidents (n=745)	Percentage of non-bite incidents (n=70)
Injured while not at work	**414 (55.6%)**	**58 (82.9%)**
Private residential property	123 (16.5%)	2 (2.9%)
No known interaction	48 (6.4%)	
Attempted interaction with dog (ie, stroke)	41 (5.5%)	
Dog escaped from a private property	25 (3.4%)	1 (1.4%)
Intervened in dog-on-cat attack	3 (0.4%)	1 (1.4%)
Intervened in dog-on-dog attack	2 (0.3%)	
Walking, exercising, playing in public without a dog	1 (0.1%)	
Unknown	3 (0.4%)	
Highway	156 (20.9%)	17 (24.3%)
Walking, exercising, playing in public without a dog	50 (6.7%)	5 (7.1%)
Walking, exercising, playing in public with own dog	43 (5.8%)	4 (5.7%)
Dog escaped from a private property	30 (4.0%)	6 (8.6%)
Intervened in dog-on-dog attack	12 (1.6%)	
No known interaction	10 (1.3%)	
Attempted interaction with dog (ie, stroke)	6 (0.8%)	
Cycling in public	3 (0.4%)	1 (1.4%)
Other	1 (0.1%)	
Unknown	1 (0.1%)	1 (1.4%)
Public space	77 (10.3%)	34 (48.6%)
Walking, exercising, playing in public with own dog	32 (4.3%)	18 (25.7%)
Walking, exercising, playing in public without a dog	30 (4.0%)	13 (18.6%)
Intervened in dog-on-dog attack	7 (0.9%)	1 (1.4%)
Dog escaped from a private property	3 (0.4%)	
Cycling in public	2 (0.3%)	2 (2.9%)
Attempted interaction with dog (ie, stroke)	2 (0.3%)	
Unknown	1 (0.1%)	
Community building	10 (1.3%)	2 (2.9%)
No known interaction	5 (0.7%)	
Walking, exercising, playing in public with own dog	1 (0.1%)	1 (1.4%)
Walking, exercising, playing in public without a dog	1 (0.1%)	1 (1.4%)
Attempted interaction with dog (ie, stroke)	1 (0.1%)	
Dog escaped from a private property	1 (0.1%)	
Other	1 (0.1%)	
Commercial	44 (5.9%)	3 (4.3%)
No known interaction	20 (2.7%)	2 (2.9%)
Attempted interaction with dog (ie, stroke)	11 (1.5%)	
Intervened in dog-on-dog attack	4 (0.5%)	1 (1.4%)
Dog escaped from a private property	3 (0.4%)	
Walking, exercising, playing in public without a dog	2 (0.3%)	
Walking, exercising, playing in public with own dog	2 (0.3%)	
Other	1 (0.1%)	
Unknown	1 (0.1%)	
Other	4 (0.5%)	0
No known interaction	4 (0.5%)	
Occupational Injury	**307 (41.2%)**	**10 (14.3%)**
Delivery workers	209 (28.1%)	6 (8.6%)
Private residential property – door opens and unrestrained dog exits	91 (12.2%)	4.3% (3)
Private residential property – loose dog on property	61 (8.2%)	4.3% (3)
Private residential property – bitten through the letter box	46 (6.2%)	
Agricultural business – loose dog on property	4 (0.5%)	
Industrial estate – loose dog on property	2 (0.3%)	
Highway	3 (0.4%)	
Private residential property – unknown	2 (0.3%)	

Continued

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Table 3 Continued

Occupational Injury	307 (41.2%)	10 (14.3%)
Worker attending/entering the property (eg, electrician, decorator)	61 (8.2%)	1 (1.4%)
Private residential property	52 (7.0%)	1 (1.4%)
Industrial estate	4 (0.5%)	
Agricultural business	2 (0.3%)	
Commercial premises	1 (0.1%)	
Community buildings	1 (0.1%)	
Highways	1 (0.1%)	
Dog-related job	37 (5.0%)	3 (4.3%)
Private residential property	16 (2.1%)	1 (1.4%)
Dog-related business (ie, veterinary clinic)	13 (1.7%)	1 (1.4%)
Public space	4 (0.5%)	
Highways	2 (0.3%)	1 (1.4%)
Food business	1 (0.1%)	
Unknown	1 (0.1%)	
Police dog bite incident	16 (2.1%)	
Highways	8 (1.1%)	
Public Space	3 (0.4%)	
Commercial	2 (0.3%)	
Private residential property	2 (0.3%)	
Unknown	1 (0.1%)	
Unknown	8 (1.1%)	2 (2.9%)
Walking, exercising, playing in public with own dog	3 (0.4%)	1 (1.4%)
Intervened in dog-on-dog attack	2 (0.3%)	
Walking, exercising, playing in public without a dog	1 (0.1%)	
Unknown	2 (0.3%)	1 (1.4%)

IPs reported a loss of earnings (OR=1.68, 95% CI 1.02 to 2.79, p=0.).

DISCUSSION AND CONCLUSIONS

We have shown that civil claim enquiries data are a viable data source to explore the context and consequences of dog-related injuries, with the potential for wider application to other causes of injury. These data implicate unrestrained dogs in non-residential locations as a major inciting factor for dog-related injuries, and injury prevention strategies need to explore how lead use can be effectively legislated.

Most claimants reported that dogs were with their owners and off lead. Almost half of bite and more than 80% of non-bite incidents occurred in non-residential locations and the majority involved unrestrained dogs (62.7% of bites, and 87.9% of non-bite incidents). These findings raise concerns over owner control. National legislation concerning lead control is limited. The Countryside and Rights of Way Act 2000 permits dogs on open access land if the dog is on a short fixed-length lead (<2 metres) between March and July and always on lead around livestock.[19] This has no impact on public highways or urban green spaces, where most injuries are occurring. The Highway Code advises that dogs should be 'kept on a short lead when walking on the pavement, road or path shared with cyclists or horse riders'.[20] This is solely guidance, not law. Local authorities can introduce Public Space Protection Orders (PSPOs) under the Anti-Social

Table 4 Anatomy injured resultant of dog-related incidents recorded in personal injury claims

	Bite claimants with a physical injury (n=737) *	Non-bite claimants with a physical injury (n=57) *
Wrist and hand	243 (33.0%)	7 (12.3%)
Knee and lower leg	147 (19.9%)	27 (47.4%) †
Elbow and forearm	139 (18.9%)	6 (10.5%)
Hip and thigh	125 (17.0%)	4 (7.0%)
Head	103 (14.0%)	5 (8.8%)
Abdomen, lower back, lumbar spine and pelvis	55 (7.5%)	6 (10.5%)
Shoulder and upper arm	44 (6.0%)	15 (26.3%)
Chest	44 (6.0%)	2 (3.5%)
Ankle and foot	11 (1.5%)	8 (14.0%)
Genitals	7 (0.9%)	
Neck	5 (0.7%)	
Unspecified	10 (1.4%)	

*Multiple anatomical area may have been injured during the incident.
†12.3% of all injuries resulted in tibial plateau fractures

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Table 5 Psychological injury resultant of dog-related incidents recorded in personal injury claims

	Percentage of bite claimants with a psychological injury (n=735)	Percentage of non-bite claimants with a psychological injury (n=70)
No psychological injury	71 (9.7%)	17 (24.3%)
Clinically given a psychiatric diagnosis	111 (15.1%)	7 (10.0%)
Post-traumatic stress disorder	31 (4.2%)	2 (2.9%)
Specific phobia (Situational type)	27 (3.7%)	2 (2.9%)
Specific phobia (Animal type)	23 (3.1%)	
Adjustment disorder with anxiety	13 (1.8%)	
Other specified trauma and stressor related disorder	7 (1.0%)	
Major depressive disorder and generalised anxiety disorder	3 (0.4%)	
Adjustment disorder with anxiety and depressed mood	2 (0.3%)	2 (2.9%)
Adjustment Disorder with Mixed Anxiety and Depressed Mood	2 (0.3%)	
Episodic Panic Disorder	1 (0.1%)	
Generalised Anxiety Disorder	1 (0.1%)	
Mixed anxiety and depressive disorder	1 (0.1%)	
Adjustment Disorder with Mixed Anxiety and Mood Disturbance		1 (1.4%)
Self-reported psychological symptoms without clinical diagnosis*	529 (72.0%)	45 (64.2%)
Phobic symptoms	394 (53.6%)	24 (34.3%)
Anxiety and stress related disorder	201 (27.3%)	11 (15.7%)
Insomnia/Disturbed sleep/Nightmares	155 (21.1%)	13 (18.6%)
Avoidant symptoms	138 (18.8%)	14 (20.0%)
Self-image issues	32 (4.4%)	2 (2.9%)
PTSD symptoms	20 (2.7%)	2 (2.9%)
Panic attacks	14 (1.9%)	1 (1.4%)
Depression	13 (1.8%)	3 (4.3%)
Intrusive thoughts	9 (1.2%)	
Adjustment disorder	6 (0.8%)	
Emotional instability	5 (0.7%)	1 (1.4%)
Unspecified	24 (3.3%)	1 (1.4%)

*Multiple symptoms may have been experienced by an injured person.

Behaviour, Crime and Policing Act 2014 Section 59,[21] to manage dogs out of control and gain the ability to fine those violating the orders. Some authorities apply PSPOs to state that dogs should be on a lead in town centres,[22] cemeteries or churchyards,[23 24] car parks,[23] sports grounds and fields,[22–24] nature reserves,[22 23] and any roads (pavements, footways and verges).[22–24] It is unknown how well PSPOs are enforced, or how effective a deterrent they are. Despite PSPO's existence, dog-related injuries in public places persist, suggesting a need to evaluate their effectiveness.

We recommend that national legislation is updated so that all dogs should be on a fixed-length short lead (<2 metres) on public highways and in urban green spaces (unless a local authority provides provisions for off-lead areas, or make areas exempt). This exemption provision is to ensure that the important balance between public safety and dog welfare can be achieved. This should be partnered with a nationally coordinated public communication campaign. It should be trialled regionally first to test effectiveness and identify any barriers to implementation. Lead control on highways would additionally enhance public safety by preventing dogs from running into traffic, while also protecting animals, and promoting responsible ownership. In urban green spaces, it would help to protect wildlife from dog attacks, ensure control in multi-purpose shared community spaces, and balance recreation with safety and environmental concerns. Key scenarios for its benefit include walking or exercising on a highway (12.5% of bites, 12.8% of non-bite incidents to the non-working public), and walking or exercising in a public space (8.3% of bites, and 44.3% of non-bites). This strategy should be complemented with public education and consideration of effective park design to maximise compliance and safety.

Non-occupational injuries mainly occurred on highways and in public spaces, where most dogs were unrestrained. Occupational injuries were almost exclusively to delivery workers, often bitten when dogs escaped as doors opened or through letterboxes, mirroring prior analysis of occupational dog bite injuries.[25] Dogs biting delivery workers is often trivialised in society, yet we can see that these injuries are frequently life changing with loss of earnings, on-going physical health problems, and significant mental health issues. With only 1 in 3 delivery workers in direct employment,[26] it is important that casual workers are protected from the everyday hazard of dogs. The onus of this should be on the agency and delivery company, but responsibility should also be placed on the dog owner. A front door should not be opened with a dog present, gates and fences should be dog-secure, and internal letter cages or external letter boxes should be installed.

About half of dog bite incidents occurred on private-residential properties, most of which were associated with working people. Delivery workers were involved in 50.4% (198/393) of bite incidents on private residential properties, 13.2% (n=52) were trades people, and 4.1% (n=16) were dog-related professionals. Non-working individuals were bitten during incidental or attempted interactions, or when dogs escaped. The majority of dog bites reported in medical records occur in people's homes.[5 8] The context of injuries described here makes it challenging to recommend specific domestic interventions, although early socialisation, positive reinforcement training, supervised

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child-dog interactions, provision of safe spaces, and recognition of canine warning signs are proposed, but effectiveness evidence remains limited.[27]

Dog bites occurred more often during working hours and summer months, with demographics and injury patterns consistent with previous research.[4 7 9 25 28 29] The majority of bitten individuals required hospital care, and a quarter required surgical treatment. A few required ongoing treatment, yet most were absent from work to some degree. These combined with the mental health consequences to IPs create a significant economic burden both to the individual and society.

Dog strike injuries primarily occurred in public spaces and highways, while exercising; although a number of IPs were injured by dogs which had escaped from a private property. These injuries occurred when a dog, not adequately controlled by its owner, collided with an individual, often unexpectedly. The common resultant trauma of lower leg fractures reflects the high-energy injury mechanism of a dog strike.[30 31] Injured individuals were predominantly women over 50, a group at increased fracture risk from low bone mass or osteoporosis.[32 33] The high rate of tibial plateau fractures is concerning, as these require major surgery with prolonged recovery and frequent complications.[34] These findings are reflected in our work where almost half of IPs required ongoing treatment. These injuries could be prevented through the regulated use of short leads.

The physical impact of dog-related injuries is well documented, but not so the psychological impact. Existing research focuses on children, with common consequences being PTSD, phobia, nightmares, flashbacks, anxiety, and social withdrawal.[35 36] We are unaware of any prior study stating the prevalence of psychological consequences of dog bites in a predominantly adult population. At least one in six IPs received a clinical psychiatric diagnosis most commonly specific phobias and PTSD. The global annual prevalence of specific phobia is 5.5%, with the lifetime prevalence of 3.8% for the animal subtype.[37] The prevalence within our study exceeds these and show that dog-related injuries could be a major risk to developing a specific phobia. This condition severely impairs the individual's role in society, with 18.7% of individuals having their home, work, social and relationships impacted, with a resulting lower quality of life.[37 38] The prevalence of PTSD in this study is higher than that of global lifetime prevalence (3.9%),[39] highlighting that dog bites could pose a significant risk of PTSD. Half of those diagnosed with PTSD experience persistent symptoms.[39 40] Many respondents reported symptoms consistent with mental health disorders despite lacking a formal diagnosis, suggesting true prevalence may be higher. If representative, these findings underscore the need for a multi-disciplinary response, including improved recognition and referral pathways in emergency and primary care. Public awareness must also grow to reduce stigma and promote support for those affected by dog-related injuries.

The data source of this analysis has limitations. The majority of IPs did not know the dog, nor were they injured at home, while most research indicates that dogs are known to the victim and occur at home.[4 7 12 29] This is unsurprising as most individuals would not litigate against family members. We do not have national-level data on the proportion of civil dog bite claims handled by Slee Blackwell Solicitors LLP, and there is no centralised registry of such cases across all firms. Therefore, we recognise that this sample may not be fully representative of all claims nationally. These data are based on a single firm, and we do not know how representative they are. It is likely that these data only represent the more serious injuries caused by dogs, as it is unlikely that a civil claim is sought when it is a minor injury. An additional limitation is the relatively small number of non-bite injuries, compared with bite injuries. This restricted the ability to conduct more detailed subgroup analyses comparable to those performed for bite-related injuries. As the analytical approach was defined a priori, no major adjustments to the analysis plan were made; however, the smaller sample limits the statistical power and generalisability of findings related to non-bite injury patterns. Future research with larger samples could enable more robust comparative analysis across injury types.

Civil claims data provide novel insight into the physical and psychological burden of dog-related injuries. We have shown that delivery workers are an occupational group at risk that require collective societal protection. Our findings demonstrate that a large proportion of dog-related injuries in non-residential locations involve unrestrained dogs. We recommend further investigation into the enforcement of lead use in specific public areas.

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