

An audit of dog-related injury notification practices in a New Zealand public hospital

Natasha Duncan-Sutherland, Calum Cunningham, Suzannah Cooper, Sylvia Boys

ABSTRACT

BACKGROUND: Dog bites and other dog-related injuries (DRIs) are an ongoing and increasing cause of unintentional injury in New Zealand. Secondary prevention strategies implemented primarily by animal management services following an incident with a dog rely on notification of incidents. Mandatory notification of DRIs is not currently required in New Zealand, however, is a strategy used internationally for either the purposes of rabies control or dog bite prevention. **AIM:** This study aimed to investigate the rate of notification by health professionals to an appropriate authority, for all DRIs that presented during the 2018/19 year to a New Zealand public hospital, and to describe the incidence and characteristics of these presentations.

METHOD: Data were obtained from all discharges from a New Zealand public hospital, with the primary external cause of injury code W54.0 (Bitten by Dog) + W54.1 (Struck by Dog) or W54.8 (Other Contact with Dog) as per the Australian Modification of the 10th revision of the International Classification of Diseases, during the period from 1 July 2018 to 30 June 2019. Clinical notes were screened for documentation of notification of the incident to an appropriate authority, including local animal management, social work, Oranga Tamariki (NZ's child protection services), or police.

RESULTS: There were 329 presentations to the emergency department with a DRI, 97% of which (n=320) were dog bites. There was a non-significant higher one-year cumulative incidence in children aged 0–9 years compared to adults aged 15 years and over. Children aged 0–9 years were also more likely to be injured on the head, face or neck, compared to adults or children 10–14 years, who were more likely to be injured on their limbs or torso. Notification of incidents were notified to an authority in 1.5% of incidents, including animal management services or a social worker.

CONCLUSION: This study found a low rate (1.5%) of documented notification by health professionals of dog bites and other DRIs. Further research is required to investigate the evidence for introducing strategies to increase reporting on the incidence of injuries, and any potential impact on presentations for medical attention.

Dog bites and other dog-related injuries (DRIs) are an increasing cause of unintentional injury in New Zealand, with an annual average of 21,665 Accident Compensation Company (ACC) claims for all DRIs during the 2014/15 to 2018/19 years, 10,951 of which were dog bite injuries.¹ There were 2,869 DRIs occurring in children aged 0–14 years, of which 2,160 were dog bite injuries. Inequity also exists with higher rates of injury in more socio-economically deprived areas and in those of Māori ethnicity¹ on a background of a socio-political environment that has resulted in the current inequity.^{2,3} Both ACC claims and hospitalisations increased over this time period, with a three-fold risk of being hospitalised from a dog bite injury compared to 30 years ago.^{1,4}

With an increasing prevalence of injury, prevention strategies become all the more important. Prevention strategies are primarily provided by animal management services within each local gov-

ernment area. Primary prevention focuses on education, dog-training, dog access and leash legislation, breed-specific restrictions, or stray dog management including registrations and microchipping.^{5,6}

Secondary prevention strategies implemented following an incident of dog aggression may include: further education to dog-owners or rehabilitation training; re-homing; enforced safety requirements such as fencing, muzzling, leashes or signage; sterilisation; infringements; or prosecution with restrictions on dog ownership or in more extreme cases, dog euthanasia.^{5,6} The need for secondary prevention is supported by studies showing that dogs who bite frequently have a history of dog aggression to either humans or animals.^{7–11} However this requires appropriate authorities becoming aware of incidents of dog aggression for enactment.

Members of the public are also able to report incidents of dog aggression. As with other significant public or child safety issues, health professionals

and veterinarians can also report concerns with or without patient consent, and may also make reports of concern to other organisations such as police, social work or Oranga Tamariki (NZ's child protection service).

Clinical practice guidelines at Middlemore Hospital Emergency Department (ED) encourages health practitioners to consider notification of dog bite injuries to Auckland animal management services with patient consent. However, it is unknown to what degree this is implemented. The importance of including all injuries caused by a dog has also been highlighted in a previous study of paediatric injuries,¹² and in a more recent study of injuries caused by dogs in New Zealand.¹

A related study *The Epidemiology of Dog-Related Injuries*, used DRI ACC claims and hospitalisations by territorial authority as two consistent measures of injury that can be monitored over time.¹ The current audit is primarily aimed to measure notification practices by health professionals within a single DHB. This will be repeated following implementation of a revised notification guideline within the region.

METHOD

This study was guided by a Kaupapa Māori approach to research,¹³ with Māori involvement at all stages. The study developed following a suggestion by a member of the Independent Māori Statutory Board during consultation with the Auckland Council in the 2019 review of dog-access legislation, that health professionals take responsibility for notification of dog related injuries to animal management services.

Data were obtained from all discharges for ED presentations and hospitalisations to any department with the primary external cause of injury code W54.0 (Bitten by Dog) + W54.1 (Struck by Dog) or W54.8 (Other Contact with Dog) as per the Australian Modification of the 10th revision of the International Classification of Diseases (ICD-10), during the period from 1 July 2018 to 30 June 2019.

Hospital discharge summaries and other relevant electronically accessible notes were reviewed. Secondary presentations for the same incident were removed. Notes were screened for documentation of incidents having been reported to an authority, including local animal management services, Oranga Tamariki, or police. Information from the animal management service, on whether incidents were reported, was not available. Further information regarding potential risk factors were collected for each unique event including:

primary cause of injury code; prioritised ethnicity (Māori, Asian, Pacific Island, or Other); age; domicile; location of injury on the body; length of stay in hospital; number of operations required during the hospital stay. Notes were also searched for the geographical location of injury, including if this occurred in public or private.

Data were collected on Microsoft Excel, with the open-access website Open-Epi version 3.01¹⁴ used for statistical analysis. To calculate one-year cumulative incidence rates, population data from the 2018 census for the Counties Manukau District Health Board (DHB) were used.¹⁵ Given the categorical data, the two-tail mid-p exact test was used to compare differences between age and ethnic groups, with 95% confidence intervals reported. A p-value of <0.05 was considered a statistically significant result. The cumulative incidence of dog bites per year was also analysed by ethnicity. Age-specific rates were calculated for each five-year age category. Further comparison was made by age groups 0–9 years, 10–14 years and 15 years and over (adults), for consistency with a previous study.¹

RESULTS

There were 329 presentations of DRIs to Middlemore Hospital during the 2018/19 fiscal year, with an incidence of 58.4 per 100,000 people per year (95% CI 52.3, 64.9). Three hundred and twenty of these were coded as dog bite injuries. Only nine were non-bite injuries (fractures, head injuries or scratches). Seven were police dog bite injuries. Twenty had no documentation; however, they were included in the analysis due to being coded as a DRI. There were no injuries with the ICD code W54.1 (Struck by dog).

Age

Of 329 patients presenting with a DRI, 19.5% (n=64) were children aged 0–9 years, 6.7% (n=22) were children aged 10–14 years, and 73.9% (n=243) were adults aged 15 years and over (Table 1). Within the 0–4 age group, five victims were 1–2 years old, and seven victims were 2–3 years of age.

While the one-year cumulative incidence was higher in children aged 0–9 years (76.6 per 100,000; 95% CI 59.5, 97.2) compared to adults (58.6 per 100,000; 95% CI 51.6, 66.3), this was not statistically significant (p=0.062) (Figure 1). There was also no significant difference between the 10–14-year age group (55.4 per 100,000; 95% CI 35.6, 83.9) and adults (p= 0.825) (Figure 1). There was no identifiable trend across the age group categories (Figure 2).

Table 1: DRIs in 2018/19 year by age group.

	0-9 years	10-14 years	15 years and over
Incidence per 100,000 people (95% CIs)	76.6 (59.5, 97.2)	55.4 (35.6, 83.9)	58.6 (51.6, 66.3)
n (%)	64 (19.5%)	22 (6.7%)	243 (73.9%)
p-value	0.062	0.825	-

Figure 1: Cumulative Incidence of DRIs per 100,000 people in 2018/19 year by age group.

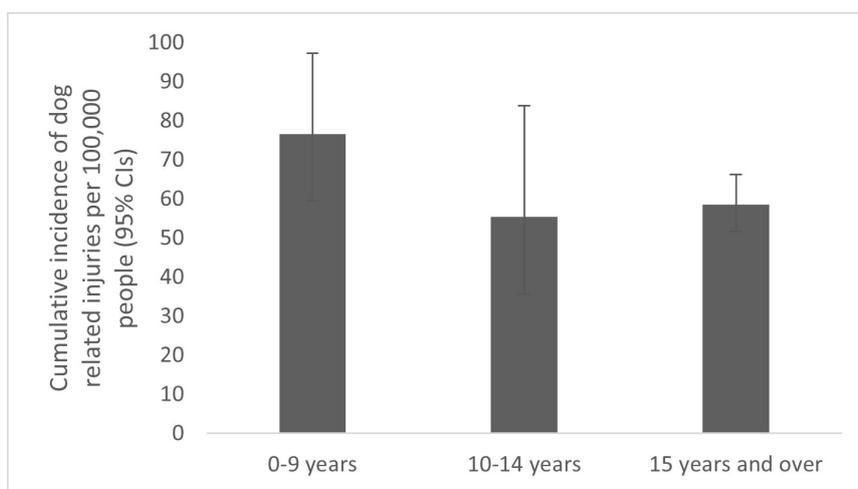
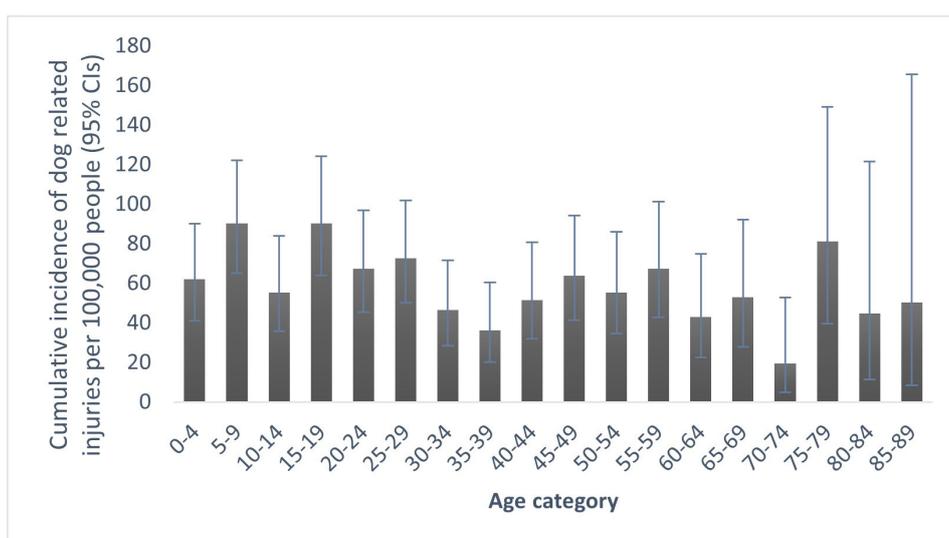


Figure 2: Cumulative Incidence of DRIs per 100,000 people in 2018/19 year by five-year age groups.



Ethnicity

The cumulative incidence was significantly higher in Māori (111.0 per 100,000; 95% CI 90.5, 134.8) compared to all non-Māori (43.9 per 100,000; 95% CI 38.5, 49.9, $p < 0.001$) (Table 2). Rates were lowest in those of Asian ethnicity (20.2 per 100,000; 95% CI 14.0, 28.3), with higher rates also present in the Pacific Island ethnic group (70.8 per 100,000; 95% CI 57.7, 86.1).

Severity of injuries

Injuries to children aged 0–9 years were more likely to occur on the head, face or neck region (64%, $n = 41/64$), compared to adults and children aged 10–14 years, who were more likely to be injured on the torso or limbs (50%, $n = 11/22$, and 83%, $n = 202/243$, respectively). Multiple injuries occurred in 8% of children aged 0–9 years ($n = 5/64$), 23% of 10–14 years ($n = 5/22$), and in 8% of adults (20/243).

Half of patients presenting were hospitalised (50%, $n = 166/329$), with 66% of these ($n = 110/166$) requiring operative management with a general anaesthetic, and 7% ($n = 12/166$) needing more than one. The average length of stay was 4.4 hours, in 87% of cases where this was recorded. Six per cent of patients ($n = 19/329$) re-presented with cellulitis, following their initial presentation.

Circumstances

Eighteen percent ($n = 58/329$) of clinical notes had the geographical location of injury described. Of these, 62% ($n = 36/58$) were in public places, including six attacks described as being by stray dogs; 21% ($n = 12/58$) occurred in the home; 14% ($n = 8/58$) at the property of a friend, neighbour or family member; and 10% ($n = 6/58$) were following a worker entering a private property. Very few

notes (10%, $n = 34/329$) described the relationship of the dog to the victim. Most injuries occurred in people residing in Counties Manukau DHB (68%, $n = 224/329$). Fifteen percent ($n = 50/329$) resided in Auckland DHB, 9% ($n = 30/329$) in Waitemata DHB, and 2% ($n = 6/329$) were overseas residents.

Notification rates

Five injuries were documented as being reported to an authority (1.5%). Four were reported to local animal management services, and one to a social worker. Victims of incidents that were reported were aged 8 years, 14 years, 7 years, and 50 years. Two other health professionals documented having a safety discussion (with victims aged 12 years and 6 years). One other patient (60 years old) had made a report to an animal management service prior to ED attendance. All victims with documented notification or safety discussions identified as being of Pacific Island or Māori ethnicity.

DISCUSSION

Patterns of injury were comparable to previous studies showing higher rates of DRIs in children compared to adults, with children more likely to be hospitalised or receive bites to the head/neck region.^{4,16–18} This is in contrast to a more recent study using a broader measure of injuries presenting for any medical attention, including within the community, showing similar rates of injury in children and adults.¹ While the circumstances around DRIs have not been well studied in children, most likely the head/neck injuries are due to their height relative to a dog.

The finding of a higher rate of injury in Māori is also consistent with previous studies.^{1,16} The reasons for this are uncertain, but may be explained

Table 2: DRIs in 2018/19 year by ethnicity.

	Māori	All non-Māori (Asian, PI, Other)	Asian	Pacific Island	Other
Incidence per 100,000 people (95% CIs)	111.0 (90.5, 134.8)	43.9 (38.5, 49.9)	20.2 (14.0, 28.3)	70.8 (57.7, 86.1)	43.9 (36.1, 53.0)
Number of injuries	97	232	31	96	105
Population identifying as ethnic group	87,375	528,162	153,594	135,519	239,049
p-value		$p < 0.001$	$p < 0.001$	$p = 0.002$	$p < 0.001$

by differences in rates of dog ownership, socio-economic deprivation on a background of the ongoing effects of colonisation,³ or inequity of investment into culturally appropriate prevention strategies. A key component of secondary prevention strategies in reducing inequity will require empowerment of Māori with involvement of Māori-led services.

The incidence of injury 58.4 per 100,000 people per year (95% CI 52.3, 64.9) was low compared to ACC claims within the South Eastern Auckland Region (220 per 100,000 people), demonstrating that many people with DRIs present to community health centres rather than to hospital, consistent with a recent New Zealand study.¹ Likewise, the plastic surgery department for the Auckland Region is also located at Middlemore Hospital, with patient referrals received from outside the Counties Manukau DHB area.

While 64% of injuries occurred in public places, the accuracy of this result was limited by the number of discharges where this was documented (18%). This is in contrast to a previous study showing a higher rate of injuries in private places,¹⁶ and is likely a reflection of the inaccuracy of medical notes as a method for investigating the circumstances surrounding an injury. The residential address of a victim may also not reflect the location of injury, particularly given injuries frequently occur when either visiting a property or in public.⁸

The low rate of notification of injuries was surprising given the severity of injuries that presented. Eighty-six injuries occurred in children aged 0–14 years; 93 occurred on the head/neck, 30 victims had injuries in multiple locations, 166 were hospitalised; and 110 required a general anaesthetic with operative management—yet only five had documented notification.

The low notification rate found in this study is, however, consistent with international studies of presentations to emergency departments showing a paucity of dog bite reporting by health profession-

als.^{19,20} A UK study found only 4% of clinicians in one hospital made a follow-up referral to a social or health worker relating to dog safety in 160 paediatric patients presenting to an emergency department with a dog bite. Although, this increased to 38% when a paediatric liaison team retrospectively reviewed all notes for the purpose of identifying child protection issues.¹⁹ A Canadian study showed that of 302 people with dog bite injuries presenting to an emergency department, only 19.5% were reported to either public health (for rabies prevention) or to police, and only 1% had a safety or preventive discussion.²⁰

Other studies showing a lack of reporting of DRIs in New Zealand include a survey of 535 adults presenting for medical attention for a dog bite in 2002, showing that only 30% of dog bite injuries were reported to an authority.⁸ Likewise, a survey of 228 New Zealand veterinary students, revealing a high lifetime incidence of dog bites (38%), found that only 5% were reported to authorities.⁸ Similar results are reflected internationally. An online survey conducted in the UK with self-identified dog bite victims showed no further action was taken in over half of dog bite incidents (53%).⁷ Likewise, a study in Ireland found that dog bites frequently went unreported in both non-legislated (72.7%) and legislated breeds (45%).²¹

New Zealand's lack of implementation of safety standards around dogs with a history of aggression poses a risk of further serious harm to people living within the home, or those in surrounding houses and local community. This is of particular concern for children, who may have aggressive dogs living with or near them, including schools or playgrounds, without adequate safety precautions. Improved reporting would also enable implementation of secondary prevention strategies for injuries occurring within private spaces, which, in turn, are less likely to be reported.^{8,9}

Notification to animal management services also

Table 3: Number of reported dog attacks on people, compared to ACC claims for DRIs within the Auckland Region.

	2014/15	2015/16	2016/17	2017/18	2018/19
Dog attacks on people reported to Auckland animal management service ^{22–25}	N/A	740	792	745	716
ACC claims for dog bite injuries only within the Auckland Region ¹	3,065	3,259	3,502	3,562	3,626
ACC claims for all DRI's within the Auckland Region ¹	4,125	4,434	4,618	4,831	4,885

allows for more accurate knowledge of geographical areas in which to focus strategies, improved monitoring of incidents over time, and presents an opportunity to increase dog-registrations, resulting in further financial investment into prevention strategies. As can be seen in table three, services may report a decrease in dog bite rates, when this apparent decline is due to under-reporting, and rates are in fact increasing. Of note, some reports to animal management may be from people who have not presented for medical attention.

Reasons for under-reporting by the public may be because the blame for dog bites can be directed toward the victim with a reluctance to accept the aggressive behaviour of dogs,²⁶⁻²⁹ because people underestimate the risk²⁷ particularly if it is their own dog,⁷ or if there is a less severe injury or non-legislated breed.²¹ Under-reporting may also occur because people are reluctant to report their own dog or a dog that is known to them, out of concerns for the consequences to the dog including the potential for euthanasia, or because of fear of retribution by the dog owner.

Most countries, including New Zealand, do not have national mandatory notification policies for dog bite and other DRIs for the purposes of dog bite prevention. Some hospitals in the UK and US have local notification practices for dog bite injuries—usually to police—with geographical disparities in reporting rates due to the lack of national policy.³⁰ Other countries have notification policies for the purposes of rabies prevention.^{20,31}

Switzerland is the only country with national mandatory notification in place for the purposes of reducing dog bites, with 40% of physicians reporting at least half of dog bites presenting for medical attention after the strategy was introduced in 2006, which were thought to be the most relevant cases.³² There was a subsequent reduction in insurance claims for DRIs from 3,600 in 2005, to 2,500 in 2007.³³

The most common reason that physicians and veterinarians in Switzerland gave for not wanting

to report a DRI, was that they did not want to break confidentiality when the patient was the owner of the dog, or if the patient did not want it reported because it was a minor injury, or because they were unaware of the requirement.³² There may also be concerns around deterring patients from presenting for medical attention.

However, with higher rates observed in Māori children this is clearly an equity issue, and mandatory notification to an appropriate authority may improve safety for our children. Likewise, patients and professionals may prefer mandatory notification, as removing a barrier to reporting may allow them to have the incident notified while maintaining relationships. The challenges of reporting dog-related issues within small communities were recognised in a qualitative study of a small Indigenous community in Northern Australia.³⁴ A further study in a small Indigenous community in Canada with a high level of community involvement also promoted reporting as part of the strategy.³⁵ This is an area for future research in the New Zealand context.

The main limitation of this study is the investigation of documented notification only. Some incidents may have been reported by either the patient or health professional, but not documented. There may be variable accuracy of documentation by health practitioners, coding administration staff or the data analyst. The number of non-bite DRIs was low, and may be due to inaccuracy in coding for injury caused by a dog.

CONCLUSION

This study found a low rate (1.5%) of documented notification by health professionals of dog bites and other DRIs. Further research is required to investigate the evidence for introducing strategies to increase reporting on the incidence of injuries and any potential impact on presentations for medical attention.

COMPETING INTERESTS

Nil

ACKNOWLEDGEMENTS

The authors would like to thank the different contributions from the following people for their contributions, along with the anonymous reviewers who provided very useful suggestions. Melissa Wilson (Former Prior Director, Safekids Aotearoa), Mareta Hunt (Ngāti Awa, Ngāi Tūhoe, Ngāti Maniapoto, Ngāti Kahungunu me Kai Tahu, Director, Safekids Aotearoa), Moses Alatini (Policy Analyst, Safekids Aotearoa), Christin Coomarasamy (Statistician, Middlemore Hospital), Te Hao Apaapa-Timu (Ngāti Ranginui, Ngāti Kahungunu, Ngāti Awa me Ngāti Pōrou, Māori Health Team & Research and Evaluation Office Counties Manukau), Dr Lyndon Drake (Te Pihopatanga o Te Tai Tokerau), Dr Zachary Moaveni (FRACS (Pl Rec Surg) Plastic Surgeon, Counties Manukau), Dr Inia Raumati (Ngāti Mutunga, Te Ātiawa, MBChB, Emergency Doctor Registrar, Auckland Hospital), Dr Inia Tomas (Te Rarawa, FACEM, Counties Manukau), Dr Eunicia Tan (FACEM, Counties Manukau), Professor Bridget Kool (Section of Epidemiology and Biostatistics, University of Auckland), Denise Peters and Chrisna Nortje (Auckland Council Animal Management), and Brent Lincoln (Tauranga Council Animal Management).

AUTHOR INFORMATION

Dr Natasha Duncan-Sutherland: Emergency Department, Middlemore Hospital, Otahuhu, Auckland.
 Dr Calum Cunningham: Emergency Department, Middlemore Hospital, Otahuhu, Auckland.
 Dr Susannah Cooper: Emergency Department, Middlemore Hospital, Otahuhu, Auckland.
 Dr Sylvia Boys: Emergency Department, Middlemore Hospital, Otahuhu, Auckland.

CORRESPONDING AUTHOR

Dr Natasha Duncan-Sutherland: Emergency Department, Middlemore Hospital, Otahuhu, Auckland 1640.
 Private Bag 93311. +64 9 276 0000.
 Natasha.DUNCAN-SUTHERLAND@middlemore.co.nz.

URL

www.nzma.org.nz/journal-articles/an-audit-of-dog-related-injury-notification-practices-in-a-new-zealand-public-hospital

REFERENCES

- Duncan-Sutherland N, Moaveni Z, Exeter D, Colbert J, Kool B. Epidemiology of dog related injuries in New Zealand. *N Z Med J*. Forthcoming 6 May 2022.
- Reid J, Rout M, Tau TM, Smith CW-R, Ngai Tahu Research Centre. The colonising environment: an aetiology of the trauma of settler colonisation and land alienation on Ngai Tahu Whanau [Internet]. 2017 [cited 2021 Dec 15]. Available from: http://ndhadeliver.natlib.govt.nz/delivery/DeliveryManagerServlet?dps_pid=IE28489676
- Robson B, Harris R, Te Ropu Rangahau Hauora a Eru Pomare. *Hauora, Maori standards of health. a study of the years, 2000-2005 IV IV*. Wellington, N.Z.: Te Ropu Rangahau Hauora a Eru Pomare; 2007.
- Marsh L, Langley J, Gauld R. Dog bite injuries. *N Z Med J*. 2004 Sep 10;117(1201):U1043.
- Department of Internal Affairs. Dog Control Act 1996 [Internet]. New Zealand Government; 1996. Available from: <https://www.legislation.govt.nz/act/public/1996/0013/latest/DLM374410.html>
- Department of Internal Affairs. Dog Control Amendment Act 2003. New Zealand Government;
- Oxley J, Christley R, Westgarth C. Contexts and consequences of dog bite incidents. *Journal of Veterinary Behavior: Clinical Applications and Research*. 2017 Oct 23;23:33-9.
- Wake A a. F, Minot EO, Stafford KJ, Perry PE. A survey of adult victims of dog bites in New Zealand. *N Z Vet J*. 2009 Dec;57(6):364-9.
- Caffrey N, Rock M, Schmidtz O, et al. Insights about the Epidemiology of Dog Bites in a Canadian City Using a Dog Aggression Scale and Administrative Data. *Animals (Basel)*. 2019 Jun 6;9(6).
- Reisner IR, Shofer FS, Nance ML. Behavioral assessment of child-directed canine aggression. *Inj Prev*. 2007 Oct;13(5):348-51.
- Reisner IR, Houpt KA, Shofer FS. National survey of owner-directed aggression in English Springer Spaniels. *J Am Vet Med Assoc*. 2005 Nov 15;227(10):1594-603.
- Juang D, Sippey M, Zuckerbraun N, et al. "Non-bite dog-related" injuries: an overlooked injury mechanism in the pediatric population. *Journal of Trauma*. 2011;71(5):S531-3.
- Hudson M, Pūtaiora Writing Group, Health Research Council of New Zealand. *Te ara tika: guidelines for Māori research ethics: a framework for researchers and ethics committee members*. Auckland, N.Z.: Health Research Council of New Zealand on behalf of the Pūtaiora Writing Group; 2010.
- Dean A, Sullivan K, Soe M. OpenEpi: Open Source Epidemiologic Statistics for Public Health, Version 3.01 [Internet]. [cited 2021 Oct 22]. Available from: www.OpenEpi.com, updated 2013/04/06
- Stats NZ. Dataset: Age and sex by ethnic group (grouped total responses), for census night population counts, 2006, 2013, and 2018 Censuses (RC, TA, SA2, DHB).

16. Mair J, Duncan-Sutherland N, Moaveni Z. The incidence and risk factors of dog bite injuries requiring hospitalisation in New Zealand. *N Z Med J*. 2019 May 3;132(1494):8-14.
17. Weiss HB. Incidence of Dog Bite Injuries Treated in Emergency Departments. *JAMA*. 1998 Jan 7;279(1):51.
18. Schalamon J. Analysis of Dog Bites in Children Who Are Younger Than 17 Years. *PEDIATRICS*. 2006 Mar 1;117(3):e374-9.
19. Hasselt T van, Bowman R, Sajeel M. G97(P) Audit of safeguarding of children presenting with dog bites to the emergency department. *Archives of Disease in Childhood [Internet]*. 2015 Apr 1 [cited 2021 Jun 17];100(Suppl 3):A41-2. Available from: https://adc.bmj.com/content/100/Suppl_3/A41.2
20. Lang ME, Klassen T. Dog bites in Canadian children: a five-year review of severity and emergency department management. *CJEM*. 2005 Sep;7(5):309-14.
21. Creedon N, Ó Súilleabháin PS. Dog bite injuries to humans and the use of breed-specific legislation: a comparison of bites from legislated and non-legislated dog breeds. *Irish Veterinary Journal*. 2017 Jul 21;70(1):23.
22. Auckland Council. Animal Management Annual Report 2015/ 2016.
23. Auckland Council. Animal Management Annual Report 2016/ 2017.
24. Auckland Council. Animal Management Annual Report 2017/ 2018.
25. Auckland Council. Animal Management Annual Report 2018/ 2019.
26. Westgarth C, Watkins F. Chapter 23: Impact of dog aggression on victims. In: Mills D, editor. *Dog bites: a multidisciplinary perspective*. Sheffield: 5M Publishing; 2017.
27. Westgarth C, Watkins F. A qualitative investigation of the perceptions of female dog-bite victims and implications for the prevention of dog bites. *Journal of Veterinary Behavior*. 2015 Nov 1;10(6):479-88.
28. Rajecki D, Sanders CR. Good Dog: Aspects of Humans' Causal Attributions for an Companion Animal's Social Behaviour. *Society and Animals*. 1999;7(1).
29. Shen J, Li S, Xiang H, et al. Antecedents and consequences of pediatric dog-bite injuries and their developmental trends: 101 cases in rural China. *Accident Analysis & Prevention*. 2014 Feb;63:22-9.
30. Murray GE. Examining evidence on dog bite injuries and their management in children. *Nursing Children and Young People*. 2017 Apr 11;29(3):35-9.
31. Ishaya N, Habib T, van Rooyen C, Steinberg WJ. Profile of dog bite injuries in patients presenting at Kimberley Hospital Complex's emergency and gateway centres, 2015 to 2017. *African Journal of Primary Health Care & Family Medicine [Internet]*. 2020 May 21 [cited 2021 Aug 30];12(1). Available from: <http://www.phcfm.org/index.php/PHCFM/article/view/2301>
32. Harisberger M, Binder H, Regula G. [First results on the mandatory notification of dog bite injuries in Switzerland: a questionnaire survey among physicians and veterinarians]. *Schweiz Arch Tierheilkd*. 2012 Mar;154(3):113-9.
33. Lanfranconi B. Unfälle mit Hunden -ein unterschätztes Problem Eine Auswertung der Daten der Schweizer Unfallversicherer. *SSUV, Luzern*, 2010. 2010.
34. Brookes VJ, Ward MP, Rock M, Degeling C. One Health promotion and the politics of dog management in remote, northern Australian communities. *Sci Rep*. 2020 Dec;10(1):12451.
35. Dhillon J, Favel D, Delorme D, et al. Finding pathways for bite prevention and decreasing dog populations: The process of animal control for indigenous communities in Canada. 2016 Dec 15;1:82-92.