

Mammalian bites - Emergency management in children

Purpose

This document provides clinical guidance for all staff involved in the care and management of a child presenting to an Emergency Department (ED) following a mammalian bite in Queensland.

This guideline has been developed by senior ED clinicians, with input from infectious diseases, plastics and pharmacy teams, Queensland Children's Hospital, Brisbane.

Introduction

Key points

- Mammalian bites are a common ED presentation in children; most are minor.
- Take a detailed history to identify the children who need further investigation.
- Assess vaccination status and consider the need for vaccinations/post exposure prophylaxis.
- Clenched fist injuries ("fight bites") that penetrate deep tissues and late presentations are considered high risk for severe infections.
- In most cases there is no indication for blood work or prophylactic antibiotics. Adequate washout is the most pivotal part of the treatment.

Australia has one of the highest rates of pet ownership in the world. Worldwide around 2% of the total population are bitten annually^{1,2,3}. Most bites are from domestic animals and majority of bite victims are children^{1,2}.

Dog (80-90%) and cat (5 to 10%) bites represent the majority of mammalian bites followed by humans (2 to 3%) and rodents (2 to 3%)^{1,2,4,5}.

Risk factors for dog bites are male gender and younger age^{1,2}. Face, neck and head bites are more frequent in children^{1,3}.

Bite related injury can vary greatly depending on the biting animal's characteristics and the anatomic location of the bite. Dog bites usually comprise crush injuries, lacerations and abrasions. Cat bite injuries are usually a puncture wound that could seem minimal at the skin surface but can penetrate deeper layers including into joints¹. Cat bites tend to have a higher incidence of infection due to tissue penetration in puncture wounds, and the microbes of the cat oral cavity²¹

Psychological trauma, including post-traumatic stress disorder, is very common in children who have experienced dog attacks^{1,2,8}.



Statewide Paediatric Guideline

Emergency

Infection rates of bite wounds can vary depending on the animal's oral flora, the environment or the host skin flora¹. Different mammalian species have characteristic oral flora, but all infections caused by mammalian bites should be considered to be polymicrobial¹. The chance of a bite site being infected varies by species – human and cat bites are the more likely to be infected^{1,6}.

- Predominantly cats and dogs:
 - *Pasteurella sp.* should be considered in rapidly progressive skin and soft tissue infection following mammalian bites. The incubation period for *Pasteurella multocida* infection is one to three days.
 - *Capnocytophaga canimorsus* can cause bacteremia and fatal sepsis after animal bites, especially in patients with asplenia or immunocompromising conditions. The incubation period for *C. canimorsus* infection is one to three days.
 - *Bartonella henselae* may be transmitted via the bite of an infected cat; other forms of transmission include cat scratches and contact with cat saliva via broken skin or mucosal surfaces. The incubation period for *B. henselae* infection is 7 to 14 days.
- Possum
 - *Francisella tularensis* may be transmitted by bites/scratches and cause Tularaemia disease. Symptoms develop day 3-5 and include are high fever, a skin ulcer at the site of the bite or skin exposure, and swelling of the nearby lymph glands chills, fatigue, general body aches, headache and nausea and develop.
- Macaque Monkeys
 - *Macacine alphaherpesvirus 1* transmitted by infected macaque monkeys can cause severe CNS disease including encephalitis.
- Rats
 - Rat bite fever (caused by *Streptobacillus moniliformis* or *Spirillum minus*) should be considered in a child presenting with fever, rash and arthritis 4 to 10 days following a rodent bite.
- Horses (not bite related)
 - Hendra Virus is known to have infected 7 people after high levels of exposure to infected horses. It should be considered in a child with a influenza-like illness 5 -21 days post exposure to a sick horse¹⁵.
- Humans
 - Clenched fist injuries (“fight bites”) are considered the most severe human bite injuries and result from the patient striking another person's teeth. They usually occur at the metacarpophalangeal joints of the dominant hand of the patient. In these cases, there is a higher risk for septic arthritis and osteomyelitis^{2,6}.
 - Human immunodeficiency virus (HIV) and Hepatitis B virus (HBV) can be transmitted following a human bite^{10,11}. (For elaboration see the [CHQ-GDL-65664 Post-Exposure Prophylaxis for HIV](#) and contact the Public Health and the Infection Disease consultant on service to discuss any suspected cases)



Statewide Paediatric Guideline

Emergency

- Bats
 - Mammalian bites in locations with endemic rabies (not including Australia) can transmit rabies and bat bites/scratches within Australia can transmit the Australian bat lyssavirus (similar to rabies virus). Three patients have died due to Australian bat lyssavirus infection. (For elaboration see the [CHQ-GDL-00719 Management of children presenting with potential Lyssavirus \(rabies\) exposures - Emergency Management in Children](#) and contact Infection Disease consultant on service to discuss suspected cases)

Assessment

The primary aim of the assessment is to identify children who need urgent management.

History

History should include specific questioning on:

- Circumstances of the bite:
 - Animal species
 - Timing
 - Geographical location
 - Circumstances surround the event and any child safety concerns
- Immunisation status (including [tetanus](#), [rabies](#), hepatitis)
- Medical comorbidities. In particular those that that may limit would healing and predispose to higher rates of infection such as diabetes and immunosuppression.

Examination

- Careful physical examination is needed including exploration even of apparently minor injuries.
- Assess the wound location and severity, degree of penetration of bone or joint, tendon function and neurovascular function.

Explore the wound (local or general anaesthetic if needed)

- Look for foreign bodies (e.g. animal teeth).
- For late presentation, assess for established infection (e.g. pain, swelling, erythema or discharge from wound, significant pain on passive movement of the MCPJ).



Investigations

Investigations for the management of mammalian bites in children

Investigation type	Utility
X-ray	In cases of suspected fracture/deep tissue involvement/foreign body
Ultrasound	Can be used for suspected soft tissue injury when a non-radiopaque foreign body is suspected
Blood tests (including blood cultures, FBC, CHEM20 and C-reactive protein)	Indicated only in specific cases of suspected soft tissue infection in late presentations. There is no need to take bloods for recent bite <i>unless the patient is systemically unwell/ life-threatening injuries.</i>
Wound swab for culture	Cultures from infected bite wounds should be obtained to establish the microbiology of the infection and to guide antibiotic therapy. <i>Wound cultures are not indicated in clinically uninfected bite wounds because results do not correlate with subsequent infection.</i>

Management

Any life-threatening injuries should be treated according to standard guidelines.

Wound management:

- Remove any foreign bodies.
- Clean wound thoroughly with water and soap or saline. Use enough fluid to remove all visible dirt and foreign material (minimum is 50mL per 1cm wound).
- Open wounds should be irrigated under high pressure using a 19 or 20 gauge needle or plastic catheter on a large syringe and non-viable tissue should be debrided.



ALERT – Note: care should be taken when irrigating small puncture wounds as high pressure irrigation may result excessive infiltration of the soft tissues with irrigation fluid.

Wound closure:

- As there is limited evidence, decisions regarding wound closure should be made on a case by case basis.
- Wound closure is generally not recommended for:
 - Delayed presentations > 24 hours²²
 - Signs of wound infection
 - Wounds at high risk of infection (see below)



Statewide Paediatric Guideline

Emergency

- Due to the cosmetic implications of bites on the face, primary wound closure of wounds to the face is generally recommended. Parents should be given an explanation of the risk of infection. Primary closure of head and neck wounds is associated with 1% of risk infection.

High risk cases for infection:

- Puncture and crush wounds
- Penetration of bone/joint/tendon/ligament/vascular structures
- Wounds of hands/feet/face or genitals
- Delayed presentation > 8 hours
- Cat bite wounds
- [Water immersed wound infection](#)
- Immunocompromised patients (including asplenic children) ^{6, 1, 14, 10}

Complex bite wounds:

- Elevate injured extremity for the first 2-3 days.
- Significant hand wounds can benefit from 3-5 days of immobilisation.
- A fracture associated with a bite should be managed as a compound fracture with IV antibiotic treatment and hospital/specialist referral.

Vaccinations/ postexposure prophylaxis:

- [Rabies vaccine and postexposure prophylaxis \(HRIG\)](#) should be administered to all bat bites/scratches and children with a mammalian bite wound from a rabies endemic area (including Indonesia/Bali).
 - If the patient is vaccinated (documented), then rabies immunoglobulin (HRIG) is not required however they should receive two additional doses of rabies vaccine. Contact Public Health authorities for advice and access to rabies vaccine.
 - No rabies postexposure prophylaxis should be administered to children bitten in Australia by any animal other than a bat.
- Tetanus vaccination should be administered according to the [Tetanus Prophylaxis in Wound Management](#)
- For human bites including clenched fist injuries consider [hepatitis B if not immune and HIV prophylaxis](#) (if at high risk seek ID advice).



ALERT – In any child suspected to be bitten by a mammal in a rabies endemic country / Bitten/scratched by a bat in Australia – [HRIG and rabies vaccination should be given according to protocol on advice from Public Health.](#)



Statewide Paediatric Guideline

Emergency

Antibiotic treatment:

Antibiotic therapy is not required if the wounds are small, not involving deeper structures and present within 8 hours and can be adequately debrided and irrigated in the healthy individual.

Prophylactic treatment is indicated in wounds with high risk of infection that include:

- presentation to medical care is delayed by 8 hours or more
- the wound is a puncture wound that cannot be debrided adequately
- the wound is on the hands, feet or face
- the wound involves deeper tissues (eg bones, joints, tendons)
- the wound involves an open fracture
- the patient is immunocompromised (eg due to asplenia or immunosuppressive medications),
- the wound is a cat bite. ^{16, 20}
- For empiric antibiotic recommendations, refer to the [CHQ-GDL-01202 CHQ Paediatric Antibiocard: Empirical Antibiotic Guidelines](#)
 - If water-related/immersed wound infection, also refer to [CHQ-GDL-63000 Management of Water-immersed Wound Infections in Children](#) and contact Infection Management team for advice.
 - If open globe/penetrating eye injury, also refer to [CHQ-GDL-01074 Acute management of Open Globe Injuries \(penetrating eye injury\)](#) and contact Ophthalmology team for advice.

Reporting:

- Brisbane Council responds to reports of dog attacks and aggressive dogs 24 hours a day, 7 days a week and can be reported by calling Council on 07 3403 8888.

When to escalate care

Follow your local facility escalation protocols for children of concern. Transfer is recommended if the child requires care beyond the level of comfort of the treating hospital. Clinicians can contact the services outlined below to escalate the care of a paediatric patient.

Indications for referral:

- Systemic signs of infection
- Refractory to oral antibiotics
- Multiple and severe injuries
- Involvement of joint/bone/nerve/tendon
- Wound requiring surgical intervention
- Significant hands, feet or facial bites
- Human bites with puncture wounds
- Immunocompromised host



Statewide Paediatric Guideline

Emergency



Contact specialist teams, infectious diseases, plastics or ortho via CATCH depending on indication

Service	Reason for contact by clinician	Contact
Local Paediatric service	For specialist paediatric advice and assistance with local transfers as per local arrangements.	As per local arrangements
Children's Advice and Transport Coordination Hub (CATCH)	For access to specialist paediatric advice and assistance with inter-hospital transfer of non-critical patients into and out of Queensland Children's Hospital. For assistance with decision making regarding safe and appropriate inter-hospital transfer of children in Queensland. For Queensland Health (QH) staff, click here for the QH Inter-hospital transfer request form (access via intranet).	13 CATCH (13 22 82) 24 hours CATCH website
Telehealth Emergency Management Support Unit (TEMSU)	For access to generalist and specialist acute support and advice via videoconferencing, as per locally agreed pathways, in regional, rural and remote areas in Queensland.	TEMSU QHEPS website 24 hours
Retrieval Services Queensland (RSQ)	For access to telehealth support for, and to notify of, critically unwell patients requiring retrieval in Queensland. For any patients potentially requiring aeromedical retrieval or transfer in Queensland.	RSQ QHEPS website 24 hours



When to consider discharge

Consider discharge in non-severe cases, systemically well children with no other indication for admission.

Follow-up

- In 24 to 48 hours by General Practitioner (GP) unless advised otherwise by a specialist.

When to consider admission

Admission should be considered in any case of:

- Systemic signs of infection
- Refractory to oral antibiotics
- Multiple and severe injuries
- Involvement of joint/bone/nerve/tendon

Related documents

Information for families

Recommendations for prevention

- <https://raisingchildren.net.au/newborns/safety/home-pets/dogs>

Guidelines

- [CHQ-GDL-01023 Tetanus Prophylaxis in Wound Management](#)
- [CHQ-GDL-00719 Management of children presenting with potential Lyssavirus \(rabies\) exposures - Emergency Management in Children](#)
- [CHQ-GDL-01202 CHQ Paediatric Antibiocard: Empirical Antibiotic Guidelines](#)
- [CHQ-GDL-63000 Management of Water-immersed Wound Infections in Children](#)
- [CHQ-GDL-01074 Acute management of Open Globe Injuries \(penetrating eye injury\)](#)



References

- (1) Dandle, Claire, and David Looke. "Management of mammalian bites." *Australian family physician* 38.11 (2009): 868.
- (2) Thompson, Peter G. "The public health impact of dog attacks in a major Australian city." *Medical Journal of Australia* 167.3 (1997): 129-132.
- (3) Kennedy, Stephen A., Laura E. Stoll, and Alexander S. Lauder. "Human and other mammalian bite injuries of the hand: evaluation and management." *JAAOS-Journal of the American Academy of Orthopaedic Surgeons* 23.1 (2015): 47-57.
- (4) Baddour L. Soft tissue infections due to dog and cat bites in adults. Available at
- (5) www.uptodate.com.
- (6) McBean CETD, Ashby K. Animal and human injuries in Victoria, 1998–2004.
- (7) *Med J Aust* 2007;186:38–40.
- (8) Rearch Research. Research report pet care industry statistics 1996. Prepared for
- (9) Petcare Information and Advisory Service. Melbourne: Rearch Research, 1997.
- (10) Ozanne-Smith J, Ashby K, Stathakis VZ. Dog bite and injury prevention:
- (11) Analysis, critical review, and research agenda. *Inj Prev* 2001;7:321–6.
- (12) Peters V, Sottiaux M, Appelboom J, Kahn A. Posttraumatic stress disorder after dog bites in children. *J Pediatr* 2004;144:121–2.
- (13) Dusheiko GM, Smith M, Scheuer PJ. Hepatitis C virus transmitted by human bite. *Lancet* 1990;336:503–4.
- (14) Bartholomew CF, Jones AM. Human bites: A rare risk factor for HIV transmission. *AIDS* 2006;20:631–2
- (15) Weiss HB, Friedman DI, Coben JH. Incidence of dog bite injuries treated in emergency departments. *JAMA* 1998;279:51-3.
- (16) Medeiros, Iara Marques, and Humberto Saconato. "Antibiotic prophylaxis for mammalian bites." *Cochrane Database of Systematic Reviews* 2 (2001).
- (17) Antibiotic Therapeutic Guidelines (15th Edition) Therapeutic Guidelines Committee, North Melbourne, Victoria (2019).
- (18) Baddour LM, Harper M. Animal bites (dogs, cats, and other animals): Evaluation and management. UpToDate. Jan 2020. [Accessed 15/02/2020: https://www.uptodate.com/contents/animal-bites-dogs-cats-and-other-animals-evaluation-and-management?search=mammalian%20bite&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1#H3
- (19) <http://conditions.health.qld.gov.au/HealthCondition/condition/14/217/363/Hendra-Virus-Infection>
- (20) Murphy J, Qaisi M. Management of Human and Animal Bites. *Oral Maxillofac Surg Clin North Am.* 2021 Aug;33(3):373-380. doi: 10.1016/j.coms.2021.04.006. Epub 2021 Jun 9. PMID: 34116908.
- (21) Greene SE, Fritz SA. Infectious Complications of Bite Injuries. *Infect Dis Clin North Am.* 2021 Mar;35(1):219-236. doi: 10.1016/j.idc.2020.10.005. PMID: 33494873



Statewide Paediatric Guideline

Emergency

Guideline approval

Document ID	CHQ-GDL-60031	Version no.	2.0	Approval date	21/02/2023
Executive sponsor	Executive Director Medical Services			Effective date	21/02/2023
Author/custodian	Statewide Emergency Care Children Working Group			Review date	21/02/2026
Supersedes	1.0				
Applicable to	Queensland Health Staff				
Document source	Internal (QHEPS) + External				
Authorisation	Executive Director Clinical Services				

Keywords	Paediatric, guideline, mammalian bites, animal bites, human bites, bat, rat, emergency management, antibiotics, wound, 60031
Accreditation references	National Safety and Quality Health Service Standards (1-8) – 1 Clinical Governance, 3 Preventing and Controlling Healthcare Associated Infections, 4 Medication Safety ISO 9001:2015 Quality Management Systems: (4-10)

Disclaimer

This guideline is intended as a guide and provided for information purposes only. The information has been prepared using a multidisciplinary approach with reference to the best information and evidence available at the time of preparation. No assurance is given that the information is entirely complete, current, or accurate in every respect.

The guideline is not a substitute for clinical judgement, knowledge and expertise, or medical advice. Variation from the guideline, taking into account individual circumstances may be appropriate.

This guideline does not address all elements of standard practice and accepts that individual clinicians are responsible for:

- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

Queensland Health disclaims, to the maximum extent permitted by law, all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs incurred for any reason associated with the use of this guideline, including the materials within or referred to throughout this document being in any way inaccurate, out of context, incomplete or unavailable

