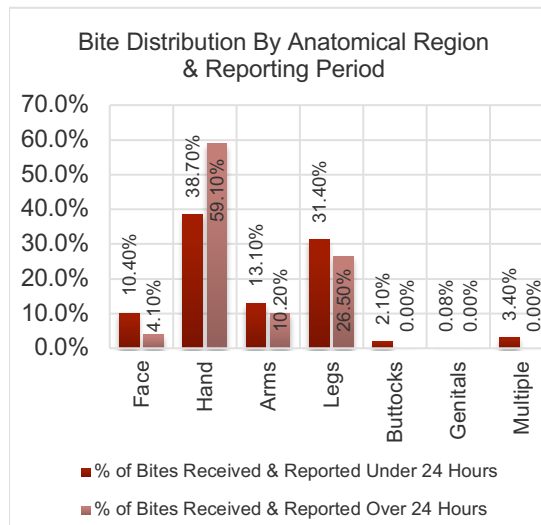


What Does Public Health and Medicine Have to Do with Dog Bites?

Dog bites are an easily preventable public health problem with potential for significant impact with the reduction of secondary effects associated with a reduction in the incidence of dog bite injuries. Dog bites are a leading cause of injury in young children and in seniors, both considered disadvantaged in that they may need assistance from outside caregivers, and care may be delayed if they are injured without someone to take care of them. Moreover, dog bites present the risk of infection by several infectious agents. As public health and medical workers, it's our job to jointly work to prevent and limit the adverse effects dog bites have in our communities.

Bites frequently effect the hands and legs, and secondarily the arms and face. Damage to hands is particular concerning due the high need for fine motor skills in our hands to live a normal life.



Text Above: (Centers for Disease Control & Prevention, 2019; Pfortmueller, et. al., 2013)

Chart: Produced by Gregory Marchese, with data from Pfortmueller

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Important Contact Information

Animal Bite Reporting:

- 877-747-2243 (phone)
- 562-401-7112 (fax)

Publication Information

- This information created by Gregory Marchese on behalf of Local Public Health.
- Information contained within is accurate at the of publishing of this guide.
- In the interest of the health and safety of all, please feel free to share or reproduce this guide as needed.



#MUZZLETHEBITE
dog bite prevention
strategies

Resource
Guide for the
Public Health &
Medical
Workers

What Risks are Associated with Dog Bites?

Primary injury associated with dog bites typically appear as a lacerating, puncture, crush or avulsion type injury to the face, hand, or extremities on the affected individual. These injuries first must be addressed to determine any secondary injuries or issues that need to be handled. Several complications from dog bites include:

- Scarring
- Tetanus
- Nerve damage
- Muscle Damage
- Death (Rare, but particularly affects children under 10).

Secondary to the primary injury, the largest risk is that of infection. While rare in the United States, rabies is particularly prone to being carried by the saliva in dogs; however, the saliva in dogs is polymicrobial and may contain multiple infectious bacteria that can cause adverse health effects if the human were to be come infected.

DID YOU KNOW?

The size of the dog does not present significant effect on whether it's likely to bite.

Above: (Pfortmueller, et. al., 2013)

Toxicokinetics of Dog Bite Infections

As previously mentioned, bite wound infections are polymicrobial in nature, containing *Pasteurella* spp. (both *Pasteurella multocida* and *Pasteurella canis*), *Staphylococcus* and *Streptococcus* spp., and *Capnocytophaga canimorsus* bacteria of particular importance to human toxicology. For purposes of this information guide, focus is given to *Pasteurella* spp. As the most abundant bacterial toxin in dog saliva.



Image: *Pasteurella* on Agar Plate

Pasteurella is a non-spore forming, non-motile, bipolar, gram negative coccobacilli that is predominantly spread through animal bite or scratch and wound contamination from infection tissues. From there, bacteria is able to enter the bloodstream and cause further adverse clinical effects. Epidemiological rates show that 50% of dog and 75% of cat bite associated infections present with *Pasteurella* bacteria as part of the infectious bacterial family.

Above: (Körmöndi, et. al., 2019; MedScape, 2011; MSDS Online, n.d; VetBook, 2013)

Toxicokinetics & Dose-Response Relationships

Pasteurella is a potent mitogen that possesses differential dose-response relationships between initial infection dose and the biological immune response. Research performed on mice found that 10^5 colony forming units per 0.4mL or higher concentration inoculation was found to have significantly worse clinical signs and histopathological lesions associated with hemorrhagic septicemia infection. These lesions were not graded as poorly in inoculations of 10^3 or less colony forming units per 0.4mL. This study validates the use of mice models for studying *Pasteurella* effected diseases; moreover, while we do not know an exact infective dose, the rate of transmission and differential toxin effects presented by *Pasteurella* suggests that a linear dose-response relationship is present in *Pasteurella* type infections in humans.

As public health and medical workers, it's essential to understand that the incidence and severity of *Pasteurella* infections can be reduced significantly through prevention because of the dose-response relationship. Further, issues with antibiotic resistance can be avoided with the reduction of unnecessary antibiotic usage due to easily preventable dog bite accidents.

Above: (Abdullah, et. al., 2014; MSDS Online, n.d.; Rybicki, Kisdi, & Anttila, 2018; Pfortmueller, et. al., 2013)