

# Animal and Human Bite Skin Soft Tissue Infection (SSTI)

Brendan Campbell, MD, MPH
Hassan El Chebib, MD
Laura Kvenvold, MD
Grace Hong, APRN





# What is a Clinical Pathway?



An evidence-based guideline that decreases unnecessary variation and helps promote safe, effective, and consistent patient care.

# **Objectives**



- Standardize treatment of animal and human bites in children
- Outline the management of an animal bite depending on patients' wound characteristics
- Recommend if vaccination and/or immune globulin prophylaxis are indicated
- Recommend if antibiotics are needed and which are optimal, tailored based on patient's wound type

# Why is the Pathway Necessary?



- Animal bites are a common reason for presentation to the Emergency Department and pediatric and surgical offices
- Dog bites account for approximately 90 percent of animal bites and occur most often in children.
  - Cat bites account for about 10 percent of all animal bites.
- In children, dog bites usually involve the head and neck
  - o in adolescents and adults, dog bites usually involve the extremities.
- Dog bites may be associated with a range of injuries, from minor to major wounds.
  - Cat bites usually occur on the extremities and tend to penetrate deeply, with higher risk of deep infection than dog bites
  - The likelihood of wound infection is more likely in cat bites (~50%) vs dog bites (~5-15%).
  - Treatment should be tailored based on physical examination, likelihood of infection and based on guidelines.

# Why is Pathway Necessary?



- The Infectious Diseases Society of America updated their Practice Guidelines for the Diagnosis and Management of Skin and Soft Tissue Infections in 2014, and these guidelines include recommendations for animal and human bite wounds prevention and treatment
- The Connecticut Children's Animal and Human Bite clinical pathway was developed to ensure an optimal consistent approach to the surgical and medical management of children who present with animal and human bites

This is the Animal and Human Bite Skin Soft Tissue Infection Clinical Pathway.

We will be reviewing each component in the following slides.

## CLINICAL PATHWAY:

## Animal and Human Bite Skin and Soft Tissue Infection

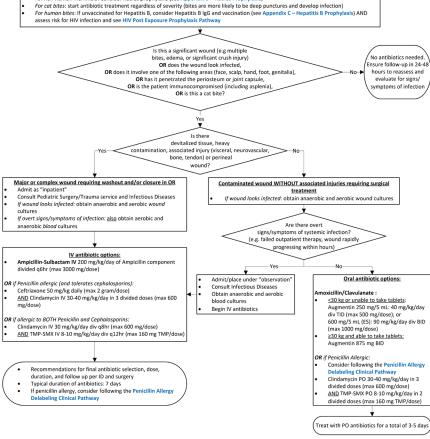
THIS PATHWAY SERVES AS A GUIDI AND DOES NOT REPLACE CLINICAL JUDGMENT.

Inclusion Criteria:  $\ge 2$  months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles Exclusion Criteria: < 2 mo old; non-animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present)

## Initial Management: Apply direct pressure to any wounds that are actively bleeding Clean non-puncture wound with saline via high pressure syringe irrigation Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human

## Consider Tetanus prophylaxis (see Appendix A – Tetanus Prophylaxis)

For non-human mammals: Consider Rabies prophylaxis (see Appendix B – Rabies Prophylaxis)



Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place
Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral
to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued
resolution of infection

NEXT PAGE



CONTACTS: BRENDAN CAMPBELL, MD, MPH | HASSAN EL CHEBIB, MD | GRACE HONG, APRN LAURA KVENVOLD, MD



©2019 Connecticut Children's Medical Center. All rights reserved.

## Animal and Human Bite Skin and Soft Tissue Infection

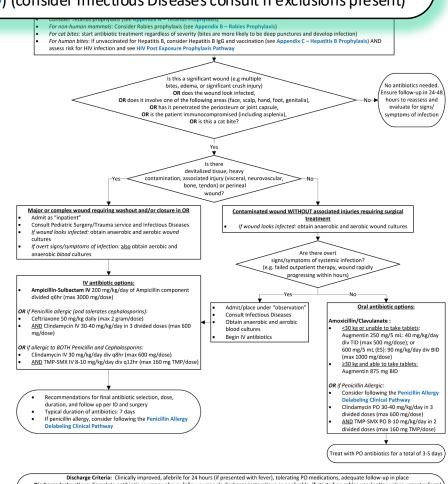
THIS PATHWAY
SERVES AS A GUIDE
AND DOES NOT
REPLACE CLINICAL
JUDGMENT.

Inclusion Criteria: ≥2 months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles

Exclusion Criteria: <2 months of age presenting with an animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present)

Inclusion Criteria: ≥2 months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles Exclusion Criteria: <2 mo old; non-animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present)

- Inclusion criteria are those who are >2 months of age, and have an animal bite SSTI from a cat, dog or human.
- If there are other animal bites NOT from a cat, dog or human, or the child is younger than 2 months of age, consider an ID consult as organisms that cause infection may change.
- Otherwise, all other non-animal bite SSTIs should refer to the SSTI clinical pathway.



Discharge Criteria: Clinically improved, afterine for 24 hours (if presented with fever), tolerating 60 medications, adequate follow-up in place
Discharge instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rables vaccination: place urgent referra
to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued
resolution of infection







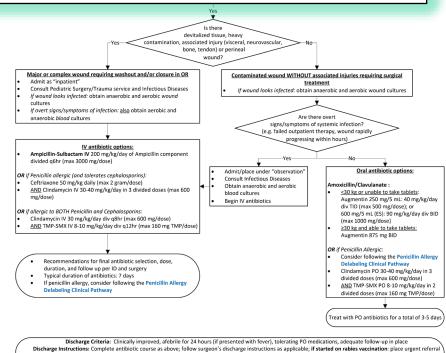


## Initial Management:

- Apply direct pressure to any wounds that are actively bleeding
- Clean non-puncture wound with saline via high pressure syringe irrigation
- Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human

## **Considerations:**

- Consider Tetanus prophylaxis (see Appendix A Tetanus Prophylaxis)
- For non-human mammals: Consider Rabies prophylaxis (see Appendix B Rabies Prophylaxis)
- For cat bites: start antibiotic treatment regardless of severity (bites are more likely to be deep punctures and develop infection)
- For human bites: If unvaccinated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C Hepatitis B Prophylaxis) AND assess risk for HIV infection and see HIV Post Exposure Prophylaxis Pathway
- Initial management includes stabilization and cleaning
- Cat bites tend to be deeper and may seem superficially well – they require antibiotic treatment regardless
- Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human



Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place Discharge Instructions: Complete antibiotic course as above, follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referrate to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued resolution of infection

NEXT PAGE





## **Initial Management:**

- Apply direct pressure to any wounds that are actively bleeding
- Clean non-puncture wound with saline via high pressure syringe irrigation
- Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human

## **Considerations:**

- Consider Tetanus prophylaxis (see Appendix A Tetanus Prophylaxis)
- For non-human mammals: Consider Rabies prophylaxis (see Appendix B Rabies Prophylaxis)
- For cat bites: start antibiotic treatment regardless of severity (bites are more likely to be deep punctures and develop infection)
- For human bites: If unvaccinated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C Hepatitis B Prophylaxis) AND assess risk for HIV infection and see HIV Post Exposure Prophylaxis Pathway

Tetanus prophylaxis recommendations are listed in Appendix A, per Red Book: 2024-2027 Report of the Committee on Infectious Diseases

## Skin and Soft Tissue Infection

nimal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present)

#### Initial Management: v bleeding

sure syringe irrigation

that is not from a dog, cat, or human

#### Considerations

exis (see Appendix B - Rabies Prophylaxis)

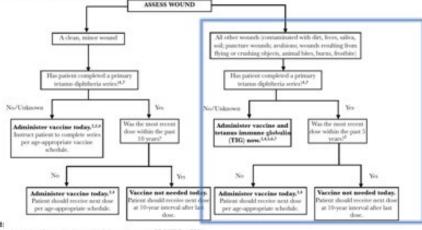
f severity (bites are more likely to be deep punctures and develop infection) ider Hepatitis B IgG and vaccination (see Appendix C - Hepatitis B Prophylaxis) AND

nimal and Human Bite Skin and Soft Tissue Infection Appendix A: Tetanus Prophylaxis

American Academy of Pediatrics

From: Tetanus (Lockjaw)

Red Book: 2024-2027 Report of the Committee on Infectious Diseases, 2024



#### Figure Legend:

A primary series consists of a minimum of 3 doses of tecanus- and dignified a containing vaccine (CTaPCTP/TapyCTTTC)

\*Age-appropriate vaccine:OTaP for infants and children fill weeks up to 7 years of age.

nus-diphtheria (Tit) loxoid for persons 7 through 8 years of age and 65 years of age and othe

Tday for persons 11 through 64 years of age if using Adace? or 10 years of age and sider if using Boostis\*, unless the person has received a prior dose of Tday. No varying or TKS is recommended for infants younger than 6 weeks of age with clean, minor example, (And no varying is branched for infants younger than 6 weeks of age.)

"Day" is preferred for persons 11 through 64 years of lage 11 using Associal 15 years of lage 11 using Associal 15 years of lage and older 2 using Boosteri who have received 15 the preferred to better to be the visit 15 or persons 7 through 92 years, 65 years and older, or who have received 15 the previously, 81 th a deminatered, and advocted 17 product is grantered to find 17 th 16 CEP 10 the 16 years of the previously, 81 th a deminatered, and advocted 17 product is grantered to find 17 the 16 CEP 10 the 16 years of th

For infants younger than 6-weeks of age. TIG (without vaccine) is recommended for "dirty" wounds (wounds other than clean, minor)

"Persons who are HV positive should receive TKG regardless of tetanus immunication his

Brand names are used for the purpose of clarifying product characteristics and are not an endorsement of either product

Tdag vaccines filosomis (GrEK) is licensed for persons 10 years of age and older Adapti (sanot) is licensed for persons 11 through-64 years of age.

Courtees of the Microsopte Decembers of Health come health state on updiscours/betained/scottenedropes here; with modifications

Date of Download: 12/30/2024

Copyright © 2024 American Academy of Pediatrics. All rights reserved.

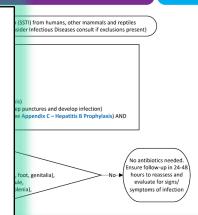
## Animal and Human Bite Skin and Soft Tissue Infection

## **Initial Management:**

- Apply direct pressure to any wounds that are actively bleeding
- Clean non-puncture wound with saline via high pressure syringe irrigation
- Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human

## Considerations:

- Consider Tetanus prophylaxis (see Appendix A Tetanus Prophylaxis)
- For non-human mammals: Consider Rabies prophylaxis (see Appendix B Rabies Prophylaxis)
- For cat bites: start antibiotic treatment regardless of severity (bites are more likely to be deep punctures and develop infection)
- For human bites: If unvaccinated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C Hepatitis B Prophylaxis) AND assess risk for HIV infection and see HIV Post Exposure Prophylaxis Pathway



## RABIES POST-EXPOSURE PROPHYLAXIS

Animal Type	Evaluation and Disposition of Animal	Postexposure Prophylaxis Recommendations
Dogs, cats, and ferrets	Healthy and available for 10 days of observation	Prophylaxis only if animal develops signs of rabies*
	Rabid or suspected of being rabid*	Immediate immunization and RIG <sup>c</sup>
	Unknown (escaped)	Consult Infectious Diseases; consider starting PEP promptly
Bats, skunks, raccoons, foxes, mongooses <sup>1</sup> , and most other carnivores; groundhogs	Regarded as rabid until animal proven negative by laboratory tests*	Immediate immunization and RIG <sup>3</sup>
Livestock, rodents, and lagomorphs (rabbits, hares, and pikas)	Consider individually	Consult Infectious Diseases; bites of squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, mice and other rodents, rabbits, hares, and pikas almost never require rabies postexposure prophylaxis

RIG indicates Rabies Immune Globulir

"The animal should be euthanized and tested as soon as possible. Holding for observation is not recommended. Immunization is discontinued if immunofluorescent test result for the animal is negative.

\*During the 10-day observation period, at the first sign of rables in the biting dog, car, or ferret, prophylaxis of the exposed person with RIG (human) and vaccine should be initiated. The animal should be euthanized immediately and tested. \*See below and text in reference

American Academy of Pediatrics. Rabies. In: Kimberlin DW, Banerjee R, Barnett ED, Lynfield R, Sawyer MH, eds. Red Book: 2024 Report of the Committee on Infectious Diseases. American Academy of Pediatrics; 2024.

The above chart has been adapted to Connecticut Children's local recommendations.

LAURA KVENVOLD, MD



©2019 Connecticut Children's Medical Center. All rights reserved.

Rabies prophylaxis is listed in Appendix

B, per AAP recommendations.

## Animal and Luman Bite Skin and Soft Tissue Infection

with saline via high pressure syringe irrigation f there is an animal bite that is not from a dog, cat, or huma

onsider Rabies prophylaxis (see Appendix B - Rabies Prophylaxis)

ge presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles

treatment regardless of severity (bites are more likely to be deep punctures and develop infection)

ated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C – Hepatitis B Prophylaxis) AND

imal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present)

# THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT:

## Initial Management:

- Apply direct pressure to any wounds that are actively bleeding
- Clean non-puncture wound with saline via high pressure syringe irrigation
- Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human

### Considerations:

- Consider Tetanus prophylaxis (see Appendix A Tetanus Prophylaxis)
- For non-human mammals: Consider Rabies prophylaxis (see Appendix B Rabies Prophylaxis)
- For cat bites: start antibiotic treatment regardless of severity (bites are more likely to be deep punctures and develop infection)
- For human bites: If unvaccinated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C Hepatitis B Prophylaxis) AND
  assess risk for HIV infection and see HIV Post Exposure Prophylaxis Pathway

# Is this a significant wound for multiple

## RABIES VACCINE ADMINISTRATION

- Two vaccines are available on the market: RabAvert (preferred) and Imovax (reserved for those with severe egg allergy).
- Administration site: typically deltoid, or for young patient may use outer aspect of thigh.
  - Do NOT administer in the gluteal muscle. Do NOT administer in the same muscle as RIG if given.
- Dose: 1 ml/dose
- Administration Schedule:
  - o Immunocompetent patients: give on days 0, 3, 7, and 14.
  - Immunocompromised patients: Discuss with ID. Consider the following: give on days 0, 3, 7, 14. After 4<sup>th</sup> dose, obtain antibody titer to ensure minimum cut off of 0.5 IU/mL has been reached or give 5<sup>th</sup> dose on day 28.
  - o Patients who have had rabies vaccine in the past: give on days 0 and 3.

## RABIES IMMUNE GLOBULIN (RIG) ADMINISTRATION

- Dose: 20 IU/kg given in a single dose
- Administration:
  - Give as soon as possible after exposure (day 0)
  - If possible, give the full dose around/into the wound(s).
  - Any remaining volume (or if unable to give the dose around the wound) should be administered IM at a site distant from the vaccine administration site.
  - If person has been previously vaccinated with rabies, RIG is not recommended. They should instead receive 2 booster doses of rabies vaccine as above on day 0 and 3. If immunocompromised, discuss with ID.

If rabies vaccine series is started, subsequent doses can be given in the ID clinic +/- 1 day of the administration schedule.

ED staff should place a referral in Epic to the ID office for these doses.

## **Animal and Human Bite Skin and Soft Tissue Infection**

THIS PATHWAY
SERVES AS A GUIDE
AND DOES NOT
REPLACE CLINICAL
JUDGMENT.

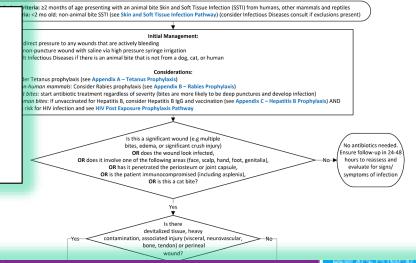
## Initial Management:

- Apply direct pressure to any wounds that are actively bleeding
- Clean non-puncture wound with saline via high pressure syringe irrigation
- Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human

## Considerations:

- Consider Tetanus prophylaxis (see Appendix A Tetanus Prophylaxis)
- For non-human mammals: Consider Rabies prophylaxis (see Appendix B Rabies Prophylaxis)
- For cat bites: start antibiotic treatment regardless of severity (bites are more likely to be deep punctures and develop infection)
- For human bites: If unvaccinated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C Hepatitis B Prophylaxis) AND
  assess risk for HIV infection and see HIV Post Exposure Prophylaxis Pathway

Appendix C has hepatitis B prophylaxis, which is based on human bites, the hepatitis B status of the source, and the vaccination status of the patient.



## Appendix C: Hepatitis B Prophylaxis

Table 3.23. Guidelines for Protexposure Prophylaxis" of People With Nonoccupational Exposures" to Blood or Body Fluids That Contain Blood, by Exposure Type and Vaccination Status

| Secure | S

Hope parties record

Transferring to the medical of the parties of

Visit of the face possits or assets for according to the control of the face o

Historian same is a reason of the four engine.

The introduct, incompanying that the closed proof is profit preferring with 2 hours, Subseque the data of the incompression of the expose study of the properties of the close is private to the close is private to the close in the close is provided to the properties of the close in the close is provided to complete. The transfer is provided to complete in the close in the close is provided to complete in the close is provided to complete in the close in the close is provided to complete in the close in the close is provided to complete in the close in the close is provided to complete in the close in t

Management apply in concentration assumed the continue for constitution assumed assumed as included by the following the following the section of the adventure of the adventuring post agency transport to the deposition of the adventuring post agency transport to the adventuring post agency to the deposition of the adventuring post agency to the deposition of the adventuring post agency to the adventure agency to the

Superior who have the process of the regularization and have the relucions and the second process the serve and characteristics and the second process the serve and the second process the second process the second process the second process that the second process the second process that the s

person of the contract discoveration of a constitutive partial A contraction of the contract recommendation recom-

A Delice Colonia Colon

NEXT PAGE



CONTACTS: BRENDAN CAMPBELL, MD, MPH | HASSAN EL CHEBIB, MD | GRACE HONG, APRN LAURA KVENVOLD, MD



Is this a significant wound (e.g multiple bites, edema, or significant crush injury)

OR does the wound look infected,

OR does it involve one of the following areas (face, scalp, hand, foot, genitalia),

OR has it penetrated the periosteum or joint capsule,

OR is the patient immunocompromised (including asplenia),

OR is this a cat bite?

## Assess for wound severity:

• Evaluate presence of infection, location, involvement, and underlying immunocompromise

If the wound is simple, clean, non-infected, not from a cat, and the patient is healthy:

- · Antibiotics are not necessary
- Ensure that patient has follow up in 24-48 hours for re-assessment.

## **CLINICAL PATHWAY:**

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY SERVES AS A GUID! AND DOES NOT REPLACE CLINICAL JUDGMENT

Inclusion Criteria: >2 months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles xclusion Criteria: <2 mg old: non-animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present) Apply direct pressure to any wounds that are acti Clean non-puncture wound with saline via high p No antibiotics needed. Consult Infectious Diseases if there is an anin Ensure follow-up in 24-48 hours to reassess and is B Prophylaxis) AND evaluate for signs/ symptoms of infection No antibiotics needed nsure follow-up in 24-48 hours to reassess and OR does it involve one of the following areas (face, scalp, hand, foot, genitalia) OR has it penetrated the periosteum or joint capsule, evaluate for signs/ OR is the patient immunocompromised (including asplenia mptoms of infectio OR is this a cat bite? devitalized tissue, heavy contamination associated injury (viscoral neurovascular bone, tendon) or perinea Contaminated wound WITHOUT associated injuries requiring surgical Consult Pediatric Surgery/Trauma service and Infectious Diseases If wound looks infected: obtain anaerobic and aerobic wound cultures If wound looks infected: obtain anaerobic and aerobic wound If overt signs/symptoms of infection: also obtain aerobic and anaerobic blood cultures signs/symptoms of systemic infection? (e.g. failed outpatient therapy, wound rapidly IV antibiotic options Ampicillin-Sulbactam IV 200 mg/kg/day of Ampicillin component divided g6hr (max 3000 mg/dose) Admit/place under "observation Oral antibiotic options R if Penicillin allergic (and tolerates cephalosporins) Consult Infectious Diseases Ceftriaxone 50 mg/kg daily (max 2 gram/dose) Obtain anaerobic and aerobic AND Clindamycin IV 30-40 mg/kg/day in 3 divided doses (max 600 <30 kg or unable to take tablets: blood cultures Augmentin 250 mg/5 mL: 40 mg/kg/day Begin IV antibiotics div TID (max 500 mg/dose); or OR if allergic to BOTH Penicillin and Cephalosporins 600 mg/5 mL (ES): 90 mg/kg/day div BID Clindamycin IV 30 mg/kg/day div q8hr (max 600 mg/dose) AND TMP-SMX IV 8-10 mg/kg/day div q12hr (max 160 mg TMP/dose ≥30 kg and able to take tablets: OR if Penicillin Allergic Consider following the Penicillin Allergy Recommendations for final antibiotic selection, dose **Delabeling Clinical Pathway** duration, and follow up per ID and surgery Clindamycin PO 30-40 mg/kg/day in 3 Typical duration of antibiotics: 7 days divided doses (max 600 mg/dose) If penicillin allergy, consider following the Penicillin Allergy AND TMP-SMX PO 8-10 mg/kg/day in 2 **Delabeling Clinical Pathway** divided doses (max 160 mg TMP/dose) Freat with PO antibiotics for a total of 3-5 days Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place

Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place
Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral
to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued
resolution of infection





CONTACTS: BRENDAN CAMPBELL, MD, MPH | HASSAN EL CHEBIB, MD | GRACE HONG, APRN LAURA KVENVOLD, MD



If a wound is significant or from a cat bite, a distinction must then be made as to wound complexity.

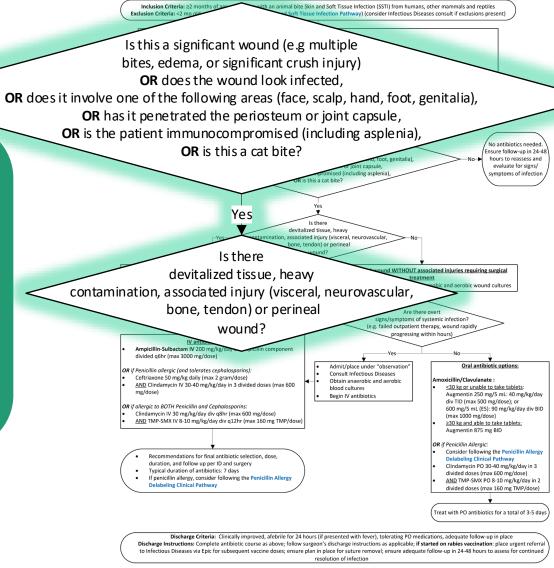
A major or complex wound will contain any of the following:

- devitalized tissue
- heavy contamination
- associated injury
- · any perineal wound

## CLINICAL PATHWAY:

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.







CONTACTS: BRENDAN CAMPBELL, MD, MPH | HASSAN EL CHEBIB, MD | GRACE HONG, APRN LAURA KVENVOLD, MD



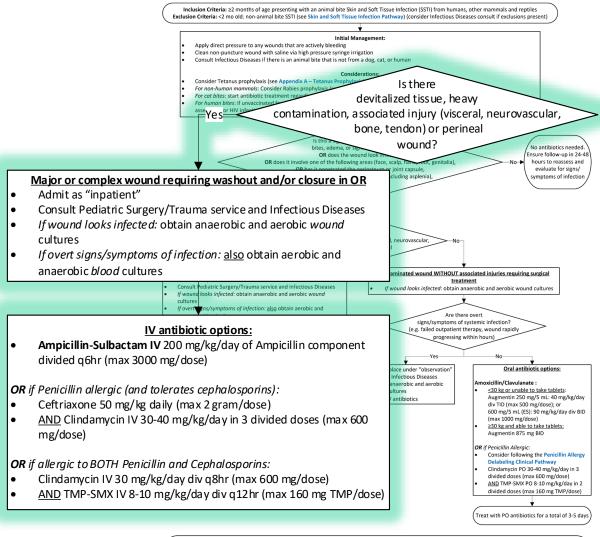
A major or complex wound requires surgical washout and/or closure.

- Admit as "inpatient"
- Consult Pediatric Surgery/Trauma service AND Infectious Diseases
- If the wound looks infected, obtain wound cultures (anaerobic and aerobic)
- If there are overt signs/symptoms of infection, also obtain blood cultures (anaerobic and aerobic)

## **CLINICAL PATHWAY:**

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.



Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place
Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referra
to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24.48 hours to assess for continued
resolution of infection









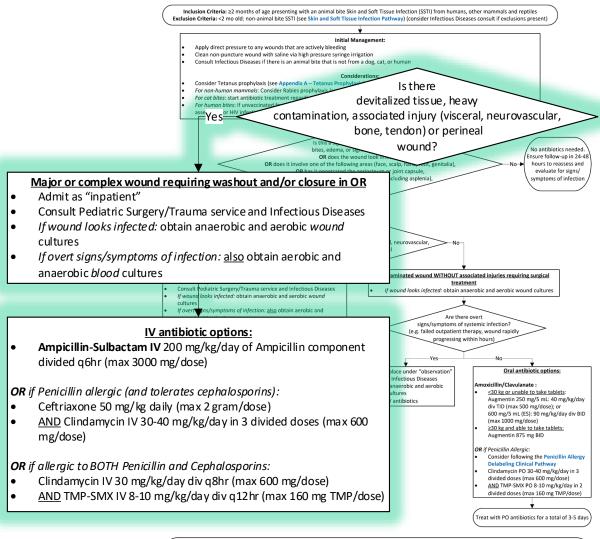
For major or complex wounds:

Initiate the appropriate IV antibiotic treatment plan

## CLINICAL PATHWAY:

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.



Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place
Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral
to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued
resolution of infection









- After IV antibiotics are started, assess for clinical improvement
- Antibiotic course details will be determined together by ID and Pediatric Surgery services
- Duration of antibiotics is typically a total of 7 days, but may vary depending on ID recommendation

 If the patient has a reported penicillin allergy, consider following the Penicillin Allergy Delabeling Clinical Pathway

## CLINICAL PATHWAY:

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY SERVES AS A GUIDS AND DOES NOT REPLACE CLINICAL JUDGMENT.

Inclusion Criteria: 22 months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles

Exclusion Criteria: <2 mo old; non-animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present)

#### nitial Management

- Apply direct pressure to any wounds that are actively bleeding
- Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or huma

## IV antibiotic options:

**Ampicillin-Sulbactam IV** 200 mg/kg/day of Ampicillin component divided q6hr (max 3000 mg/dose)

**OR** if Penicillin allergic (and tolerates cephalosporins):

- Ceftriaxone 50 mg/kg daily (max 2 gram/dose)
- AND Clindamycin IV 30-40 mg/kg/day in 3 divided doses (max 600 mg/dose)

**OR** if allergic to BOTH Penicillin and Cephalosporins:

- Clindamycin IV 30 mg/kg/day div q8hr (max 600 mg/dose)
- AND TMP-SMX IV 8-10 mg/kg/day div q12hr (max 160 mg TMP/dose)



- Recommendations for final antibiotic selection, dose, duration, and follow up per ID and surgery
- Typical duration of antibiotics: 7 days
- If penicillin allergy, consider following the Penicillin Allergy Delabeling Clinical Pathway
  - duration, and follow up per ID and surgery
     Typical duration of antibiotics: 7 days
     If penicillin allergy, consider following the Penicillin Allergy

**Delabeling Clinical Pathway** 

Clindamycin PO 30-40 mg/kg/day in 3 divided doses (max 600 mg/dose)

AND TMP-SMX PO 8-10 mg/kg/day in 2 divided doses (max 160 mg TMP/dose)

Treat with PO antibiotics for a total of 3-5 days

Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place
Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referra
to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24.48 hours to assess for continued
resolution, of infection.

resolution, of infection.

NEXT PAGE



CONTACTS: BRENDAN CAMPBELL, MD, MPH | HASSAN EL CHEBIB, MD | GRACE HONG, APF LAURA KVENVOLD, MD



©2019 Connecticut Children's Medical Center. All rights reserved

## Animal and Human Bite Skin and Soft Tissue Infection

Inclusion Criteria: >2 months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles

THIS PATHWAY
SERVES AS A GUIDE
AND DOES NOT
REPLACE CLINICAL
JUDGMENT.

Is there

devitalized tissue, heavy

contamination, a ssociated injury (visceral, neurovascular, bone, tendon) or perineal

wound?

Exclusion Criteria: <2 mo old; non-animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider infectious Diseases consult if exclusions present)

Initial Management:

devitalized tissue, heavy

contamination, a ssociated injury (visceral, neurovascular, No Considerations:

bone, tendon) or perineal

wound?

Exclusion Criteria: <2 mo old; non-animal bite SSTI (see Skin and Soft Tissue Infectious Diseases consult if exclusions present)

Initial Management:

| Consideration | No Considerations:
| Considerations: | Pophylaxis | Considerations: | Pophylaxis | P

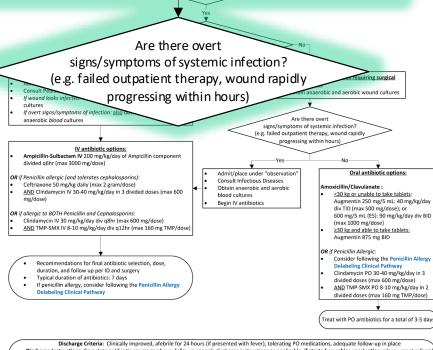
A contaminated wound **without** associated injuries is considered a significant wound, but does not require surgical treatment.

 If the wound looks infected, obtain wound cultures (anaerobic and aerobic)

## Contaminated wound WITHOUT associated injuries requiring surgical treatment

If wound looks infected: obtain anaerobic and aerobic wound cultures

otics needed.
ow-up in 24-48
reassess and
e for signs/
s of infection



Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place
Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral
to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued
resolution of infection





CONTACTS: BRENDAN CAMPBELL, MD, MPH | HASSAN EL CHEBIB, MD | GRACE HONG, APRN LAURA KVENVOLD, MD



Antibiotic selection will depend on overt signs of infection.

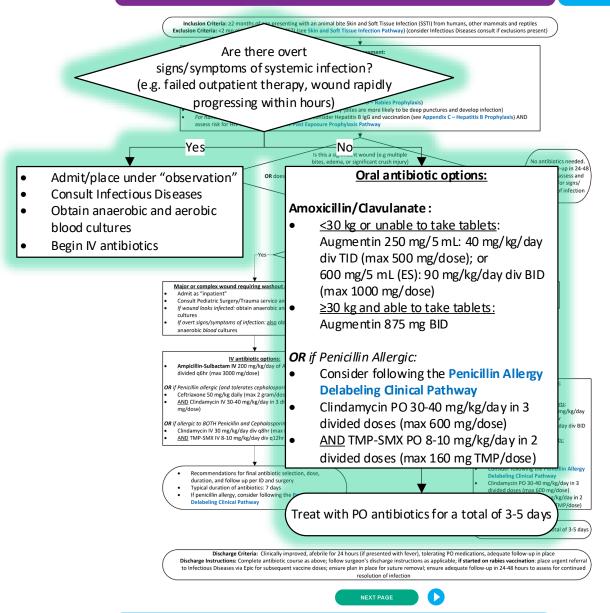
Examples of overt signs/symptoms of infection include:

- Failing outpatient therapy
- Wound is rapidly (i.e. within hours) progressing

## **CLINICAL PATHWAY:**

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.



CONTACTS: BRENDAN CAMPBELL MD. MPH I HASSAN EL CHEBIB MD I GRACE HONG, APRN



If there are overt signs/symptoms of infection:

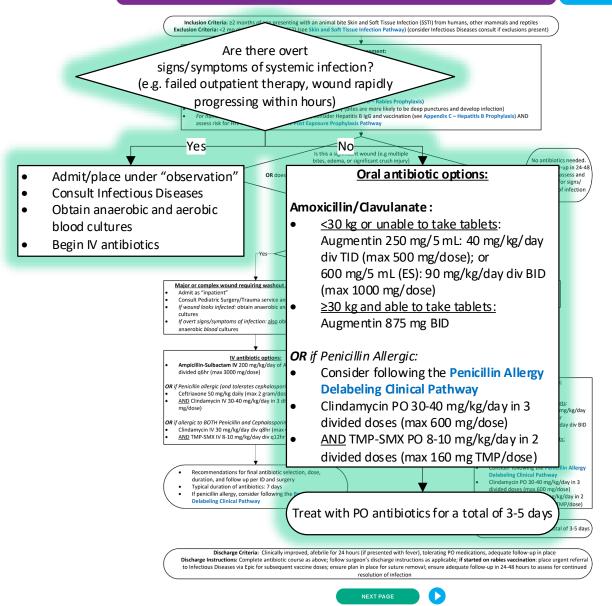
- Obtain an ID consult
- Obtain blood cultures (anaerobic and aerobic)
- Start IV antibiotics

Of note, these patients do not meet inpatient admission criteria and should be "admitted/placed in observation"

## CLINICAL PATHWAY:

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY
SERVES AS A GUIDE
AND DOES NOT
REPLACE CLINICAL
JUDGMENT.



CONTACTS: BRENDAN CAMPBELL, MD. MPH I HASSAN EL CHEBIB, MD I GRACE HONG, APRN



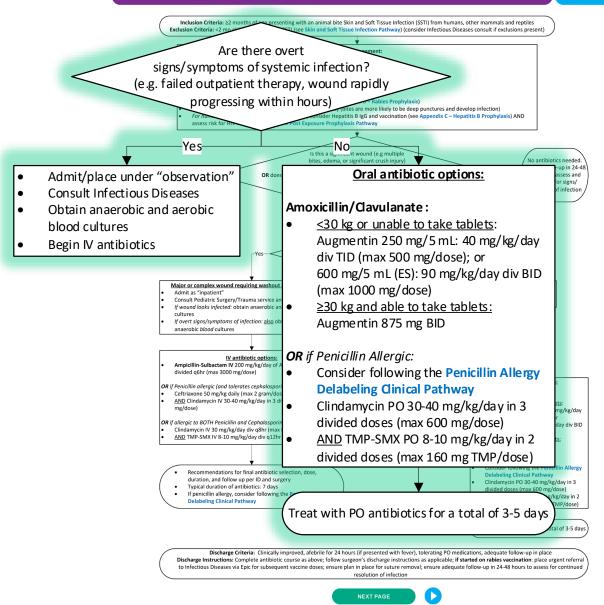
# If there are no overt signs and symptoms of infection:

- Begin treatment with the appropriate ORAL antibiotic
- If the patient has a reported penicillin allergy, consider following the Penicillin Allergy Delabeling Clinical Pathway
- Clindamycin and TMP-SMX are preferred over doxycycline alone for true penicillin allergy
- Note that the TOTAL treatment duration is 3-5 days

## **CLINICAL PATHWAY:**

## Animal and Human Bite Skin and Soft Tissue Infection

THIS PATHWAY SERVES AS A GUIDE AND DOES NOT REPLACE CLINICAL JUDGMENT.



CONTACTS: BRENDAN CAMPBELL, MD. MPH I HASSAN EL CHEBIB, MD I GRACE HONG, APRN



## Discharge criteria and instructions are listed

Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued resolution of infection

#### Initial Management: Apply direct pressure to any wounds that are actively bleeding Clean non-puncture wound with saline via high pressure syringe irrigation Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human Consider Tetanus prophylaxis (see Appendix A - Tetanus Prophylaxis) For non-human mammals: Consider Rabies prophylaxis (see Appendix B - Rabies Prophylaxis) For cat bites: start antibiotic treatment regardless of severity (bites are more likely to be deep nunctures and develop infection) For human bites: If unvaccinated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C - Hepatitis B Prophylaxis) AND assess risk for HIV infection and see HIV Post Exposure Prophylaxis Pathway Is this a significant wound (e.g multiple bites, edema, or significant crush injury) No antibiotics needed OR does the wound look infected, nsure follow-up in 24-48 OR does it involve one of the following areas (face, scalp, hand, foot, genitalia), hours to reassess and OR has it penetrated the periosteum or joint capsule, evaluate for signs/ OR is the patient immunocompromised (including asplenia mptoms of infection OR is this a cat bite? Is there devitalized tissue, heavy contamination, associated injury (visceral, neurovascular bone, tendon) or perinea Contaminated wound WITHOUT associated injuries requiring surgical Consult Pediatric Surgery/Trauma service and Infectious Diseases If wound looks infected: obtain anaerobic and aerobic wound cultures If wound looks infected: obtain anaerobic and aerobic wound If overt signs/symptoms of infection: also obtain aerobic and anaerobic blood cultures signs/symptoms of systemic infection? (e.g. failed outpatient therapy, wound rapidly progressing within hours) IV antibiotic options Ampicillin-Sulbactam IV 200 mg/kg/day of Ampicillin component

**Animal and Human Bite Skin and Soft Tissue Infection** 

Inclusion Criteria: >2 months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles Exclusion Criteria: < 2 mo old; non-animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present)

Recommendations for final antibiotic selection, dose duration, and follow up per ID and surgery

- Typical duration of antibiotics: 7 days If penicillin allergy, consider following the Penicillin Allergy
- **Delabeling Clinical Pathway**

Consider following the Penicillin Allergy **Delabeling Clinical Pathway** Clindamycin PO 30-40 mg/kg/day in 3 divided doses (max 600 mg/dose) AND TMP-SMX PO 8-10 mg/kg/day in 2 divided doses (max 160 mg TMP/dose)

able to take tablets:

able to take tablets:

250 mg/5 mL: 40 mg/kg/day L (ES): 90 mg/kg/day div BID

Treat with PO antibiotics for a total of 3-5 days

Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued resolution of infection

NEXT PAGE



CONTACTS: BRENDAN CAMPBELL, MD, MPH | HASSAN EL CHEBIB, MD | GRACE HONG, APRN LAURA KVENVOLD, MD



CLINICAL PATHWAY:

Note that you may now refer to Infectious Disease for subsequent rabies vaccines via Epic.

## CLINICAL PATHWAY:

## **Animal and Human Bite Skin and Soft Tissue Infection**

Inclusion Criteria: >2 months of age presenting with an animal bite Skin and Soft Tissue Infection (SSTI) from humans, other mammals and reptiles Exclusion Criteria: < 2 mo old; non-animal bite SSTI (see Skin and Soft Tissue Infection Pathway) (consider Infectious Diseases consult if exclusions present) Apply direct pressure to any wounds that are actively bleeding Clean non-puncture wound with saline via high pressure syringe irrigation Consult Infectious Diseases if there is an animal bite that is not from a dog, cat, or human Consider Tetanus prophylaxis (see Appendix A - Tetanus Prophylaxis) For non-human mammals: Consider Rabies prophylaxis (see Appendix B - Rabies Prophylaxis) For cat bites: start antibiotic treatment regardless of severity (bites are more likely to be deep punctures and develop infection) For human bites: If unvaccinated for Hepatitis B, consider Hepatitis B IgG and vaccination (see Appendix C - Hepatitis B Prophylaxis) AND assess risk for HIV infection and see HIV Post Exposure Prophylaxis Pathway Is this a significant wound (e.g multiple bites, edema, or significant crush injury) No antibiotics needed nsure follow-up in 24-48 OR does the wound look infected, OR does it involve one of the following areas (face, scalp, hand, foot, genitalia), hours to reassess and OR has it penetrated the periosteum or joint capsule, evaluate for signs/ OR is the patient immunocompromised (including asplenia mptoms of infection OR is this a cat bite? devitalized tissue, heavy contamination, associated injury (visceral, neurovascular bone, tendon) or perinea Major or complex wound requiring washout and/or closure in OR Contaminated wound WITHOUT associated injuries requiring surgical Consult Pediatric Surgery/Trauma service and Infectious Diseases If wound looks infected: obtain anaerobic and aerobic wound cultures If overt signs/symptoms of infection: also obtain aerobic and anaerobic blood cultures signs/symptoms of systemic infection? (e.g. failed outpatient therapy, wound rapidly progressing within hours) IV antibiotic options Ampicillin-Sulbactam IV 200 mg/kg/day of Ampicillin component divided q6hr (max 3000 mg/dose) Admit/place under "observation Oral antibiotic options: R if Penicillin allergic (and tolerates cephalosporins): Consult Infectious Diseases Ceftriaxone 50 mg/kg daily (max 2 gram/dose) Obtain anaerobic and aerobic AND Clindamycin IV 30-40 mg/kg/day in 3 divided doses (max 600 <30 kg or unable to take tablets: blood cultures Augmentin 250 mg/5 mL: 40 mg/kg/day Begin IV antibiotics div TID (max 500 mg/dose); or OR if allergic to BOTH Penicillin and Cephalosporins: 600 mg/5 mL (ES): 90 mg/kg/day div BID Clindamycin IV 30 mg/kg/day div q8hr (max 600 mg/dose) AND TMP-SMX IV 8-10 mg/kg/day div q12hr (max 160 mg TMP/dose) ≥30 kg and able to take tablets: R if Penicillin Allergic ing Clinical Pathway

Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued resolution of infection

> Discharge Criteria: Clinically improved, afebrile for 24 hours (if presented with fever), tolerating PO medications, adequate follow-up in place Discharge Instructions: Complete antibiotic course as above; follow surgeon's discharge instructions as applicable; if started on rabies vaccination: place urgent referral to Infectious Diseases via Epic for subsequent vaccine doses; ensure plan in place for suture removal; ensure adequate follow-up in 24-48 hours to assess for continued resolution of infection

> > NEXT PAGE







mycin PO 30-40 mg/kg/day in 3 doses (max 600 mg/dose)

MP-SMX PO 8-10 mg/kg/day in 2 doses (max 160 mg TMP/dose)

O antibiotics for a total of 3-5 days

# **Review of Key Points**



- Inclusion criteria includes an animal bite (from cat, dog, human) and the patient is ≥2
  months of age
- Consider Tetanus, Rabies, Hepatitis B and HIV prophylaxis in select circumstances
- Cat bites always need antibiotics
- Assess wound severity to determine treatment
  - Minor, non-infected wounds need no antibiotics
- If there are overt signs/symptoms of infection, obtain anaerobic AND aerobic blood cultures
- The preferred/first choice IV antibiotic is ampicillin-sulbactam

# **Quality Metrics**



- Number of Patients (Breakdown ED, IP/Obs
- % Patients with pathway order set
- % Patients who receive recommended antibiotics per pathway
- % Patients who were prescribed correct duration antibiotics per pathway
- Return to ED within 7 days from ED visit
- Returns to ED within 7 days of discharge from IP/Obs stay
- % Patients requiring surgery that had surgery/trauma consult

# **Pathway Contacts**



- Brendan Campbell, MD, MPH
  - Division of Pediatric Surgery and Trauma
- Hassan El Chebib, MD
  - Division of Infectious Disease and Immunology
- Laura Kvenvold, MD
  - Division of Infectious Disease and Immunology
- Grace Hong, APRN
  - Division of Infectious Disease and Immunology

## References



- American Academy of Pediatrics. Rabies. In: Kimberlin DW, Banerjee R, Barnett ED, Lynfield R, Sawyer MH, eds. Red Book: 2024 Report of the Committee on Infectious Diseases. American Academy of Pediatrics; 2024.
- Stevens DL, Bisno AL, Chambers HF, et al. <u>Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014 update by the Infectious Diseases Society of America</u>. *Clin Infect Dis.* 2014 Jul;59(2):e10-52.
- Centers for Disease Control and Prevention. <u>Epidemiology and Prevention of Vaccine-Preventable Diseases</u>. Hamborsky J, Kroger A, Wolfe S, eds. 13th ed. Washington D.C. Public Health Foundation, 2015.

## **Thank You!**



## **About Connecticut Children's Clinical Pathways Program**

The Clinical Pathways Program at Connecticut Children's aims to improve the quality of care our patients receive, across both ambulatory and acute care settings. We have implemented a standardized process for clinical pathway development and maintenance to ensure meaningful improvements to patient care as well as systematic continual improvement. Development of a clinical pathway includes a multidisciplinary team, which may include doctors, advanced practitioners, nurses, pharmacists, other specialists, and even patients/families. Each clinical pathway has a flow algorithm, an educational module for end-user education, associated order set(s) in the electronic medical record, and quality metrics that are evaluated regularly to measure the pathway's effectiveness. Additionally, clinical pathways are reviewed annually and updated to ensure alignment with the most up to date evidence. These pathways serve as a guide for providers and do not replace clinical judgment.