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Travel-associated Rickettsioses Guidance: Pre-travel Counseling, Diagnosis, Treatment, and Reporting

Clinician Outreach and Communication Activity (COCA)

May 7, 2019

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At the conclusion of the session, participants will be able to accomplish the following:

- Identify clinical characteristics associated with African tick bite fever, Mediterranean spotted fever, and scrub typhus.
- Describe the available diagnostic tests for African tick bite fever, Mediterranean spotted fever, and scrub typhus.
- Explain the advantages and disadvantages of each diagnostic test and the appropriate time points and specimens for collection.
- Discuss African tick bite fever, Mediterranean spotted fever, and scrub typhus in the context of travel medicine.

Today's First Presenter

Cara Cherry, DVM, MPH, DACVPM
Veterinary Epidemiologist
Rickettsial Zoonoses Branch
Division of Vector-borne Diseases
National Center for Emerging and Zoonotic Infectious Diseases
Centers for Disease Control and Prevention

Today's Second Presenter

Kristina M. Angelo, DO, MPH&TM
Medical Epidemiologist
Travelers' Health Branch (*proposed*)
Division of Global Migration and Quarantine
National Center for Emerging and Zoonotic Infectious Diseases
Centers for Disease Control and Prevention

Travel-associated Rickettsioses Guidance: Pre-travel Counseling, Diagnosis, Treatment, and Reporting

Cara Cherry, DVM, MPH, DACVPM

Veterinary Epidemiologist — Rickettsial Zoonoses Branch

Kristina Angelo, DO, MPH&TM

Medical Epidemiologist — Travelers' Health Branch

Clinician Outreach and Communication Activity (COCA) Call

May 7, 2019

Introduction

Increases in international travel necessitate enhancing tropical disease awareness by health care providers

Numbers of U.S. travelers to international regions have increased steadily during the last decade

- U.S. travelers to Asia
  - 5.8 million in 2017 vs 5.6 million in 2007
- U.S. travelers to Africa
  - 403,151 in 2018 vs. 205,173 in 2007
- Rapid expansion of ecotourism

Tickborne rickettsial pathogens in Asia

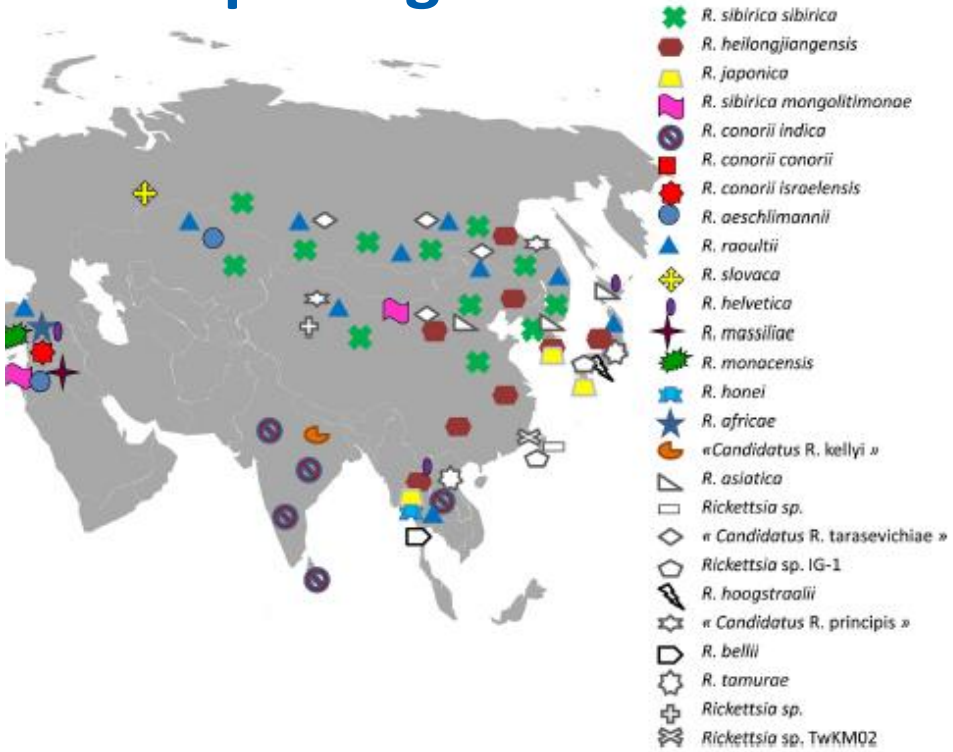
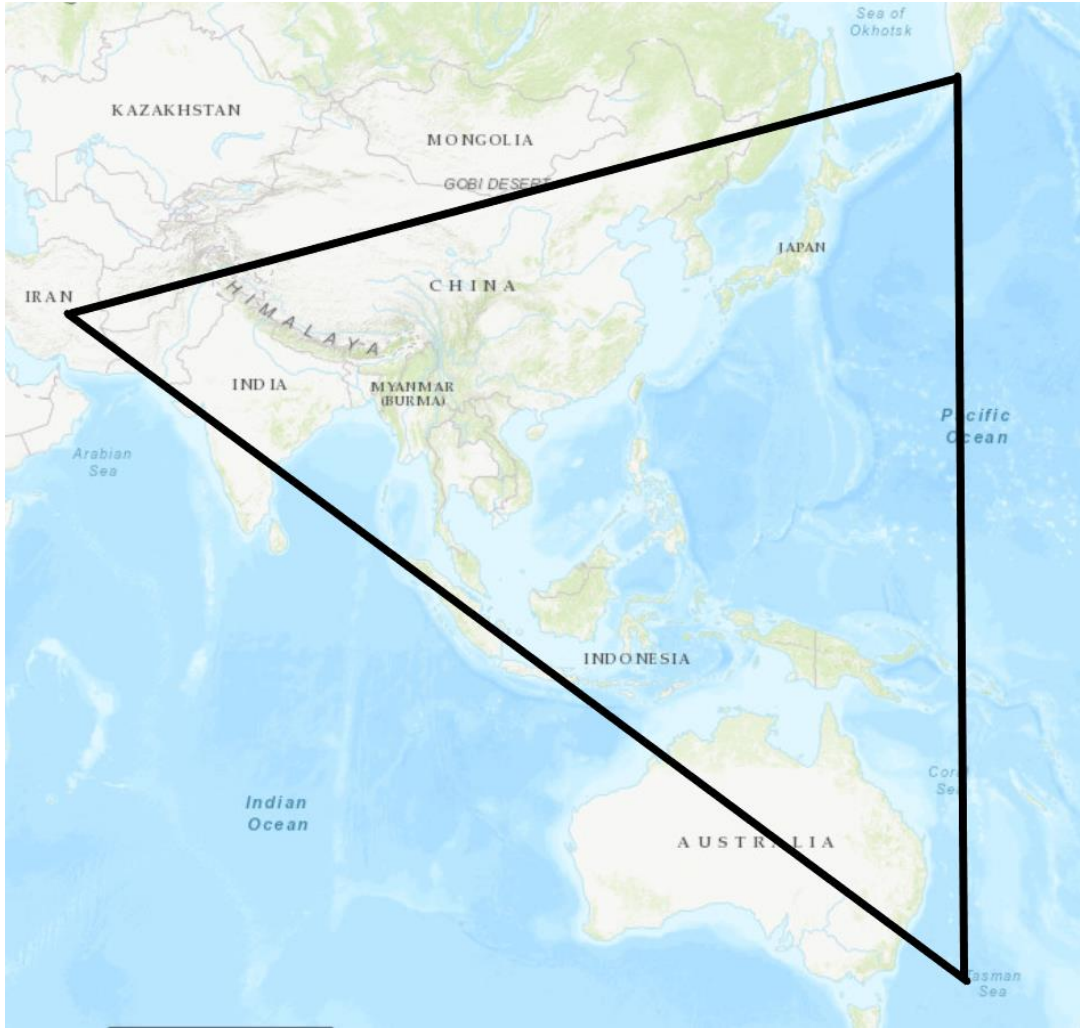


Figure 13 from Parola P, Paddock CD, Socolovschi C, Labruna MB, Mediannikov O, Kernif T, Abdad MY, Stenos J, Bitam I, Fournier PE, Raoult D, 2013. Update on tick-borne rickettsioses around the world: a geographic approach. Clin Microbiol Rev 26: 657-702.

Tsutsugamushi Triangle



Tickborne rickettsial pathogens in North Africa

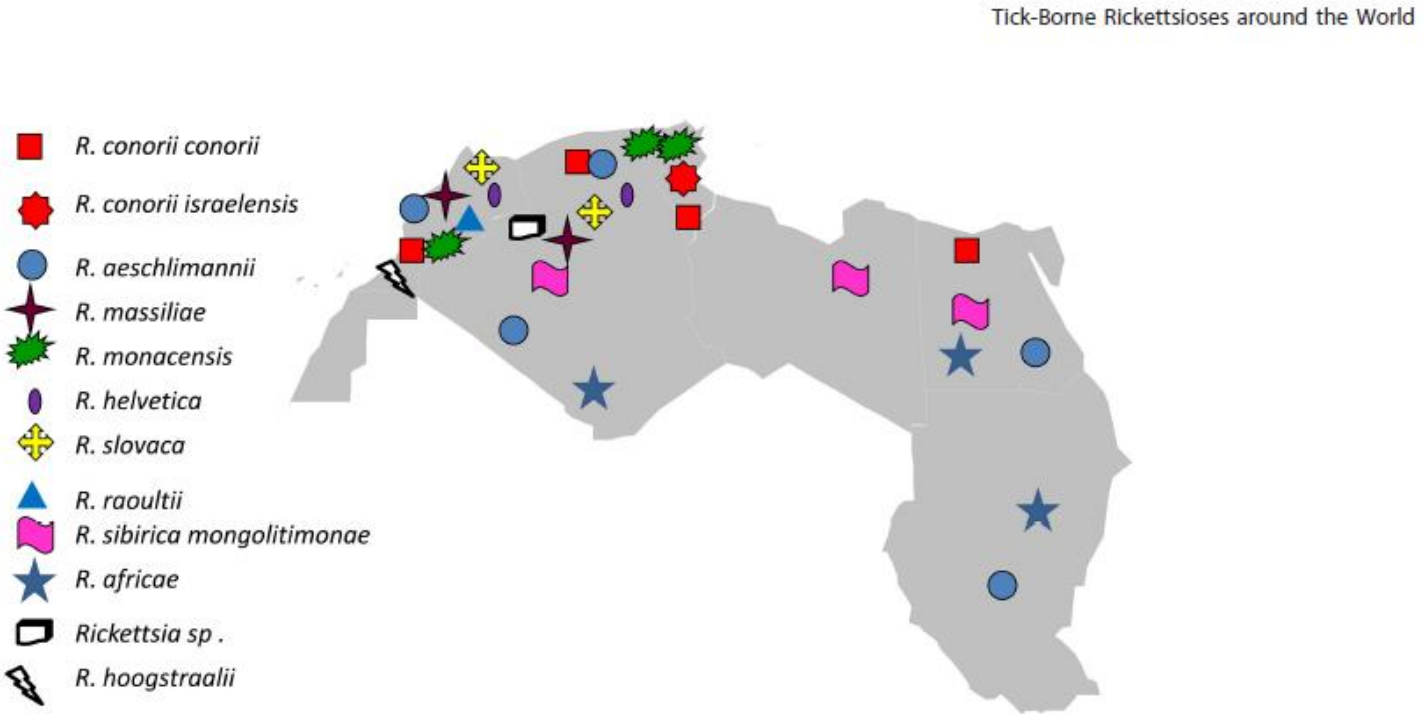


Figure 10 from Parola P, Paddock CD, Socolovschi C, Labruna MB, Mediannikov O, Kernif T, Abdad MY, Stenos J, Bitam I, Fournier PE, Raoult D, 2013. Update on tick-borne rickettsioses around the world: a geographic approach. Clin Microbiol Rev 26: 657-702.

Tickborne rickettsial pathogens in sub-Saharan Africa

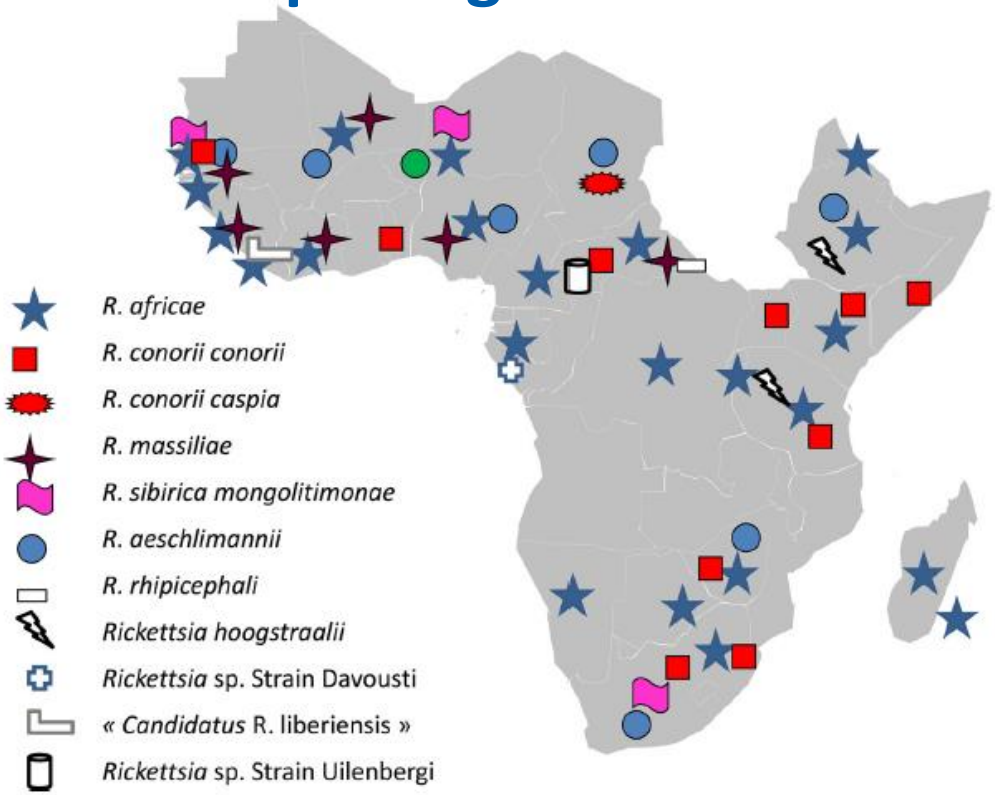


Figure 11 from Parola P, Paddock CD, Socolovschi C, Labruna MB, Mediannikov O, Kernif T, Abdad MY, Stenos J, Bitam I, Fournier PE, Raoult D, 2013. Update on tick-borne rickettsioses around the world: a geographic approach. Clin Microbiol Rev 26: 657-702.

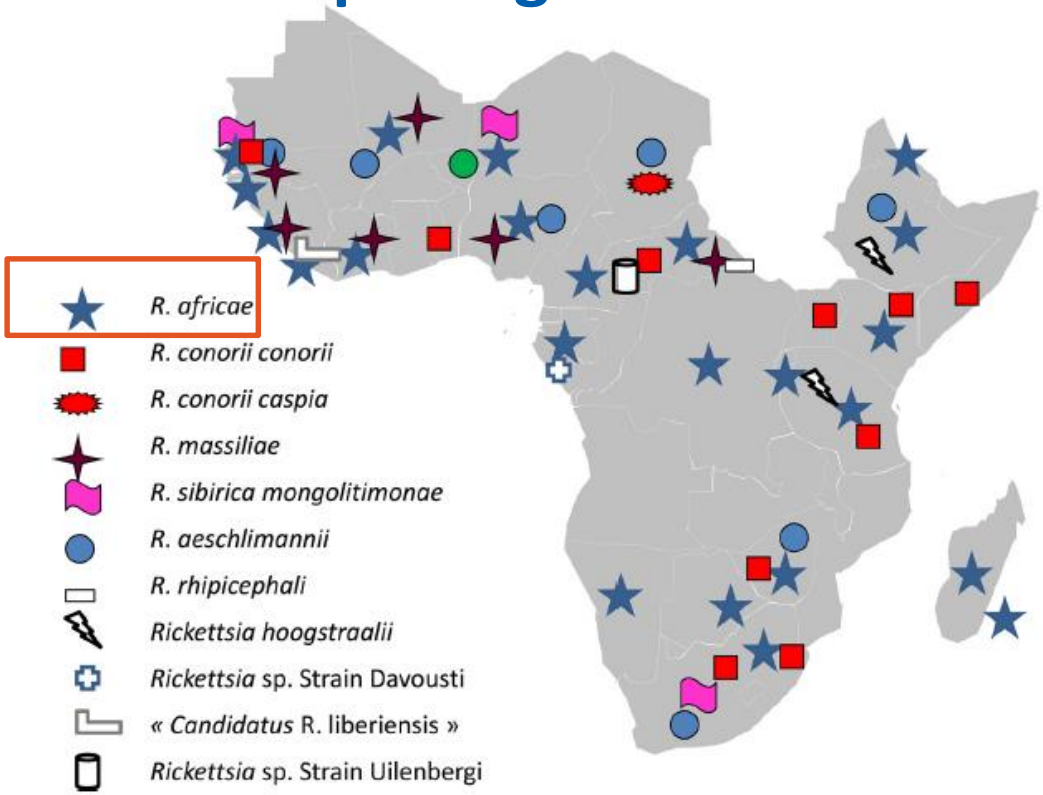
African tick bite fever (ATBF)

Rickettsia africae

African tick bite fever

- Caused by infection with the bacterium *Rickettsia africae*
  - Spotted fever group rickettsiosis
- Most commonly diagnosed rickettsial disease among international travelers
- One of the most commonly diagnosed diseases for ill travelers returning from southern Africa
- Disease is primarily associated with travel to Africa
  - *R. africae* has been identified in other parts of the world, such as the Caribbean
- Clusters of cases among families or tourist groups occur commonly

Tickborne rickettsial pathogens in sub-Saharan Africa



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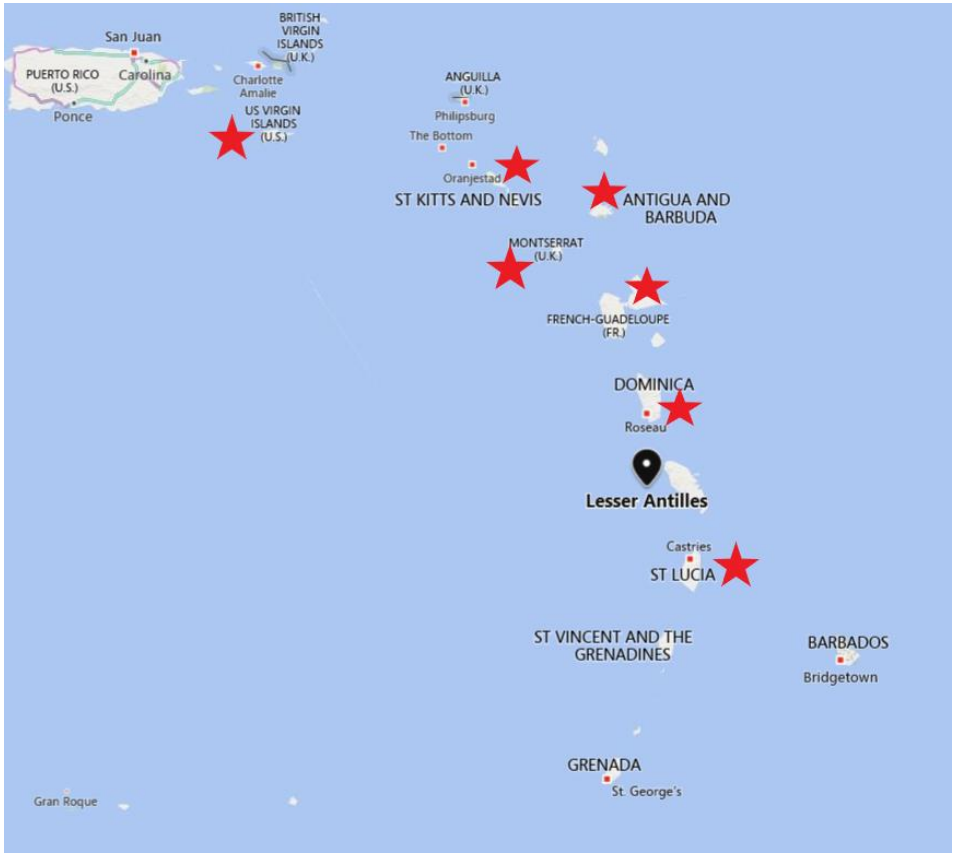
R. africae in the Caribbean

- U.S. Virgin Islands
- Dominica
- Montserrat
- Nevis
- St. Kitts
- St. Lucia



ATBF is transmitted predominately by *Amblyomma hebraeum* or *Amblyomma variegatum* ticks

A. hebraeum female

A. variegatum female

A. hebraeum male

A. variegatum male

Photo: James Gathany, CDC

ATBF clinical presentation

- Typically a self-limited disease
- No known deaths attributable to infection with *R. africae*
- Doxycycline is the recommended treatment
  - Patients normally improve 24–48 hours after administration
- Some patients who do not receive appropriate antibiotic therapy may remain febrile for 1-3 weeks
- Rare severe manifestations include reactive arthritis, peripheral neuropathy, or myocarditis

Reported clinical signs among travelers with imported spotted fever group *Rickettsia*

- Fever = 69% — 81–100%

- Eschar = 55% — 53–95%

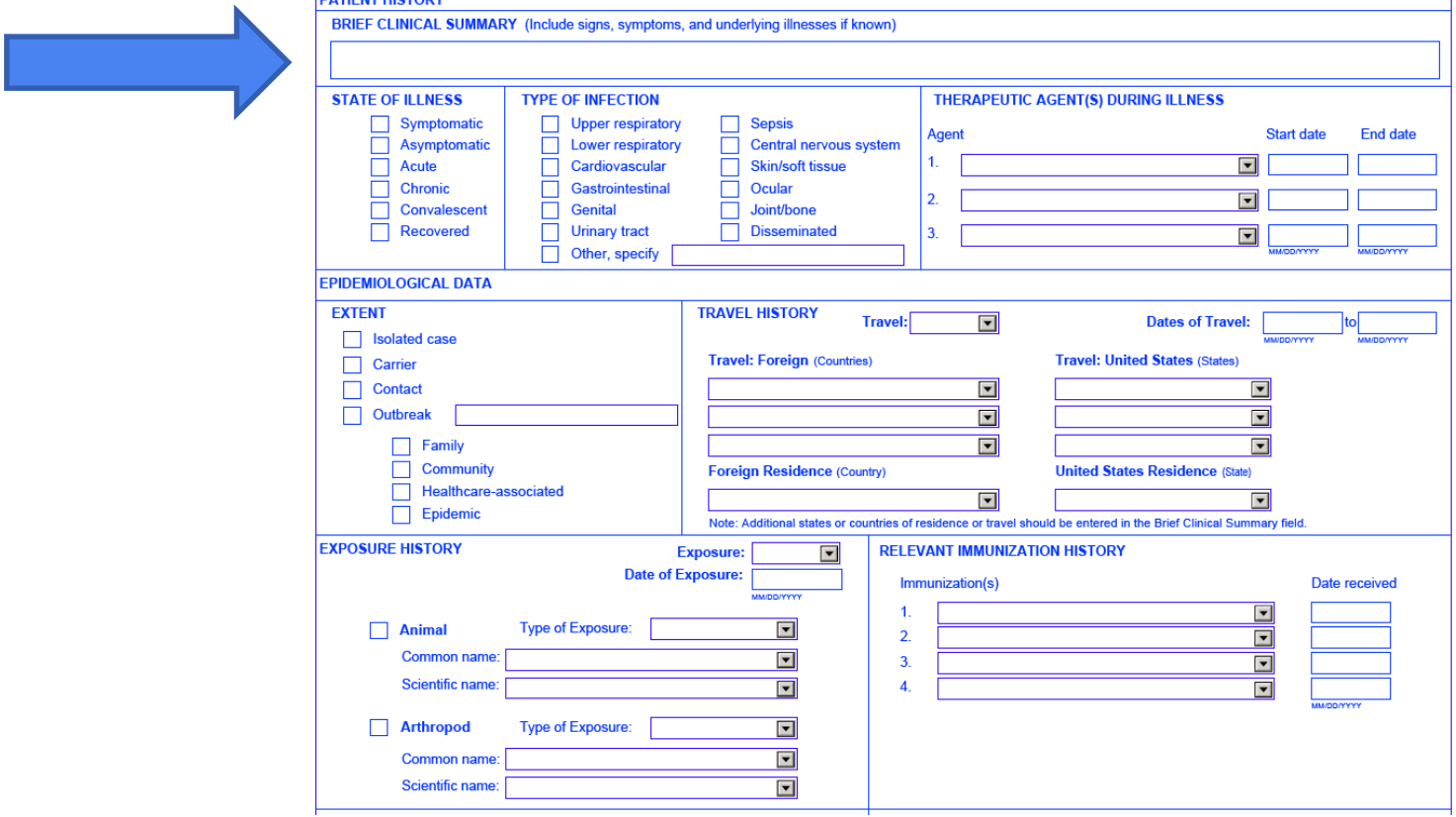
- Headache = 43% — 42–83%

- Rash = 36% — 46–62%

- Myalgia = 33% — 63–87%

Icons from the Noun Project

Frequencies of clinical findings described in this evaluation are likely underestimates



PATIENT HISTORY

BRIEF CLINICAL SUMMARY (Include signs, symptoms, and underlying illnesses if known)

STATE OF ILLNESS
- Symptomatic
- Asymptomatic
- Acute
- Chronic
- Convalescent
- Recovered

TYPE OF INFECTION
- Upper respiratory
- Lower respiratory
- Cardiovascular
- Gastrointestinal
- Genital
- Urinary tract
- Other, specify
- Sepsis
- Central nervous system
- Skin/soft tissue
- Ocular
- Joint/bone
- Disseminated

THERAPEUTIC AGENT(S) DURING ILLNESS

Agent	Start date	End date
1.		
2.		
3.	MM/DD/YYYY	MM/DD/YYYY

EPIDEMIOLOGICAL DATA

EXTENT
- Isolated case
- Carrier
- Contact
- Outbreak
  - Family
  - Community
  - Healthcare-associated
  - Epidemic

TRAVEL HISTORY

Travel: Dates of Travel: to (MM/DD/YYYY)

Travel: Foreign (Countries)

Travel: United States (States)

Foreign Residence (Country)

United States Residence (State)

Note: Additional states or countries of residence or travel should be entered in the Brief Clinical Summary field.

EXPOSURE HISTORY

Exposure:

Date of Exposure: MM/DD/YYYY

Animal — Type of Exposure:
- Common name:
- Scientific name:

Arthropod — Type of Exposure:
- Common name:
- Scientific name:

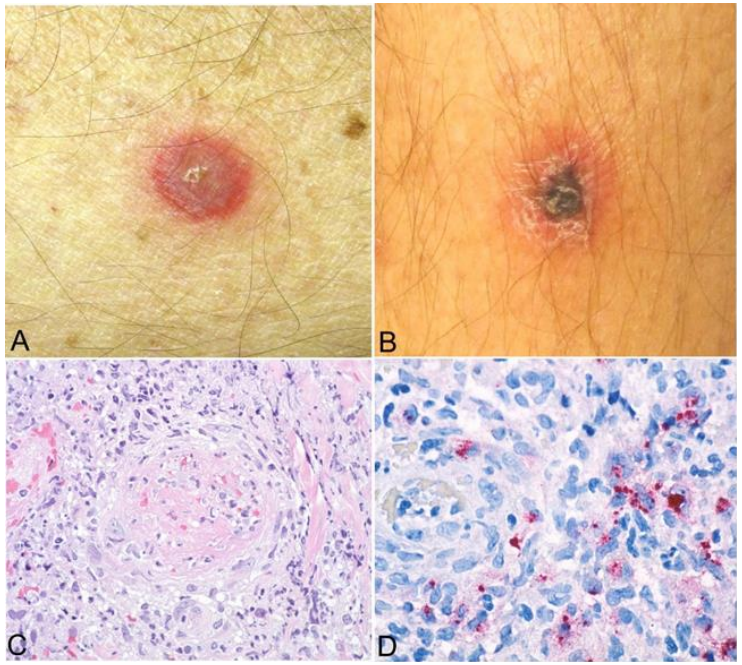
RELEVANT IMMUNIZATION HISTORY

Immunization(s)	Date received
1.	
2.	
3.	
4.	MM/DD/YYYY

Eschars are an important clinical feature of ATBF

- Also occur in SFGR caused by other *Rickettsia* species endemic to sub-Saharan Africa
  - *R. conorii,*
  - *R. aeschlimannii,*
  - *R. sibirica mongolitimonae*
  - *R. monacensis*

What is an eschar?



Images A and B courtesy of Charles Thurston M.D. and Lester Libow M.D., TX;
Images C and D courtesy of Sherif Zaki, MD, PhD, CDC.

- A lesion that occurs at the site of a tick bite
- Forms within a few days (median 5 days) after the bite
- May take several weeks to heal completely

Early eschars can look like a small vesicle or like an erythematous plaque

Eschar will develop into a central, 0.5–3.0 cm ulcer covered by a brown-black crust and surrounded by an annular red halo

The healed lesion typically appears as a small depressed scar

Mediterranean spotted fever (MSF)

Rickettsia conorii conorii

Rickettsia conorii complex

- *R. conorii conorii*
  - Mediterranean spotted fever
  - Mediterranean basin, Africa, Croatia, Slovenia
- *R. conorii israelensis*
  - Israeli spotted fever
  - Israel, Portugal, Sicily
- *R. conorii caspia*
  - Astrakhan spotted fever
  - Astrakhan region of Russia, Chad, Kosovo
- *R. conorii indica*
  - Indian tick typhus
  - India, Pakistan

Mediterranean spotted fever

- Caused by infection with the bacterium *Rickettsia conorii conorii*
  - Spotted fever group rickettsiosis
- AKA boutonneuse fever
- Sporadic cases
- More severe than ATBF
- Cases mainly occur in warm months (July–September)

MSF is endemic in the Mediterranean basin, northern Africa, and southern Europe

MSF is transmitted by *Rhipicephalus sanguineus*

MSF clinical presentation

- Abrupt onset of high fever with headache, chills, and myalgia
- Eschar present in 60–86% of patients
  - Rare to see multiple eschars
- Rash appears 2–3 days after fever
  - Develops in 96–99% of patients

Severe forms of MSF

- Neurological manifestations from meningoencephalitis
- Deep vein thrombosis
- Multiorgan involvement
  - Kidneys, lungs, GI tract, liver, pancreas, heart, spleen
- Purpuric rash

Risk factors for severe manifestations of MSF

- Advanced age
- Immunocompromised
- Diabetes mellitus
- Cardiac insufficiency
- Alcoholism
- G6PD deficiency

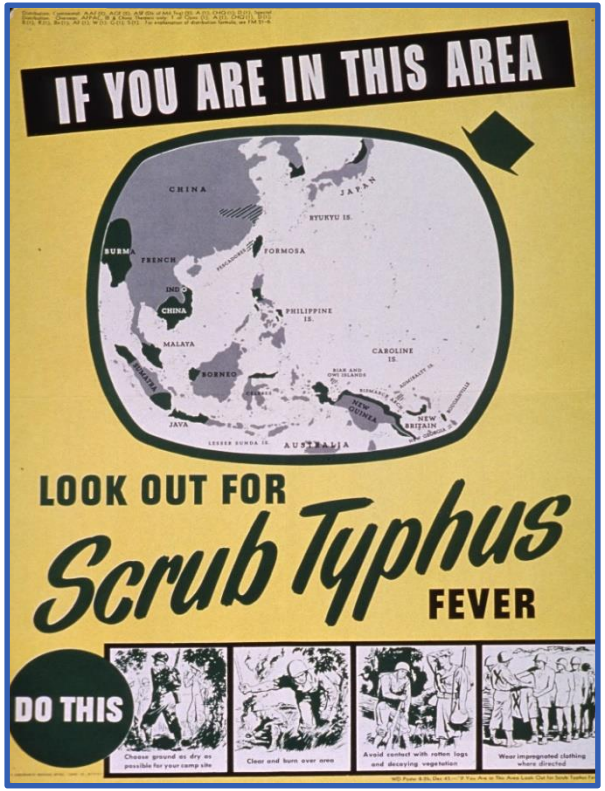
Scrub typhus

Orientia tsutsugamushi

Scrub typhus

- Caused by infection with the bacterium *Orientia tsutsugamushi*
  - Over 70 known strains
- Rural disease prevalent in much of the world
  - Common in Southeast Asia and the Pacific
- In 1999, WHO reported that “Scrub typhus is probably one of the most underdiagnosed and underreported febrile illnesses requiring hospitalization in the region”
- Second most common rickettsial disease in international travelers

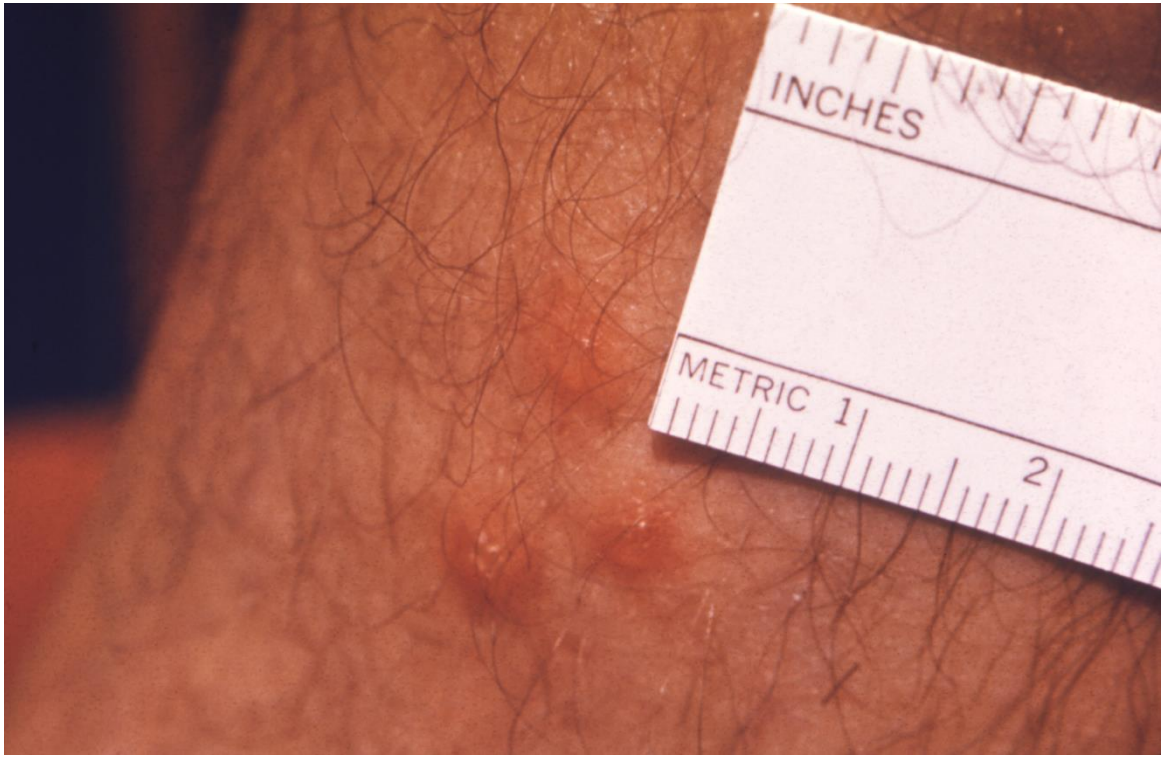
Scrub typhus is emerging in areas outside the tsutsugamushi triangle



- Triangle extends from far eastern Russia to northern Australia to Afghanistan
- Newly discovered autochthonous cases in:
  - Chile
  - Dubai*
  - Cameroon
  - Kenya
  - Republic of Congo
  - Djibouti
  - Tanzania

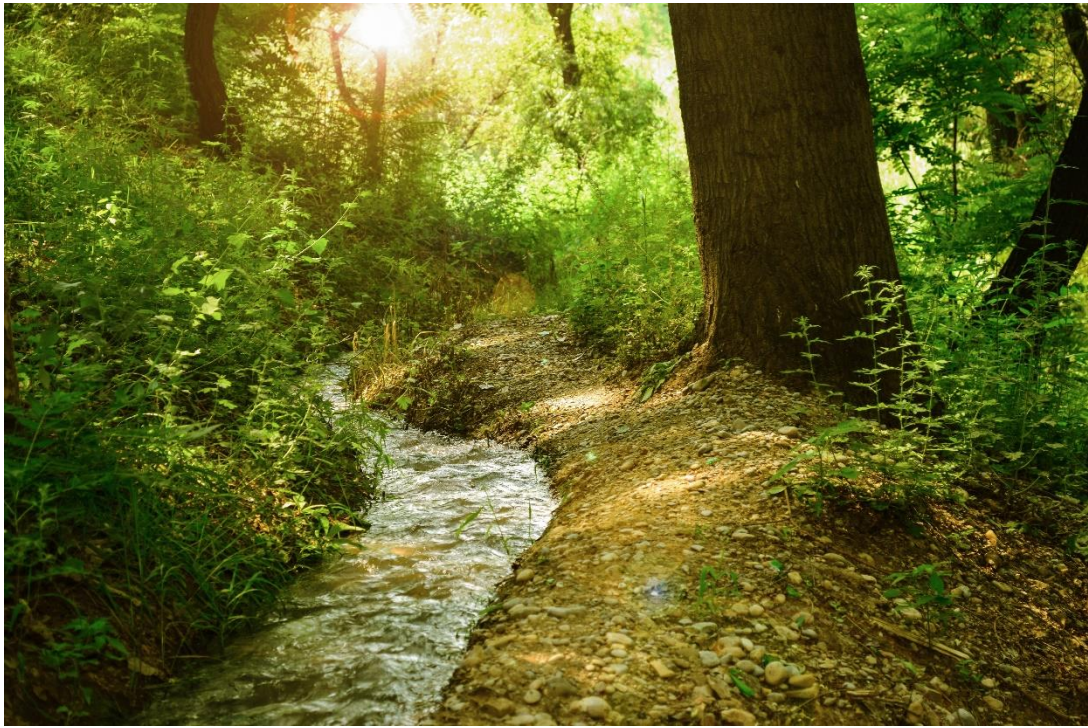
*=isolation of a novel species *O. chuto*

O. tsutsugamushi is transmitted by a chigger bite



Chigger environments

- Occur in overgrown brushy or grassy areas
  - Especially where small rodents are abundant
- Prefer shady areas with plenty of moisture



Scrub typhus clinical presentation

- Ranges from mild to fatal illness.
- Early clinical manifestations
  - Eschar(s) — wide range of occurrence (1–97%)
  - Regional lymphadenopathy
- 10–14 days after exposure
  - Fever, headache, myalgia, generalized lymphadenopathy, cough, gastrointestinal symptoms, rash
- Varying case fatality rates

Severe manifestations of scrub typhus

- Acute respiratory distress
- Pneumonitis
- Meningoencephalitis
- Gastrointestinal bleeding
- Acute renal failure
- Hypotensive or septic shock
- Coagulopathy
- Myocarditis or pericarditis

Treatment

Doxycycline is the treatment of choice for all age groups

- Appropriate antibiotic therapy should not be delayed

Recommended by:
American Academy of Pediatrics
Centers for Disease Control and Prevention

Outdated perceptions: Doxycycline in pediatric patients

- In 1970, FDA placed a warning label on all tetracycline-related medications, including doxycycline
  - Believed to be associated with enamel hypoplasia and tooth discoloration

Doxycycline and tooth staining, Arizona

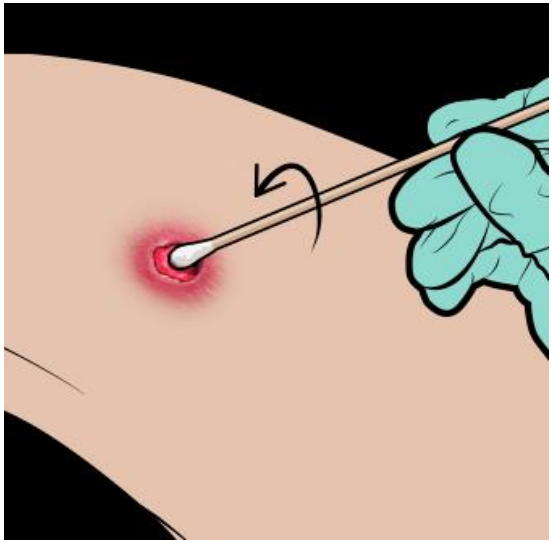
- 2013 Study examined the erupted teeth of 58 children who received doxycycline before 8 years old
  - NO staining or hypoplasia, even with multiple short courses
  - NO significant difference in objective tooth shade between exposed and unexposed children
- CDC and the American Academy of Pediatrics (AAP) recommend doxycycline as **first line** treatment for suspected RMSF in children.

Doxycycline dosing

- Adult or child ≥ 45 kg = 100 mg twice daily
- Child < 45 kg: 2.2 mg/kg twice daily
- Pregnant adult or tetracycline allergy: consult infectious diseases specialist, in severe cases doxycycline may be warranted
- Duration of treatment: 5-7 days (or 3 days past defervescence)

Diagnosis

Diagnosing ATBF, MSF, and Scrub typhus

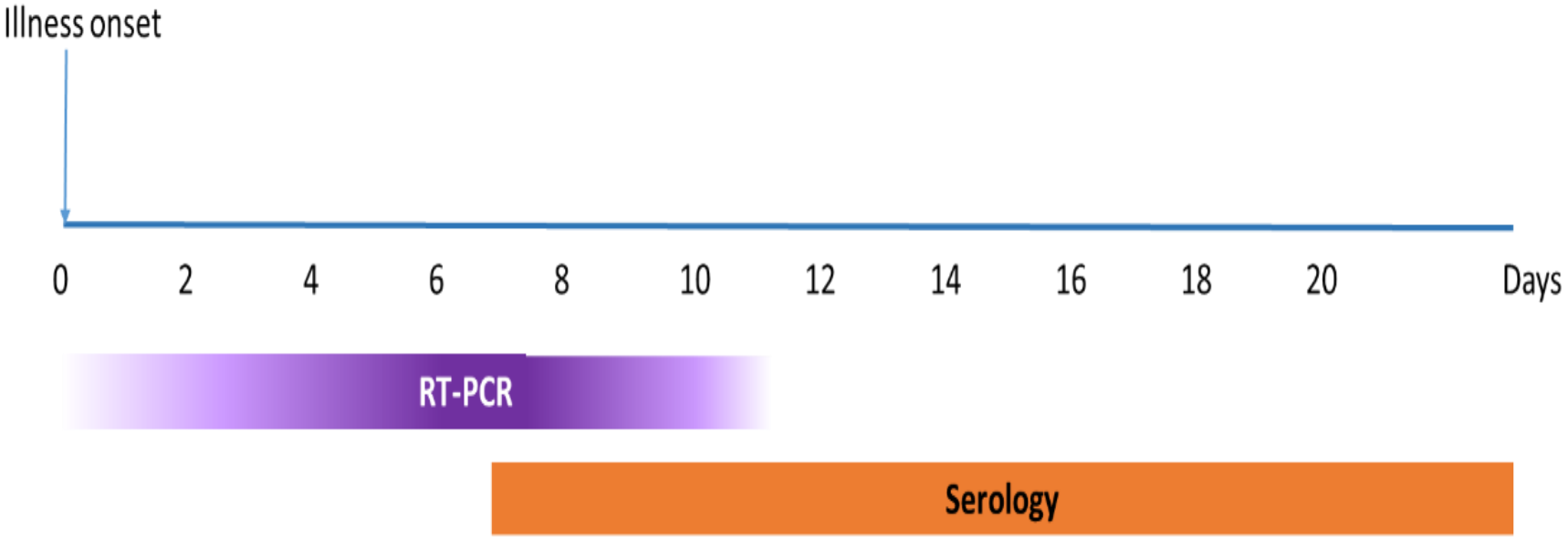


- Few (no?) commercial U.S. laboratories provide specific testing
  - Cross reactivity with other spotted fevers
- CDC's Rickettsial Zoonoses Branch Diagnostic Laboratory
  - IgG IFA serology for *R. africae, R. conorii, O. tsutsumagushi*
  - PCR for pan-*Rickettsia* or *Orientia* on fresh tissue biopsies (rash, eschar, organ), eschar swabs, and whole blood
- CDC's Infectious Diseases Pathology Branch
  - Immunohistochemistry (IHC) on fixed skin or organ biopsies

How to confirm disease

- Serology (serum)
  - Four-fold change in IgG-specific antibody titer by indirect immunofluorescence antibody (IFA) assay in paired serum samples.
  - Acute: first two weeks or while symptomatic
  - Convalescent: 4–6 weeks after acute draw (depending on pathogen)
- Molecular diagnostics (whole blood)
  - Sensitivity can be low during early acute illness

Estimated utility of diagnostic tests over time



The reported median time to IgG seroconversion to *R. africae* is 28 days after onset of symptoms

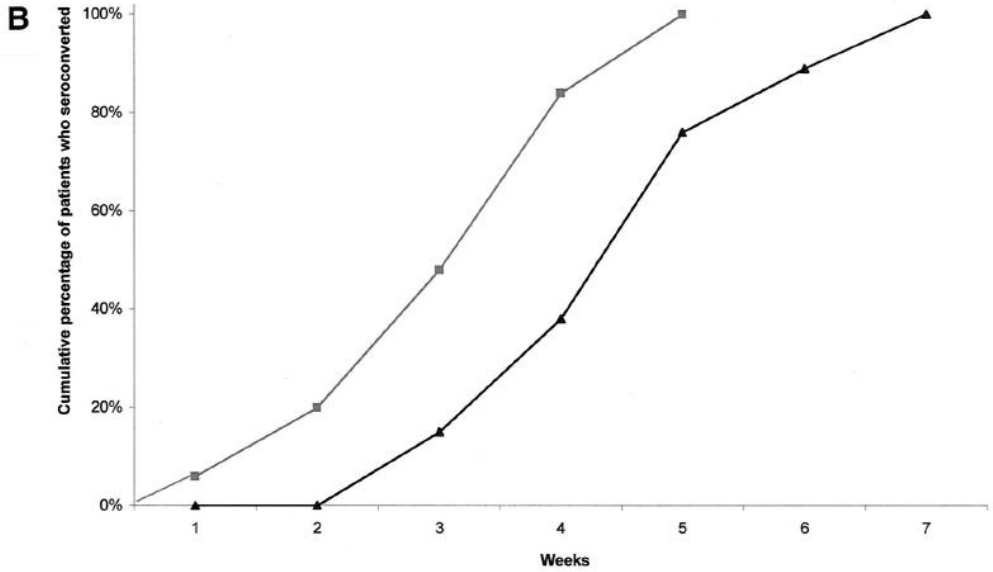


FIG. 2. (A) Cumulative percentage of IgM seroconversion against *R. conorii* (gray curve) and *R. africae* (black curve) in patients with African tick-bite fever. (B) Cumulative percentage of IgG seroconversion against *R. conorii* (gray curve) and *R. africae* (black curve) in patients with African tick-bite fever.

From Fournier PE, Jensenius M, Laferl H, Vene S, Raoult D, 2002. Kinetics of antibody responses in *Rickettsia africae* and *Rickettsia conorii* infections. Clin Diag Lab Immunol 9: 324-328.

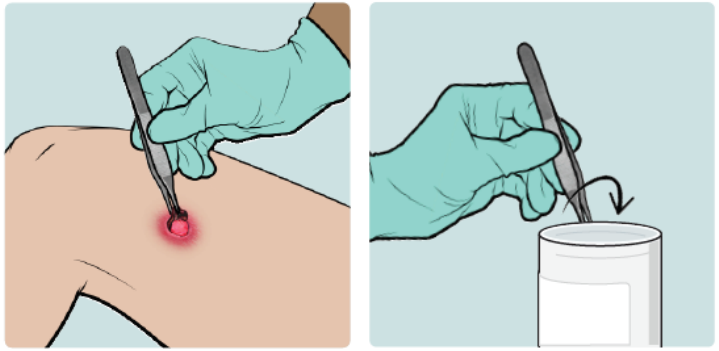
PCR of eschar swabs or biopsies provides a confirmed diagnosis in the early stage of the disease

1

Cleanse the eschar with a standard disinfectant solution.
Use sterile saline to remove remaining disinfectant.

2

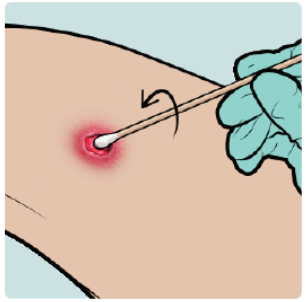
Use sterile tweezers to lift the scab partially or completely.
It is not necessary to remove the scab entirely if it is firmly attached. If removed, place the scab into an empty, sterile specimen container.



https://www.cdc.gov/ncezid/dvbd/pdf/Collection-Submission-Eschar-Swab-Specimens-Rickettsial-Disease-508.pdf

PCR of eschar swabs or biopsies provides a confirmed diagnosis in the early stage of the disease

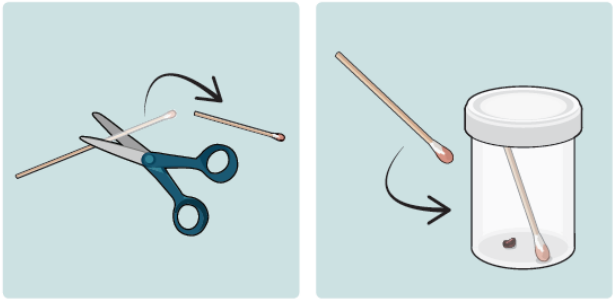
3



Use a dry, sterile cotton swab to sample the ulcerated area. Rotate the swab vigorously on ulcerated area while applying steady, gentle pressure.

4

Place the swab in a sterile specimen container. Swab can be placed in the same sterile specimen container as the scab.



5

Ship specimen immediately overnight on cold packs or freeze and ship on dry ice.

Key Takeaways

Travel-associated rickettsial disease summary

Disease	Pathogen	Geography	Vector	Eschars
African tick bite fever	*Rickettsia africae*	Sub-Saharan Africa, West Indies	*Ambylomma* ticks	Sometimes multiple
Mediterranean spotted fever	*Rickettsia conorii conorii*	Mediterranean basin, northern Africa	*Rhicephalus* ticks	Usually single
Scrub typhus	*Orientia tsutsugamushi*	Southeast Asia and the Pacific	Chiggers	Presence varies greatly

Consider imported rickettsial diseases

- When evaluating patients for a febrile illness with eschar and compatible foreign travel history
- Diagnostic sampling techniques should include:
  - Two serum samples, one collected during the acute illness and a second sample collected at 4–6 weeks after symptom onset
  - PCR testing of eschar biopsies or swabs and whole blood, when available
- Appropriate antibiotic therapy should not be delayed
  - Doxycycline (100 mg twice daily) is the recommended dose for adults;
  - 2.2 mg/kg body weight twice daily is the recommended dose for children under 100 lbs.

Image Credits

- Figure 10 and 11 from Parola P, Paddock CD, Socolovschi C, Labruna MB, Mediannikov O, Kernif T, Abdad MY, Stenos J, Bitam I, Fournier PE, Raoult D, 2013. Update on tick-borne rickettsioses around the world: a geographic approach. Clin Microbiol Rev 26: 657-702.
- James Gathany (CDC) for the photographic images of ticks
- Charles Thurston and Lester Libow (Aurora Diagnostics) for eschar photos
- Sherif Zaki (CDC) for eschar histopath images
- Meredith Boyter Newlove (CDC) for eschar stages and how to collect eschar illustrations
- Figure 2 from Fournier PE, Jensenius M, Laferl H, Vene S, Raoult D, 2002. Kinetics of antibody responses in Rickettsia africae and Rickettsia conorii infections. Clin Diag Lab Immunol 9: 324-328.
- Stock photos from pexels.com
- Icons from the Noun Project https://thenounproject.com/
  - Rash by Pierce Meehan
  - Headache by Artem Kovyazin
  - Rash by Priyanka
  - Knee pain by Gan Khoon Lay

Prevention of Rickettsioses in the Context of Travel Medicine

What is a Pre-travel Consultation?

- Visit with a healthcare provider **at least 4 weeks before travel**
  - Travel medicine specialist
  - Primary care physician
- Typically does NOT include a physical exam

Opportunities at the Pre-travel Consultation

- Receive personalized travel advice

Opportunities at the Pre-travel Consultation

- Receive personalized travel advice
- Depart with both verbal and written information for reference

VACCINE INFORMATION STATEMENT

Meningococcal ACWY Vaccines—MenACWY and MPSV4: *What You Need to Know*

1 Why get vaccinated?

2 Meningococcal ACWY Vaccines

Opportunities at the Pre-travel Consultation

- Receive personalized travel advice
- Depart with both verbal and written information for reference
- Get vaccinations and medications

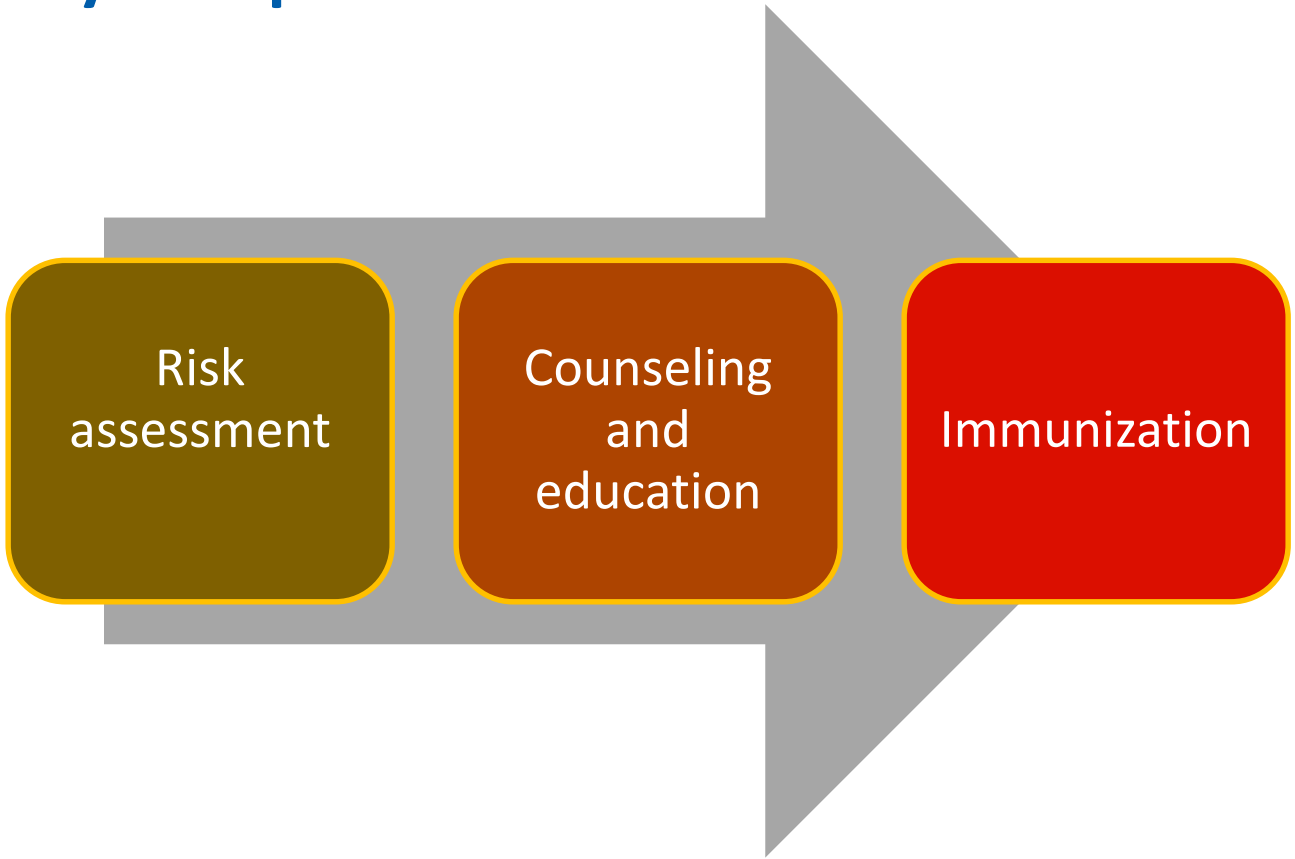
VACCINE INFORMATION STATEMENT

Meningococcal ACWY Vaccines—MenACWY and MPSV4: *What You Need to Know*

1 Why get vaccinated?

2 Meningococcal ACWY Vaccines

Three Key Components of the Pre-travel Consultation



Risk Assessment

Key Information to Collect to Perform a Travel Risk Assessment

- Past medical history
- Special conditions
- Immunization history
- Trip details

Past Medical History

- Age
- Sex
- Underlying medical conditions
- Medications
- Allergies

Consideration of Special Conditions

- Reproductive health
  - Pregnancy
  - Breastfeeding
  - Plans to become pregnant
- Disability / Handicap
- Immunocompromise
- History of Guillain-Barré syndrome
- Recent surgery or medical event

Immunization History

- Routine vaccines
- Travel vaccines

Trip Details: Itinerary and Timing

- Itinerary
  - Country (ies)
  - Layovers
  - Urban vs rural

Trip Details: Itinerary and Timing

- Itinerary
  - Country (ies)
  - Layovers
  - Urban vs rural
- Timing
  - Duration
  - Season at destination
  - Time to departure

Trip Details: Reasons for Travel

- Tourism
- Business
- Research
- Education
- Adventure
- Visiting friends and relatives
- Volunteer, missionary, or aid work
- Seeking health care (medical tourism)
- Pilgrimage
- Adoption

Trip Details: Travel Style

- Tour vs self-planned
- Solo vs group
- Eating habits
- Hygiene standards
- Modes of transportation
- Accommodations

Trip Details: Special Activities

- Extreme sports (sky diving, cliff jumping, etc.)
- High altitude
- Safari
- Disaster relief
- Providing or receiving medical care
- Cruise ship
- Fresh water exposure (rafting, wading, etc.)
- Animal interaction
- Camping
- Hiking

Trip Details: Special Activities

- Extreme sports (sky diving, cliff jumping, etc.)
- High altitude
- Safari
- Disaster relief
- Providing or receiving medical care
- Cruise ship
- Fresh water exposure (rafting, wading, etc.)
- Animal interaction
- Camping
- Hiking

Counseling and Education: Rickettsioses

Prevention: Arthropod and Animal Avoidance

- Minimize exposure to:
  - Biting arthropods
  - Animals that serve as reservoirs
- Be aware of peak exposure times and places for insects/arthropods

Minimizing Exposure to Biting Arthropods

- Cover exposed skin by wearing long-sleeved shirts, long pants, and hats
  - Tuck in shirts
  - Tuck pants into socks
  - Wear closed-toed shoes
- Treat clothing and gear with 0.5% permethrin
- Avoid wooded areas with high grass, brush, and leaves
- Walk in the center of hiking trails
- Use repellents and insecticides

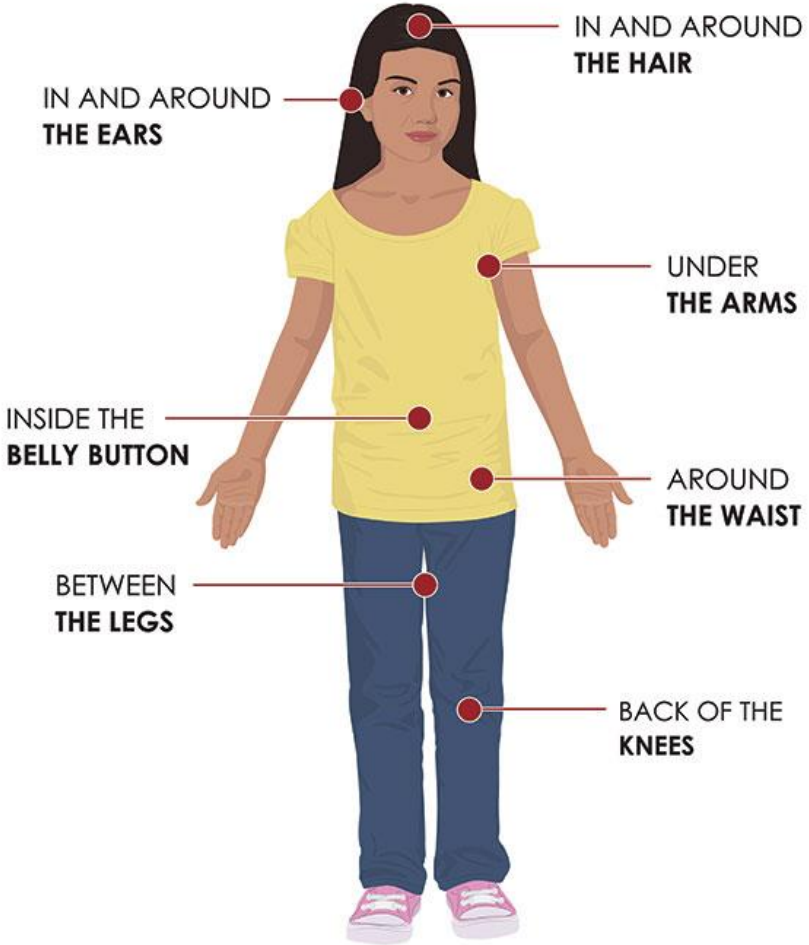
Prevention: Personal Protective Measures

- Wear appropriate, protective clothing (long sleeves and long pants)

Prevention: Personal Protective Measures

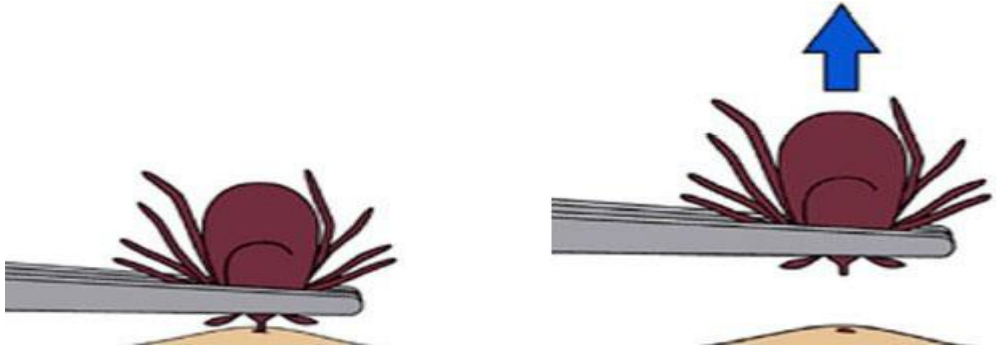
- Wear appropriate, protective clothing (long sleeves and long pants)
- Perform daily self-examination
  - Bathe or shower soon after coming indoors
  - Use a hand-held or full length mirror
  - Remove ticks properly

Self-Examination



Tick Removal

- Use tweezers to grasp the tick as close to the skin's surface as possible.
- Pull upward with steady, even pressure.
- After removing the tick, thoroughly clean the bite area and your hands with rubbing alcohol or soap and water
- Dispose of a live tick by putting it in alcohol, placing it in a sealed bag/container, wrapping it tightly in tape, or flushing it down the toilet



Prevention: Personal Protective Measures, continued

- Sleep under insecticide-treated bed nets

Prevention: Personal Protective Measures, continued

- Sleep under insecticide-treated bed nets
- Check pets and belongings

Prevention: Personal Protective Measures

- Sleep under insecticide-treated bed nets
- Check pets and belongings
- Use repellents
  - DEET (at least 20%)
  - Picaridin
  - Oil of lemon eucalyptus (OLE)
  - IR3535
  - 2-undecanone
  - Permethrin

Repellent Efficacy

- Varies among products
- Impacted by:
  - Temperature
  - Level of activity
  - Amount of perspiration
  - Exposure to water
- Apply according to label instructions for maximum effect

Repellent Precautions

- Apply only to exposed skin or clothing
- Never use on cut or irritated skin
- Do not spray directly to the face
- Avoid contact with the eyes and mouth
- Wash hands after application
- Avoid oversaturation
- Wash repellent-treated skin with soap and water

Application of Sunscreen and Repellents

Travel Kit

- Medications
  - Prescription
  - Over-the counter
    - Antacid
    - Antihistamine
    - Anti-diarrheals
    - Decongestant, cold medicine, cough suppressant
    - Pain relief (aspirin, ibuprofen, etc.)
    - Antibiotic/antifungal/hydrocortisone creams
- Bandages
- Tweezers
- Insect repellant, sunscreen
- Thermometer
- Hand sanitizer

Vaccines

Prevention: Vaccines and Pharmaceuticals

- No vaccine is available to prevent rickettsioses
- Antibiotics are not recommended for prophylaxis

Evaluation of a Traveler with Suspected Rickettsioses

Consider the Following During a Post-travel Evaluation

- Travel itinerary and activities
- Timing of the illness related to travel
- Comorbidities

Consider the Following During a Post-travel Evaluation

- Travel itinerary and activities
- Timing of the illness related to travel
- Comorbidities

African Tick Bite Fever

- Travel itinerary and activities
  - November through April
  - Sub-Saharan Africa, West Indies
  - Camping, hiking, hunting
  - Spending time in wooded, brushy, or grassy areas

African Tick Bite Fever

- Timing of the illness related to travel
  - Within 2 weeks of a tick bite
  - First symptoms is usually an eschar
  - Fever, headache, myalgia, and rash

Scrub Typhus

- Travel itinerary and activities
  - Rural areas of Southeast Asia, Indonesia, China, Japan, India, Sri Lanka, western Pacific islands, or northern Australia
  - Camping, hiking, rafting
  - High grass and brush

Scrub Typhus

- Timing of the illness related to travel
  - Within 10 days of a chigger bite
  - Fever, headache, myalgia, eschar, and rash

Mediterranean Spotted Fever

- Travel itinerary and activities
  - Summer months
  - Southern Europe, southern and western Asia, Africa, and India

Mediterranean Spotted Fever

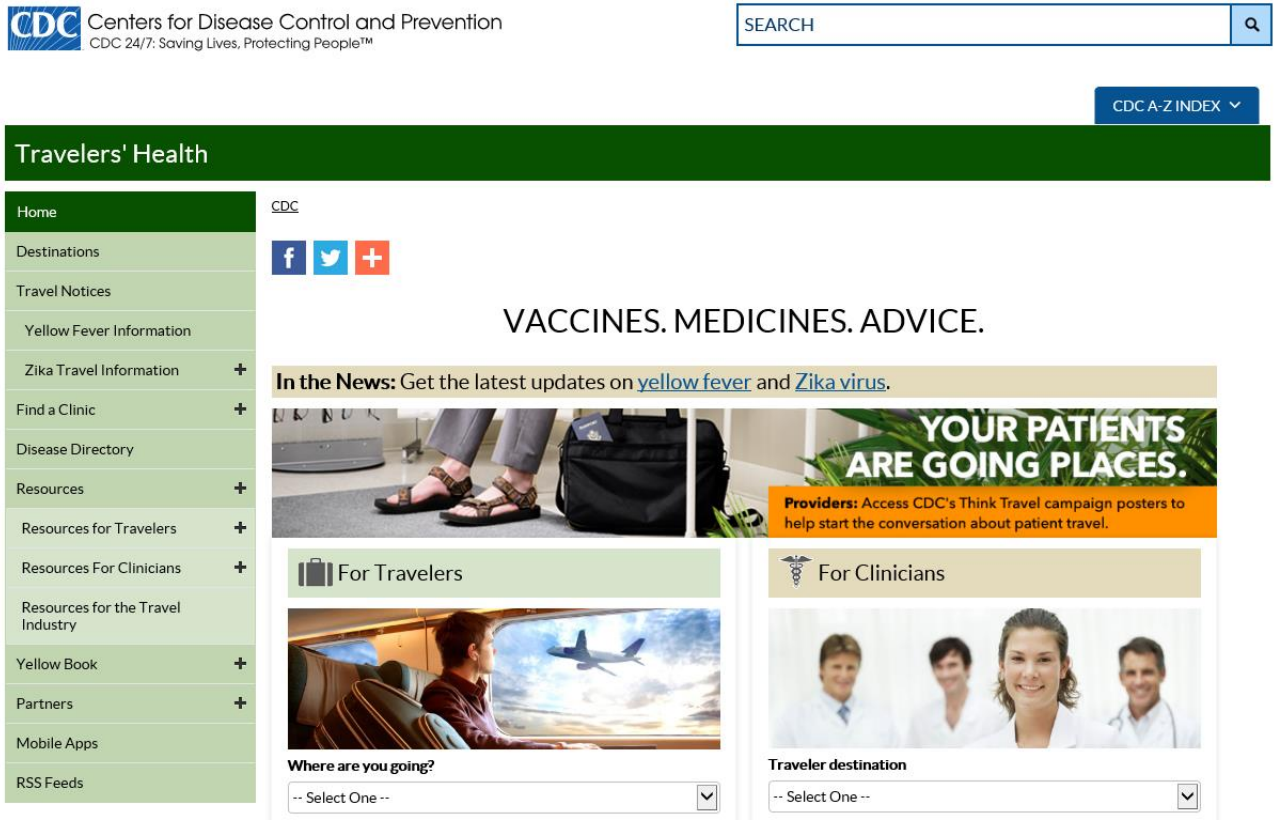
- Timing of the illness related to travel
  - Within 14 days of a tick bite
  - Fever, headache, myalgia, eschar and rash

Management of Rickettsioses

- Ask about international travel
- Check with the local or state health department about reporting requirements
  - Spotted fever group rickettsioses are nationally notifiable diseases
- Admit patients to inpatient care if their presentation is severe
- Consult with an infectious disease physician

Resources

CDC Travelers' Health Website



cdc.gov/travel

Traveler's health website

Travelers' Health

- Home
- Destinations
- Travel Notices
  - Yellow Fever Information
  - Zika Travel Information +
- Find a Clinic +
- Disease Directory (41) −
  - **African Tick-Bite Fever**
- Resources +
  - Resources for Travelers +
  - Resources For Clinicians +
  - Resources for the Travel Industry

CDC > Home > Disease Directory (41)

African Tick-Bite Fever

What is African tick-bite fever?

African tick-bite fever is a bacterial infection that is spread through the bite of infected ticks. Symptoms usually appear within 2 weeks after a tick bite and often include fever, headache, muscle soreness, and a rash. At the site of the tick bite will be a red skin sore with a dark center.

On This Page

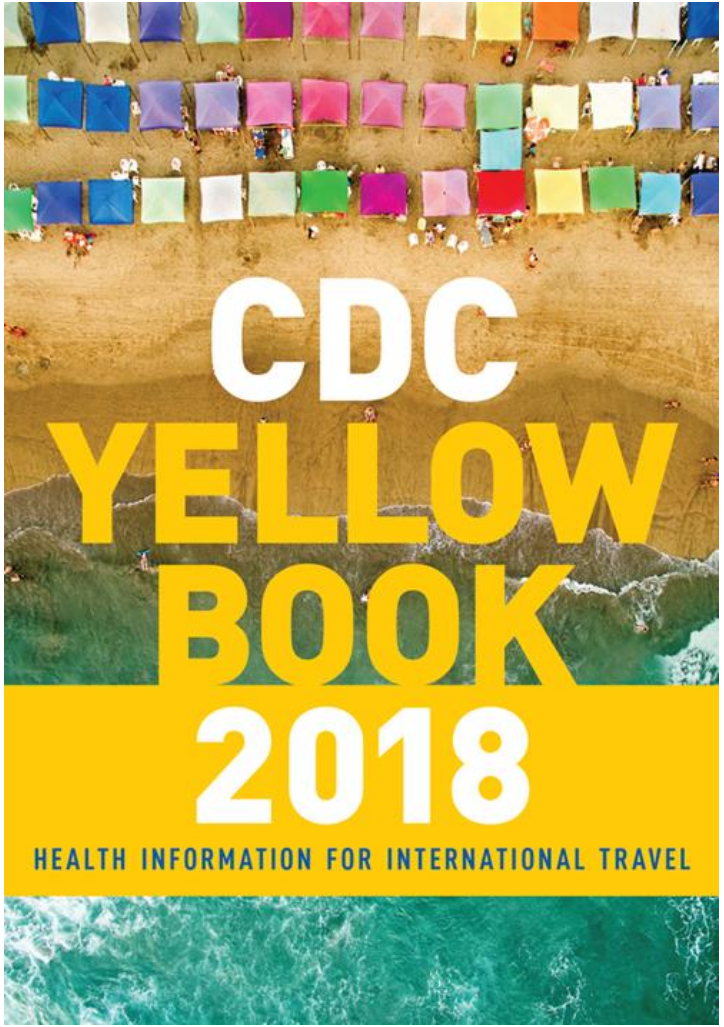
Who is at risk?

Travelers to sub-Saharan Africa and the West Indies are at risk of infection. You may be at higher risk for African tick-bite fever if your travel plans include outdoor activities such as camping, hiking, and game hunting in wooded, brushy, or grassy areas. Ticks that are infected with tick-bite fever are usually most active from November through April.

What can travelers do to prevent African tick-bite fever?

CDC Yellow Book

- Current travel health guidelines
- Vaccine recommendations
- Destination-specific advice
- Maps, tables, and charts



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

Questions?

To Ask a Question

- **Using the Webinar System**
  - Click the **Q&A** button in the webinar
  - Type your question in the **Q&A** box
  - Submit your question in the **Q&A** box
- **CDC Media: media@cdc.gov or 404-639-3286**
- **Patients, please refer your questions to your healthcare provider.**

Today's webinar will be archived

When: A few days after the live call

What: All call recordings (audio, webinar, and transcript)

Where: On the COCA Call webpage

https://emergency.cdc.gov/coca

Continuing Education for this COCA Call

All continuing education (CME, CNE, CEU, CECH, ACPE, CPH, and AAVSB/RACE) for COCA Calls are issued online through the CDC Training & Continuing Education Online system (http://www.cdc.gov/TCEOnline/).

Those who participated in today's COCA Call and who wish to receive continuing education should complete the online evaluation by June 10, 2019, with the course code WC2922.

Those who will participate in the on demand activity and wish to receive continuing education should complete the online evaluation between June 10, 2019, and June 10, 2021, will use course code WD2922 .

Continuing education certificates can be printed immediately upon completion of your online evaluation. A cumulative transcript of all CDC/ATSDR CE's obtained through the CDC Training & Continuing Education Online System will be maintained for each user.

Next COCA Call

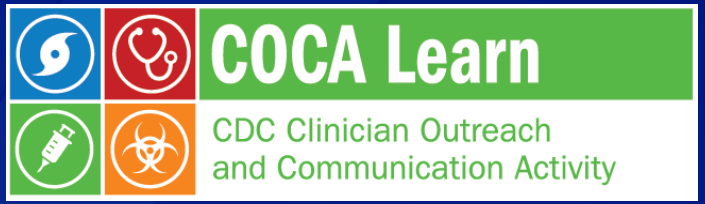
“Most Measles Cases in 25 Years: Is the End of Measles Elimination in the United States?”

Tuesday, May 21, 2019

2:00 P.M. ET

COCA Products & Services

Promotes COCA Calls and contains all information subscribers need to participate in COCA Calls. COCA Calls are done as needed.

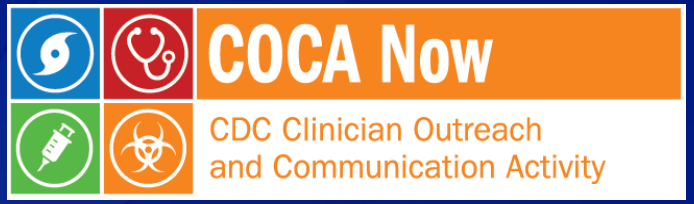


Monthly email that provides information on CDC training opportunities, conference and training resources located on the COCA website, the COCA Partner Spotlight, and the Clinician Corner.

Provides comprehensive CDC guidance so clinicians can easily follow recommendations.

COCA Products & Services

Monthly email that provides new CDC & COCA resources for clinicians from the past month and additional information important during public health emergencies and disasters.



Informs clinicians of new CDC resources and guidance related to emergency preparedness and response. This email is sent as soon as possible after CDC publishes new content.

CDC's primary method of sharing cleared information about urgent public health incidents with public information officers; federal, state, territorial, and local public health practitioners; clinicians; and public health laboratories.

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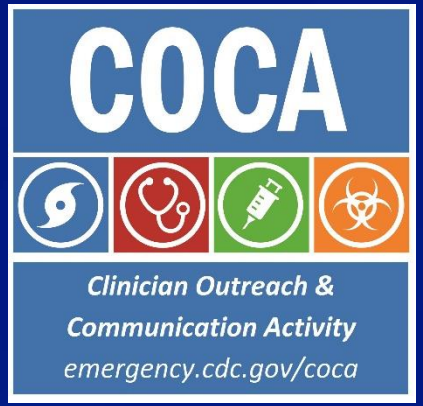
- **Upcoming COCA Calls**
- **Health Alert Network notices**
- **CDC public health activations**
- **Emerging health threats**
- **Emergency preparedness and response conferences and training opportunities**



http://emergency.cdc.gov/coca

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