

***Staphylococcus aureus* Community-associated Mortality**

PROTOCOL CHECKLIST

- Review background on disease criteria, case definition, and laboratory testing.
- Contact provider (infection preventionist, medical examiner, etc.) or physician reporting the death.
- Determine if history & physical, full hospital chart, autopsy or family or other close contact are available to determine case eligibility and provide additional information
 - Review case definition
 - Clinical case definition
 - Laboratory criteria
 - Exclusion criteria
 - Confirm fatal outcome and other eligibility criteria
 - Laboratory culture from sterile or respiratory site (+) for *Staphylococcus aureus*
 - Patient NOT hospitalized within the past year prior to death (for children < age 1, does not include birth)
 - Patient was NOT admitted to nursing home, skilled facility or hospice within 1 year prior to death
 - Patient did NOT undergo dialysis within 1 year prior to death
 - Patient did NOT undergo surgery within 1 year prior to death
 - Patient did NOT have indwelling catheter/medical device that passed through skin within 1 year prior to death
 - CASE INELIGIBLE IF DOES NOT MEET ALL ABOVE CRITERIA
- Complete the case report form
- Enter available information into Merlin upon determination of eligibility
 - Determine if case was referred to a medical examiner and if an autopsy was performed
 - Determine laboratory specimen sites, dates and positive reports for all *S. aureus* isolates
 - Determine when first *S. aureus* isolate was collected
 - Request antibiogram panel to determine if specimen is MSSA or MRSA
 - Review pertinent clinical symptoms and epidemiology as outlined in case report form
 - Enter additional data obtained from chart review, autopsy or interview into Merlin

Staphylococcus aureus Community-associated Mortality

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

1. Monitor cases of death attributed to *S. aureus* community-associated mortality
2. Determine risk factors related to these deaths
3. Ensure surveillance of particularly virulent strains of *S. aureus* infections, particularly as co-morbid disease contributing to death

B. Legal reporting requirements

Laboratories and physicians are required to report cases of *S. aureus* community-associated mortality to the county health department (CHD) within one working day of identification/diagnosis.

C. County health department investigation responsibilities

Begin investigation within two business days of receiving report from a provider
Report all confirmed cases in Merlin once a determination for case eligibility has been made (see case report form which can be found at:

http://www.doh.state.fl.us/Disease_ctr/epi/topics/crforms.htm

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent

Staphylococcal disease causes a variety of syndromes with clinical manifestations ranging from minor infections such as a skin pustule or infections to severe disease with systemic manifestations, including sepsis and death. The virulence of the strains varies greatly. The most important human pathogen is *Staphylococcus aureus*. Most strains ferment mannitol and are coagulase-positive. However, coagulase-negative strains are becoming increasingly important, although these are more likely to be found in patients with hospital exposure or indwelling catheters or prosthetic devices.

B. Description of illness

Community-associated staphylococcal disease can produce a variety of infections and syndromes. Skin disease such as boils, carbuncles, furuncles, and abscesses, impetigo, and cellulitis are common. Localized skin infections typically do not have constitutional symptoms; however extended or widespread lesions may cause fever, malaise, headache and anorexia. More invasive disease such as staphylococcal pneumonia, arthritis, osteomyelitis, endocarditis and meningitis can also occur through bloodstream transmission (bacteremia). Staphylococcal pneumonia is a well-recognized complication of influenza. Susceptibility to staphylococcal infections is greatest among newborns and the chronically ill. Elderly and debilitated people, drug abusers and those with co-morbidities such as diabetes mellitus, cystic fibrosis, chronic renal failure, neoplastic disease, burns and those with prolonged use of steroids and antimetabolites also are at increased risk.

S aureus Community-associated Mortality Guide to Surveillance and Investigation

C. Reservoirs

Staphylococcus aureus is typically found in humans, and may be found in animals as well.

D. Modes of transmission

Twenty to 30% of the general population is nasal carriers of coagulase-positive staphylococci. Auto-infection is responsible for at least one-third of infections. Persons with a draining lesion or purulent discharge are the most common sources of epidemic spread. Transmission is through contact with a person who has a purulent lesion or an asymptomatic carrier of a pathogenic strain. Hands are the most important instrument of transmitting infection. Droplet spread is rare but has been demonstrated in patients with associated viral respiratory disease.

E. Incubation period

Variable and indefinite.

F. Period of communicability

Risk of transmission of staphylococcal infections continues as long as the purulent lesions are present or the carrier state persists.

G. Treatment

Local skin infections usually are treated by wound cleaning and a topical antibiotic. For invasive or serious staphylococcal infections, systemic antimicrobials are indicated, based on culture and susceptibility of the isolate. First line drugs include penicillinase-resistant penicillin. If there is a hypersensitivity to penicillin, a cephalosporin active against staphylococci (unless there is a history of immediate hypersensitivity) or a macrolide may be indicated. Vancomycin is the treatment of choice for coagulase-negative staphylococci and methicillin-resistant *S. aureus*. Strains of *S. aureus* with resistance to vancomycin and other glycopeptides antibiotics are reported from many countries worldwide. Vancomycin non-susceptible strains are rarely reported in the United States. Typically this occurs in patients previously treated with vancomycin for extended periods.

H. Prevention

Educate the public about the importance of personal hygiene, especially hand washing and the importance of not sharing toilet articles.

Treat initial cases of infection promptly and appropriately.

I. *S. aureus* community- associated mortality in Florida

The Florida Department of Health (DOH) has been monitoring community associated mortality since 2008. Overall, there have been 346 deaths recorded to date (5 in 2008, 15 in 2009, 13 in 2010, and 13 for 2011 per Merlin surveillance data). Most of the Florida *S. aureus* community-associated mortality deaths have been due to a community strain of MRSA that contains a toxin referred to as Panton-Valentine leukocidin (PVL). These cases typically have pneumonia and many test positive for influenza along with *S. aureus*.

3. CASE DEFINITION

A. Clinical description

Symptoms may include pneumonia, sepsis, or meningitis which may quickly lead to death.

Clinical case definition

- A fatal outcome
AND
- Death occurred outside a hospital setting *or* if death occurred in the hospital setting a clinical culture positive for *S. aureus* that was obtained < 48 hours after admission to the hospital

B. Laboratory criteria for diagnosis

A laboratory culture positive for *Staphylococcus aureus* from a sterile or respiratory site

C. Exclusion Criteria

- Hospitalized within the year prior to death. For children less than one year old, a hospitalization other than childbirth.
- OR
- Admission to a nursing home, skilled nursing facility, or hospice within the last year
- OR
- Dialysis within the last year
- OR
- Surgery within the last year
- OR
- Indwelling catheters or medical devices that pass through the skin into the body in the last year

D. Case classification

Confirmed: A case that 1) meets the clinical case definition and 2) laboratory criteria and 3) does NOT meet any of the exclusion criteria

E. Comment

Laboratory Specimens: Clinical specimens for addition testing must be sent to the Florida Department of Health Bureau of Laboratories.

Acceptable specimens include:

1. *Staphylococcus aureus* isolate
2. Clinical specimen
3. *Staphylococcus aureus* cultures - a fresh slant on appropriate media is preferred. *S. aureus* cultures must be sent to the Bureau of Laboratories-Jacksonville.

S aureus Community-associated Mortality Guide to Surveillance and Investigation

AND

4. For cases with Respiratory Symptoms: Respiratory specimens for viral testing must be collected if possible. Acceptable respiratory specimens for viral testing: nasopharyngeal swabs and aspirates, oropharyngeal aspirates or washes, throat swabs, tracheal aspirates or bronchoalveolar lavage. Nasopharyngeal aspirates are the samples of choice. Tissue specimens from the respiratory track may also be sent. These specimens may be sent to either the Bureau of Laboratories-Jacksonville or -Tampa laboratories.

Swab specimens should be collected using swabs with a Dacron® tip and an aluminum plastic shaft and should be submitted in viral transport medium (e.g., viral culturettes). Swabs with calcium alginate or cotton tips and wooden shafts are unacceptable.

A copy of laboratory test results must accompany the paper case report form.

4. LABORATORY TESTING

A. Clinical specimens for additional testing must be sent to the Florida Department of Health Bureau of Laboratories

Acceptable specimens include:

- 1) *S. aureus* cultures – a fresh slant on appropriate media (chocolate agar) preferred. *S. aureus* cultures must be sent to the Bureau of Laboratories-Jacksonville.
- 2) For cases with respiratory symptoms: respiratory specimens for viral testing must be collected if possible. Acceptable respiratory specimens for viral testing include nasopharyngeal swabs and aspirates, oropharyngeal aspirates or washes, throat swabs, tracheal aspirates or bronchoalveolar lavage. Nasopharyngeal aspirates are the sample of choice. Swab specimens should be collected using swabs with a Dacron tip and an aluminum or plastic shaft and should be submitted in viral transport media (e.g. viral culturettes). Swabs with calcium alginate or cotton tips and wooden shafts are not acceptable collection tools. Respiratory specimens for viral testing may be sent to either the Bureau of Laboratories-Jacksonville or Tampa.

The labeled slant/swab is placed in the inner/outer container. Please place the form 1847 in a plastic zip lock bag between the inner and outer container. Package according to IATA regulations, labeling the outer shipping container: *UN3373, Biological Substance Category B.*

B. All submissions should be accompanied by a Clinical Lab Submission Form: http://www.doh.state.fl.us/lab/PDF_Files/DOH_Form_DH1847_1009_v12152010.pdf

C. Packaging and shipping

- a. http://www.doh.state.fl.us/lab/PDF_Files/Packaging_Flowchart_0422051.pdf
- b. http://www.doh.state.fl.us/lab/PDF_Files/Packaging_Flowchart_notes_0422051.pdf
- c. Contact the regional laboratory with questions:
http://www.doh.state.fl.us/lab/addpages/BOL_Contacts.html.

D. Copies of laboratory results should accompany the paper case report form when submitted to the Bureau of Epidemiology.

5. CASE INVESTIGATION

A. Contact the physician or hospital

1. Confirm that a death attributed to *S. aureus* has occurred.
2. Obtain records or interview reporting physician or provider to ascertain that decedent meets case definition eligibility criteria including evidence of a positive laboratory report for , *S. aureus* in an outpatient setting (or within 48 hours of admission if hospitalized) *and* paying special attention to documenting that decedent did not have any of the EXCLUSION FACTORS:
 - a. Hospitalized within the past year prior to death (for children < age 1, does not include birth)
 - b. Admitted to nursing home, skilled facility or hospice within 1 year prior to death
 - c. Dialysis within 1 year prior to death
 - d. Surgery within 1 year prior to death
 - e. Indwelling catheter/medical device that passed through skin within 1 year prior to death
3. For case meeting the eligibility criteria, document the source of information and complete the rest of the case report form found at:
http://www.doh.state.fl.us/Disease_ctrl/epi/surv/CaseReportForms/CA_S_%20aureus.pdf
This may require
 - a. physician, hospital, clinic and/or laboratory medical records
 - b. medical examiner records/autopsy report if applicable
 - c. interview with family or close contact

B. Merlin data entry

Create a case in Merlin under disease code *STAPHYLOCOCCAL AUREUS COMMUNITY-ASSOCIATED MORTALITY* (04111). Enter the data collected into Merlin, being sure to include all required fields on the Basic Data screen, complete the Case Notes, and attach all relevant labs.

6. REFERENCES

- A. Heymann, D.L. (Ed.). (2008). *Control of communicable diseases manual* (19th ed.). Washington: American Public Health Association.