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Management of Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infections

Federal Bureau of Prisons
Clinical Practice Guidelines

April 2012

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What's New in the Document?

Revisions to the April 2011 version of these guidelines are as follows:

- *Appendix 4*, *Treatment Options for Serious MRSA Infections*, now refers readers to the BOP *Antimicrobial Stewardship Guidance*, when available, for detailed information on dosing and monitoring information for vancomycin.

The following changes to the February 2010 version were made in the April 2011 version:

- The References section has been updated to include the Infectious Diseases Society of America (IDSA) *Clinical Practice Guidelines for the Treatment of MRSA in Adults and Children*.
- Clinical distinction is made between purulent cellulitis and nonpurulent cellulites.
- Vancomycin dosaging and monitoring are updated (see *Appendix 4*).

The following changes to the August 2005 version were made in the February 2010 version:

- Terminology has changed from "community-acquired" and "healthcare-acquired" MRSA to "community-associated" and "healthcare-associated" MRSA.
- Background information on the epidemiology of community-associated MRSA is updated (*Section 2*).
- Risk factors for MRSA are listed in Table 1 (*Section 2*).
- Criteria for empiric diagnosis of MRSA (without culture) are provided (*Section 4*). Criteria for empiric treatment (without culture results) are included (*Section 4*).
- Steps for Evaluation and Treatment of SSTIs (page 7) are significantly revised. Treatment approach is based upon clinical presentation. A simple algorithm for treatment decisions is provided in *Appendix 1* and is summarized below:
  - *Lesions <5 cm and no signs of systemic infection or cellulitis:* Conservative treatment alone (warm soaks and compresses, and incision and drainage—*without antibiotics*) is recommended. Consider antibiotics if immunosuppression, e.g., diabetes.
  - *Lesions ≥5 cm and no signs of systemic infection or cellulitis:* Conservative measures and oral antibiotic treatment are recommended.
  - *Cellulitis and no signs of systemic infection:* Prescribe empiric antibiotic therapy covering for both MRSA and *Streptococcus sp.* Maintain a low threshold for IV antibiotics and hospitalization.
  - *Signs and symptoms of systemic infection, toxic presentation, or fasciitis:* Hospitalize and prescribe empiric IV antibiotics covering for both MRSA and *Streptococcus sp.* and other pathogens as clinically warranted.
- A procedure for Incision and Drainage is provided (*Appendix 2*).
- For antibiotics that are prescribed to treat presumed or confirmed MRSA infections, administration should be directly observed via pill line.
- Decolonization is rarely indicated and should only be considered in individuals with recurrent infection or if there is ongoing transmission in a specific cohort of individuals. The procedure for decolonization is updated (*Section 4*).
- The title of *Appendix 9*, which discusses appropriate housing of inmates with known or suspected MRSA, is changed from "MRSA Containment Guidelines" to "MRSA Inmate Housing Guidelines."
- Standard Precautions are the generally recommended precautions to be utilized with MRSA pneumonia. Inmates with MRSA pneumonia can generally be housed with other inmates; however, decisions about their housing should be made on a case-by-case basis. If inmates with MRSA pneumonia have copious respiratory secretions or have poor hygiene habits, they should be housed in a separate room and contact precautions should be utilized.
- The Definitions section now includes common dermatology terminology.

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1. Purpose

The BOP Clinical Practice Guidelines for the Management of Methicillin-Resistant *Staphylococcus aureus* (MRSA) Infections provide recommendations for the prevention, treatment, and containment of MRSA infections within federal correctional facilities.

2. Background

Epidemiology

MRSA infections are traditionally associated with exposure to a health care environment, especially the inpatient hospital setting. However, MRSA has newly evolved to include bacterial strains affecting persons without previous exposure to health care environments. These community-associated MRSA (CA-MRSA) infections have been identified in a variety of populations, including: athletes participating in close contact sports, military recruits in barracks settings, intravenous drug users, men who have sex with men, tattoo recipients, religious community members, and inmate populations. Moreover, many healthy adults and children—without any obvious risks for exposure—are also developing MRSA infections. In most communities in the U.S., MRSA is the leading cause of skin and soft tissue infections (SSTIs) among persons seeking emergency care. Risk factors for MRSA are listed in Table 1.

Table 1. Risk Factors that Should Increase Suspicion for MRSA Infection

• High prevalence of MRSA in the institution or community of origin
• History of MRSA infection or colonization
• Close contact with someone known to be infected with MRSA
• Recent or frequent antibiotic use
• Recurrent skin disease
• Crowded living conditions
• Clusters of infections among persons in groups with skin-to-skin contact or sharing items, e.g., towels, exercise equipment
	• Complaint of “spider or insect bite”
	• SSTI with failure to respond to beta-lactam antibiotics
	• History in the past year of:
	  ► Hospitalization
	  ► Long-term care
	  ► Dialysis and end-stage renal failure
	  ► Diabetes mellitus
	  ► Surgery
	  ► Indwelling catheter
	  ► Injection drug use

Further complicating the evolving epidemiology of MRSA is that the distinction between CA-MRSA and healthcare-associated MRSA (HA-MRSA) is increasingly blurred. *S. aureus* can persist as a colonizer for months to years. Therefore, some infections that develop in the hospital may be community-acquired; conversely, some MRSA infections that develop in the community may be healthcare-acquired.

Within the federal prison system, CA-MRSA infections have been associated with illicit, unsanitary tattoo practices and poor inmate hygiene. MRSA transmission in other correctional systems has been linked to inmates sharing soap or towels with one another, infrequent showering, and inmates lancing boils with fingernails or tweezers.

An estimated 10–30% of persons are colonized with *Staphylococcus aureus* in their nares, mucous membranes, or breaks in their skin; a smaller percentage are colonized with MRSA. Colonized persons are more likely to develop staphylococcal infections; however, many colonized persons remain asymptomatic and never become ill. Staphylococcal colonization occurs more commonly in injection drug users, persons with diabetes, hemodialysis patients, persons with acquired immunodeficiency syndrome (AIDS), surgical patients, and previously hospitalized patients.

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Clinical Presentation

The range of disease caused by CA-MRSA is similar to that caused by CA-methicillin sensitive *Staphylococcus aureus* (MSSA). The most common lesions are abscesses and cellulitis. Frequently, abscesses are accompanied with an area of central necrosis. Furuncles (boils) are also common, particularly in the context of a MRSA outbreak. Frequently MRSA infections are reported by patients to be "spider bites." This is not because a spider bite has actually occurred, but because CA-MRSA lesions often have a similar appearance to a spider bite—a raised red tender lesion that may progress to develop a necrotic center. Fever, leukocytosis, and systemic signs of inflammation are often absent. Less commonly—but not infrequently—CA-MRSA presents as: impetigo, folliculitis, deep-seated abscesses, pyomyositis, osteomyelitis, necrotizing fasciitis, staphylococcal toxic-shock syndrome, pneumonia, and sepsis. Serious systemic infections are more common among persons with a history of injection drug use, diabetes, or other immunocompromising conditions.

Transmission

A primary mode of transmission of MRSA is person-to-person via contaminated hands. MRSA may also be transmitted by sharing towels, personal hygiene items, and athletic equipment; through close-contact sports; and by sharing tattoo or injection drug use equipment. Persons with MRSA pneumonia who are in close contact with others can potentially transmit MRSA by coughing up large droplets of infectious particles that can contaminate the environment. Persons with asymptomatic MRSA nasal carriage can also transmit MRSA, especially when symptomatic from a viral upper respiratory infection. MRSA can also cause a toxin-mediated, food borne gastroenteritis.

3. Screening and Surveillance for SSTIs in the BOP

The following screening measures should be implemented routinely to assure prompt detection of SSTIs within the BOP.

Intake: All inmates undergoing intake medical screening and physical examinations should be carefully evaluated for skin infections.

Recently hospitalized inmates: All inmates who are discharged from the hospital should be screened for skin infections immediately upon return to the prison and be specifically instructed to self-report any new onset of skin infections or fever. (MRSA or other hospital-acquired infections may develop weeks after hospital discharge.)

Inmates at greater risk of serious MRSA infections: Inmates with risk factors, such as diabetes, immunocompromised conditions, open wounds, recent surgery, indwelling catheters, implantable devices, chronic skin conditions, or paraplegia with decubiti, should be periodically evaluated for skin infections during routine medical evaluations.

Monitoring bacterial culture results: All bacterial culture results should be reviewed in a timely manner to detect new MRSA infections.

Observations by correctional workers: Inmates with minor skin infections may be reluctant to seek health care. Inmates with visible or reported sores or wounds, or who self-report "boils" or "insect or spider bites" should be referred to health services.

Food handlers: All inmate food handlers should be advised on the necessity of self-reporting all skin infections, no matter how minor. Food handlers should be routinely examined for visible skin infections. Food handlers with suspected or confirmed contagious MRSA should be removed from their duties until they are no longer infectious.

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Transfers: Inmates with SSTIs should ordinarily not be transferred to other institutions until fully evaluated and appropriately treated. More information is provided under inmate transfers and releases in *Section 6*.

Employees: Correctional workers (including health care workers) should report all skin infections and any confirmed MRSA infections to their supervisor. Supervisors should refer correctional workers with possible skin infections to their health care provider. Employees with MRSA infections should be removed from direct inmate contact until the infection resolves.

Periodic bacteriologic surveillance: Bacterial wound cultures should be obtained as part of periodic surveillance of SSTI pathogens within a given correctional setting to determine the predominant circulating pathogens.

4. Principles of SSTI Diagnosis and Treatment

➜ ***Specific steps for evaluating and treating SSTIs are outlined in Section 5 and in Appendix 1. General principles regarding diagnosis and treatment are discussed below.***

Diagnosis

A careful patient history and skin examination should be performed. The decision about obtaining a wound culture is based upon the following considerations:

Empiric diagnosis

The diagnosis of a probable MRSA SSTI can be made empirically—without culture confirmation—for inmates who present with an SSTI within the context of a known MRSA outbreak, or when periodic surveillance of SSTIs confirms that CA-MRSA is the predominant circulating pathogen within a given correctional setting. Conversely, a presumptive diagnosis of MSSA can be made—without culture confirmation—for inmates who present with an SSTI where the predominant circulating pathogen is methicillin-sensitive.

Culture diagnosis

MRSA infections are diagnosed by routine aerobic bacterial cultures. Oxacillin-resistance, detected by laboratory susceptibility testing, also indicates methicillin-resistance. Positive MRSA cultures from blood and sterile body fluids (e.g., joint fluid, pleural fluid, cerebrospinal fluid) are considered diagnostic. Positive cultures of drainage from non-sterile sites (e.g., wounds) may indicate either bacterial colonization or infection. Wound cultures obtained from expressed pus (avoiding skin contamination) or aspirated abscesses are diagnostically meaningful; whereas, positive cultures obtained directly from the surface of a wound are of limited value in detecting true infection.

Indications: Bacterial cultures for detecting a possible MRSA SSTI should be obtained from inmates whenever clinically warranted, including in the following situations:

- Serious MRSA infections, e.g., deep-seated abscesses requiring drainage;
- Recurrent skin infections;
- An SSTI that is not resolving with current treatment; and
- As part of periodic surveillance to determine the predominant circulating pathogens in a given facility.

Blood cultures should be obtained in febrile inmates with suspected MRSA infections and whenever active injection drug use or endocarditis is clinically suspected.

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Conservative Treatment Measures

A conservative, mechanical approach should be a component of treatment of most SSTIs and is the primary treatment of choice for minor SSTIs (<5 cm) that have no signs of systemic illness. Most skin abscesses in the early stages of development can be treated with warm soaks or compresses to promote spontaneous drainage.

- ***Warm soaks and compresses:*** The use of warm soaks or compresses should be routinely considered when treating minor SSTIs, including confirmed MRSA infections. Soak the infected area in warm water for 20 minutes, ideally 2–3 times per day. (If soaking is not feasible, apply a heating pad or a warm, moist washcloth to the area for 20 minutes, 2–3 times a day.) Continue until the infection clears. Change dressings once a day until the wound has healed.

  Decisions about how to safely implement warm soaks and/or compresses in the correctional setting must be made on a case-by-case basis, in consultation with the infection control officer. Consideration should be given to how and where to safely perform the soaks, as well the safe *disposal of bandages* in *Section 6.*
- ***Incision and drainage (I & D):*** Surgical drainage may be required if spontaneous drainage does not occur. Incision and drainage should not be performed on lesions involving the face, hands, and genitalia. See *Appendix 2*, *Incision and Drainage Procedure*. If an infection requires drainage, frequently reassess to determine whether repeated drainage is warranted. With some deep-seated abscesses, it may not be possible to successfully perform I & D without conducting imaging studies or performing an invasive procedure.
- ***Foreign devices:*** Catheters and other foreign devices related to the infection should be removed whenever possible.

Antibiotic Therapy for MRSA

Antibiotic therapy for MRSA should be considered for the following treatment indications: large SSTIs (>5 cm); cellulitis; and with signs or symptoms of systemic infection and other serious manifestations.

A distinguishing feature of CA-MRSA isolates (compared to HA-MRSA) is that they are often susceptible *in vitro* to common oral antibiotics. The optimal drug treatment regimen for CA-MRSA is unknown. When antibiotics are clearly warranted for the treatment of an SSTI, it is recommended that antibiotics be prescribed that are effective *in vitro* to the cultured isolate. Lacking culture results, prescribe antibiotics that are effective against the circulating strain of MRSA, if known.

➜ ***Antibiotics that are used to treat presumed or confirmed MRSA infections should be directly observed via pill line.***

Empiric treatment

Empiric antibiotic treatment of SSTIs can be considered for large (≥5 cm) lesions when:

- Bacterial cultures are not easily obtainable, e.g., cellulitis, deep-seated abscess; or
- Local institution surveillance of wound cultures has identified a circulating strain of MRSA that has stable antibiotic sensitivities.

Empiric antibiotic therapy—whether for MRSA or MSSA—should not be prescribed in lieu of more conservative measures such as warm soaks and compresses, and I & D.

Note: *CA-MRSA is now the predominant cause of SSTIs in many communities throughout the United States; however, MSSA remains an extremely common bacterial pathogen causing SSTIs. The appearance or severity of most abscesses is not useful clinically in identifying the offending*

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pathogen. The choice of empiric antibiotic therapy should be based on surveillance data and on whether or not the patient has associated risk factors for MRSA, such as recent hospitalization. Beta-lactam antibiotics, such as cephalexin, can be prescribed empirically if periodic surveillance cultures reveal that MSSA is the predominant circulating pathogen.

Treatment of mild to moderate SSTIs

If it is determined that more than conservative measures are indicated, oral antibiotic therapies can be provided to patients with SSTIs that do not involve either significant cellulitic changes or signs and symptoms of systemic infection. Oral antibiotics for treating SSTIs are outlined in *Appendix 3*, and reviewed below.

- ***Trimethoprim-sulfamethoxazole (TMP-SMX):*** Most CA-MRSA isolates are sensitive *in vitro* to TMP-SMX, and antibiotic resistance has not been a significant problem in facilities where this treatment option has been exercised routinely. Potential limitations for TMP-SMX include the following:
  - The optimal dose is uncertain and complicated by the potential lack of drug penetration into purulent abscesses.
  - TMP-SMX may not be effective against Beta-hemolytic streptococci, a common pathogen for nonpurulent cellulitis. A Beta lactam antibiotic, e.g., amoxicillin, should be added to TMP-SMX if coverage for both CA-MRSA and Beta-hemolytic streptococci is desired.
  - Hypersensitivity allergic reactions to TMP-SMX can be severe, e.g., Stevens-Johnson syndrome.
- ***Clindamycin:*** Many CA-MRSA isolates are sensitive *in vitro* to clindamycin; however, resistance to clindamycin among CA-MRSA isolates is developing in some settings. Factors to consider in weighing the use of clindamycin for the treatment of CA-MRSA include the following:
  - MRSA isolates that are susceptible to clindamycin *in vitro* may have inducible clindamycin resistance *in vivo*. The double-disk diffusion ("D-test") can detect inducible clindamycin resistance.

    The D-test is performed as follows: The MRSA isolate is inoculated onto an agar plate with erythromycin and clindamycin susceptibility discs. The MRSA strains with inducible resistance develop a circular zone of inhibition around the clindamycin disc that is blunted by the adjacent erythromycin disc, creating a visible capital "D" on the agar plate.

    Inducible clindamycin resistance should be ascertained when utilizing the drug for inmates with severe disease, with a high organism load, or MRSA infections that are both erythromycin-resistant and clindamycin-sensitive on routine susceptibility testing.
  - Clindamycin is an effective drug against Beta hemolytic streptococcal infections and is therefore an empiric treatment option for non-toxic patients presenting with cellulitis.
  - Clindamycin has excellent bone penetration and is therefore a potential treatment option for patients with joint or bone MRSA infections.
  - Clindamycin may inhibit toxin production that may play a role in MRSA pathogenicity.
  - Clindamycin can cause *Clostridium difficile* colitis.
  - Clindamycin is not effective in treating endocarditis.
- ***Doxycycline and minocycline:*** CA-MRSA isolates may be sensitive *in vitro* to long-acting tetracyclines such as doxycycline and minocycline. Furthermore, CA-MRSA sensitivity to these antibiotics may be underestimated because tetracycline is routinely used to evaluate drug

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susceptibilities for this class of antibiotics, but does not necessarily correlate with minocycline or doxycycline resistance to MRSA. Consultation with the laboratory is warranted.

- ***Rifampin:*** CA-MRSA isolates are routinely sensitive to rifampin, *in vitro*. Rifampin has been used in combination with other antibiotics to treat MRSA; however, the benefits are unproven. Within the BOP, rifampin is *not* recommended for treatment of uncomplicated SSTIs. Rifampin can be considered, on a case-by-case basis, for treatment of recurrent or complicated SSTIs only after approval of the Central Office. Rifampin should never be used as monotherapy for MRSA infections due to the rapid development of drug resistance. Thus, *rifampin must always be used in conjunction with another antibiotic.*
- ***Vancomycin:*** Oral vancomycin should never be prescribed to treat MRSA infections since it is inadequately absorbed from the gut.
- ***Fluoroquinolones*** should *not* be used for treatment of SSTIs.
- ***Topical mupirocin*** should *not* be used for treatment of folliculitis because of the high likelihood of drug resistance.

Duration of treatment: The duration of antibiotic therapy for MRSA skin and soft tissue infections depends on the severity of the infection, the site of infection, and the clinical response to therapy. For uncomplicated infections that do not respond within several days to warm soaks and/or I & D, oral antibiotic treatment for at least 5–10 days is indicated. Inmates with skin infections should be examined periodically during therapy to determine if drainage or re-drainage is warranted, and to ensure that the infection is resolving. Once antibiotic therapy is discontinued, the inmate should be re-evaluated in frequent follow-up appointments to ensure that new lesions have not developed.

Treatment of serious SSTIs

Systemic infections, significant cellulitis, endocarditis and other endovascular infections, osteomyelitis, necrotizing fasciitis, pneumonia, and other deep-seated MRSA infections require treatment with IV vancomycin or another effective agent for an extended period of time, i.e., 4–6 weeks or more. A second or third antibiotic may also be indicated in combination with vancomycin for certain MRSA infections (e.g., prosthetic valve endocarditis). See *Appendix 4* for an overview of antibiotics used for treatment of serious SSTIs.

➜ ***Consultation with a physician expert is recommended for serious MRSA infections.***

Intravenous vancomycin can be safely administered to medically stable inmates in most BOP institutions. Clinical directors should consult with their chief pharmacists on protocols for administering and monitoring vancomycin therapy in the outpatient setting. Intravenous antibiotic therapy in an inpatient setting is indicated for pneumonia, toxic shock syndrome, or skin and soft tissue infections associated with clinical evidence of sepsis or necrotizing fasciitis, or if the infection is clinically worsening despite oral antibiotic therapy.

Linezolid is a relatively new oral and intravenous antibiotic that may be an alternative to intravenous vancomycin for highly resistant MRSA infections, possibly allowing earlier hospital discharge on an oral antibiotic regimen. However, linezolid is costly and has potential for significant toxicities with long-term use. *Linezolid should only be used after consultation with a physician expert to determine if alternative antimicrobials would be more appropriate.*

Life Threatening Infections: Empiric therapy with IV vancomycin, plus other antibiotics as warranted, should be strongly considered for inmates who present with life threatening infections such as pneumonia or sepsis—*regardless of existing risk factors*—due to the inherent risk of MRSA infection in the correctional setting.

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Decolonization

Treatment to eliminate colonization with MRSA (decolonization) is not routinely recommended. The effectiveness of decolonization methods to interrupt MRSA recurrence and transmission are not well-established. However, it may be reasonable to consider decolonization on a case-by-case basis in two circumstances: (1) for inmates with recurrent MRSA infections (e.g., three or more infections in less than six months); and (2) in outbreak situations in which ongoing MRSA transmission is occurring among a well-defined cohort with close contact.

Decolonization procedure

The decolonization procedure recommended within the BOP includes all of the following measures to be administered in the health care clinic:

- Apply 2% mupirocin ointment generously throughout the inside of both nostrils with a cotton swab, *twice daily* for 5–10 days; and
- Topically administer chlorhexidine gluconate solution 4% (118 ML) for 5 days.

  Note: Due to the lack of definitive evidence to support decolonization within the correctional environment, coupled with the security concerns related to chlorhexidine formulations, the judicious use of chlorhexidine for decolonization is recommended on a case-by-case basis. Chlorhexidine formulations contain anywhere between 4% and 70% ethanol or isopropyl alcohol and, therefore, should always be used within the controlled clinic setting to ensure appropriate use. Chlorhexidine formulations should not be dispensed directly to the inmate as a self-carry (i.e., Keep on Person—KOP) item. The directions for decolonization with chlorhexidine are to bathe daily for at least 5 days with 4% Chlorhexidine solution, washing and cleansing the body with a chlorhexidine-saturated cloth and warm water. Scrub for 3 minutes, and rinse thoroughly. Keep out of the eyes, ears, and mouth. Do not apply to open wounds.

Surveillance cultures following decolonization are not recommended in the absence of an active infection.

Monitoring of Antibiotic Prescribing Practices

Clinical directors, in consultation with their chief pharmacists, should monitor antibiotic prescribing patterns at their institutions to ensure that antibiotics are being appropriately prescribed—and not used in lieu of the recommended conservative treatments for uncomplicated MRSA, e.g., warm soaks or compresses and I & D. The use of broad-spectrum antibiotics should be strictly monitored, and unnecessary use curtailed, to reduce the development of antibiotic resistance among the inmate population.

5. Steps for Evaluation and Treatment of SSTIs

Appendix 1 provides an overview of steps for managing SSTIs, based on their presentation. The implementation of these steps is further discussed below.

Step 1. Evaluate patient and characterize the SSTI.

Patient Interview and History: Inquire about the history of the problem, quality of any pain (including symptoms distant from the index lesion, which may suggest systemic spread), presence of systemic symptoms, and risk factors for MRSA (see *Table 1*). Assess for the presence of immunocompromising conditions, e.g., diabetes mellitus.

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Physical Examination: CA-MRSA SSTIs cannot be clinically distinguished from infections caused by other staphylococcal strains or other bacterial pathogens. The physical examination of an SSTI should involve a complete skin exam including the following:

- Determine the location of the infection(s).
- Measure size (diameter) of the lesion(s).
- Note presence or absence of cellulitis with or without purulent drainage. Describe any pertinent changes: location, redness, streaking, lymphangitis, crepitus, edema, or exquisite pain.
- Note presence of erythema, tenderness, fluctuance, purulent drainage (whether spontaneous or induced), necrosis, gangrene, or signs of necrotizing fasciitis.
- Assess for signs of systemic infection, including: fever, unstable vital signs, "toxic" presentation, streaking from the infection site, and rapid spread of inflammation over a period of hours. Systemically ill inmates should be carefully examined for non-dermatologic sources of infection, including endocarditis and pneumonia.

Wound Culture: If indicated, attempt to obtain wound culture (see Indications in *Section 4*).

Step 2. Provide appropriate treatment based upon the SSTI characteristics.

Appendix 1 outlines an approach to treatment based upon the size of the lesion(s), and the presence or absence of immunosuppressive conditions, cellulitis, or signs of systemic infection. The majority of SSTIs can be successfully treated with conservative measures alone—including warm soaks and incision and drainage (I & D)—without the use of antibiotics. Note that these guidelines are provided for general reference only; each SSTI presentation should be managed on a case-by-case basis.

- ***Lesion <5 cm:*** In general, patients with small abscesses or localized erythema—without signs of systemic infection or cellulitis—should be treated initially with conservative measures *without* antibiotics. These include warm soaks or compresses to produce spontaneous drainage, and I & D if an abscess is drainable unless it involves the face, hand, or genitalia. See *Appendix 2* for procedures for I & D. Antibiotics should be considered for patients with immunosuppressive conditions, such as diabetes.

- ***Lesion ≥5 cm:*** In addition to conservative measures, patients with larger lesions—without signs of systemic infection or cellulitis—should generally be prescribed oral antibiotics. The antibiotic should be either selected based upon culture results, or selected presumptively based upon bacteriologic surveillance data for the facility (see discussion of Empiric Treatment in *Section 4*). Perform I & D if the lesion is drainable.

- ***Cellulitis:*** Patients with *purulent cellulitis* (e.g., cellulitis associated with purulent discharge or exudate in the absence of a drainable abscess), should receive empiric treatment with antibiotics that cover for CA-MRSA. Patients with *nonpurulent cellulitis* (e.g., cellulitis with no purulent drainage or exudate and no associated abscess) can usually be treated empirically for Beta-hemolytic streptococcal infection; however, dual coverage for CA-MRSA should be considered on a case-by-case basis, particularly in facilities where CA-MRSA infections commonly occur.

  Clinicians should monitor all inmates with cellulitis carefully, and should have a low threshold for administering intravenous antibiotics and pursuing hospitalization

- ***Complicated SSTIs or systemic infection:*** Patients with deep-seated infections such as fasciitis, large abscesses, surgical or traumatic wound infections, or signs or symptoms of systemic infection should be hospitalized for IV antibiotics. Surgical debridement should be aggressively pursued as clinically warranted. Inmates with MRSA infections should be educated about both the treatment

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regimen and appropriate precautions (see *Appendix 5*, *General Instructions for Skin Infections, and Appendix 6*, *MRSA Fact Sheet*).

Step 3. Observe closely for resolution of SSTI and for no recurrence.

Patients who are being treated with conservative measures (without antibiotics) should be monitored closely; if the SSTI worsens, then pursue antibiotic treatment and culture (if not obtained previously). For those on antibiotic therapy, adjust therapy based upon culture results and monitor inmates closely for complete resolution of infection.

Recurrent or persistent skin and soft tissue infections during or immediately following antibiotic therapy may indicate patient nonadherence to the prescribed treatment regimen, development of antibiotic resistance, or re-exposure to MRSA. Medication administration should be directly observed via pill line. Inmates with recurrent or persistent skin lesions should be evaluated on a case-by-case basis to assess the most likely cause and to determine the appropriate intervention.

6. Infection Control

Primary Prevention: Preventing MRSA Infections

Primary prevention involves measures to prevent MRSA transmission in the absence of a known case. Preventing transmission of MRSA in a confined setting, such as a prison, is extraordinarily difficult, time consuming, and resource-intensive. All potential opportunities for inmates to have close physical contact or to share communal items should be carefully scrutinized within each correctional institution to identify strategies to interrupt MRSA transmission. The following general interventions should be considered.

Education: Inmates and correctional staff should be provided information on the transmission, prevention, treatment, and containment of MRSA infections. Condensed information for inmates is outlined in *Appendix 6*, *MRSA Fact Sheet*. Regular hand washing should be emphasized as the most important intervention for preventing a MRSA outbreak. Emphasis should also be placed on the importance of inmates with skin infections being promptly referred for a medical evaluation.

Correctional standard precautions: Correctional workers should assume that all inmates are potentially contagious. Precaution should be taken whenever direct contact is anticipated with blood, body fluids (e.g., secretions, excretions, feces, and urine), nonintact skin, and mucous membranes. Correctional standard precautions have been adapted from hospital standard precautions, which include increased emphasis on sanitation in housing areas, as well as accommodating recently identified modes of transmission of MRSA (e.g., sharing of towels, use of exercise benches, and participation in sweat lodges). Correctional standard precautions for the general population are outlined in *Appendix 7a* and for the health care setting in *Appendix 7b*.

Hand hygiene program: Hand hygiene is the simplest and most important infection control measure for preventing and containing MRSA infections, and yet the most difficult to implement. Specific hand hygiene procedures are outlined in *Appendix 7a* and *Appendix 7b*.

- ***Oversight:*** The hand hygiene program should be overseen by the institution's local infection control committee, by means of ongoing observational studies and data collection on program operation (e.g., compliance with hand hygiene guidelines, amount of hand hygiene supplies used, etc.). The hand hygiene behaviors of all correctional workers who have contact with inmates should be assessed, with feedback given to the workers as necessary.

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- ***Training:*** Correctional staff, health care workers, and inmates should be provided periodic updates (during annual training and other venues) with emphasis on the importance of hand hygiene and effective hand hygiene techniques.

Sanitation: MRSA is susceptible to most routinely used environmental cleaning agents. Sanitation measures, which are essential for preventing the spread of MRSA infections, are outlined in detail in *Appendix 7a* and *Appendix 7b.* Sanitation should be assessed regularly, with any lapses rectified in accordance with local policies and procedures.

Periodic laboratory surveillance: To assess the predominant circulating pathogens within a correctional facility, bacterial wound cultures should be obtained as part of periodic surveillance of SSTI pathogens.

Secondary Prevention: Containing Detected MRSA Infections

Secondary prevention involves measures to prevent transmission of infection when there is a known case. A checklist of containment measures for use when an inmate is identified with a suspected MRSA infection is summarized below and in *Appendix 10*.

Inmate education: All inmates with MRSA infections should be instructed in regular handwashing, maintaining personal hygiene (including regular showers), and the importance of keeping wounds covered. A fact sheet for inmates with skin infections is provided in *Appendix 5*.

Appropriate housing: Inmates diagnosed with MRSA infections should be examined by a clinician to determine the risk of contagion to others. Decisions about housing assignments should be made utilizing the *MRSA Inmate Housing Guidelines* (*Appendix 9*). Factors influencing decisions about where to house inmates with SSTIs include: the degree to which wound drainage can be contained, the ability or willingness of an inmate to follow infection control instructions, and the available housing options. In general, inmates with wounds in which drainage can be completely contained can be housed in general population. If drainage cannot be contained, the inmate should be housed separately. Inmates with MRSA pneumonia can generally be housed with other inmates; however, decisions about their housing should be made on a case-by-case basis. Inmates with MRSA pneumonia who have copious respiratory secretions, or who have poor hygiene habits and are likely to contaminate the environment, should be housed in separate rooms and contact precautions utilized. Criteria for discontinuing single-cell housing are outlined in *Appendix 9*.

Hand hygiene: Adequate hand hygiene should be re-emphasized with staff who work with inmates diagnosed with MRSA infections. Adequate hand washing supplies for inmates diagnosed with MRSA, and for the staff who are in contact with them, is critical. The availability of these supplies should be regularly assessed and remedied as necessary.

***Plan for safe dressing changes*:** A plan should be developed to assure that dressings can be replaced safely. Draining wounds must be adequately dressed to prevent contamination of environmental surfaces, and dressings should be changed regularly. Clean, non-sterile gloves should be worn when contact with wound drainage is anticipated. Gloves must be removed and hands cleaned immediately before leaving the patient's room. When caring for isolated patients with grossly draining wounds, a clean non-sterile gown should be worn whenever it is likely that there will be contact with wound drainage.

- **Disposal of bandages:** Bandages should be disposed of in accordance with OSHA policy and as determined by the local safety and security policy. Bandages which fully contain the wound drainage can be disposed of in a leak-proof container (e.g., plastic bag or wax paper) and placed in the regular

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trash. Bandages that are saturated and do not contain the drainage, or that may become liquefied and leak blood or contaminated materials, should be handled in accordance with regulated medical waste procedures. Inmates should be instructed in the proper disposal of their used bandages in accordance with local policy.

***Correctional contact precautions*:** When health care providers and correctional personnel have direct contact with inmates who have suspected or confirmed SSTIs, correctional contact precautions should be utilized. Hospital contact precautions have been adapted to the unique requirements of the correctional setting and are outlined in detail for the general population in *Appendix 8a*, and for health care settings in *Appendix 8b*.

***Sanitation*:** Sanitation measures used for primary prevention of MRSA infections should be strictly enforced. Prioritize the cleaning of rooms that are used to house inmates who are placed on contact precautions—with focus on cleaning and disinfecting frequently touched surfaces (e.g., bedrails, bedside commodes, bathroom fixtures in patient room, and door knobs). All rooms of infected inmates should be decontaminated ("terminally cleaned") prior to occupancy by another inmate.

***Surveillance for more cases*:** Upon the diagnosis of a single MRSA case, surveillance measures to detect additional cases should be started, utilizing procedures which are summarized under Outbreak Management (page 12), and in *Appendix 10*. Each case should be interviewed to determine risk factors for infection (see Table 1).

***Activities and visitors*:** Inmates with MRSA infections may be excluded from certain activities on a case-by-case basis. For example, an inmate with a draining shoulder wound should be restricted from recreation activities, but might be allowed to eat meals in the cafeteria if the drainage is contained. Restriction of visitors is rarely indicated and should be handled on a case-by-case basis, in consultation with the infection control officer.

***Inmate transfers and releases*:** Inmates with contagious MRSA infections should ordinarily not be transferred to other BOP institutions or halfway houses until their infection has been adequately treated and the risk of contagion is controlled.

- **Required transfers:** Inmates with contagious MRSA infections whose transfer is absolutely required for security or medical reasons should have their draining wounds dressed the day of the transfer, with bandages that adequately contain the drainage. The following should occur prior to the transfer:
  - Escort officers should be notified of the inmate's condition and be educated on infection control measures, including the importance of hand hygiene, protective measures, safe disposal of contaminated dressings, and decontamination of security devices (e.g., handcuffs, leg irons, martin chains, and other reusable restraints). They should be advised to use disposable restraints, when feasible.
  - The clinical director (or designee) of the sending institution should notify the receiving institution's clinical director or health services administrator of the pending transfer of an inmate with suspected or confirmed MRSA infection.
- **Releases:** Inmates with skin and soft tissue MRSA infections who are scheduled for release should:
  - Have draining infections bandaged to adequately contain drainage prior to release.
  - Be given enough antibiotics to complete treatment.
  - Be counseled on practical infection control measures to prevent transmission to household members and other anticipated close contacts.
  - Be given assistance in accessing follow-up medical services.

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Outbreak Management

A MRSA outbreak is suggested if similar antibiotic susceptibility patterns are identified among two or more MRSA isolates from epidemiologically-linked patients. Outbreak surveillance measures are not indicated if the MRSA infections are obviously unrelated (e.g., two inmates returning separately from a hospital where nosocomial MRSA infections are endemic, or multiple MRSA infections separated in time without any epidemiologic link).

Detection of two or more cases of epidemiologically-related MRSA infections should prompt an immediate investigation to look for more cases. Once a MRSA outbreak is suspected the following measures must be taken.

***Infection control measures*:** In the context of a MRSA outbreak the following should be emphasized:

- Hand hygiene and the use of correctional contact precautions should be strictly enforced for all health care providers and correctional workers.
- Sanitation of "high-touch" surfaces should be strongly emphasized in the affected units.
- More stringent infection control practices should be implemented after all patient contacts (e.g., routine cleaning and disinfection of patient care items such as stethoscopes and blood pressure cuffs).
- Diligent inspection and re-inspection to detect potential modes of ongoing MRSA transmission should be done in living, sleeping, bathroom, recreational, and other areas within the correctional facility where close skin-to-skin contact or sharing of personal hygiene or communal items is likely to occur. If the outbreak is confined to a particular housing unit or dormitory, careful inspections (including "shakedowns" when necessary) of all living, sleeping, and bathroom areas should be done to identify potential sources of infection, such as unsanitary conditions or ongoing injection drug use or tattooing.
- The broader use of antimicrobial soaps, washes, or shampoos in affected housing units and dormitories, or throughout the entire correctional facility, should be considered on a case-by-case basis during a MRSA outbreak.

***Education*:** Educational efforts to contain a MRSA outbreak should target inmates, correctional workers, and health care personnel. The following educational initiatives should be considered:

- Town hall meetings with inmates to reinforce the importance of the following: regular handwashing, good personal hygiene, and routine showering; maintenance of a clean cell and regular laundering of bed linens; self-reporting of all skin lesions and keeping wounds covered; and refraining from injection drug use, tattooing, and sexual contact with other inmates.
- Recalls with correctional staff to reinforce the importance of the following: regular handwashing; the use of correctional standard precautions (see *Appendix 7a*) when interacting with all inmates; the use of correctional contact precautions (see *Appendix 8a*) when interacting with MRSA-infected inmates; the routine inspection of inmate housing units for cleanliness; the examination of food handlers for visible skin infections; and the detection of tattooing practices, injection drug use, and sexual activity among inmates.
- Meetings with health care personnel to reinforce the importance of the following: hand hygiene before and after every patient contact, decontamination of shared medical devices, and the appropriate use of correctional standard precautions (see *Appendix 7b*) and correctional contact precautions (see *Appendix 8b*).

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***Surveillance for more cases*:** Once a MRSA outbreak is suspected or confirmed, health care personnel should determine if the MRSA-infected inmates have a common source of infection.

- **Interview the inmate(s) with MRSA** to identify potential sources of infection and close contacts. The date of onset of the infection should be ascertained to determine how far back in time the investigation should go, and whether the onset was before or after intake into the correctional system. The content of the interview is outlined below.

Table 2. Content of MRSA Case Interview

• Prior incarceration at other facilities • Recent hospitalizations • Housing and work assignments • Sharing of personal hygiene items with other inmates • Participating in sweat lodge ceremonies • Recent injection drug use or tattooing	• Sexual contact with other inmates • Participation in close-contact sports • Exposures to others with draining wounds or skin infections • History of food handling • Common health care provider

- **Identify and evaluate contacts:** Assess for signs and symptoms of an SSTI. *Appendix 11* is a linelist to be used for tracking MRSA contacts.
- **Increase SSTI surveillance at routine health care visits:** Health care providers evaluating inmates during sick call and chronic care visits should be on the alert for inmates who have SSTIs or other evidence of MRSA infections.
- **Targeted surveillance of high-risk inmates:** If the outbreak involves multiple inmates or is sustained over time, targeted examinations for both surveillance and diagnostic purposes should be considered for inmates who are at higher risk for MRSA (e.g., inmates with diabetes, renal failure, surgical wounds, indwelling catheters, chronic skin diseases, or immunocompromised conditions).
- **Laboratory surveillance:** Bacterial cultures and antibiotic susceptibilities should be regularly monitored to detect MRSA infections among the inmate population.
- **Health care worker as possible source:** If a health care worker is suspected of being the common source of MRSA infections, the worker should be interviewed by the clinical director or designee to: (1) determine if the worker has had any recent SSTI; and (2) review the worker's infection control practices such as hand washing and the use of contact precautions. The health care worker should be referred to a physician for medical evaluation and clearance if a MRSA infection is suspected clinically or epidemiologically.

***Housing*:** In the context of a large MRSA outbreak, cohorting of inmates with SSTIs may be considered as long as the cohorted inmates have MRSA infections with similar antibiotic susceptibilities.

***Inmate transfers*:** During a MRSA outbreak, the guidelines for transferring inmates with contagious MRSA infections (see Inmate Transfers and Releases on pages 11–12) should be followed. All inmates scheduled to transfer to another institution should be interviewed by a health care provider and have a targeted skin examination to determine if they have an undiagnosed SSTI.

***Decolonization*:** Treatment to eliminate colonization with MRSA is not generally recommended. However, in the context of a MRSA outbreak, with MRSA transmission occurring among a well-defined cohort, it may be reasonable to consider decolonization as a control strategy. The decolonization procedure is outlined on page 7.

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***Influenza prevention*:** Individuals with influenza are at higher risk of secondary, pulmonary infections with *Staphylococcus aureus* and other bacteria. Necrotizing MRSA pneumonias, affecting multiple inmates, could occur during concurrent influenza and MRSA outbreaks within the correctional setting. If a MRSA outbreak occurs during influenza season, or if MRSA infections are endemic in the facility, clinical directors should consider more aggressive influenza prevention strategies, including the following:

- Influenza vaccination of the entire affected inmate population, regardless of individual risk factors for influenza, in consultation with Central Office HSD.

Infection Control on Inpatient Units

Inpatient units within correctional facilities should develop site-specific infection control practices to prevent the spread of resistant organisms. Infection control guidelines used for the hospital setting have been adapted to the correctional inpatient setting.

Primary prevention: The following routine infection control measures should be emphasized generally to prevent MRSA transmission:

- Educate inpatient health care providers on the importance of preventing the spread of antibiotic resistant organisms and the efficacy of control measures.
- Strictly enforce hand hygiene before and after all patient contacts.
- Avoid inappropriate or excessive antibiotic usage for inpatients (with monitoring through the infection control committee, and the pharmacy and therapeutics committee).
- Dedicate noncritical patient-care equipment to a single patient when contact precautions are indicated; when use of common equipment or items is unavoidable, adequately clean and disinfect before use with other patients.
- Strictly enforce environmental disinfection of patient rooms, including terminal cleaning at the time of patient discharge, with a focus on environmental surfaces exposed to frequent hand contact (e.g., bed rails, door knobs).
- Regularly monitor bacterial cultures of current and recently discharged inpatients to detect clusters of MRSA infections.
- Appropriately assign beds for new admissions who have undiagnosed, potentially infectious conditions (which may include MRSA). Avoid placing them in a room with other patients at high risk for developing infections.

Secondary prevention: The following infection control measures should be utilized to contain known or suspected MRSA infections in inpatient units:

- Aggressively evaluate, contain, and treat inpatients with suspected or confirmed MRSA infections, since these inpatients are at greater risk of serious disease.

  Note: Transmission of MRSA infections within the inpatient setting can occur easily and can cause serious illness to medically compromised patients. Contact precautions and other recommended infection control practices should be strictly enforced.

- Heighten MRSA surveillance of other inpatients.

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- As resources permit, designate specific staff to care for contagious MRSA patients to minimize the risk of cross-infection (i.e., these same staff members should not be assigned to care for other inmates at high risk of developing infection).

Outbreak management: MRSA outbreaks within the inpatient setting can be extremely difficult to control and are affected by multiple factors that vary among inpatient units. The most effective methods to eradicate MRSA infections from the inpatient setting have involved the active surveillance and isolation of the patients with MRSA infection, along with using strict contact precautions when managing these patients. Public health authorities should ordinarily be consulted when developing a specific infection control strategy, due to the difficulties in managing MRSA outbreaks in the inpatient setting and the inherent risks to the patient population.

Beyond full implementation of the primary and secondary infection control measures described above, strategies for controlling a MRSA outbreak in the inpatient setting may also include the following: (1) careful and repeated examinations of all inpatients for undiagnosed MRSA infections; and (2) aggressive culturing of all potential infections and regular review of culture results. The utility of obtaining nares surveillance cultures for new inpatients is unclear and should be undertaken only after expert consultation, usually in the context of a MRSA outbreak.

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Definitions

Abscess is an infection characterized by a localized accumulation of polymorphonuclear leukocytes with tissue necrosis involving the dermis and subcutaneous tissue.

Beta-lactam antibiotics include: penicillin, ampicillin, amoxicillin, amoxicillin/clavulanate, methicillin, oxacillin, dicloxacillin, cephalosporins, carbapenems (e.g., imipenem), and the monobactams (e.g., aztreonam).

Bulla (plural bullae) is a raised, circumscribed lesion (> 0.5 cm) containing serous fluid above the dermis.

Carbuncle consists of two or more confluent *furuncles* with separate heads. A furuncle is a well-circumscribed, painful, supporative inflammatory nodule involving hair follicles that usually arises from preexisting *folliculitis*.

Cellulitis involves deep subcutaneous infection of the skin—typically by bacteria—that results in a localized area of *erythema* and inflammation, with or without associated purulence.

Colonization is the presence of bacteria on or in the body without causing infection.

Community-associated MRSA (CA-MRSA) refers to an MRSA infection with onset in the community, in an individual lacking established risk factors for *health-care associated* infection, such as recent hospitalization, surgery, residence in a long-term care facility, receipt of dialysis, or presence of invasive medical devices.

Correctional contact precautions, which should be used with draining skin and soft tissue infections, are *hospital transmission-based precautions* for infection control that have been adapted to the correctional setting—taking into account relevant security concerns, inmate housing factors, and infection control issues inherent to jails and prisons (see *Appendix 8a* and *Appendix 8b*).

Correctional standard precautions are *hospital standard precautions* for infection control that have been adapted to the correctional setting—taking into account security issues, inmate housing factors, and infection control concerns inherent to jails and prisons (see *Appendix 7a* and *Appendix 7b*).

Crepitus is grating, crackling, or popping sounds and sensations experienced upon contacting the skin.

Crusting appears as varying colors of liquid debris (serum or pus) that has dried on the surface of the skin.

Erythema is blanchable redness of the skin, which can be localized or generalized, and is caused by dilation of superficial blood vessels and capillaries near the skin's surface.

Fasciitis is an inflammation of the fascia, the soft tissue component of the connective tissue system that permeates the human body and interpenetrates and surrounds muscles, bones, organs, nerves, blood vessels, and other structures.

Fluctuance is an indication of the presence of pus in a bacterial infection. As the skin becomes infected, redness and induration develop. If the pus does not drain, the skin overlapping the pus remains red, but touching this area produces a soft, boggy feel known as "fluctuance." In general, lesions that are fluctuant need to be incised and drained (see *Appendix 2* for I & D procedure).

Folliculitis is inflammation of the hair follicle that appears clinically as an eruption of *pustules* and/or *papules* centered upon hair follicles.

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Furuncle is a well-circumscribed, painful, supporative inflammatory nodule involving hair follicles that usually arises from preexisting *folliculitis*. Furuncles can occur anywhere on the skin surface that contains hair follicles and is subject to friction and maceration, e.g., thighs, neck, axillae, groin, and buttocks. They may extend into the dermis and subcutaneous tissues and often are associated with *cellulitis*.

Gangrene is a complication of *necrosis* caused by infection or thrombosis, and is characterized by the decay of body tissues, which become black (and/or green) and malodorous.

Health-care associated MRSA (HA-MRSA) infections generally are associated with recent hospitalization, surgery, residence in a long-term care facility, receipt of dialysis, or presence of invasive medical devices.

Hospital standard precautions are the standard infection control practices used in hospital settings to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection. See http://www.cdc.gov/ncidod/dhqp/gl_isolation.html

Hospital transmission-based precautions are patient-specific precautions taken for hospitalized patients with suspected or diagnosed infections that are either highly transmissible or epidemiologically important. The three types of transmission-based precautions include airborne, droplet, and contact precautions. Contact precautions should be utilized with *SSTIs* (see *Appendix 8a* and *Appendix 8b* for *correctional contact precautions*).

Impetigo is an infectious skin eruption of flaccid *pustules*, which open to form a thick, honey-colored to brown crust.

Inflammation is a local response to cellular injury that is marked by capillary dilatation, leukocytic infiltration, redness, heat, pain, swelling, and, often, loss of function.

Lymphangitis is inflammation of the lymphatic vessels.

Methicillin-resistant *Staphylococcus aureus* or "MRSA" are staph bacteria that are resistant to *beta-lactam antibiotics*, including: penicillin, ampicillin, amoxicillin, amoxicillin/clavulanate, methicillin, oxacillin, dicloxacillin, cephalosporins, carbapenems (e.g., imipenem), and the monobactams (e.g., aztreonam). MRSA causes the same types of infections as does staphylococcal bacteria that are sensitive to beta-lactam antibiotics.

MRSA outbreak is a clustering of two or more epidemiologically-related, culture-positive cases of MRSA infection. Confirmation that a MRSA outbreak is caused by the same organism is suggested by similar isolate antibiotic susceptibilities and is further supported if molecular analysis, such as pulsed-field gel electrophoresis, identifies a predominant MRSA strain.

Necrosis refers to dead tissue.

Osteomyelitis is inflammation of bone and bone marrow usually due to a bacterial infection.

Papule is a well-circumscribed, elevated, solid lesion that measures less than 1 cm and is usually dome shaped.

Primary prevention is the implementation of general measures to prevent MRSA transmission in the absence of a known case. These include: screening to identify *SSTIs* at intake or after inmates return from the hospital; standard precautions, including hand hygiene and general sanitation; and education to report skin infections, etc. (See *secondary prevention* below.)

Pustule is a small (< 1 cm in diameter), circumscribed, superficial elevation of the skin that is filled with purulent material.

Pyoderma is a pus-containing skin infection.

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Pyomyositis is an acute bacterial infection of skeletal muscle.

Secondary prevention is the implementation of control measures *after* detection of a case of MRSA in the inmate population, including: appropriate treatment and housing of the case, institution of contact precautions, surveillance for additional cases, augmented general infection control measures including hand hygiene and general sanitation, appropriate handling of transfers and releases, etc.

SSTI is skin and soft tissue infection.

Staphylococcus aureus, often referred to as "staph," is a commonly occurring bacterium that is carried on the skin and in the nose of healthy persons. *Staphylococcus aureus* may cause minor skin or soft tissue infections such as boils, as well as more serious infections such as wound infections, abscesses, pneumonia, and sepsis.

Suppurative means pus-forming.

Vesicle is a small, blister-like elevation of the skin (<1 cm), containing serous fluid.

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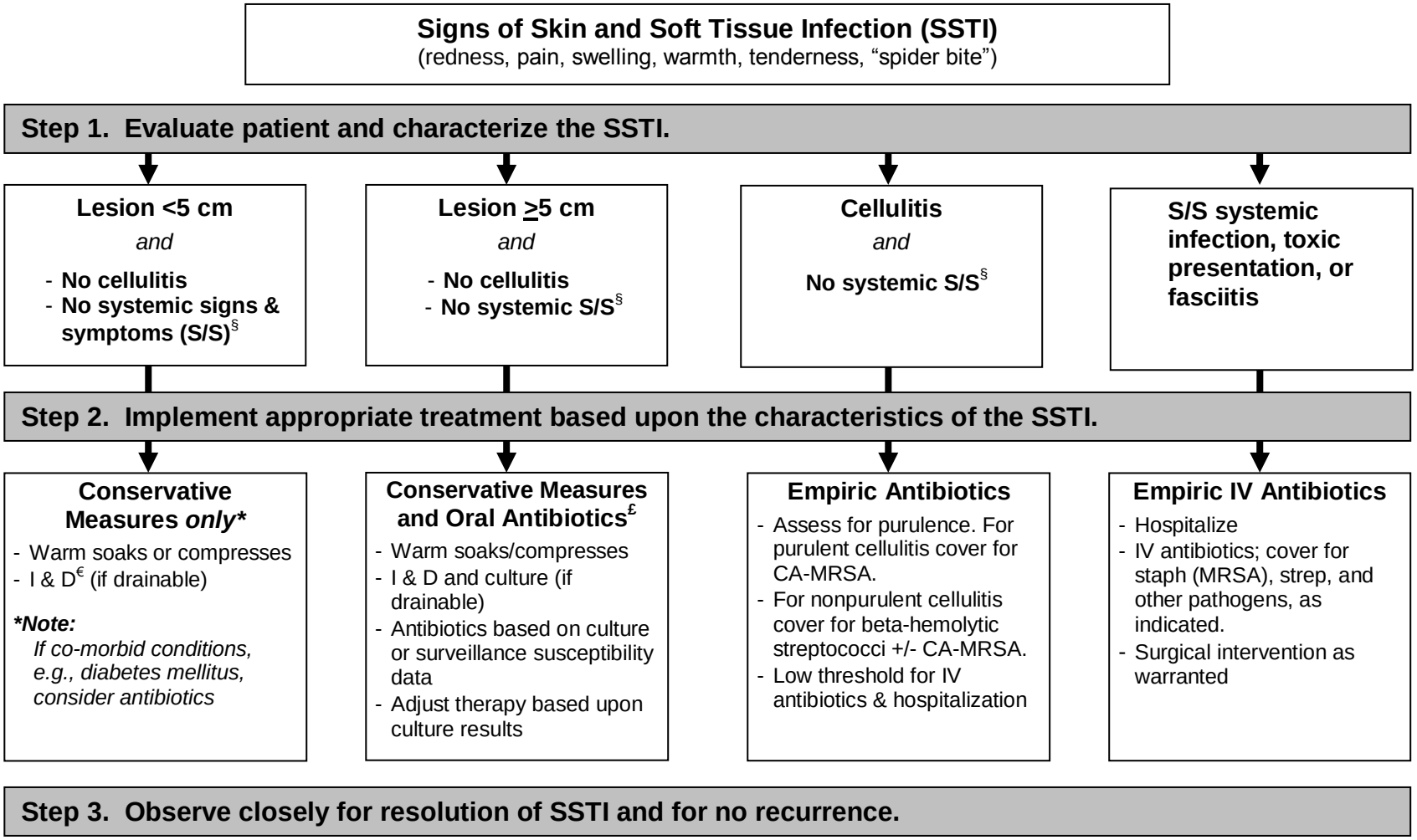
Appendix 1. Steps for Evaluation and Treatment of Skin and Soft Tissue Infections[¶]



[¶] Every SSTI presentation warrants management on a case-by-case basis.
[€] I & D = incision and drain (see *Appendix 2*). Abscesses of face, hand, and genitalia should not be drained.
[£] Antibiotic treatment for presumed or confirmed MRSA infection should be directly observed via pill line.
[§] Signs and symptoms (S/S) of systemic infection include: fever, unstable vital signs, "toxic" presentation, streaking from the infection site, crepitus, necrosis, and rapid spread of inflammation over a period of hours.

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Appendix 2. Incision and Drainage (I&D) Procedure

Abscesses are localized infections of tissue marked by a collection of pus surrounded by inflamed tissue. Abscesses may be found in any area of the body, but most abscesses presenting for urgent attention are found on the extremities, buttocks, breast, perianal area, axilla, groin, or from a hair follicle. Abscesses begin when the normal skin barrier is breached, and microorganisms colonize the underlying tissues. Causative organisms commonly include *Streptococcus sp.*, *Staphylococcus sp.*, enteric bacteria (perianal abscesses), or a combination of anaerobic and gram-negative organisms.

Abscesses resolve by drainage. Smaller abscesses may resolve with conservative measures (warm soaks) to promote spontaneous drainage. Larger abscesses will require incision to drain them (I & D), as the increased inflammation, pus collection, and walling-off of the abscess cavity diminish the effectiveness of antibiotic treatment. Healing following an I & D should progress from the inside of the abscess outward to the incision site. This will require a gauze packing to promote healing from the inside outward.

Indication: Abscess within the skin that is palpable.

Contraindications

1. Extremely large abscesses that require extensive incision, debridement, or irrigation (best done in operating room).
2. Deep abscesses in very sensitive areas (labial, supralevator, ischiorectal, perirectal) that require a general anesthetic to obtain proper exposure.
3. Abscess in the hands or feet.
4. Abscesses in the triangle formed by the bridge of the nose and the corners of the mouth (should generally be treated with warm compresses and aggressive antibiotic therapy).
5. Abscesses located near major vessels must be differentiated from aneurysms before I & D are performed to avoid fatal hemorrhage. The distinction is made through aspiration with a large bore needle.

Materials

1. Sterile gloves
2. Mask/eye protection (if abscess appears to be under pressure enough to cause expulsion of contents with the incision)
3. 1% or 2% lidocaine with epinephrine for local anesthesia; 10 cc syringe and 23 gauge needle for infiltration. Alternatively, diphenydramine (Benadryl) 10 to 25 mg can be used for anesthesia. Dilute a 50 mg (1 cc) vial in a syringe with 4 cc of normal saline. (*Note:* Epinephrine is contraindicated in areas such as the fingers, nose, toes, and penis.)
4. Alcohol or povidone-iodine wipes
5. #11 scalpel blade with handle
6. Draping
7. Hemostat or sterile cotton-tipped applicator
8. Packing (plain or iodoform, ½" or ¼" packing)
9. Scissors
10. Gauze and tape
11. Culture swab (aerobic and anaerobic)

(continued on next page)

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Appendix 2. Incision and Drainage Procedure (I&D) *(Page 2 of 3)*

Pre-Procedure Education

1. Obtain informed consent. Inform the patient of potential severe complications and their treatment.
2. Explain the steps of the procedure, including the not insignificant pain associated with anesthetic infiltration.

Procedure

1. Use Standard Precautions.
2. Cleanse site over abscess with skin preparation of choice.
3. Drape to create a sterile field.
4. Infiltrate local anesthetic, allowing 2–3 minutes for anesthetic to take effect.
5. Incise over abscess with the #11 blade, cutting through the skin into the abscess cavity. Follow skin fold lines whenever possible while making the incision. The incision should be sufficiently wide to allow the abscess to drain and to prevent premature closure of the incision.

   For smaller abscesses requiring incisions, a "stab" or "cruciate" incision should be adequate. Some refer to this as a puncture or stab technique since the operator inserts the tip of the scalpel directly into the center of the abscessed tissue without making a linear incision.
6. Allow the pus to drain, using the gauzes to soak up drainage and blood. If a culture is being obtained, use the culture swab to take culture of abscess contents, swabbing inside the abscess cavity—not from the superficial skin over the abscess.
7. Use the hemostat or sterile cotton-tipped applicator to gently explore the abscess cavity to break up any loculations within the abscess.
8. Loosely pack the abscess cavity with the packing.
9. Place gauze dressing over the wound, and tape in place (without placing tape over the incision site).
10. Remove gloves and wash hands. Properly dispose of contaminated articles and assure appropriate cleaning of the area.
11. Schedule a call-out within 24–48 hours post-op. Depending upon the location and size of the abscess, arrange for the packing material to be changed daily or several times per day.
12. Pain from the site may require acetaminophen or nonsteroidal anti-inflammatory drugs; narcotics are rarely needed. With a tense abscess, the pain relief associated with the I & D itself may be sufficient enough that no pain medication is required.

Post-Procedure Patient Education.

Patients should be instructed to watch for the following symptoms:

- Recollection of pus in the abscess
- Fever and chills
- Increased pain and redness
- Red streaks near the abscess
- Increased swelling

While some inmates will have to return to the clinic to have their dressings changed, others can be taught to do this for themselves. In addition to showing these patients how to change the packing and replace the dressings, they should be educated on:

- Disposal of dressing material
- Hand-washing technique
- Cleansing the area after the dressing is complete

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Appendix 2. Incision and Drainage Procedure (I&D) *(Page 3 of 3)*

Complications

Prevention and management of complications associated with the I & D procedure are outlined below.

Complication	Prevention	Management
Insufficient anesthesia	Remember that the tissue around an abscess is acidotic, and local anesthetic loses effectiveness in acidotic tissues.	Do a field block; use sufficient quantity of anesthetic; allow time for anesthetic effect.
No drainage	Localize site of incision by palpation.	Extend incision deeper or wider as needed.
Drainage is sebaceous material	Abscess was an inflamed sebaceous cyst.	Express all material; break up sac with hemostat; pack open as with an abscess.

Following I & D of any abscess, the site should be observed for signs of recollection of pus or cellulitis. Complications of an inadequately treated abscess include bacteremia and septicemia. In persons who are immunocompromised, particularly diabetics, an abscess on an extremity can be complicated by severe cellulitis or gangrene, with potential loss of the affected extremity. An I & D of a periannal abscess frequently results in a chronic anal fistula that requires fistulaectomy by a surgeon. Deep palmar abscesses are a surgical emergency.

Documentation on the Medical Record

1. Informed Consent (signed)
2. Procedure used, prep, anesthetic (and quantity), success of drainage, culture if collected
3. Any complications (or "none")
4. Who was notified of any complication (MLP, attending MD)
5. Follow-up arrangements for scheduled call-out and dressing changes

Sources:

Dirksen DJ. Incision and drainage of an abscess. In: Pfenninger JL, Fowler GC, eds. *Procedures for primary care physicians*. St. Louis: Mosby;2003:50–53.

Kronful R. Technique of incision and drainage for skin abscess. *UpToDate*. May 13, 2009;17.2

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Appendix 3. Treatment Options for Mild-to-Moderate Skin and Soft Tissue MRSA Infections

Drug	Oral Dose	Monitoring	Adverse Reactions/ Drug Interactions/Comments
Note: Antibiotic therapy for presumed or confirmed MRSA infection should be administered via pill line.			
TMP-SMX	1 DS tablet twice daily (Consider higher dosing with more serious infections.)	Routine lab tests are not indicated. In cases of prolonged treatment or in complicated patients: Monitor CBC/platelets, and renal & hepatitis parameters.	**Adverse effects:** Rash, erythema multiforme, Stevens-Johnson syndrome, hemolysis w/ G-6-PD deficiency, hepatitis, pancreatitis, bone marrow suppression. **Drug interactions:** Dapsone, anticoagulants, phenytoin, cyclosporine, diuretics, MTX.. **Comments:** With renal insufficiency, maintain hydration to prevent crystalluria. Check for sulfa allergy.
Clindamycin	300–450 mg three times daily	Routine lab tests are not indicated.	**Adverse effects:** GI upset and relatively high incidence of *C. difficile*-induced colitis as compared to other antibiotics. **Comments:** If isolate is erythromycin-resistant *in vitro*, clindamycin resistance may develop during therapy; consult with microbiology laboratory prior to treatment regarding "D test" (*Section 4*). Advise inmate to report diarrhea immediately.

Clinical Notes:

- For less serious infections, antibiotic treatment may be avoided by using conservative measures (warm soaks or compresses and/or I & D). When antibiotics are administered, do so in conjunction with conservative measures.
- Select antibiotics based upon susceptibility results or the prevalent strain circulating in the facility.
- Minocycline or doxycycline, 100 mg twice daily, may be an alternative treatment option; however, laboratory susceptibility results must be carefully reviewed.
- Do not use fluoroquinolones to treat MRSA. MRSA isolates may be sensitive to quinolones *in vitro*; however, the potential for resistance limits the use of this class of antibiotics.
- Within the BOP, rifampin is *not* recommended for treatment of uncomplicated SSTIs. For treatment of recurrent or complicated SSTIs, rifampin can be considered on a case-by-case basis only after Central Office approval. Note that rifampin *must always* be used in conjunction with another antibiotic.
- Recurrent/persistent skin lesions may indicate nonadherence to treatment, antibiotic resistance, or re-exposure to an infected source.
- Resistant or serious infections usually require IV vancomycin or an alternative agent.

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Appendix 4. Treatment Options for Serious MRSA Infections

Drug	Dose[1]	Monitoring	Adverse Effects/ Drug Interactions/Comments
Vancomycin (Vancocin®)	15–20 mg/kg/dose (actual body weight) every 8–12 hours, not to exceed 2 g per dose. For most non-obese patients with SSTIs and normal renal function, a dose of 1 gm every 12 hours is adequate. Infuse over 1 hour. ***Ineffective if given orally.***	Refer to the BOP *Antimicrobial Stewardship Guidance*, when available, for more detailed information on monitoring. Collect trough level 1 hour prior to the fourth dose. *Target:* 10–15 mcg/mL for uncomplicated SSTIs or cellulitis *Target:* 15–20 mcg/mL for bacteremia, endocarditis, pneumonia, and other serious infections Auditory function Renal function/CBC	**Adverse effects:** ► Ototoxicity, nephrotoxicity, drug fever, hypotension, rash, pruritus, reversible neutropenia. ► If used with aminoglycosides, increases nephrotoxicity. ► Histamine reaction; flushing. **Drug interactions:** Anesthetics **Comments:** ► Infuse over 1 hour to reduce "red man syndrome" → flushing, hypotension. Monitor BP. May need to extend infusion time. ► Adjust dosage is based on trough levels. Refer to the BOP *Antimicrobial Stewardship Guidance*, when available, for more detailed dosing information. ► May require second or third antibiotic for serious infections.
Linezolid[2] (Zyvox®)	600 mg twice daily, orally or IV Can take with or without meals.	CBC with differential/platelet count weekly Monitor BP if hypertensive or taking a sympathomimetic.	**Adverse effects:** Diarrhea (including pseudomembranous colitis), bone marrow suppression, nausea, headache. Peripheral and optic neuropathy have been reported in patients treated with linezolid, primarily for those patients treated for longer than the maximum recommended duration of 28 days. **Drug interactions:** Avoid adrenergic and serotonergic agents, including decongestants and SSRI antidepressants. **Comments:** ► Avoid consuming foods containing large amounts of tyramine[3]. ► Use cautiously if patient is hypertensive.

[1] Sepsis requires at least 2 weeks of IV antibiotics. Endovascular infections such as endocarditis, osteomyelitis, and other deep-seated infections require 4–6 weeks of therapy and may require combination antibiotic therapy; consult with expert on treatment regimen and length of treatment.

[2] Linezolid is costly and has potential for serious toxicities. Linezolid should only be used after consultation with a physician expert to determine if alternative antimicrobials would be more appropriate.

[3] Avoid foods with very high tyramine content such as packaged soups, pickled/smoked fish, orange pulp, fava beans, and aged cheeses.

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Appendix 5. Inmate Fact Sheet—General Instructions for Skin Infections

The following instructions are for inmates diagnosed with a skin infection.

Handwashing and General Hygiene

- Regularly wash your hands with soap and water for at least 15 seconds, especially:
  - Before and after using the toilet.
  - Before and after touching your wound.
  - Before eating.
- Shower frequently and put on clean clothes. Change your clothing whenever they become soiled with wound drainage.
- Change bed linens and towels regularly and whenever they become soiled with wound drainage.
- Do not share personal items such as razors, towels, wash cloths, bars of soap, etc.
- If you have an open wound, it should be covered at all times with a bandage.
- Do not allow other inmates to touch your wound.
- If your bandage comes off, dispose of it carefully in a leak-proof container as instructed by health services staff. Wash your hands. Inform a correctional worker that you need a new bandage.

Warm Soaks and Compresses

You may be instructed to soak your skin infection regularly in warm salt water or apply moist compresses for 20 minutes at a time. Carefully follow the instructions you receive. If your wound begins to drain, report it to the health center.

Antibiotics

Take all medications prescribed by your doctor exactly as you are told to. They generally will be given only at pill line.

Report any of the following to the health center:

- Fever
- Red streaks up from the wound
- Increased foul smell from wound drainage
- Increased wound drainage

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Appendix 6. MRSA Fact Sheet

What is MRSA?
Staphylococcus aureus, often referred to as "staph," is a common type of bacteria that is found on the skin and in the nose of healthy persons. Staph bacteria may cause minor skin infections such as boils, or more serious infections such as pneumonia and blood poisoning. Certain "staph" bacteria that have become resistant to "first-line" antibiotics are called MRSA—which is short for "Methicillin-resistant *Staphylococcus aureus*." MRSA infections are more difficult to treat, but they usually respond to incision and drainage and/or antibiotics.
How is MRSA spread from person to person?
MRSA is usually spread through direct physical contact with an infected person, but may also be transmitted through contact with contaminated objects or surfaces. MRSA is not spread by coughing unless the infected person has pneumonia.
How can I prevent becoming infected with MRSA?
• **Wash your hands** thoroughly with soap and water throughout the day, particularly every time you use the toilet and before every meal. • Never touch another person's wounds, infected skin, or dirty bandages. • Don't scratch skin rashes. • Maintain personal hygiene through regular showers and by keeping your living space clean, including regularly laundering your bed linens. • Do not hand-wash and air dry your laundry. • Never share personal hygiene items with others, including toiletries or towels. • Clean off any surfaces shared with others, such as weight benches. • Use a towel or shirt as a barrier between your bare skin and exercise equipment. • Shower after participating in close-contact recreational activities whenever possible. • Don't get a tattoo in prison. • Don't use injection drugs. • Don't have sexual contact with other inmates.
How does a person know whether he or she has a MRSA infection?
◆ Always seek medical attention if you develop a boil, red or inflamed skin, an insect or spider bite, or a sore that does not go away. ◆ The most common way for health care providers to detect MRSA is by doing a culture of the pus from the skin infection.
How is MRSA treated?
MRSA skin infections are often treated first with frequent warm soaks and draining of the wound. Strong antibiotics can be effective in treating MRSA. Serious or highly resistant MRSA infections may require intravenous (IV) antibiotics in the hospital.

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Appendix 7a. Correctional Standard Precautions in the General Population[1]

To prevent the spread of disease, all correctional workers should routinely observe the following precautions.

Control Measure	Indicated (X)	Notes
Hand Washing	X	Hands should be routinely washed with soap and running water in all of the following situations: before eating, after using the lavatory, when hands are visibly dirty, and when there has been contact with blood or other body fluids. Wash hands with soap and running water for at least 15 seconds.
Personal Protective Equipment (PPE)	Not routinely	The following personal protective equipment is indicated only if contact with blood or body fluids is likely: gloves to protect hands from contact; masks, face/eye wear, and gowns to protect from sprays and splashes.
Sharps	X	Dispose of sharps in a leak-proof, puncture-resistant container. Never recap, bend, break, or otherwise manipulate used needles by hand.
Single cell	Not routinely	Place potentially infectious inmates in a private room (in consultation with medical staff).
Sanitation	X	Do routine cleaning with an Environmental Protection Agency (EPA) registered disinfectant (http://www.epa.gov/oppad001/chemregindex.htm), according to the manufacturer's instructions. All washable (non-porous) surfaces should be cleaned **during and after** (terminal) cell occupancy. Correctional workers should conduct sanitation inspections of living and bathroom areas to identify visibly dirty areas.
Laundry	X	Collect at bedside or allow inmate to self-launder. If wet or soiled, handle as little as possible while wearing gloves. Bag in a leak-proof bag at the location in which it was used, in accordance with local policy on management of contaminated linens. Machine wash and dry.
Activities	X	**Shared exercise equipment** such as weight benches or other surfaces exposed to sweat should be disinfected daily, and routinely wiped clean between users with a clean dry towel. Inmates using exercise equipment should use barriers to protect bare skin, such as a towel or clean shirt. **Inmates participating in Sweat Lodges** should shower beforehand and wear clean shorts and shirts; afterwards, they should shower and again put on clean clothes. Routinely clean blankets and towels used during the ceremony.
Reporting Skin Infections	X	Correctional workers with possible skin infections should report them promptly to their supervisor. Likewise, inmates with possible skin infections should be sent promptly for medical evaluation.

[1] *General Population* refers to all correctional settings except health care settings.

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Appendix 7b. Correctional Standard Precautions in the Health Care Setting[1]

The following precautions should be observed routinely by all correctional workers and clinicians who work in health care (HC) settings.

Control Measure	Indicated (X)	Notes
Hand Washing	X rigorously	Perform **before and after** every patient contact, whether or not gloves were worn. *If not visibly soiled:* Clean hands with a small quantity (e.g., 2–3 mL) of an alcohol-based handrub containing at least 60% alcohol (if permitted) or an antimicrobial soap. *If visibly soiled:* Hands should be washed with soap (antimicrobial or regular) and running water, using friction. Liquid soap dispensers at sinks are preferred.
Personal Protective Equipment (PPE)	X	Staff should have access to single-use, disposable gloves for use when contact with infectious body fluids or mucous membranes is anticipated. Latex-free gloves for latex-sensitivities should be available. Gloves may be sterile or non-sterile, depending on the task. All HC staff should clean their hands before and after use of gloves. Use other PPE (e.g., masks, face/eye wear, and gowns) if spray/splash is likely.
Sharps	X	Properly dispose of sharps in a leak-proof and puncture-proof container per OSHA standards. Never recap, bend, break, or manipulate used needles by hand.
Room Assignment	not routinely	Place potentially infectious inmates in a private room. Consider for those with poor hygiene.
Sanitation	X strictly enforced	Routinely clean all countertops and treatable surfaces in HC facilities per local schedule, with emphasis on frequently touched surfaces (e.g., door knobs, bed rails), and after any contamination with blood/body fluids. Use an appropriate quaternary ammonium (chloride containing) disinfectant. Change solutions on a *daily* basis, and clean the container to prevent contamination. Ensure that patient care items and potentially contaminated surfaces are cleaned and disinfected after use. Use protective coverings as barriers for surfaces that are touched frequently with gloved hands during patient care, that may become contaminated with blood/body fluids, or that are difficult to clean.
Laundry	X	Collect and bag at bedside using standard precautions. Machine wash in hot water and machine dry regularly. Distribute when thoroughly dry.
Patient Care Equipment	X	Safely handle contaminated patient-care equipment to prevent skin and mucous membrane exposures, contamination of clothing, or transfer of microorganisms to other patients and environments. Ensure that reusable equipment is decontaminated and reprocessed after each patient use. Discard all single-use items properly. Promptly decontaminate reusable equipment if contaminated with infectious body fluids or visibly soiled.
Reporting Skin Infections	X	Healthcare staff should follow local procedures on reporting infections. Staff with suspected skin infections should report them promptly to their supervisors.

[1] *Health care setting* refers to areas where health care is delivered such as: medical/observation rooms, ambulatory or chronic care clinics, dental offices, or inpatient units.

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Appendix 8a. Correctional Contact Precautions in the General Population[1]

*Observe the following precautions, **in addition** to routine Correctional Standard Precautions (see Appendix 7a), when working with an inmate known to have a skin infection.*

Control Measure	Indicated (X)	Notes
Hand Washing	X rigorously	Hands should be routinely washed with soap and running water for at least 15 seconds. Perform hand washing **before and after** every contact with an infected inmate, even if gloves were worn.
Personal Protective Equipment (PPE)	as needed	Use gloves if touching contaminated items or having contact with blood/infectious body fluids is likely. Use other personal protective equipment (mask, face/eye wear, gowns) if contact with sprays or splashes is likely.
Sharps	X	Dispose of sharps properly in a leak-proof, puncture-resistant container. Never recap, bend, break, or otherwise manipulate used needles by hand.
Housing	varies	Medical personnel determine the appropriate housing for an inmate with a skin infection. Inmates with skin infections may be housed in the general population if the wound drainage can be contained in a dressing *and* the inmate is cooperative. Inmates with wounds that have significant drainage should generally be housed in a single cell. In an outbreak situation, inmates with MRSA may be housed together.
Sanitation	X	Do routine cleaning with an Environmental Protection Agency (EPA) registered disinfectant (http://www.epa.gov/oppad001/chemregindex.htm). Inmates are responsible for daily sanitation of their cell. Instruct inmates to safely dispose of bandages in a leak-proof container according to local security policy. Remove trash *daily*. Clean all washable surfaces during and following (terminal) cell occupancy. Correctional workers should conduct sanitation inspections of living and bathroom areas.
Laundry	X	Change bed linens every other day (more often if visibly soiled). Linen should be bagged by the inmate in the cell. Change towels and wash cloths *daily*. Machine wash and dry.
Inmate Hygiene	X	Monitor inmate hygienic practices, particularly if the inmate is mentally impaired. Inmates with skin infections should shower *daily*.
Activities/ Visitors	case-by-case	Medical personnel will make decisions about the need for restrictions on activities or visitors for inmates with skin infections. Restrictions on visitors are rarely indicated.
Equipment	X	For hand-cuffs and other security devices, single-use disposable items are recommended. Otherwise, clean after each use.
Transports	only when essential	If transfer is *required* for security or medical reasons, the following procedures should be followed: (1) The wound should be dressed on the day of transfer with clean bandages that will contain the wound drainage. (2) Use contact precautions as described above (hand-washing, gloves if touching wound drainage, safe disposal of dressings). If soiling of security devices is likely, use disposable restraints if feasible. If not, decontaminate after use. (3) Place a clean sheet on cloth seats in vehicle (not needed if vinyl). Decontaminate if visible contamination occurs.

[1] *General Population* refers to all correctional settings except health care settings.

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Appendix 8b. Correctional Contact Precautions in the Health Care Setting[1]

*Observe the following precautions, **in addition** to routine Correctional Standard Precautions (see Appendix 7b), when evaluating and treating inmates with skin or soft tissue infections in health care (HC) settings.*

Control Measure	Indicated (X)	Notes
Hand Washing	X rigorously	Perform hand washing **before and after** every contact with an infected inmate, in accordance with Correctional Standard Precautions.
Personal Protective Equipment (PPE)	X as needed	Use clean, non-sterile gloves for patient care. Change gloves after contact with infective material. Before leaving the patient's room, remove gloves and immediately wash hands with an antimicrobial. Avoid touching potentially contaminated surfaces/items to avoid transfer of germs. Use other PPE if contact with wound drainage is likely.
Sharps	X	Dispose of sharps properly in a leak-proof, puncture-resistant container. Never recap, bend, break or otherwise manipulate used needles by hand.
Room Assignment	private or cohort	*Outpatient:* Use a private exam room for suspected/confirmed MRSA cases. *Inpatient:* Use private exam room if inmate has extensive draining lesions (keep covered) or MRSA pneumonia. May cohort if patients have same antibiotic resistance pattern. (See *Appendix 9*)
Sanitation	X	Perform routine cleaning per local schedule, with emphasis on high touch areas. Use quaternary ammonium. All patient care items and potentially contaminated surfaces must be cleaned and disinfected after use. Use protective coverings as barriers for surfaces that are touched frequently with gloved hands during patient care, that may become contaminated with blood/body fluids, and/or that are difficult to clean. Dispose of dirty bandages in accordance with local waste management policy.
Laundry	X	Use routine standard precautions. No separate "isolation linen" is needed.
Patient Care Equipment	X single-use, if feasible	Safely handle contaminated patient-care equipment to prevent skin and mucous membrane exposures, contamination of clothing, or transfer of microorganisms to other patients and environments. Ensure that reusable equipment is decontaminated and reprocessed after each patient use. Discard all single-use items properly. Promptly decontaminate reusable equipment if it is contaminated with infectious fluid or visibly soiled.
Reporting Infections	X	HC staff should follow local procedures for reporting MRSA infections. Staff with suspected skin infections should report to their supervisors.
Movement	essential purposes only	Limit movement outside room to *essential* purposes only. Cover wound with clean dressing.
Transfers		*In general, do not transfer* inmates with contagious MRSA infections. If transfer is required for security or medical reasons: **(1)** On the day of transfer, securely dress draining wounds to prevent seepage. **(2)** Use contact precautions (described above). If soiling of security devices is likely, use disposable restraints if feasible. If not, decontaminate after use. **(3)** Place a clean sheet on cloth seats in vehicle (not needed if vinyl). Decontaminate vehicle if visible contamination. **(4)** Have the clinical director (CD)/designee notify receiving CD/health services administrator of pending transfer with MRSA infection.

[1] *Healthcare Setting* refers to areas where health care is delivered such as medical/observation rooms, ambulatory or chronic care clinics, dental offices, or inpatient units.

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Appendix 9. MRSA Inmate Housing Guidelines

Status	Housing Containment Guideline	Precautions
Non-draining skin or soft tissue infection (SSTI)	**Single-cell housing is not required.** Inmates should be instructed in personal hygiene, as well as the need to report a worsening of the infection or an increase in wound drainage.	[1] Correctional Standard Precautions
Small, draining SSTI (easily contained by a simple dressing)	**Single-cell housing usually is not required.** Single-cell housing should be considered for inmates who are mentally ill, cognitively impaired, or uncooperative.	[1] Correctional Standard Precautions
SSTI with uncontained drainage (e.g., weeping cellulitis, purulent catheter-site infections, non-healing abscesses, infected surgical wounds, etc.)	**Single-cell housing is recommended. In outbreak situations, it is acceptable to cohort MRSA-infected inmates with similar antibiotic resistance patterns.** ▸ Restrict these inmates from recreation and other common areas. ▸ Visitor restrictions are rarely indicated, and should be handled on a case-by-case basis. ▸ Separate shower and toilet facilities are preferred, with priority given to inmates with draining peri-rectal or thigh lesions.	[1] Correctional Standard Precautions & [2] Correctional Contact Precautions
MRSA pneumonia	Inmates with MRSA pneumonia can often be housed with other inmates. Decisions about housing should be made on a case-by-case basis. If the inmate has copious respiratory secretions or has poor hygiene habits—and is likely to contaminate the environment—house in a separate room and utilize contact precautions.	[1] Correctional Standard Precautions & [2] Correctional Contact Precautions, if indicated

Status	Criteria for Discontinuing Restricted Housing
Healed wounds	Release 24 hours after wound drainage has ceased (even if antibiotic therapy is incomplete).
Draining wounds	Release once wound drainage can be contained with a simple dressing. *or* Release after documenting clinical improvement *and* 2 consecutive negative cultures, at least 72 hours apart.

[1] The components of *Correctional Standard Precautions* are outlined in *Appendix 7a* and *Appendix 7b*.

[2] The components of *Correctional Contact Precautions* are outlined in *Appendix 8a* and *Appendix 8b*.

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Appendix 10. MRSA Infection Control Checklist (Page 1 of 2)

T	SSTI Case Follow-Up
Case – Last name:	**First name:** **Registration #:**
	1. History of current illness G Non-draining skin infection (location):_____ G Draining wound (location)_____ Description: _____ Onset date: __/__/__ G I & D Date: __/__/__ _____ G I & D Date: __/__/__ _____ G Pneumonia Onset date: __/__/__ G History of fever (obtain blood cultures)
	2. Culture Results: G Culture/Source: _____ Date: ___/___/___ Organism: _____ Resist:_____ G Culture/Source: _____ Date: ___/___/___ Organism: _____ Resist:_____ G Culture/Source: _____ Date: ___/___/___ Organism: _____ Resist:_____
	3. Indicate recommended housing of inmate: (see *Appendix 9*, *Inmate Housing Guidelines*) G **General population** (generally non-draining lesions or lesions with contained drainage) G **Single cell housing** (draining lesions, uncooperative inmates with MRSA, MRSA pneumonia–if indicated) G Separate toilet facility preferred G Separate toilet facility required (thigh/peri-rectal lesions, etc.) G **Cohorted housing** for inmates with MRSA with similar susceptibility patterns (outbreak situations)
	4. Inmate teaching/restrictions (*check all that apply*) G Teach inmate about wound care/precautions (see *Appendix 5*, *General Instructions for Skin Infections*). G Restrict from work assignment (_____) until not infectious. G Restrict from recreation, until not infectious. G Restrict *or* G do not restrict from dining hall (check one). G Impose visitor restrictions (rarely indicated; determine on a case-by-case basis).
	5. Case interview to identify potential sources of infection Date of interview: __/__/__ G History of SSTI _____ G Hospitalization or surgery (*where/when?*) _____ G Sharing of personal hygiene items _____ G Recent injection drug use _____ G Tattoo while incarcerated _____ G Other medical risk, e.g., diabetes, dialysis, etc. _____ G Sexual contact with other inmates _____ G Participation in close-contact activity _____ G Exposure to other inmates with draining lesions _____ G Recent transfer _____
	6. Identify potential contacts: G Review infection data, sick-call → trends, more cases? G Yes G No G Review interaction with providers → more cases? G Yes G No G Identify other positive laboratory cultures? G Yes G No G Work assignment: _____ G Housing assignment(s) (dorm/room): _____
	7. Discontinue restricted housing: __/__/__ G **Healed wounds:** Release 24 hours after wound drainage ceased (even if antibiotic Tx incomplete). G **Draining wounds responding to Tx:** Release if cooperative and drainage contained by simple bandage *OR* after 2 consecutive negative cultures, at least 72 hours apart.
	8. Follow up visit to monitor for potential reoccurrence. Date: __/__/__

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Appendix 10. MRSA Infection Control Checklist (Page 2 of 2)

T	Contact Follow-Up/General Infection Control
Case – Last name:	**First name:** **Registration #:**
	9. Implement appropriate barrier precautions and promote good hand hygiene. G Insure appropriate staff communication. G Insure processes to maintain access to appropriate hand hygiene supplies are in place for infected inmate and staff. **Describe:** **Date: __/__/__**
	10. Communicate risks and educate on transmission, infection control, & prevention. G Inmates G Correctional workers G Clinician staff – include management training as necessary **Describe:** **Date: __/__/__**
	11. Screen all close contacts for symptoms. **Date completed: __/__/__** Screen for localized symptoms or systemic symptoms/potential sepsis, e.g., fever, tachycardia, tachypnea, hypotension, and mental status changes. Expedite to hospital, as indicated.
	12. Evaluate symptomatic cases and treat and contain as indicated. Refer as necessary. Obtain culture and susceptibility testing on draining lesions. If MRSA is suspected, refer back to steps 1–8 on Page 1 of this checklist.
	13. Report MRSA outbreak* to: G Not applicable G Warden Date: __/__/__ G Regional Office Date: __/__/__ G Central Office HSD Date: __/__/__ G Local health department Date: __/__/__ ** Outbreak: Two or more epidemiologically related cases with similar antibiotic resistance pattern.*
	14. Continue surveillance to identify potential cases. If transmission-linked cases are evident, consider mass screening of implicated areas.
	15. Provide feedback and address areas where improvement in infection control is indicated.
	16. Transfers/Releases: Inmates with contagious MRSA infections should ordinarily not be transferred to other BOP institutions or halfway houses until their infection has been adequately treated and the risk of contagion is controlled. See recommendations on page 11 regarding required transfers & releases.
	_____ Investigating Employee (Last Name, First – Print) _____ Date Completed _____ Employee Signature

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Appendix 11. MRSA Case Tracking and Reporting Form*

Name	Age	Rm #	Hsg Unit	Facility Admit Date	Recent Hospitalization Admit Date	Past or recent invasive procedures? (describe)	Infection Site	Date of First + Culture	Case Closure: (date clinically resolved)
Registration #				Transfer Date (if <30 days)	Discharge Date		Onset Date	Strain (if typed)	Final Culture Date

*List all cases/suspected cases of MRSA.