Environmental Health & Safety
UNIVERSITY OF COLORADO **BOULDER**

Post Exposure Plan for *Methicillin-Resistant Staphylococcus aureus* (MRSA)

Background Information:

Staphylococcus aureus is an opportunistic pathogen, found worldwide, that causes both self-limiting and life-threatening diseases in humans. It is one of the most common causes of skin, soft-tissue and hospital-borne infections. Many strains of *S. aureus* produce staphylococcal enterotoxins, exotoxins and exfoliative toxins. This bacterium is naturally found on humans, primarily in the nose and on the skin. Methicillin-resistant *staphylococcus aureus* (MRSA) is a strain resistant to the antibiotic, methicillin (a closely related antibiotic to penicillin, resistance to which usually includes resistance to all penicillin-derived antibiotics).

Staphylococcus aureus is the leading cause of food poisoning resulting from consumption of food contaminated with enterotoxins. Additionally, some strains produce the exotoxin, TSST-1, which is the leading cause of toxic shock syndrome (TSS).

The primary reservoir hosts of *S.aureus* are humans, wild and domestic animals.

Person-to-person transmission can occur from contact with a purulent lesion or with a carrier's skin. Transmission between patients and health care workers can be common in health care settings via inadequately washed hands or by fomites. Nasal colonization can by asymptomatic or can lead to autoinfection and auto-reinfection. Additionally, unsanitary conditions can increase exposure to *S.aureus.* Inhaling MRSA into the lungs can result in extremely severe pneumonia.

Laboratory-acquired infections are presumed to occur via skin or clothing exposure to contaminated materials. Also, possibly via eating with contaminated hands.

Primary hazards in the laboratory :

Creation of splashes or aerosols, exposure to mucous membranes or skin, ingestion, and exposure to contaminated sharps.

Acceptable disinfectants:

S.aureus is susceptible to 70% ethanol, chlorhexidine, 1% sodium hypochlorite, 2% glutaraldehyde, 0.25% benzalkonium chloride and formaldehyde.

Exposure controls and personal protection:

MRSA is a Risk Group 2 organism. BSL-2 practices, containment equipment, and facilities are required when working with materials known or suspected of containing this agent.

Personal protective equipment such as lab coats and gloves must be worn when handling infected or potentially infected materials. Eye protection must be used when there is a known or potential risk of generating splashed or aerosols.

Procedures that may generate aerosols or splashes should be conducted in a certified biosafety cabinet.

Personnel should wash their hands frequently while working in and before leaving the laboratory. Personal items including waters bottles, cell phones, car keys, etc., should be stored in such a way as to avoid contamination and should be accessed only when the laboratory exercise is completed, lab coats and gloves are removed, and hands are washed.

If an infection is acquired, any lesions must be completely covered to prevent spreading the infection. MRSA skin and soft tissue infections likely result in boils, abscesses, cellulitis, and fasciitis. Recurrences may indicate that a person has been colonized with MRSA and should be seen by a health care provider.

The Principal Investigator (PI), or their designee, must ensure that all personnel are adequately trained in safe laboratory practices, universal precautions, and proper surface and equipment disinfection before initiating any work with this agent. The PI must also ensure that all personnel are aware of the signs and symptoms of a potential infection with MRSA with an emphasis on the effects on the immunocompromised, elderly and persons with metabolic disorders (e.g. diabetes).

At risk populations:

Immunocompromised individuals along with the elderly are at highest risk for MRSA infections.

Immediate Action by Route of Exposure:

Needlestick, Animal Bite, Laceration: Wash area thoroughly with soap and running water. Do not apply disinfectant to the skin.
Mucous membranes (Eyes, nose, mouth): Flush the eyes for 10-15 minutes if eyes have been exposed to splash or spray containing bacteria. Rinse out mouth without swallowing after any exposure.
Inhalation: If contaminated materials are aerosolized and potentially inhaled, rinse mouth twice and spit. Do not swallow.
Intact skin: Wash the area thoroughly with soap and water.

After First Aid:

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Suspected infections related to research exposures must be reported to the University of Colorado, Boulder's Biosafety Officer at 303-492-2817. Please see below for complete instructions related to suspected research exposure.
If at all possible, take the antibiogram of the suspected exposure MRSA strain with you to the treating health care provider or have the susceptibilities called in to the treating provider. Treating medical providers should be informed of the possibility of MRSA infection. The incubation period for this bacteria ranges from 1-10 days. Individuals with suspected MRSA infections should have cultures and sensitivities done to ensure proper and adequate treatment.

Post-exposure Prophylaxis:

None.

Symptoms of infection in adults:

Food poisoning (onset usually within hours, but most symptoms subside within 24 hrs):

- Nausea
- Vomiting
- diarrhea

Skin infections (no defined onset. Lesions may happen at site of break in skin.):

- blisters
- skin peeling and loss
- impetigo
- folliculitis or boils
- abscesses
- fluid loss
- necrotizing fasciitis
- cellulitis

Animal bite:

- local skin infection
- cellulitis or abscess
- tenderness
- mild fever
- adenopathy

Toxic Shock Syndrome

- high fever
- vascular collapse
- vomiting

- diarrhea
- myalgia

After First Aid – Treatment and Reporting:

University of Colorado Boulder: Procedures for Work-Related Injuries or Illness, Including Animal Bites, Severe Allergic Symptoms, and Sharps Exposures.

It is the policy of the University of Colorado at Boulder (UCB) that all incidents that result in an injury or severe illness to faculty, staff or students be appropriately documented and reported. If a work-related incident, accident, injury or illness occurs:

a) Medical Treatment

a. **In case of life or limb-threatening emergency call 911** or go immediately to the nearest emergent or urgent care facility. Immediately administer appropriate first aid, including thoroughly washing any wounds or exposed areas with soap and water, if at all possible.

b. **If you are an employee of the University and you need non-emergency care** for a work-related illness or injury that has occurred during regular weekday working hours, you must be treated at one of the UCB Designated Medical Providers (DMPs: shown below). **Boulder Community Hospital Emergency Department has the ability to rapidly test for work-related infectious disease or potential biological exposures; all other DMPs may not have this rapid capability.** Testing can be done on the exposed personnel; it may be difficult to test any source patient or sample at the DMP.

c. **After hours or while traveling**, go to the nearest urgent or emergent care facility.

d. **Sharps injuries** that include exposure to human blood, body fluids, tissues, tissue culture cells are considered to be injuries with a potential for transmitting bloodborne pathogens. Prompt evaluation and treatment is necessary for these injuries. (go to Boulder Community Hospital Emergency Department)

b) Reporting

a. Report the work-related injury or illness to your supervisor immediately. You or your supervisor should notify the Biosafety Officer at 303-492-2817 or at Cher.Masini@colorado.edu . (The BSO may confer with IACUC administrator, veterinarian, or Occupational Health RN.)

b. You must file a worker's compensation injury report form **within 4 days of the work-related injury** / exposure or illness onset. Report the incident on the URM website and use the on-line reporting form.

c. Sharps injuries must be reported on the URM's needle stick exposure report form.

d. All injury reporting forms can be found at the URM's website at https://www.cu.edu/risk/file-claim

c) Eligibility (who is eligible to be seen by UCB Designated Medical Providers?)

a. All UCB employees, paid UCB staff, graduate students receiving a traineeship or stipend administered by UCB, undergraduate work-study students and paid undergraduate student assistants are eligible to be seen by UCB DMPs. If you are an UCB employee and you visit your regular primary care provider for a work-related injury and your visit is coded as a work-related injury, your primary insurance may not cover the cost of your visit or treatment with your primary care provider.

Some individuals are not covered by UCB Worker's Compensation: All visiting or resident scholars who do not receive payment via UCB (e.g., Howard Hughes Medical Institute Fellows) must follow the work-related exposure / illness or injury protocol outlined by their parent institution or outside funding source. Contract or consulting employees are also not covered by UCB Worker's Compensation; they need to follow the work-related exposure / illness or injury protocols established by their parent institution or consult with their personal health care provider. Volunteers, contract employees and students not paid by UCB are **not** covered by UCB Worker's Compensation and should be seen by their personal health care provider. If you are a student with a Wardenburg Health care plan, post-exposure lab tests are available and covered.

d) Payment and questions:

a. All bills from medical providers must be sent to University Risk Management:

University Risk Management (https://www.cu.edu/risk/file-claim)
1800 Grant Street, Ste 700
Denver, CO 80203
Fax: 303-860-5680

b. For further questions, contact URM at: 303-860-5682 or 888-812-9601

UCB Designated Medical Providers

This list changes frequently. For a current listing of DMPs, please refer to the University of Colorado's Risk Management website at: https://www.cu.edu/risk/dmp