01.22 – Control of Multi-Drug Resistant Organisms (MDRO)

Purpose

To describe the strategies to prevent transmission of multi-drug resistant organisms (MDROs) and extremely drug-resistant organisms (XDROs) in the healthcare setting.

Audience

All employees of UTMB hospitals, clinics, ambulatory surgery centers, and licensed independent practitioners, contract workers, volunteers, and students

This policy provides guidance for all MDROs in various healthcare settings of UTMB. The requirements in this policy are consistent with, but may be more specific than, the isolation policy 0 1.19.

In 2019, CDC released a document entitled Antibiotic Resistant Threats in the US. Drug resistant organisms were categorized as follows: urgent threats, serious threats, concerning threats, and watch list. Several of these organisms pose a threat of transmission in healthcare facilities and are addressed in this document.

Appendices A-C deal with active surveillance culturing, previously addressed only by department procedures and were not included in policies. Appendix D is a recap of all recommendations by organism and resistance pattern.

Organism-specific protocols

For organisms not specifically covered, see isolation policy (01.19), *C. difficile* policy (01.43), and drug-resistant tuberculosis (Policy 01.21). Organism-specific protocols will be reviewed at least annually and when new concerns emerge.

Methicillin-resistant *Staphylococcus aureus* (MRSA)

Impact: In a healthcare setting, MRSA transmission can cause serious infections such as bacteremia, pneumonia and surgical site infections. If not treated quickly, MRSA infections can cause sepsis and death. MRSA is categorized as a serious threat.

Definition: An isolate with minimal inhibitory concentration (MIC) of >2 µg/ml to oxacillin or by detection of the *mec*A gene by nucleic acid amplification tests, such as the polymerase chain reaction (PCR)

Identification:

- Clinical isolates flagged in Sentri7
- Active surveillance culturing of nares in ICUs and other high-risk patient populations (MRSA and MSSA) See appendices A&B
- Other surveillance cultures may be ordered by providers for pre-operative clearance

Decolonization

- If patient is positive for MRSA or MSSA, decolonize with a nasal disinfectant or topical antibiotic. Widespread use of topical antibiotics has been demonstrated to lead to resistance and therefore is suggested only for patients who need prolonged protection, e.g., dialysis patients. A topical antiseptic such as Nozin is preferred for

widespread use. Skin decolonization by bathing with chlorhexidine gluconate (CHG) products is performed in high-risk patient populations.

- For pre-operative screening and/or decolonization, regimens are prescribed by the patient's care team.
- Employees will not be screened or decolonized unless epidemiologically linked to an infection.

Isolation:

- Contact precautions for MRSA (but not MSSA) isolated in clinical specimens only.
- Nasal colonization only (no recent history of MRSA infection): Contact Precautions in NICU; Standard Precautions (no isolation) in pediatric and adult units. Patients who remain nasally colonized after a clinical infection will remain in Contact Precautions until criteria described below are met.

Discontinuing isolation:

- Clinical site of MRSA infection must be resolved (e.g., no draining wounds).
- Criteria for discontinuing isolation:
  - Patient admitted with chart flagged from previous encounter: 2 negative cultures a week apart.
  - Patient who has not been admitted for ≥ 12 months after initial flag placed: discontinue precautions without re-culturing.

Employees

- Employees who have direct touch contact with patients, should not work while having an active MRSA infection. MRSA colonization is generally not a reason for exclusion for work unless linked to an outbreak.
- No active surveillance cultures of employees will be performed except as a part of an investigation.
- No decolonization is recommended for staff except as a part of outbreak management.

Environmental cultures: taken periodically in selected adult ICUs to check cleaning processes.

Reporting: MRSA bacteremia in hospitalized or ED patient is reportable to NHSN.

Vancomycin resistant *Enterococcus* (VRE)

Impact: VRE is often passed from person to person by the contaminated hands of caregivers. VRE can get onto a caregiver's hands after they have contact with other people with VRE or after contact with contaminated surfaces. VRE can also be spread directly to people after they touch surfaces that are contaminated with VRE.

Definition

Enterococcus faecalis, Enterococcus faecium, or Enterococcus species unspecified *(only those not identified to the species level)* that is resistant to vancomycin, by standard susceptibility testing methods or by results from any

FDA-approved test for VRE detection from specific specimen sources.

Disc content	Interpretive Category and Zone Diameter Breakpoints			Interpretive Categories and MIC Breakpoints (µg/mL)		
30 µg	S	I	R	S	I	R
	≥ 17	15-16	≤ 14	≤ 4	8-16	≥32

Identification:

- Clinical isolates flagged in Sentri7.

Isolation:

- Contact precautions for those who are colonized or infected with VRE while in inpatient units.

Decolonization: no

Environmental cultures: periodic cultures in adult ICUs to check on cleaning efficacy.

Discontinuing isolation:

- Clinical site of VRE infection must be resolved (e.g., no draining wounds).
- 2 perirectal cultures taken a week apart
- Patient who has not been admitted for ≥ 12 months after initial flag placed: discontinue precautions without culture

Multi-drug resistant *Acinetobacter*

Impact: *Acinetobacter* has emerged as an important nosocomial pathogen. It survives well in the environment at a variety of temperatures, pH, and in both moist and dry environments. Treatment options are severely limited for MDR strains. Carbapenem-resistant *Acinetobacter baumannii* (CRAB) isolates are particularly concerning.

Definition:

Any ***Acinetobacter*** spp. testing non-susceptible (i.e., resistant or intermediate) to at least one agent in at least 3 antimicrobial classes of the following 6 antimicrobial classes:

Class	Antimicrobial
Aminoglycosides	Amikacin Gentamicin Tobramycin
β-lactam/β-lactam β-lactamase inhibitor combination	Piperacillin Piperacillin/tazobactam
Carbapenems	Imipenem Meropenem Doripenem
Cephalosporins	Cefepime Ceftazidime
Fluoroquinolones	Ciprofloxacin Levofloxacin

Sulbactam	Ampicillin/sulbactam

Identification:

- Clinical specimens
- Active surveillance cultures: patients in adjacent rooms (ring culturing)
- Environmental cultures: adjacent rooms, patient room after dc clean if feasible

Isolation: Contact precautions. Dedicated patient equipment for CRAB

Discontinuing isolation for MDR carbapenem-sensitive:
Clinical site of infection has resolved
2 negative perirectal cultures taken 1 week apart

Discontinuing isolation for CRAB:
1) Do not discontinue unless the following criteria are met Clinical cultures: No clinical isolate of CRAB in last 12 months
2) Hospitalization or long-term care:
   a. Not discharged from acute care facility in last 30 days
   b. Not a resident of a long-term care facility or rehabilitation facility
3) Skin integrity: no open wounds
4) Presence of devices: no drain, foley, ventilator, central line (PIVs OK**)**

AND

- *2 negative perirectal cultures 1 week apart*.

Environmental culturing if precautions not in place upon admission:

- Surfaces in patient's rooms, 2 adjacent rooms, and other areas in unit as needed.
- As needed to conduct an outbreak investigation

Reporting: All MDR *Acinetobacter* is reportable to the local health authority

Extended-beta lactamase producing organisms (ESBL)

Impact: *Klebsiella*, *Escherichia, Enterobacter,* and some other genera of the Enterobacteriaceae family may cause serious infections in hospitalized patients, particularly those who require the use of devices such as ventilators, central lines, and urinary catheters. According to the CDC, patients with bloodstream infections caused by ESBL-producing Enterobacteriaceae are about 57% more likely to die than those with bloodstream infections caused by a non ESBL-producing strain.

As the family name implies, they are normal inhabitants of the human bowel. They are spread primarily by person-to-person contact but may also spread from contact with a contaminated environment. In some cases, carbapenems are the only antibiotic class available for treatment, which is leading to the emergence of carbapenem resistance.

Definition: ESBLs are enzymes that mediate resistance to extended-spectrum (third generation) cephalosporins (e.g., ceftazidime, cefotaxime, and ceftriaxone) and monobactams (e.g., aztreonam) but do not affect

cephamycins (e.g., cefoxitin and cefotetan) or carbapenems (e.g., meropenem or imipenem). Although this definition applies to any species in the *Enterobacteriaceae* family, the emphasis will be placed on the species with those deemed to be clinically significant for UTMB: *Klebsiella pneumoniae*, *Klebsiella oxytoca, Escherichia coli*, *Enterobacter cloacae*, and *Enterobacter aerogenes.*

Identification:

- Clinical isolates
- Active surveillance cultures for investigations or to discontinue isolation

Isolation: Contact precautions

Environmental cultures: only as a part of an outbreak investigation.

Discontinuing isolation:

- Initial site of infection resolved (e.g., no draining wounds)
- Screening to discontinue isolation precautions:
  - 2 negative perirectal cultures
  - Patient who has not been admitted for ≥ 12 months after initial flag placed: discontinue precautions without culture

Carbapenem resistant Enterobacteriaceae

Impact: CRE are resistant to most, if not all antibiotics. For many years carbapenem antibiotics were used effectively for treatment of many microorganisms resistant to all the other antibiotics available.

Definition:

As with ESBLs, any species found in the Enterobacteriaceae family may be carbapenem resistant. The emphasis will be placed on ***Escherichia coli***, ***Klebsiella oxytoca, Klebsiella pneumoniae***, ***Enterobacter* cloacae, and *Enterobacter aerogenes*** isolates testing resistant to imipenem, meropenem, doripenem, or ertapenem by standard susceptibility testing methods (i.e., minimum inhibitory concentrations of ≥4 mcg/mL for doripenem, imipenem and meropenem or ≥2 mcg/mL for ertapenem) OR by production of a carbapenemase (i.e., KPC, NDM, VIM, IMP, OXA-48) demonstrated using a recognized test (e.g., polymerase chain reaction, metallo-β-lactamase test, modified-Hodge test, Carba-NP).

Identification:

- Clinical specimens
- Active surveillance cultures: patients in adjacent rooms (ring culturing)
- Environmental cultures: adjacent rooms, pt room after dc clean if feasible

Isolation

- Contact precautions
- Physicians and other healthcare workers may not take a stethoscope,

cell phone or iPad into the room unless they are covered by the gown and are not removed from under the gown while in the room

Environmental cultures if patient was not isolated upon admission:

- Surfaces in patient's rooms, 2 adjacent rooms, and other areas in unit as needed.
- As needed to conduct an outbreak investigation

Discontinuing isolation:

Do not discontinue unless the following criteria are met

1) Clinical cultures: No clinical isolate of CRE in last 12 months AND
2) Hospitalization or long-term care:
   a) Not discharged from acute care facility in last 30 days
   b) Not a resident of a long-term care facility or rehabilitation facility
3) Skin integrity: no open wounds AND
4) Presence of devices: no drain, foley, ventilator, central line (PIVs OK) AND

5) 2 negative perirectal cultures taken1 week apart

Other resistant gram-negative bacteria (e.g., *Pseudomonas*, *Serratia*)

Impact: *Pseudomonas aeruginosa* is typically the greatest threat because it is a common cause of healthcare-associated infections including pneumonia, bloodstream infections, urinary tract infections, and surgical site infections. Some strains are resistant to almost all antibiotics. Report Carbapenem-resistant *Pseudomonas* (CRPA) to GCHD.

Definition: Gram-negative organisms which are resistant to 3 or more classes of antibiotics to which they should be sensitive.

Identification:

- Clinical cultures
- Active surveillance cultures (ring culturing) as indicated.

Isolation: Contact precautions

Environmental cultures: as needed to conduct an outbreak investigation

Discontinuing isolation: 2 negative perirectal and oropharyngeal specimens.

If carbapenem resistant: Do not discontinue unless the following criteria are met

1) Clinical cultures: No clinical isolate in last 12 months
2) Hospitalization or long-term care:
   a) Not discharged from acute care facility in last 30 days
   b) Not a resident of a long-term care facility or rehabilitation facility
3) Skin integrity: no open wounds
4) Presence of devices: no drain, foley, ventilator, central line (PIVs OK) **AND**

2 negative perirectal cultures 1 week apart. For Pseudomonas, also 2 oropharyngeal cultures taken 1 week apart.

Extensively

Impact: Bacteria or fungi that are classified as XDRO are epidemiologically

Drug- Resistant Organisms (XDRO)

significant due to their resistance to all first-line antimicrobials. They are also species that have been identified as causes of outbreaks in healthcare facilities.

Definition: Bacteria that are non-susceptible (I or R) to all first-line antimicrobials for that species.

Identification:

- Clinical cultures
- Active surveillance cultures: patients in adjacent rooms (ring culturing)

Isolation:

- Contact precautions
- Physicians and other healthcare workers may not take a stethoscope, cell phone or iPad into the room unless they are covered by the gown and are not removed from under the gown while in the room

Environmental cultures: as needed to conduct an outbreak investigation

Discontinuing isolation: Isolation remains throughout duration of admission. Patient's chart will remained flagged in the event they are readmitted. Criteria for discontinuing isolation will be made on a case-by-case basis.

Other efforts: The Director or Director of Operations of ICHE will communicate and work with faculty physicians to prevent the patient from acquiring additional infections as well as the spread of these bacteria. This includes but is not limited to recommending the discontinuation of invasive devices. HCE staff will perform surveillance cultures on all patients on unit for a minimum of four weeks after first positive XDR culture is identified.

Candida auris

See APPENDIX E for Candida auris Management Protocol

Impact: *C. auris* is an emerging multidrug-resistant (MDR) yeast that has caused outbreaks of invasive healthcare-associated infections with high mortality. This organism represents a serious global health threat. Some strains of *C. auris* have elevated minimum inhibitory concentrations (MICs) to the three major classes of antifungals, severely limiting treatment options.

Definition*:* Resistance to at least one major class of antifungals.

Isolation: XDRO Contact Precautions for patients colonized or infected with C.auris as confirmed by surveillance or clinical culture(s). Additionally, patients exposed via contact with a colonized or infected patient, or their environment, should also be placed in isolation.

Disinfection of room daily and post-discharge with disinfectant effective against *C. difficile* (e.g., bleach-based solution).

Reportable to local health authority.

Vancomycin intermediate (VISA) and vancomycin resistant S. aureus (VRSA

Impact: VISA and VRSA infections are rare. CDC considers VRSA to be a public health threat. Like any strain of *S. aureus*, VISA and VRSA may cause serious, even life-threatening infections.

VISA strains should be monitored for increasing vancomycin resistance.

Definition: VISA: decreased susceptibility to vancomycin (minimum inhibitory concentration [MIC], 4 – 8 µg/ml). VRSA: fully resistant to vancomycin (MIC ≥ 16 µg/ml). Note: these definitions are irrespective of sensitivity to methicillin.

Identification:

- Clinical isolates (verify results have been confirmed by Microbiology supervisor)
- Active surveillance cultures collected for VRSA (but not VISA) as outlined in appendix C
- Use cultures rather than PCR to permit strain analysis if indicated (sent for PFGE)
- Periodic testing (e.g., weekly?) of the index patient and/or others found to be colonized will be conducted to inform the duration of control measures

Decolonization: of VISA or VRSA carriers will be performed as indicated.

- Two or more negative results obtained at least 7 days apart while off antibiotic therapy (for at least one week) that would be expected to be active against this organism should be obtained before colonization is considered resolved and a change in infection control precautions is considered.

Isolation-hospitals:

- Contact precautions (gown and gloves for room entry).
- Minimize the number of persons who enter the room.
- Per standard precautions, wear facemask and eye protection or face shield if performing procedures likely to generate splash or splatter (e.g., wound manipulation, suctioning) of VRSA contaminated material (e.g., blood, body fluids, secretions, and excretions).
- Dedicate non-disposable items that cannot be cleaned and disinfected between patients (e.g., adhesive tape, cloth-covered blood pressure cuffs) for use only on the patient with VRSA.
- **Monitor and strictly enforce compliance with Contact Precautions**.
- Educate and inform the appropriate healthcare personnel about the presence of a patient with VRSA and the need for contact precautions.
- Dialysis: provide dialysis in the patient's room.

Isolation-clinics and other ambulatory healthcare settings:

- How can we communicate this to clinics beyond flag? Maybe add Note for ambulatory sites: call/page HCE.
- Contact Precautions (gown and gloves) to enter room/care area if extensive contact is anticipated or contact with infected areas is planned (e.g., debridement or dressing of colonized or infected wound).
- Per Standard Precautions, wear mask and eye protection or face shield if performing procedures likely to generate splash or splatter (e.g., wound manipulation, suctioning) of VRSA contaminated material (e.g., blood, body fluids, secretions, and excretions).
- Dedicate non-disposable items that cannot be cleaned and disinfected between patients (e.g., adhesive tape, cloth-covered blood pressure cuffs) for use only on the patient with VRSA.
- Minimize the number of persons who care for the VRSA colonized/infected patient (e.g., dedicate a single staff person).
- Ensure meticulous cleaning of the room/patient care area at the end of each visit.
- Educate and inform the appropriate personnel about the presence of a patient with VRSA and the need for contact precautions.
- In the event the patient needs to be admitted or referred to another facility, the receiving facility must be notified of the patient's VRSA status.

Environmental cultures: collected weekly in rooms/care spaces adjacent to room housing VISA/VRSA patient until patient is discharged or culture-negative.

Reporting:

- VISA and VRSA are reportable to the local health authority
- Consult with public health authority to transfer a patient to another facility or to discontinue isolation

Appendix A:
Active Surveillance for Epidemiologically Significant Organisms in Adult Units

Purpose: To identify epidemiologically significant organisms for the purpose of implementing isolation precautions and for trending. This procedure describes only response to organisms identified by active surveillance. Additional organisms identified by clinical cultures require isolation precautions and may require follow-up surveillance cultures if epidemiologic linkage is suspected.

Procedure: Active surveillance for epidemiologically significant organisms is performed in all the adult ICU's. Methods used are PCR and cultures. Selective media is used to facilitate detection of significant organisms.

Specifics

A. Epidemiologically significant organisms identified by active surveillance
1. All adult ICUs: MRSA and MSSA (for purposes of decolonization)
2. BICU: *Pseudomonas* and *Acinetobacter*
3. Other adult or pediatric units (excluding nurseries):
   a. Follow-up cultures to assess the need for continued isolation
   b. Cultures collected to investigate a single case of an unusual and epidemiologically significant organism or a cluster of infections with possible epidemiologic linkage

B. Frequency of testing
1. MRSA/MSSA: all new admissions to adult ICUs for purposes of decolonization. Not isolated.
2. Burn ICU: weekly
3. Follow-up cultures: reassess patients with contact precautions in place to evaluate the need for continued isolation
4. Investigations
   a. MDR *Acinetobacter,* CRE, CRAB, CRPA (carbapenem resistant pseudomonas), XDRO organisms
      1) Circumstances: when patients colonized or infected are identified.
      2) Process: ring culturing if isolation precautions were not present upon admission
         a) Start with patients in same nursing assignment. If cultures are negative, continue with weekly cultures for patients in those rooms until index patient is discharged.
         b) If a patient in an adjacent room is positive, expand the ring to patients adjacent to that patient. Continue until no new positive patients are identified.
         c) Request Microbiology to save isolates for additional studies (e.g. PFGE) if needed.
      3) Continue weekly culturing until all infected/colonized patients have been discharged.
   b. Other organisms: plan investigation with Healthcare Epidemiologist and communicate to the manager and medical director of the unit.

C. Specimen Sites

1. New admission to ICU: nasal specimen for PCR (MRSA/MSSA)
2. Investigation for suspected or confirmed MDRO outbreaks: plan will include sites and frequency of testing
3. Follow-up cultures: as appropriate to the organism (e.g., nasal for previous clinical isolate positive for MRSA, perirectal for clinical isolate previously positive for VRE)

D. Action

1. MRSA/MSSA in a patient newly admitted to an ICU: Initiate nasal decolonization with Nozin and assure CHG bathing is performed daily.
2. Other surveillance cultures performed for investigations or follow up on previous clinical isolates: implement Isolation as indicated
   a. Inform Nursing unit
   b. Select appropriate type of isolation precautions (Contact/XDRO)
   c. Enter new order for isolation
      1) Select New Order
      2) Select Preference, click on isolation screen
      3) Select isolation category and click Accept
      4) Sign orders: Director
   d. Enter into EPIC ISO/INF:
      1) Select appropriate category
      2) Click on category to add a note: date, organism, specimen site
      3) Update note with new results of clinical or follow-up cultures.
3. Discontinue isolation
   a. # specimens/type to dc isolation or patient has not been readmitted within the last year.
   b. Discontinue the order-condition no longer warrants
   c. ISO/INF flag: click on resolve

Appendix B:
Title: Active Surveillance for Epidemiologically Significant Organisms in the Neonatal Intensive Care Unit

Purpose: To identify epidemiologically significant organisms for the purpose of implementing isolation precautions and for trending.

Procedure: Active surveillance cultures for epidemiologically significant organisms is performed in the NICU as described below.

A. Epidemiologically Significant Organisms Identified by Active Surveillance

1. Routine monitoring: MRSA
2. Investigative (time-limited): based upon trends in clinical cultures, including but not limited to organisms such as drug-resistant *Acinetobacter*, CRE, ESBLs (genus-specific), *Pseudomonas,* and *Serratia.* Surveillance culturing is not limited to patient culturing and may include environmental specimen collection.

B. Frequency of Testing: weekly

1. Routine: bi-weekly (unless HCE office is closed)
2. Investigative: as determined by Epidemiologist, typically weekly for 90 days. Exclude neonates who are being treated with antibiotics effective against the organism in question.

C. Specimens collected

1. MRSA: nasal for routine culture Consider MRSA/MSSA for this unit as well.
2. Investigative: may include oropharyngeal, sputum (for ventilated patients), perirectal, and ostomy bags. This will be determined at the onset of the investigation.

D. Action

1. Order isolation as indicated
   a. Inform Nursing unit
   b. Select New Order in EPIC
   c. Select Preference, click on isolation screen
   d. Select isolation category and click Accept
   e. Sign orders: Provider: Healthcare Epidemiologist Enter progress note in
2. ISO/INF flag in EPIC
   a. Choose appropriate category
   b. Click on flag and category to enter comment: date, site cultured positive,
3. Follow up cultures (patient with previous positive culture)
   a. If patient remains positive, assure isolation precautions are appropriate and enter a progress note

b. If patient has a negative culture, enter a progress note with the number of cultures that have been negative and note on isolation flag as well
c. When on negative nasal PCR/culture for MRSA or 2 negative cultures are obtained a week apart, discontinue isolation:
    i) Review Orders, select Isolation, discontinue
    ii) Resolve the ISO/INF status
    iii) Progress note: note isolation is discontinued and reason)

4. If a cluster is identified (clinical and/or surveillance cultures): discuss need for strain typing with Epidemiologist.
    a. If Strain typing is indicated, notify Clinical Microbiology to save and package isolates for shipping
    b. Notify DSHS that we will send specimens

Appendix C:
Active Surveillance for VISA/VRSA

Patients colonized or infected with VISA/VRSA

- Culture multiple sites (minimum, 2 to 3 sites per patient). Both frequently colonized sites such as anterior nares, throat, axilla, groin, or perirectal area and clinically relevant sites such as wounds and drains should be selected. Can determine which sites on a case-by-case basis.
- Specimens may be collected to determine colonization with vancomycin-resistant enterococci (VRE) carriage status (i.e., rectal, peri-rectal). Any VRE recovered may be of laboratory interest and should be saved for further testing. Any VRSA, MRSA or VRE that are isolated should be saved for further evaluation

Persons with Extensive contact with VISA/ VRSA include:

- Patients who share the VISA/VRSA patient's room
- Nursing or patient-care providers involved in direct patient care who:
    - Clean/bathe/rotate/ambulate the patient or have other prolonged contact
    - Change dressings
    - Enter room frequently (>3 entries per shift)
    - Handle secretions and body fluids, including respiratory secretions
    - Manipulate intravenous lines
- Physicians who:
    - Care for wound dressings or perform debridement (outside of Operating Room)
    - Conduct extensive exams on the VRSA patient
- Ancillary staff who have prolonged physical patient contact,
  including physical therapy or rehabilitation personnel, dialysis or respiratory technicians, and home health aides

Specimens from persons with extensive contact with VISA/VRSA patient:
Culture multiple (e.g., 2 to 3) frequently colonized sites, such as anterior nares, throat, groin, axilla, or peri-rectal area, plus any skin lesions (e.g., abscess or dermatitis, open wounds)

Moderate contact

- Patients who: Share patient care areas and healthcare providers for extended periods with the VRSA patient (e.g., patients receiving dialysis on same shift as VRSA patient or hospitalized in a different room but with same providers for several days while patient not in Contact Precautions)
- Nursing or patient-care providers who:
    - Deliver medications
    - Cross-cover patient only
- Physicians who:
    - See patient on daily rounds, without conducting extensive exams
    - Perform surgical or invasive procedures where sterile barriers or aseptic techniques are used
    - Ancillary staff who have limited interactions (e.g., radiology technicians)

- Family members or household contacts who: ♣ Live with or have physical contact with the VRSA patient but do not meet the criteria for extensive interaction

Persons with minimal contact with VRSA patient include:

- Patients
  - On same ward but for short periods of time or while patient in CP
  - Seen in same outpatient clinic on same day as patient B. Nursing or patient-care providers who:
  - Work on the same floor without formal cross-coverage of patient
  - Perform predominately administrative duties
- Physicians who: Consult infrequently without extensive exam ♣ Visit during teaching rounds only
- Ancillary staff who:
  - Monitor patient-care equipment and do not have known contact with secretions
  - Provide dietary or maintenance services and do not interact directly with the patient

Specimens for persons with moderate to little contact with VRSA patient:

Decisions about culturing those with moderate or minimal interactions should be made in consultation with public health authorities. In general, those with minimal interactions do not require screening unless there is substantial transmission among the other groups
Culture of anterior nares, additional body site (groin, axilla, or peri-rectal area), and skin lesions (e.g., abscess or dermatitis, open wounds) should be considered.

APPENDIX D:

Organism	Drug Resistance	Precautions Clin Isolate	Precautions Colonization	Criteria to DC isolation	Ring Cultures	Env Cultures
A. baumannii	3 or more drug classes	Contact	Contact	Clin inf resolved, 2 neg perirectal cultures	No*	No*
A. baumannii	Carbapenem-resistant (CRAB)	Contact	Contact	Do not dc unless • **No clinical isolate of CRAB in last 12 months** • **Not discharged from acute care facility in last 30 days AND** • **Not a resident of a long-term care facility or rehabilitation facility AND** • **No open wound** • **No drains, foley, ventilator, central line (PIVs OK) AND** • ***2 negative perirectal cultures 1 week apart***.	If not isolated on admission	If not isolated on admission
Candida auris	All isolates	XDRO	XDRO	Requires ICHE approval. If approved, 2 neg axilla and groin cultures 1 week apart	If not isolated on adm	
Enterobacter sp.	Extended beta lactamases (ESBL)	Contact	Contact	2 neg PR one week apart	No*	No*
Enterobacter sp	Carbapenems (CRE)	Contact	Contact	Do not dc unless • **No clinical isolate of CRE in last 12 months** • **Not discharged from acute care facility in last 30 days AND**	If not isolated on adm	If not isolated on adm

				• **Not a resident of a long-term care facility or rehabilitation facility AND** • **No open wound** • **No drains, foley, ventilator, central line (PIVs OK) AND** • ***2 negative perirectal cultures 1 week apart***		
Enterococcus faecium or *E. faecalis*	Vancomycin	Contact	Contact	2 neg perirectal cultures taken 1 week apart	No*	No*
E. coli	Extended beta lactamases (ESBL)	Contact	Contact	2 neg perirectal cultures taken 1 week apart	No*	No*
E. coli	Carbapenem R CRE)	Contact	Contact	Do not dc unless • **No clinical isolate of CRAB in last 12 months** • **Not discharged from acute care facility in last 30 days AND** • **Not a resident of a long-term care facility or rehabilitation facility AND** • **No open wound** • **No drains, foley, ventilator, central line (PIVs OK) AND** • ***2 negative perirectal cultures 1 week apart***.	If not isolated on adm	If not isolated on adm
Gram-negative bacilli not listed	Pan-resistant (not covered elsewhere)	XDR			If not isolated on adm	If not isolated on adm
K. pneumoniae, other	Extended beta lactamases (ESBL)	Contact	Contact	2 neg perirectal cultures taken 1 week apart	No*	No*

Klebsiella species						
K. pneumoniae, other Klebsiella species	Carbapenem-resistant	Contact	Contact	Do not dc unless • **No clinical isolate of CRAB in last 12 months** • **Not discharged from acute care facility in last 30 days AND** • **Not a resident of a long-term care facility or rehabilitation facility AND** • **No open wound** • **No drains, foley, ventilator, central line (PIVs OK) AND** • ***2 negative perirectal cultures 1 week apart***.	If not isolated on adm	If not isolated on adm
K. pneumoniae, other Klebsiella species	Pan-resistant	XD Contact	XD Contact	Do not DC (consider on case-by-case basis)	If not isolated on adm	
Pseudomonas	Carbapenem resistant	Contact	Contact	Do not dc unless • **No clinical isolate of CRPA in last 12 months** • **Not discharged from acute care facility in last 30 days AND** • **Not a resident of a long-term care facility or rehabilitation facility AND** • **No open wound** • **No drains, foley, ventilator, central line**		

				(PIVs OK) AND • ***2 negative perirectal and oropharyngeal cultures 1 week apart***.		
S. aureus	Methicillin	Contact	Standard	Clinical infection resolved, 2 neg nasal cultures taken 1 week apart	Only for outbreak	No
S aureus	Vancomycin (I or R)	Extremely drug resistant organisms (XD Contact)	XD Contact			

*Ring cultures and/or environmental cultures only if outbreak suspected.

APPENDIX E:
Candida auris Management Protocol

A. **Purpose:** Outline infection control procedures and steps to manage suspected and confirmed C. auris infections and colonization. This document is an extension of UTMB's "Transmission Based Precautions Policy" and may be modified based on new guidelines and risk assessments performed by ICHE.

Impact: *C. auris* is an emerging multidrug-resistant (MDR) yeast that has caused outbreaks of invasive healthcare-associated infections with high mortality. This organism represents a serious global health threat. Some strains of *C. auris* have elevated minimum inhibitory concentrations (MICs) to the three major classes of antifungals, severely limiting treatment options.

Screening for C. auris Colonization:
Screening for C. auris colonization will be implemented for high-risk patients on admission if indicated by a risk assessment and data supports an increase in cases in local areas.

1. **Who to screen:**
   a. Screen all high-risk population on admission. High risk populations include patients coming from long-term care, rehab, skilled nursing or nursing facilities, as well as group homes. As determined by ICHE, additional populations may be screened depending on risk assessment.
   b. Transmission occurs via contact with an infected or colonized patient or environment. Thus, other patients with close contacts to patients with confirmed C.auris infection or their environment warrants screening. Two negative surveillance cultures are required at least one week apart.
   c. In the event of an outbreak, healthcare workers may also be screened at the discretion of infection control.
   d. Patients who have had an overnight stay in a healthcare facility outside the United States in the previous one year, especially if in a country with documented C. auris cases. Strongly consider screening when patients have had such inpatient healthcare exposures outside the United States and have infection or colonization with carbapenemase-producing Gram-negative bacteria. C. auris co-colonization with these organisms has been observed regularly.
2. **Steps to screen:**
   a. Identify high risk patients on admission and place in transmission based XDRO contact isolations (see Section E below) until further assessment and screening is completed.
   b. All High-risk patients identified by ICHE will be screened by collecting C. auris cultures from axilla and groin on each admission.
      i. Patients with no history or unknown history of C. auris will be screened on admission one time. Each chart will be reviewed by ICHE to confirm that one negative screen is sufficient to discontinue isolation. Infection Control will consider known outbreak locations to determine if additional screening is needed.

ii. Patients with history of C. auris will be on isolation indefinitely.

B. **Identification:** from clinical isolates

1. Diagnostic instruments based on matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) can differentiate *C. auris*, but not all devices currently include *C. auris* in the reference database to allow for detection.

2. Molecular methods based on sequencing the D1-D2 region of the 28s rDNA can also identify *C. auris*.

3. Diagnostic methods other than MALDI-TOF and sequencing may not be able to distinguish *C. auris* from other yeasts.

C. **Laboratory Safety Instructions:**

1. Use at least lab coat and gloves, and eye protection if spatter or splash may occur.
2. Use a biological safety cabinet (BSL2) when manipulating known or suspected *C. auris* isolates. *C. auris* can contaminate surfaces extensively, and it is difficult to eradicate. We do not know if *C. auris* can colonize the skin of otherwise healthy people. Yeast isolates confirmed **NOT** to be *C. auris* may be processed on the bench if your institution's safety policy allows.
3. To disinfect surfaces contaminated with *C. auris*, use either 10% bleach (made fresh daily) or a product with Environmental Protection Agency (EPA) approval specifically for *C. auris*. Note that the list of products approved by EPA is being updated as more is learned about this emergent pathogen. The most recent list of approved products can be found in CDC's environmental disinfection guidance. It is important to note that products with *C. albicans* or fungicidal claims may not be effective against *C. auris*, and accumulating data indicate products solely dependent on quaternary ammonium compounds are **NOT** effective.
4. After work with *C. auris* is complete, decontaminate the biological safety cabinet with 10% bleach (or another product from #3 above) for your institution's recommended contact time for this disinfectant (but for at least 10 minutes). Wipe off excess bleach solution after the recommended contact time is met (i.e., after at least 10 minutes). To minimize bleach damage to equipment, use 70% ethanol after bleach treatment.
5. Remove PPE and clean hands before leaving the laboratory, according to your institution's policy and methods.
6. Dispose of contaminated materials as infectious waste following your institution's standard guidelines.
7. Perform environmental cultures on the safety cabinet and work bench used to work up C. auris cultures. Follow instructions below under "Sample Collection".

D. **Transmission Based XDRO Contact Isolation Precautions:**

Patients with positive cultures for C. auris will be placed in Contact Isolation for extremely drug-resistant organisms (XDRO) indefinitely (colonization or infected site). Patient who meets criteria for screening under section B.1. will require XDRO isolation until negative surveillance cultures are finalized.

The following steps are required to prevent transmission to patients, visitors and staff in patients who require isolation as above:

1. Colonization and infection with C. auris will be placed in XDRO contact isolation
2. **Door:** Place XDRO contact isolation sign on the patient door
3. Ensure availability of all necessary PPE
4. **Documentation:**
    a. An isolation order must be entered into the EMR each admission.
    b. "Flag" the patient's record to alert healthcare personnel to institute recommended infection control measures in case of readmission.
5. **Private Room:** necessary for all patients in this category.
6. **Limit Patient Contact** to those directly involved in patient care, no large teams.
7. **Visitors:** limit to immediate family and require isolation attire (gowns, gloves, and mask) and require hand hygiene to enter and leave the room.
8. **Gloves** Wear gloves (clean, nonsterile gloves are adequate) when:
    a. Entering the room.
    b. Change gloves after having contact with infective material that may contain high concentrations of microorganisms (e.g., wound).
    c. Remove gloves before leaving the patients environment and wash hands immediately with an antimicrobial soap and water.
9. **Gowns:** Wear a gown when entering the room.
    a. Remove gown before leaving patient's room.
    b. After gown removal, ensure that clothing does not contact potentially contaminated environmental surfaces.
10. **Facial Protection:** Wear surgical mask and eye protection (e.g., For suction of respiratory secretions, intubation/extubation).
11. **Food Trays** Patients will be served meals on regular food trays.
12. **Patient Care Equipment:** dedicated to patient.
13. **Patient Transport** Limit the movement and transport of the patient from the room for essential purposes only. If the patient is transported, ensure that precautions are maintained to minimize the risk of transmission of microorganisms to other patients and contamination of environmental surfaces or equipment. Patients on XDRO Contact Precautions must be transported on a stretcher or wheelchair covered with a sheet or other physical barrier. It is not necessary for the patient or the transporter to wear gown and/or gloves during transport. The transporter should wear a gown and gloves to assist the patient in and out of the wheelchair/stretcher. Use alcohol hand sanitizer or wash with an antimicrobial soap or after gloves are removed.

Environmental Disinfection:

Patient room/environment and equipment will be disinfected with hospital approved products with EPA-registered claims for C. auris (List P: link below):

1. https://www.epa.gov/pesticide-registration/list-p-antimicrobial-products-registered-epa-claims-against-candida-auris

2. Preferred product on list P when adequate supply is available: Sodium Hypochlorite

3. When supply shortages are encountered, products on list K with EPA claims against Clostridioides difficile spores may be used: https://www.epa.gov/pesticide-registration/list-k-epas-registered-antimicrobial-products-effective-against-clostridium

4. **After discharge:**
   a. **Inpatient room:**
      i. Terminal cleaning of patient room, adjacent rooms, and surrounding documentation spaces must be completed. Terminal includes removal of curtains, shower curtains, pillows, linen and surfaces that cannot be disinfected. These items should be bagged and removed prior to terminal cleaning commencing. Curtains and linen should be placed in the soiled utility room for laundering. Pillows should be disposed of with trash in the room.
      ii. Apart from the listed above items, all other items/equipment (i.e., IV poles, SCD machine, fans, bedside commode, etc.) must remain in the room until the room has been released by Infection Control.
      iii. Environmental cultures must be performed after terminal cleaning is completed.
      iv. Confirmed positive Candida auris patient's room only: After discharge, the patient's room must remain closed until the following steps are met:
         - Bleach-based terminal cleaning, all items must remain in the room until results are released.
         - All environmental culture results are finalized and negative.
   b. **Hospital outpatient rooms/space:**
      i. Terminal cleaning of patient room/environment must be completed. Terminal includes removal of curtains, pillows, linen and surfaces that cannot be disinfected. These items should be bagged and removed prior to terminal cleaning commencing.
      ii. Outpatient room/space (e.g., Bay) can be used after terminal cleaning is complete. Additional screening is at the discretion of infection control.

5. Environmental Surface Sampling:
Surface samples must be collected from high touch surfaces and patient equipment as follows:

a. Inpatient:
   - Isolation patient room
   - Surrounding documentation spaces
   - Medication room when requested by ICHE
   - Outbreak situations: additional environmental culturing will be required at the direction of ICHE

b. Outpatient:
   - Environmental culturing may be required at the direction of ICHE

- Any exposed adjacent spaces when requested by ICHE.

6. Sample Collection:

a. Wash hands, don clean gloves, and mask. Change PPE between rooms/spaces.
b. Use sterile water as a wetting agent.
c. Swabs:
   - eSwab collection & preservation

   OR

   - Remel BactiSwab™: Liquid Stuart Plastic Shaft
d. Poor sterile water in a sterile container. Use new sterile water and new sterile container for each room/space. Date sterile water bottle with the date opened and discard after 28 days.
e. Dip swab once in sterile water and culture surface of interest.
f. Place swab in tube.
g. Label tube with printed labels

Table 1: Examples of high touch surfaces for sampling:

Room/Area High Touch Area
Patient Room
1. Door (includes handles and areas within the vicinity of the handle that people may touch)
2. Bed/Patient Chair/Call Light (includes bed rails and mattress)
3. Commit to Sit chair
4. IV pole (includes pole, handles and any pumps on the machine that remain)
5. Monitor (if applicable)
6. Monitor Leads
7. Workstation (includes keyboard, mouse, barcode scanner and screen)
8. Tables (overbed & patient side table)
9. Sink area (includes sink area and any shelving adjacent)
10. Visitor area (include the couch and any surface the visitor may touch)
11. Thermostat/O2 and Suction/Light switches (includes knobs and connections)
12. Bathroom (door, sink, shower chair, bedside commode, toilet)

Additional items within the room may be cultured at the discretion of ICHE staff (may include, but not limited to SCD machines, fans)

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