

ISOLATION PRECAUTIONS

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2006 Management Of Resistant Organisms In Healthcare Settings

2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

Jane D. Siegel, MD; Emily Rhinehart, RN MPH CIC; Marguerite Jackson, PhD; Linda Chiarello, RN MS; the Healthcare Infection Control Practices Advisory Committee

- Inclusion of non-hospital settings
- Re-emphasis on Standard Precautions
 - Safe injection Practices
 - Respiratory hygiene practices
 - Use of mask during spinal procedures

KEY CONCEPTS

- ▶ Risk of transmission of infectious agents occurs in all settings
- ▶ Infections are transmitted from patient-to-patient via HCPs or medical equipment/devices
- ▶ Isolation precautions are only part of a comprehensive IP program
- ▶ Unidentified patients who are colonized or infected represent risk to other patients

FUNDAMENTAL ELEMENTS

- ▶ Administrative support
- ▶ Adequate Infection Prevention staffing
- ▶ Good communication with clinical microbiology lab and environmental services
- ▶ A comprehensive educational program for HCPs, patients, and visitors
- ▶ Infrastructure support for surveillance, outbreak tracking, and data management

STANDARD PRECAUTIONS



Standard

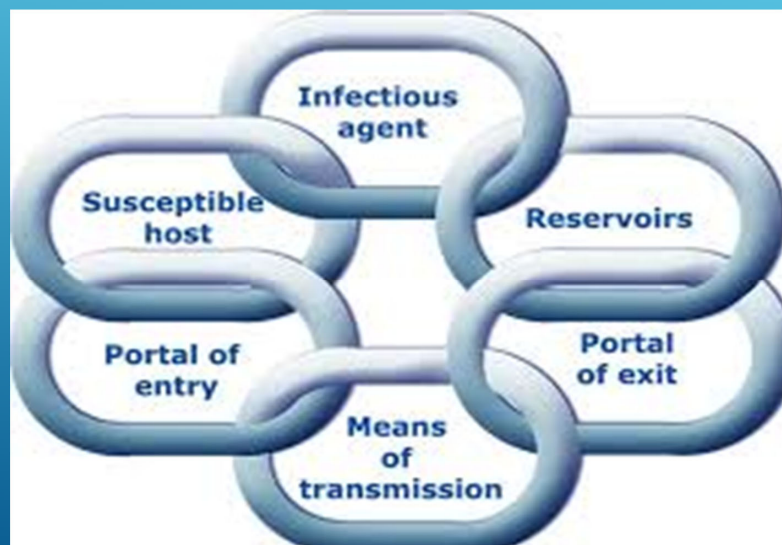
Component	Recommendation
Hand Hygiene	After touching blood, body fluids, secretions, excretions, contaminated items; immediately after removing gloves; between patient contacts.
Personal Protective Equipment (PPE)	
Gloves	For touching blood, body fluids, secretions, excretions, contaminated items; for touching mucous membranes and non-intact skin (Hand Hygiene before and after glove removal unless for environmental cleaning)
Gown	During procedures and patient-care activities when contact of clothing/exposed skin with blood/body fluids, secretions, and excretions is anticipated
Mask, eye protection	During procedures and patient-care activities likely to generate splashes or sprays of blood, body fluids, secretions, especially suctioning, endotracheal intubation

Component	Recommendation
Soiled equipment	Handle in a manner that prevents transfer of microorganisms to others and to the environment; wear gloves if visibly contaminated; perform hand hygiene
Environmental Control	Develop procedures for routine care, cleaning, and disinfection of environmental surfaces, especially frequently touched surfaces in patient-care areas
Laundry	Handle in a manner that prevents transfer of microorganisms to others and to the environment
Needles and sharps	One patient one needle one syringe and HCP use masks for spinal injections.
Patient Resuscitation	Use mouthpiece, resuscitation bag, other ventilation devices to prevent contact with mouth and oral secretions

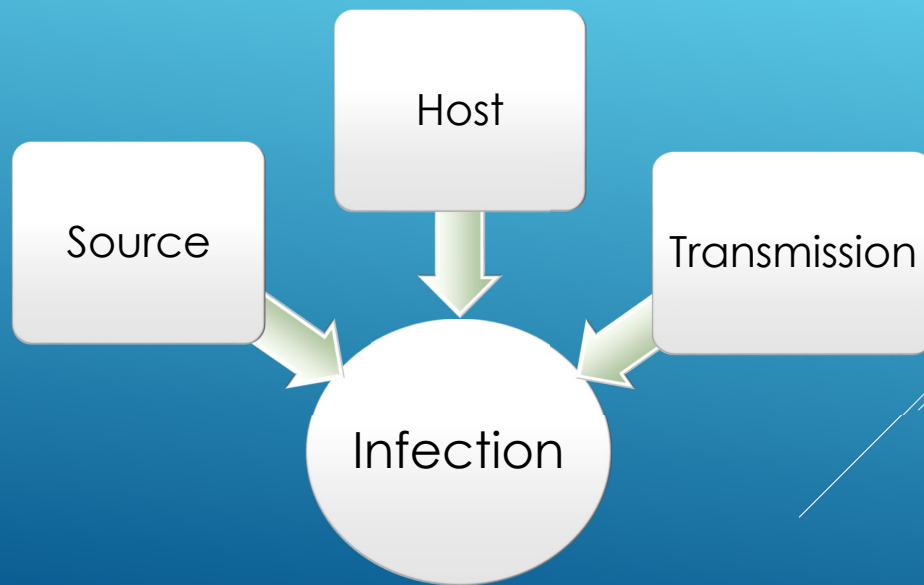
Component	Recommendation
Patient placement	Prioritize for single-patient room if patient is at increased risk of transmission, is likely to contaminate the environment, does not maintain appropriate hygiene, or is at increased risk of acquiring infection or developing adverse outcome following infection.
Respiratory hygiene/cough etiquette (source containment of infectious respiratory secretions in symptomatic patients, beginning at initial point of encounter)	Instruct symptomatic persons to cover mouth/nose when sneezing/coughing; use tissues and dispose in no-touch receptacle; observe hand hygiene after soiling of hands with respiratory secretions; wear surgical mask if tolerated or maintain spatial separation, >3 feet if possible; Post signage at the points of entry to the facility during periods of increased community respiratory diseases.

TRANSMISSION BASED PRECAUTIONS (TBP)

CHAIN OF INFECTION



RATIONALE BEHIND TRANSMISSION BASED PRECAUTIONS



SOURCES OF INFECTION

Human

Patients

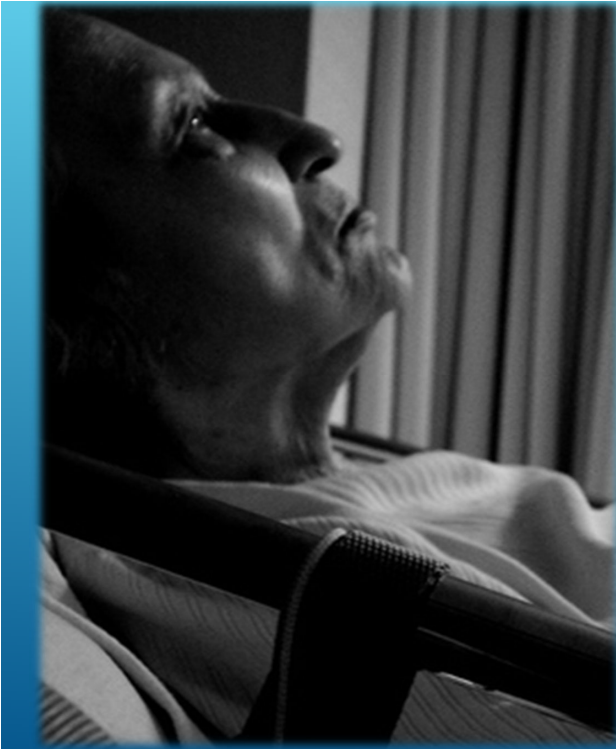
Healthcare Personnel

Visitors/household
members

Environmental

Common Vehicles

Vectorborne



Host Factors

Age
Immobility
Incontinence
Dysphagia
Chronic Diseases
Poor Functional Status
Medications
Indwelling devices

ROUTES OF TRANSMISSION

- ▶ Direct Contact
- ▶ Indirect Contact
- ▶ Aerosol
- ▶ Droplet



DIRECT AND INDIRECT CONTACT TRANSMISSION



Direct Contact: Skin to skin touching



Indirect Contact: inanimate surfaces

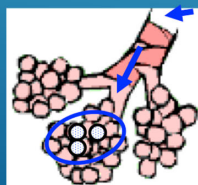
DROPLET AND AIRBORNE TRANSMISSION



Largest droplets fall to ground in seconds; may persist in dust, but not an important cause of infection.

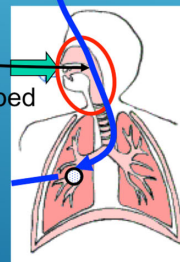
Largest Droplets

Medium-sized droplets: trapped & cleared in upper airway.



Smallest droplets (<25 mm) evaporate leaving "**droplet nuclei**" of bacilli that can reach **alveoli** (e.g., TB).

Medium Droplets



Types of Transmission Based Precautions:

- Airborne Precautions
- Droplet Precautions
- Contact Precautions



DOFFING AND DUFFING

1. Donning PPE: 1 protocol deviation in 27% EVD; 50% CP
Doffing PPE: 1 protocol deviation in 100% EVD; 67% CP
Fluorescence detected: for EVD 44% EVD; 28% CP

Kwon JH, et al. Assessment of HCWs Protocol Deviations and Self-Contamination During Personal Protective Equipment Donning and Doffing. ICHE. September 2017.

2. HCP contaminated almost 80% of the PPE simulations.

Kang, et al. Use of personal protective equipment among health care personnel: Results of clinical observations and simulations. (2017)

3. Mannequin simulated BBF with UV-fluorescent tracers

Poller B, et al. A fluorescence-based simulation exercise for training HCW in the use of personal protective equipment, Journal of Hospital Infection 2018,

4. HCP (ICU) 39% error doffing, 36% MDRO contaminated

Di Fiore et al, Improper Removal of Personal Protective Equipment Contaminates HCWs ICHE, March 2018.



Surgical mask prior to entry

No special ventilation

Private room or Cohort

Hand hygiene

Residents use mask outside of room



DROPLET PRECAUTIONS



Visitors must report to Nursing Station before entering.



Perform hand hygiene before entering and before leaving room



Wear mask when entering room
Visitors and health care workers



Dietary may not enter
No debe entrar el dietista

PRECAUCIONES DE GOTAS DIMINUTAS

Los visitantes deben presentarse primero al puesto de enfermería antes de entrar. Lávese las manos. Póngase máscara al entrar al cuarto. No debe entrar el dietista.

HD 5225 Rev. 12/06

CONDITIONS OR DISEASES REQUIRING DROPLET PRECAUTIONS

Disease/Condition	Duration of Isolation
Influenza	For 5 days from onset of symptoms or 24 hours without fever, whichever is longer
Meningococcal Diseases: meningitis, pneumonia	For 24 hours after treatment has started
MRSA pneumonia	For duration of illness (also use Contact Precautions)
Strep Throat	For 24 hours after treatment has started
Rhinovirus (cold)	For duration of illness

Private room only
Room requires negative
airflow pressure

Doors must remain
closed

Visual air monitors

Everyone must wear an
N-95 respirator or higher

Limit the movement and
transport of the patient



AIRBORNE INFECTION ISOLATION PRECAUTIONS



Visitors must report to Nursing Station before entering.



Perform hand hygiene before entering
and before leaving room



Wear N95 respirator when entering
room
Visitors see nurse for instruction on proper use.



Keep door closed



Dietary may not enter
No debe entrar el dietista

PRECAUCIONES AMBIENTALES

Los visitantes deben presentarse primero al puesto de enfermería
antes de entrar. Lávese las manos. Póngase máscara N95 con filtro al
entrar al cuarto. Mantenga la puerta cerrada. No debe entrar el dietista.

CONDITIONS OR DISEASES REQUIRING AIRBORNE PRECAUTIONS

Disease/Condition	Duration of Isolation
Tuberculosis	For 5 days from onset of symptoms or 24 hours without fever, whichever is longer
Chickenpox	For 24 hours after treatment has started
Vesicular	For duration of illness (also use Contact Precautions)
	For 24 hours after treatment has started
	For duration of illness



CONTACT PRECAUTIONS



Visitors must report to Nursing Station before entering.



Perform hand hygiene before entering and before leaving room.



Wear gloves when entering room or cubicle, and when touching patient's intact skin, surfaces, or articles in close proximity



Wear gown when entering room or cubicle and whenever anticipating that clothing will touch patient items or potentially contaminated environmental surfaces.



Use patient-dedicated or single-use disposable shared equipment or clean and disinfect shared equipment (BP cuff, thermometers) between patients.

PRECAUCIONES DE CONTACTO

Los visitantes deben presentarse primero al puesto de enfermería antes de entrar. Lávese las manos. Póngase guantes al entrar al cuarto.

Controversy No 1

- Gown and gloves before or “upon entry”
- Disinfect shared equipment



CONTACT PRECAUTIONS



Visitors must report to Nursing Station before entering.

SPECIAL ENTERIC



Perform hand hygiene **before** entering room AND wash hands with **soap and water** before leaving room.
Lávese las manos con agua y jabón.



Wear gloves when entering room or cubicle, and whenever touching the patient's intact skin, surfaces, or articles in close proximity.



Wear gown when entering room or cubicle and whenever anticipating that clothing will touch patient items or potentially contaminated environmental surfaces.



Use patient-dedicated or single-use disposable shared equipment or clean and disinfect shared equipment (BP cuff, thermometers) between patients.

PRECAUCIONES DE CONTACTO

Los visitantes deben presentarse primero al puesto de enfermería antes de entrar. Lávese las manos. Póngase guantes al entrar al cuarto.

Controversy No. 2

Special enteric precautions for C. difficile and Norovirus

Does CDC recommend routine handwashing with soap and water or ABHR?



Visitors must report to Nursing Station before entering.

SPECIAL ENTERIC



Perform hand hygiene **before** entering room AND wash hands with **soap and water** before leaving room.
Lávese las manos con agua y jabón.



Wear gloves when entering room or cubicle and whenever touching the patient's intact skin, surfaces, or articles in close proximity.



Wear gown when entering room or cubicle and whenever anticipating that clothing will touch patient items or potentially contaminated environmental surfaces.



Use patient-dedicated or single-use disposable shared equipment or clean and disinfect shared equipment (BP cuff, thermometers) between patients.

PRECAUCIONES DE CONTACTO

Los visitantes deben presentarse primero al puesto de enfermería antes de entrar. Lávese las manos. Póngase guantes al entrar al cuarto.

Controversy No. 2

Answer:

- Soap and water handwash

(Ref. 2007 CDC Isolation Precautions Guidelines)

- CDC recommends ABHR unless there is ongoing transmission or high endemic levels.
(Ref. C. Diff Tool Kit)



Visitors, including family, must not enter—report to Nursing Station.

HEALTH CARE WORKERS MUST WEAR

- N95 Respirator (prior fit test required)
- Gloves – double glove (2 sets)
- Tyvek Coverall "Bunny Suit"
- Fluid Impervious Gown/apron
- Protective Face shield
- Surgical Hood
- Boots or Boot covers (foot protection)

All personal items should remain outside the room

Perform Hand hygiene before entering the room, following removal of PPE and when leaving the patient's room

For questions call the Infection Control Professional at _____

PRECAUCIONES ESPECIALES PARA LA TRANSMISIÓN POR VÍA AÉREA O POR CONTACTO

Los visitantes, incluyendo la familia, no deben entrar preséntense a la estación de enfermeras.

EL PERSONAL DE CUIDADO DE LA SALUD DEBE USAR:

- mascarilla respiratoria N-95 (para poder usarla es obligatorio que pase antes la prueba para saber la medida correcta)
- guantes – dobles (2 pares)
- traje Tyvek «Bunny Suit»
- delantal impermeable a los fluidos
- protección para los ojos
- cubiertas para los zapatos (protección para los pies)

Lleve a cabo la higiene de las manos antes de entrar a la habitación y después de quitarse el equipo de protección personal y salir de la habitación del paciente.

Si tiene preguntas llame al Profesional en Control de Infecciones.

SPECIAL AIRBORNE/CONTACT ISOLATION

HIGHLY TRANSMISSIBLE PATHOGENS: EBOLA

NC SPICE

COVID-19 Personal Protective Equipment (PPE) for Healthcare Personnel

Preferred PPE – Use N95 or Higher Respirator

Acceptable Alternative PPE – Use Facemask



cdc.gov/COVID19

**COVID
RESPIRATORS-REUSE
FDA/CDC-NIOSH**

CONDITIONS OR DISEASES REQUIRING CONTACT PRECAUTIONS

Disease/Condition	Duration of Isolation
Epidemiologically Significant - Antibiotic Resistant Bacteria – MRSA, VRE, ESBL-E.coli, etc. Controversy No. 3	Per MDRO guideline –
Clostridium difficile (C. diff)	24-48 hours after symptoms resolve
Norovirus	48 hours after symptoms resolve
Scabies and Lice	24 hours after treatment started
Viral Conjunctivitis (pink eye)	Until symptoms resolve

DO ALL MDROS REQUIRE TRANSMISSION BASED PRECAUTIONS?

- ▶ Epidemiologic significant pathogens - MDROs judged by the IPCP, based on local, state, regional, or national recommendations to be of clinical and epidemiologic significance.
- ▶ Contact Precautions recommended in settings with evidence of ongoing transmission, acute-care settings with increased risk for transmission or wounds that cannot be contained by dressings.
- ▶ Contact state health department for guidance regarding new or emerging MDRO.

2007 CDC HICPAC Isolation-Precautions Guidelines

HOW EFFECTIVE ARE CONTACT PRECAUTIONS?

CONTROVERSY NUMBER 4

- ▶ Unknown
- ▶ Ineffective “MRSA” if adherence is poor (20-30%)
 - ▶ Afif W, et al. Am J Infect Control 2002;30:430-433
 - ▶ Cromer AL, et al. Am J Infect Control 2004;32:451-5
- ▶ Most data from outbreak settings
- ▶ Given extent of environmental contamination with some MDR-GNRs, barrier precautions make theoretical sense.

ROLES OF ACTIVE SURVEILLANCE- TIER 2 CDC RECOMMENDATIONS

- ▶ (Tier 2 recommendations)
- ▶ Targeted surveillance of high risk patients:
 - ▶ Useful during outbreaks and when incidence of an MDR-GNR is rising or not declining despite routine control efforts
- ▶ Point prevalence surveys during outbreaks:
 - ▶ Define reservoir and guide control efforts
 - ▶ Determine if on-going surveillance cultures needed

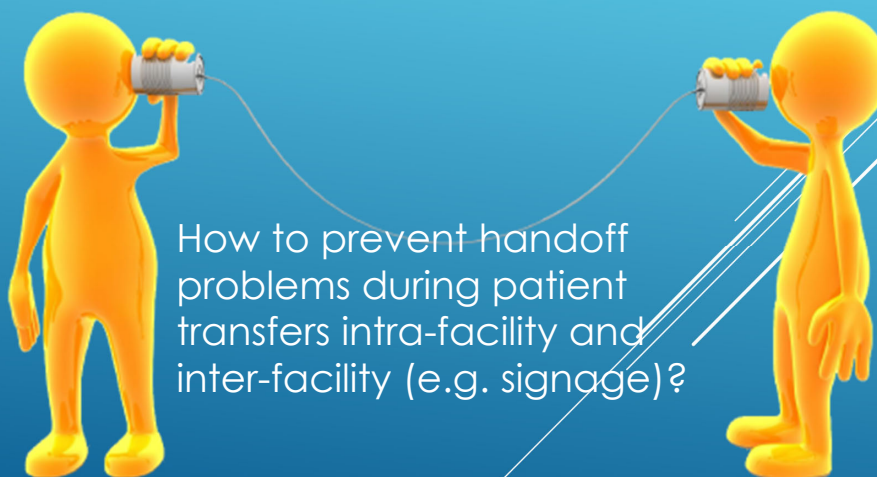
CDC/HICPAC MDRO guideline.

SYNDROMIC AND EMPIRIC APPLICATION OF TRANSMISSION-BASED PRECAUTIONS

- ▶ Diagnosis requires lab confirmation
- ▶ Culture-based lab test require 2 or more days
- ▶ Precautions should be implemented while awaiting results
 - ▶ Based on clinical presentation and likely pathogen
- ▶ Reduces transmission opportunities

Clinical Syndrome or Condition	Potential Pathogens	Empiric Precautions (always includes Standard Precautions)
Diarrhea		
Acute diarrhea with infectious cause in incontinent or diapered patient	Enteric Pathogens	Contact Precautions
Rash or Exanthems, generalized, unknown etiology		
Petechial/Ecchymotic w/ fever	Neisseria meningitides	Droplet Precautions for 1 st 24hrs of antimicrobial therapy
Vesicular	Varicella-zoster, herpes simplex, vaccinia viruses	Airborne plus Contact precautions
Respiratory Infections		
Cough/fever/upper lobe infiltrate	Tb, Respiratory Viruses, S. pneumoniae, S. aureus	Airborne Precautions plus contact
Skin or Wound Infection		
Abscess or draining wound that cannot be covered	Staphylococcus aureus, group A streptococcus	Contact Precautions Add Droplet for the first 24 hours of antimicrobial therapy if group A strep disease suspected

COMMUNICATING PRECAUTIONS



IMPLEMENTATION STRATEGIES FOR MDRO CONTROL

COHORTING AS A CONTROL STRATEGY

- Single rooms first choice; cohorting second, and roommate that is not compromised or with risks (invasive devices).
- Cohorting of patients with same pathogen;
- Cohorting of staff;
- Cohorting by use of designated beds or units.

UPDATE ON RECOMMENDATIONS FOR PRECAUTIONS FOR VISITORS

- ▶ Use guided by specific pathogen, underlying infectious condition and endemicity of the organism in hospital and community

SHEA EXPERT GUIDANCE

Isolation Precautions for Visitors

L. Silvia Munoz-Price, MD, PhD;¹ David B. Banach, MD, MPH, MS;² Gonzalo Bearman, MD, MPH;³
Jane M. Gould, MD;⁴ Surbhi Leekha, MBBS;⁵ Daniel J. Morgan, MD, MS;⁶ Tara N. Palmore, MD;⁷
Mark E. Rupp, MD;⁸ David J. Weber, MD, MPH;⁹ Timothy L. Wiemken, PhD¹⁰

Infection Control & Hospital Epidemiology / FirstView Article / April 2015, pp 1 - 12

ISOLATION PRECAUTIONS FOR VISITORS

- ▶ All visitors comply with hand hygiene before and after visiting
- ▶ Endemic situations with MRSA and VRE
 - ▶ No Contact Precautions for visitors in routine circumstances
 - ▶ Visitors visiting multiple patients should use Contact Precautions

ISOLATION PRECAUTIONS FOR VISITORS

- ▶ Parents/guardians/visitors with extended stay in patient's room, Contact Precautions are not practical.
 - ▶ Exceptions: C. difficile, CRE
 - ▶ Use gowns and gloves if assisting in direct patient care.

ISOLATION PRECAUTIONS FOR VISITORS

- ▶ Visitors to patients on Droplet and Airborne Precautions must wear surgical mask
 - ▶ Visitors with extensive documented exposure may be excluded from this recommendation
 - ▶ Restrict visitors that are symptomatic
 - ▶ Limit entrance of visitors at risk of an airborne pathogen and lacking exposure

ISOLATION PRECAUTIONS FOR VISITORS

- ▶ Enforce isolation precautions for visitors during outbreak or novel, virulent pathogens are suspected (Ebola, MERS, SARS)

DISCONTINUING CONTACT PRECAUTIONS

- ▶ Disease specific recommendations in Appendix A of CDC Isolation-Precautions Guidelines
 - ▶ Type and duration of precautions
- ▶ Remain in effect for limited period of time (i.e. while the risk for transmission persist or for the duration of illness)
- ▶ New SHEA Expert Guidance 2018

Ref. SHEA Duration of Contact Precautions. ICHE. 2018 by The Society for Healthcare Epidemiology of America. All rights reserved. DOI: 10.1017/ice.2017.245

MDR-GNR COLONIZATION PERSISTENCE

Table 3. Duration of colonization with multidrug-resistant gram-negative bacteria (MDRGNB).

MDRGNB	No. of isolates	Duration of colonization, median days (range)
All species	52	144 (41–349)
<i>Proteus mirabilis</i>	15	161 (50–279)
<i>Klebsiella pneumoniae</i>	12	132 (70–349)
<i>Escherichia coli</i>	8	178 (50–259)
<i>Proteus stuartii</i>	7	121 (50–322)
<i>Morganella morganii</i>	5	103 (41–328)
<i>Citrobacter species</i>	4	76 (41–168)
<i>Enterobacter cloacae</i>	1	133

O'Fallon E, et al. Clin Infect Dis 2009;48:1375-81.

DISCONTINUATION OF CP FOR MRSA

Establish policy for previously MRSA colonized or infected.

- ▶ Off antibiotics effective against MRSA ≥ 72 hrs (3 weeks for dialysis)
- ▶ Optimal number of surveillance cultures unclear
- ▶ Optimal culture site unclear, anterior nares common

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CP DISCONTINUATION FOR MRSA

High risk patients:

- ▶ Chronic wounds
- ▶ Reside in LTCF
- ▶ If yes (for any high risk conditions) extend CP from the last MRSA-positive culture, prior to assessing for CP

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CP DISCONTINUATION FOR MRSA

- ▶ Outside an outbreak setting and low endemic rates, alternative approach - CP for active MRSA infection for duration of index admission and discontinuing CP on hospital discharge.
- ▶ Hospital using this approach should:
 - ▶ monitor facility MRSA infection rates,
 - ▶ maximize and consider monitoring use of standard precautions,
 - ▶ minimize patient cohorting to avoid intra-facility transmission.
- ▶ If the hospital's MRSA infection rates increase, hospital should:
 - ▶ transition to a screening culture– based approach for discontinuation of CP.

▶ Ref. SHEA Duration of Contact Precautions. ICHE. 2018 by The Society for Healthcare Epidemiology of America. All rights reserved. DOI: 10.1017/ice.2017.245

CP DISCONTINUATION OF VRE

- ▶ Patient off antibiotics ≥ 7 days
 - ▶ Ok to obtain cultures while pt. receiving IV/PO Vancomycin
- ▶ Obtain one culture from original site (wound, respiratory tract, urine)
- ▶ Optimal number of negative cultures from stool or rectum is unclear,
 - ▶ 1–3 negative cultures, each at least 1 week apart

CP DISCONTINUATION FOR VRE

- ▶ Consider extending CP if:
 - ▶ highly immunosuppressed,
 - ▶ receiving care in protected environments (e.g., burn units, bone marrow transplant units, or settings with neutropenic patients),
 - ▶ receiving care at institutions with high rates of VRE infection.
- ▶ Outside an outbreak setting, and if endemic VRE rates low, consider the alternative of CP for active VRE infection for the duration of the index admission and discontinuation of CP on hospital discharge.

CP DISCONTINUATION FOR MDR-E (ESBL-E AND/OR CRE)

- ▶ For extensively drug-resistant Enterobacteriaceae, such as carbapenemase-producing CRE, or Enterobacteriaceae with very limited treatment options (susceptible to ≤ 2 antibiotic classes used to treat that organism),
- ▶ Maintain CP for ESBL-E and CRE for the duration of the index hospital stay when infection or colonization with these bacteria is first detected.
- ▶ Hospitals should maintain CP indefinitely.

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CP DISCONTINUATION FOR MDR-E (ESBL-E/CRE)

- ▶ Consider discontinuation of CP on a case-by-case basis, taking into account the following criteria:
 - ▶ at least 6 months elapsed since the last positive culture;
 - ▶ presence of a clinical infection and ongoing concurrent broad spectrum antibiotic in use may select for these organisms;
 - ▶ at least 2 consecutive negative rectal swab samples obtained at least 1 week apart to consider an individual negative for ESBL-E or CRE colonization.

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CP DISCONTINUATION FOR C DIFFICILE

- ▶ CP for at least 48 hours after resolution of diarrhea.
- ▶ Consider extending CP through the duration of hospitalization if elevated rates of CDI are present despite appropriate infection prevention and control measures.
- ▶ Insufficient evidence exists to make a formal recommendation as to whether patients with CDI should be placed on CP if they are readmitted to the hospital.

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PREVENTING TRANSMISSION: SUMMARY

- ▶ Focus on Standard Precautions
- ▶ Contact (barrier) precautions for those known to carry MDROs
 - ▶ Education and observation/feedback
 - ▶ PPE usage
 - ▶ Hand hygiene
 - ▶ Practical issues (e.g. cost, room turnover)

SUMMARY

Healthcare facilities must not accept ongoing MDRO outbreaks or high endemic rates as the status quo.

Selection of infection control measures appropriate to their situation, facilities can reach the desired goal and reduce the MDRO burden substantially

Conclusions

MUST NOT ACCEPT ONGOING MDRO OUTBREAKS OR HIGH ENDEMIC RATES AS THE STATUS QUO.

SELECTION OF INFECTION CONTROL MEASURES APPROPRIATE TO THEIR SITUATION, FACILITIES CAN REACH THE DESIRED GOAL AND REDUCE THE MDRO BURDEN SUBSTANTIALY

► **Questions???**

THANK YOU!