ISOLATION PRECAUTIONS
Karen Hoffmann RN, MS, CIC, FSHEA, FAPIC

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

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

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

Types of Transmission
- Based Precautions:
  - Airborne Precautions
  - Droplet Precautions
  - Contact Precautions

Droplet and Airborne Transmission
- Smallest droplets (<25 mm) evaporate leaving "droplet nuclei" of bacilli that can reach alveoli (e.g., TB).
- Medium-sized droplets: trapped & cleared in upper airway.
- Largest droplets fail to ground in seconds; may persist in dust, but not an important cause of infection.

Doffing and Duffing
1. Donning PPE: 1 protocol deviation in 27% EVD; 50% CP
   - Fluorescence detected: for EVD 44% EVD; 28% CP
2. HCP contaminated almost 80% of the PPE simulations.
3. Mannequin simulated BBF with UV-fluorescent tracers
4. HCP (ICU) 39% error doffing, 36% MDRO contaminated
Surgical mask prior to entry
No special ventilation
Private room or Cohort
Hand hygiene
Residents use mask outside of room

CONDITIONS OR DISEASES REQUIRING DROPLET PRECAUTIONS

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

CONDITIONS OR DISEASES REQUIRING AIRBORNE PRECAUTIONS

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

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

CONTACT PRECAUTIONS

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

Controversy No 2
Special enteric precautions for C. difficile and Norovirus
Does CDC recommend routine handwashing with soap and water or ABHR?
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)

Special Airborne/Contact Isolation

Highly Transmissible Pathogens: Ebola

NC SPICE

Special Airborne/Contact Isolation

Highly Transmissible Pathogens: Ebola

Condition or Diseases Requiring Contact Precautions

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

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%)
- 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

<table>
<thead>
<tr>
<th>Clinical Syndrome or Condition</th>
<th>Potential Pathogens</th>
<th>Empiric Precautions (always includes Standard Precautions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute diarrhea with infectious cause in incontinent or diapered patient</td>
<td>Enteric Pathogens</td>
<td>Contact Precautions</td>
</tr>
<tr>
<td>Rash or Exanthems, generalized, unknown etiology</td>
<td>N. meningitides</td>
<td>Droplet Precautions for first 24 hours of antimicrobial therapy</td>
</tr>
<tr>
<td>Vesicular</td>
<td>Varicella zoster, herpes simplex, vaccinia viruses</td>
<td>Airborne plus Contact precautions</td>
</tr>
<tr>
<td>Respiratory infections</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough/fever/upper lobe infiltrate</td>
<td>Res. Viral, S. pneumoniae, S. aureus</td>
<td>Airborne Precautions plus contact</td>
</tr>
<tr>
<td>Skin or Wound Infection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abscess or draining wound that cannot be covered</td>
<td>Staphylococcus aureus, group A streptococci</td>
<td>Contact Precautions. Add Droplet for first 24 hours of antimicrobial therapy if group A strep disease suspected</td>
</tr>
</tbody>
</table>

COMMUNICATING PRECAUTIONS

How to prevent handoff problems during patient transfers intra-facility and inter-facility (e.g. signage)?

IMPLEMENTATION STRATEGIES FOR MDRO CONTROL

- 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

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

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).

<table>
<thead>
<tr>
<th>MDRGNB</th>
<th>No. of isolates</th>
<th>Duration of colonization, median days (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>All species</em></td>
<td>52</td>
<td>144 (61-349)</td>
</tr>
<tr>
<td><em>Pseudomonas</em></td>
<td>15</td>
<td>161 (50-279)</td>
</tr>
<tr>
<td><em>Klebsiella</em></td>
<td>12</td>
<td>132 (70-349)</td>
</tr>
<tr>
<td><em>Escherichia coli</em></td>
<td>8</td>
<td>178 (50-259)</td>
</tr>
<tr>
<td><em>Proteus</em></td>
<td>7</td>
<td>121 (69-222)</td>
</tr>
<tr>
<td><em>Morganella</em></td>
<td>5</td>
<td>103 (41-329)</td>
</tr>
<tr>
<td><em>Citrobacter</em></td>
<td>4</td>
<td>76 (41-168)</td>
</tr>
<tr>
<td><em>Enterobacter</em></td>
<td>1</td>
<td>133</td>
</tr>
</tbody>
</table>


**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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- 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.

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**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 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)

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**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 SUBSTANTIALLY
Questions??

THANK YOU!