Summary of Recommendations

Management of Multidrug-Resistant Organisms in Healthcare Settings (2006)

WHAT TO KNOW

Recommendations from the Management of Multidrug-Resistant Organisms in Healthcare Settings (2006) guideline.

HICPAC Recommendation Categories

Rank	Description
Category IA	Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.
Category IB	Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale.
Category IC	Required for implementation, as mandated by federal and/or state regulation or standard.
Category II	Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.
No recommendation	Unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

V.A. General Recommendations

for all healthcare settings independent of the prevalence of multidrug resistant organism (MDRO) infections or the population served. (See Table 3, Tier 1.)

V.A.1. Administrative Measures

#	Recommendation	Category
V.A.1.a.	Make MDRO prevention and control an organizational patient safety priority.	IB
V.A.1.b.	Provide administrative support, and both fiscal and human resources, to prevent and control MDRO transmission within the healthcare organization.	IB
V.A.1.c.	In healthcare facilities without expertise for analyzing epidemiologic data, recognizing MDRO problems, or devising effective control strategies (e.g., small or rural hospitals, rehabilitation centers, long-term care facilities (LTCFs), freestanding ambulatory centers), identify experts who can provide consultation as needed.	II
V.A.1.d.	Implement systems to communicate information about reportable MDROs [e.g., VRSA, VISA, MRSA, Penicillin resistant S. pneumoniae (PRSP)] to administrative personnel and as required by state and local health authorities ([This link is no	II/IC

#	Recommendation	Category
	longer active: www.cdc.gov/epo/dphsi/nndsshis.htm. Similar information may be available on National Notifiable Diseases Surveillance System (NNDSS) website accessed May 4, 2016]). Refer to websites for updated requirements of local and state health departments.	
V.A.1.e.	Implement a multidisciplinary process to monitor and improve healthcare personnel (HCP) adherence to recommended practices for Standard and Contact Precautions.	IB
V.A.1.f.	Implement systems to designate patients known to be colonized or infected with a targeted MDRO and to notify receiving healthcare facilities and personnel prior to transfer of such patients within or between facilities.	IB
V.A.1.g.	Support participation of the facility or healthcare system in local, regional, and national coalitions to combat emerging or growing MDRO problems.	IB
V.A.1.h.	Provide updated feedback at least annually to healthcare providers and administrators on facility and patient-care-unit trends in MDRO infections. Include information on changes in prevalence or incidence of infection, results of assessments for system failures, and action plans to improve adherence to and effectiveness of recommended infection control practices to prevent MDRO transmission.	IB

Recommendations for administrative measures by ID number and category.

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V.A.2. Education and Training of Healthcare Personnel

Recommendations for education and training of healthcare personnel by ID number and category.

#	Recommendation	Category
V.A.2.a.	Provide education and training on risks and prevention of MDRO transmission during orientation and periodic educational updates for healthcare personnel; include information on organizational experience with MDROs and prevention strategies.	IB

V.A.2. Education and Training of Healthcare Personnel

Recommendations for education and training of healthcare personnel by ID number and category.

#	Recommendation	Category
V.A.2.a.	Provide education and training on risks and prevention of MDRO transmission during orientation and periodic educational updates for healthcare personnel; include information on organizational experience with MDROs and prevention strategies.	IB

V.A.3. Judicious Use of Antimicrobial Agents

~ (i.e., systems to promote optimal treatment of infections and appropriate antimicrobial use).

Recommendations for judicious use of antimicrobial agents by ID number and category.

#	Recommendation	Category

#	Recommendation	Category
V.A.3.a.	In **hospitals and LTCFs**, ensure that a multidisciplinary process is in place to review antimicrobial utilization, local susceptibility patterns 36 (antibiograms), and antimicrobial agents included in the formulary to foster appropriate antimicrobial use.	IB
V.A.3.b.	Implement systems (e.g., computerized physician order entry, comment in microbiology susceptibility report, notification from a clinical pharmacist or unit director) to prompt clinicians to use the appropriate antimicrobial agent and regimen for the given clinical situation.	IB
V.A.3.b.i.	Provide clinicians with antimicrobial susceptibility reports and analysis of current trends, updated at least annually, to guide antimicrobial prescribing practices.	IB
V.A.3.b.ii.	In settings that administer antimicrobial agents but have limited electronic communication system infrastructures to implement physician prompts (e.g., LTCFs, home care and infusion companies), implement a process for appropriate review of prescribed antimicrobials. Prepare and distribute reports to prescribers that summarize findings and provide suggestions for improving antimicrobial use.	II

V.A.4. Surveillance

#	Recommendation	Category
V.A.4.a.	In **microbiology laboratories**, use standardized laboratory methods and follow published guidance for determining antimicrobial susceptibility of targeted (e.g., MRSA, VRE, MDR-ESBLs) and emerging (e.g., VRSA, MDR-*Acinetobacter baumannii*) MDROs.	IB
V.A.4.b.	In all healthcare organizations, establish systems to ensure that clinical microbiology laboratories (in-house and out-sourced) promptly notify infection control staff or a medical director/ designee when a novel resistance pattern for that facility is detected.	IB
V.A.4.c.	In **hospitals and LTCFs**, develop and implement laboratory protocols for storing isolates of selected MDROs for molecular typing when needed to confirm transmission or delineate the epidemiology of the MDRO within the healthcare setting.	IB
V.A.4.d.	Prepare facility-specific antimicrobial susceptibility reports as recommended by the Clinical and Laboratory Standards Institute (CLSI) ([This link is no longer active: www.phppo.cdc.gov/dls/master/default.aspx.]); monitor these reports for evidence of changing resistance patterns that may indicate the emergence or transmission of MDROs.	IB/IC
V.A.4.d.i.	In **hospitals and LTCFs with special-care units** (e.g., ventilator-dependent, ICU, or oncology units), develop and monitor unit-specific antimicrobial susceptibility reports.	IB
V.A.4.d.ii.	Establish a frequency for preparing summary reports based on volume of clinical isolates, with updates at least annually.	II/IC
V.A.4.d.iii.	In healthcare organizations that outsource microbiology laboratory services (e.g., ambulatory care, home care, LTCFs, smaller acute care hospitals), specify by contract that the laboratory provide either facility-specific susceptibility data or local or regional aggregate susceptibility data in order to identify prevalent MDROs and trends in the geographic area served.	II
V.A.4.e.	Monitor trends in the incidence of target MDROs in the facility over time using appropriate statistical methods to determine whether MDRO rates are decreasing and whether additional interventions are needed.	IA
V.A.4.e.i.	Specify isolate origin (i.e., location and clinical service) in MDRO monitoring protocols in hospitals and other large multi-unit facilities with high-risk patients.	IB
V.A.4.e.ii.	Establish a baseline (e.g., incidence) for targeted MDRO isolates by reviewing results of clinical cultures; if more timely or localized information is needed, perform baseline point prevalence studies of colonization in high-risk units. When possible, distinguish colonization from infection in analysis of these data.	IB

Recommendations for MDRO surveillance by ID number and category.

V.A.5. Infection Control Precautions to Prevent Transmission of MDROs

Recommendations for infection control precautions for MDROs by ID number and category.

#	Recommendation	Category
V.A.5.a.	Follow Standard Precautions during all patient encounters in all settings in which healthcare is delivered.	IB
V.A.5.b.	Use masks according to Standard Precautions when performing splash-generating procedures (e.g., wound irrigation, oral suctioning, intubation); when caring for patients with open tracheostomies and the potential for projectile secretions; and in circumstances where there is evidence of transmission from heavily colonized sources (e.g., burn wounds). Masks are not otherwise recommended for prevention of MDRO transmission from patients to healthcare personnel during routine care (e.g., upon room entry).	IB

V.A.5.c. Use of Contact Precautions

V.A.5.C.I. IN ACUTE-CARE HOSPITALS

Recommendations for MDRO prevention in acute-care hospitals by ID number and category.

#	Recommendation	Category
V.A.5.c.i.	Implement Contact Precautions routinely for all patients infected with target MDROs and for patients that have been previously identified as being colonized with target MDROs (e.g., patients transferred from other units or facilities who are known to be colonized).	IB

V.A.5.C.II. IN LTCFS

Edit [February 2017]

An * indicates recommendations that were renumbered for clarity. The renumbering does not constitute change to the intent of the recommendations.

Recommendations for MDRO prevention in LTCFS by ID number and category.

#	Recommendation	Category
* V.A.5.c.ii.1.	Consider the individual patient's clinical situation and prevalence or incidence of MDRO in the facility when deciding whether to implement or modify Contact Precautions in addition to Standard Precautions for a patient infected or colonized with a target MDRO.	II
* V.A.5.c.ii.2.	For relatively healthy residents (e.g., mainly independent) follow Standard Precautions, making sure that gloves and gowns are used for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes/bags.	II
* V.A.5.c.ii.3.	For ill residents (e.g., those totally dependent upon healthcare personnel for healthcare and activities of daily living, ventilator-dependent) and for those residents whose infected secretions or drainage cannot be contained, use Contact Precautions in addition to Standard Precautions.	II
* V.A.5.c.ii.4.	For MDRO colonized or infected patients without draining wounds, diarrhea, or uncontrolled secretions, establish ranges of permitted ambulation, socialization, and use of common areas based on their risk to other patients and on the ability of the colonized or infected patients to observe proper hand hygiene and other recommended precautions to contain secretions and excretions.	II

V.A.5.D. IN AMBULATORY SETTINGS

Recommendations for MDRO prevention in ambulatory settings by ID number and category.

#	Recommendation	Category
V.A.5.d.	Use Standard Precautions for patients known to be infected or colonized with target MDROs, making sure that gloves and gowns are used for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes and bags.	II

V.A.5.E. IN HOME CARE SETTINGS

Edit [February 2017]

An * indicates recommendations that were renumbered for clarity. The renumbering does not constitute change to the intent of the recommendations.

Recommendations for MDRO prevention in home care settings by ID number and category.

#	Recommendation	Category
* V.A.5.e.1.	Follow Standard Precautions making sure to use gowns and gloves for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool incontinence, and ostomy tubes and bags.	II
* V.A.5.e.2.	Limit the amount of reusable patient-care equipment that is brought into the home of patients infected or colonized with MDROs. When possible, leave patient-care equipment in the home until the patient is discharged from home care services.	II
* V.A.5.e.3.	If noncritical patient-care equipment (e.g., stethoscopes) cannot remain in the home, clean and disinfect items before removing them from the home, using a low to intermediate level disinfectant, or place reusable items in a plastic bag for transport to another site for subsequent cleaning and disinfection.	II

* V.A.5.F. IN AMBULATORY OR HOME CARE SETTINGS

Recommendations for MDRO prevention in ambulatory or home care settings by ID number and category.

#	Recommendation	Category
* V.A.5.f.	No recommendation is made for routine use of gloves, gowns, or both to prevent MDRO transmission in ambulatory or home care settings.	Unresolved issue

* V.A.5.G. IN HEMODIALYSIS UNITS

#	Recommendation	Category
* V.A.5.g.	Follow the “Recommendations to Prevent Transmission of Infections in Chronic Hemodialysis Patients” ([This link is no longer active: www.cms.hhs.gov/home/regsguidance.asp.]).	IC

Recommendations for MDRO prevention in hemodialysis units by ID number and category.

* V.A.5.H. DISCONTINUATION OF CONTACT PRECAUTIONS

Recommendations for discontinuation of contact precautions by ID number and category.

#	Recommendation	Category
* V.A.5.h.	No recommendation can be made regarding when to discontinue Contact Precautions. (See Background for discussion of options.)	Unresolved issue

* V.A.5.I. PATIENT PLACEMENT IN HOSPITALS AND LTCFS

Recommendations for patient placement in hospitals and LTCFS by ID number and category.

#	Recommendation	Category
* V.A.5.i.1.	When single-patient rooms are available, assign priority for these rooms to patients with known or suspected MDRO colonization or infection. Give highest priority to those patients who have conditions that may facilitate transmission, e.g., uncontained secretions or excretions.	IB
* V.A.5.i.2.	When single-patient rooms are not available, cohort patients with the same MDRO in the same room or patient-care area.	IB
* V.A.5.i.3.	When cohorting patients with the same MDRO is not possible, place MDRO patients in rooms with patients who are at low risk for acquisition of MDROs and associated adverse outcomes from infection and are likely to have short lengths of stay.	II

V.A.6. Environmental Measures

Recommendations for environmental measures by ID number and category.

#	Recommendation	Category
V.A.6.a.	Clean and disinfect surfaces and equipment that may be contaminated with pathogens, including those that are in close proximity to the patient (e.g., bed rails, over bed tables) and frequently-touched surfaces in the patient care environment (e.g., door knobs, surfaces in and surrounding toilets in patients' rooms) on a more frequent schedule compared to that for minimal touch surfaces (e.g., horizontal surfaces in waiting rooms).	IB
V.A.6.b.	Dedicate noncritical medical items to use on individual patients known to be infected or colonized with MDROs.	IB
V.A.6.c.	Prioritize room cleaning of patients on Contact Precautions. Focus on cleaning and disinfecting frequently touched surfaces (e.g., bedrails, bedside commodes, bathroom fixtures in the patient's room, doorknobs) and equipment in the immediate vicinity of the patient.	IB

V.B. Intensified interventions

to prevent MDRO transmission (See Table 3, Tier 2.)

The interventions presented below have been utilized in various combinations to reduce transmission of MDROs in healthcare facilities. Neither the effectiveness of individual components nor that of specific combinations of control measures has been assessed in controlled trials. Nevertheless, various combinations of control elements selected under the guidance of knowledgeable content experts have repeatedly reduced MDRO transmission rates in a variety of healthcare settings.

V.B.1. Indications and Approach

Recommendations for indications and approach by ID number and category.

#	Recommendation	Category
V.B.1.a.	Indications for intensified MDRO control efforts (VII.B.1.a.i and VII.B.1.a.ii) should result in selection and implementation of one or more of the interventions described in VII.B.2 to VII.B.8 below. Individualize the selection of control measures according to local considerations.	IB
V.B.1.a.i.	When incidence or prevalence of MDROs are not decreasing despite implementation of and correct adherence to the routine control measures described above, intensify MDRO control efforts by adopting one or more of the interventions described below.	IB
V.B.1.a.ii.	When the first case or outbreak of an epidemiologically important MDRO (e.g., VRE, MRSA, VISA, VRSA, MDR-GNB) is identified within a healthcare facility or unit.	IB
V.B.1.b.	Continue to monitor the incidence of target MDRO infection and colonization after additional interventions are implemented. If rates do not decrease, implement more interventions as needed to reduce MDRO transmission.	IB

V.B.2. Administrative Measures

Recommendations for administrative measures by ID number and category.

#	Recommendation	Category
V.B.2.a.	Identify persons with experience in infection control and the epidemiology of MDRO, either in house or through outside consultation, for assessment of the local MDRO problem and for the design, implementation, and evaluation of appropriate control measures.	IB
V.B.2.b.	Provide necessary leadership, funding, and day-to-day oversight to implement interventions selected. Involve the governing body and leadership of the healthcare facility or system that have organizational responsibility for this and other infection control efforts.	IB
V.B.2.c.	Evaluate healthcare system factors for their role in creating or perpetuating transmission of MDROs, including: staffing levels, education and training, availability of consumable and durable resources, communication processes, policies and procedures, and adherence to recommended infection control measures (e.g., hand hygiene and Standard or Contact Precautions). Develop, implement, and monitor action plans to correct system failures.	IB
V.B.2.d.	During the process, update healthcare providers and administrators on the progress and effectiveness of the intensified interventions. Include information on changes in prevalence, rates of infection and colonization; results of assessments and corrective actions for system failures; degrees of adherence to recommended practices; and action plans to improve adherence to recommended infection control practices to prevent MDRO transmission.	IB

V.B.3. Educational Interventions

Recommendations for educational interventions by ID number and category.

#	Recommendation	Category
V.B.3.	Intensify the frequency of MDRO educational programs for healthcare personnel, especially those who work in areas in which MDRO rates are not decreasing. Provide individual or unit-specific feedback when available.	IB

V.B.4. Judicious Use of Antimicrobial Agents

Recommendations for judicious use of antimicrobial agents by ID number and category.

#	Recommendation	Category
V.B.4.	Review the role of antimicrobial use in perpetuating the MDRO problem targeted for intensified intervention. Control and improve antimicrobial use as indicated. Antimicrobial agents that may be targeted include vancomycin, third-generation cephalosporins, and anti-anaerobic agents for VRE, third-generation cephalosporins for ESBLs; and quinolones and carbapenems.	IB

V.B.5. Surveillance

#	Recommendation	Category
V.B.5.a.	Calculate and analyze prevalence and incidence rates of targeted MDRO infection and colonization in populations at risk; when possible, distinguish colonization from infection.	IB
V.B.5.a.i.	Include only one isolate per patient, not multiple isolates from the same patient, when calculating rates.	II
V.B.5.a.ii.	Increase the frequency of compiling and monitoring antimicrobial susceptibility summary reports for a targeted MDRO as indicated by an increase in incidence of infection or colonization with that MDRO.	II
V.B.5.b.	Develop and implement protocols to obtain active surveillance cultures (ASC) for targeted MDROs from patients in populations at risk (e.g., patients in intensive care, burn, bone marrow/stem cell transplant, and oncology units; patients transferred from facilities known to have high MDRO prevalence rates; roommates of colonized or infected persons; and patients known to have been previously infected or colonized with an MDRO).	IB
V.B.5.b.i.	Obtain ASC from areas of skin breakdown and draining wounds. In addition, include the following sites according to target MDROs:	n/a
V.B.5.b.i.1.	**For MRSA**: Sampling the anterior nares is usually sufficient; throat, endotracheal tube aspirate, percutaneous gastrostomy sites, and perirectal or perineal cultures may be added to increase the yield. Swabs from several sites may be placed in the same selective broth tube prior to transport.	IB
V.B.5.b.i.2.	**For VRE**: Stool, rectal, or perirectal samples should be collected.	IB
V.B.5.b.i.3.	**For MDR-GNB**: Endotracheal tube aspirates or sputum should be cultured if a respiratory tract reservoir is suspected, (e.g., Acinetobacter spp., Burkholderia spp.).	IB
V.B.5.b.ii.	Obtain surveillance cultures for the target MDRO from patients at the time of admission to high-risk areas, e.g., ICUs, and at periodic intervals as needed to assess MDRO transmission.	IB
V.B.5.c.	Conduct culture surveys to assess the efficacy of the enhanced MDRO control interventions.	n/a
V.B.5.c.i.	Conduct serial (e.g., weekly, until transmission has ceased and then decreasing frequency) unit-specific point prevalence culture surveys of the target MDRO to determine if transmission has decreased or ceased.	IB
V.B.5.c.ii.	Repeat point-prevalence culture surveys at routine intervals or at time of patient discharge or transfer until transmission has ceased.	IB
V.B.5.c.iii.	If indicated by assessment of the MDRO problem, collect cultures to assess the colonization status of roommates and other patients with substantial exposure to patients with known MDRO infection or colonization.	IB
V.B.5.d.	Obtain cultures of healthcare personnel for target MDRO when there is epidemiologic evidence implicating the healthcare staff member as a source of ongoing transmission.	IB

Recommendations for intensified MDRO surveillance by ID number and category.

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V.B.6. Enhanced Infection Control Precautions

Edit [February 2017]

An * indicates recommendations that were renumbered for clarity. The renumbering does not constitute change to the intent of the recommendations.

* V.B.6.a. Use of Contact Precautions

Recommendations for use of contact precautions by ID number and category.

#	Recommendation	Category
V.B.6.a.i.	Implement Contact Precautions routinely for all patients colonized or infected with a target MDRO.	IA
V.B.6.a.ii.	Because environmental surfaces and medical equipment, especially those in close proximity to the patient, may be contaminated, don gowns and gloves before or upon entry to the patient's room or cubicle.	IB
V.B.6.a.iii.	**In LTCFs**, modify Contact Precautions to allow MDRO colonized/infected patients whose site of colonization or infection can be appropriately contained and who can observe good hand hygiene practices to enter common areas and participate in group activities.	IB
V.B.6.b.	When ASC are obtained as part of an intensified MDRO control program, implement Contact Precautions until the surveillance culture is reported negative for the target MDRO.	IB
V.B.6.c.	No recommendation is made regarding universal use of gloves, gowns, or both in high-risk units in acute-care hospitals.	Unresolved issue

V.B.7. Patient Admission and Placement

Recommendations for patient admission and placement by ID number and category.

#	Recommendation	Category
V.B.7.	Implement policies for patient admission and placement as needed to prevent transmission of a problem MDRO.	IB
V.B.7.a.i.	Place MDRO patients in single-patient rooms.	IB
V.B.7.a.ii.	Cohort patients with the same MDRO in designated areas (e.g., rooms, bays, patient care areas.	IB
V.B.7.a.iii.	When transmission continues despite adherence to Standard and Contact Precautions and cohorting patients, assign dedicated nursing and ancillary service staff to the care of MDRO patients only. Some facilities may consider this option when intensified measures are first implemented.	IB
V.B.7.a.iv.	Stop new admissions to the unit of facility if transmission continues despite the implementation of the enhanced control measures described above. (Refer to state or local regulations that may apply upon closure of hospital units or services.)	IB

V.B.8. Enhanced Environmental Measures

Recommendations for enhanced environmental measures by ID number and category.

#	Recommendation	Category
V.B.8.a.	Implement patient-dedicated or single-use disposable noncritical equipment (e.g., blood pressure cuff, stethoscope) and instruments and devices.	IB

#	Recommendation	Category
V.B.8.b.	Intensify and reinforce training of environmental staff who work in areas targeted for intensified MDRO control and monitor adherence to environmental cleaning policies. Some facilities may choose to assign dedicated staff to targeted patient care areas to enhance consistency of proper environmental cleaning and disinfection services.	IB
V.B.8.c.	Monitor (i.e., supervise and inspect) cleaning performance to ensure consistent cleaning and disinfection of surfaces in close proximity to the patient and those likely to be touched by the patient and HCP (e.g., bedrails, carts, bedside commodes, doorknobs, faucet handles).	IB
V.B.8.d.	Obtain environmental cultures (e.g., surfaces, shared medical equipment) when there is epidemiologic evidence that an environmental source is associated with ongoing transmission of the targeted MDRO.	IB
V.B.8.e.	Vacate units for environmental assessment and intensive cleaning when previous efforts to eliminate environmental reservoirs have failed.	II

V.B.9. Decolonization

Recommendations for decolonization by ID number and category.

#	Recommendation	Category
V.B.9.a.	Consult with physicians with expertise in infectious diseases and/or healthcare epidemiology on a case-by-case basis regarding the appropriate use of decolonization therapy for patients or staff during limited periods of time, as a component of an intensified MRSA control program.	II
V.B.9.b.	When decolonization for MRSA is used, perform susceptibility testing for the decolonizing agent against the target organism in the individual being treated or the MDRO strain that is epidemiologically implicated in transmission. Monitor susceptibility to detect emergence of resistance to the decolonizing agent. Consult with a microbiologist for appropriate testing for mupirocin resistance, since standards have not been established.	IB
V.B.9.b.i.	Because mupirocin-resistant strains may emerge and because it is unusual to eradicate MRSA when multiple body sites are colonized, do not use topical mupirocin routinely for MRSA decolonization of patients as a component of MRSA control programs in any healthcare setting.	IB
V.B.9.b.ii.	Limit decolonization of HCP found to be colonized with MRSA to persons who have been epidemiologically linked as a likely source of ongoing transmission to patients. Consider reassignment of HCP if decolonization is not successful and ongoing transmission to patients persists.	IB
V.B.9.c.	No recommendation can be made for decolonizing patients with VRE or MDR-GNB. Regimens and efficacy of decolonization protocols for VRE and MDR-GNB have not been established.	Unresolved issue

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