AMERICAN ACADEMY OF PEDIATRICS

Committee on Infectious Diseases and Committee on Hospital Care

The Revised CDC Guidelines for Isolation Precautions in Hospitals: Implications for Pediatrics

ABSTRACT. The Hospital Infection Control Practices Advisory Committee of the US Centers for Disease Control and Prevention and the National Center for Infectious Diseases have issued new isolation guidelines that replace earlier recommendations. Modifications of these guidelines for the care of hospitalized infants and children should be considered specifically as they relate to glove use for routine diaper changing, private room isolation, and common use areas such as playrooms and schoolrooms. These new guidelines replace those provided in the 1994 *Red Book* and have been incorporated into the 1997 *Red Book*.

ABBREVIATION. CDC, Centers for Disease Control and Prevention.

These new isolation guidelines developed by the Hospital Infection Control Practices Advisory Committee of the US Centers for Disease Control and Prevention (CDC) and the National Center for Infectious Diseases are specifically recommended for use in the care of hospitalized adults and children.[1] Settings such as schools and child care centers are similar to hospital environments in which children share common space but differ in that the involved children are, for the most part, healthy. These recommendations, therefore, should not be applied to those settings. These new guidelines are simpler and rely on very consistent strategies to prevent the spread of infection to uninfected hospitalized patients. These new recommendations specifically state that "No guideline can address all of the needs of the more than 6000 US hospitals, which range in size from five beds to more than 1500 beds and serve very different patient populations. Hospitals are encouraged to review the recommendations and to modify them according to what is possible, practical, and prudent . . . "[1] Therefore, with these new recommendations as a guide, each institution must create its own specific isolation policies. These isolation policies, supplemented by hospital policies and procedures for other aspects of infection and environmental control and occupational health, coupled with common sense, will serve to create reasonable policies for each unique medical center.

These new guidelines rely on the routine and optimal performance of an expanded set of universal precautions, now called standard precautions, for the care of all patients regardless of their diagnosis or presumed infection status, and pathogen and syndrome-based precautions, termed transmission-based precautions, for the care of patients who are infected or colonized with pathogens spread through airborne, droplet, or contact routes.

The recommendations in this statement do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

STANDARD PRECAUTIONS

Standard precautions now apply to nonintact skin, mucous membranes, blood, all body fluids, secretions, and excretions except sweat, regardless of whether or not they contain visible blood. These general methods of infection prevention are indicated for all patients and are designed to reduce the risk of transmission of microorganisms from both recognized and unrecognized sources of infection in hospitals.

TRANSMISSION-BASED PRECAUTIONS

Transmission-based precautions are designed for patients documented or suspected to be infected or colonized with pathogens that require additional precautions beyond the standard precautions necessary to interrupt transmission. These precautions apply to airborne, droplet, and contact transmissions. The precautions may be combined for diseases that have multiple routes of transmission. Whether singly or in combination, they are always to be used in addition to standard precautions.

Contact Transmission

Contact transmission, the most important and frequent mode of transmission of nosocomial infections, is divided into two subgroups: direct-contact transmission and indirect-contact transmission.

Direct-contact transmission involves a direct body surface-to-body surface contact and physical transfer of microorganisms between a susceptible host and an infected or colonized person, such as occurs when a person turns a patient, gives a patient a bath, or performs other patient-care activities that require direct personal contact. Direct-contact transmission also can occur between two patients, with one serving as the source of the infectious microorganisms and the other as a susceptible host.

Indirect-contact transmission involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, such as contaminated instruments, needles, dressings, or contaminated

TABLE 1. Transmission-Based Precautions for Hospitalized Patients*

Standard Precautions
Use standard precautions for the care of all patients
Airborne Precautions
In addition to standard precautions, use airborne precautions for patients known or suspected to have serious illnesses transmitted by airborne droplet nuclei. Examples of such illnesses include:
Measles
Varicella (including disseminated zoster)†
Tuberculosis‡
Droplet Precautions
In addition to standard precautions, use droplet precautions for patients known or suspected to have serious illnesses transmitted by large particle droplets. Examples of such illnesses include:
Invasive *Haemophilus influenzae* type b disease, including meningitis, pneumonia, epiglottitis, and sepsis
Invasive *Neisseria meningitidis* disease, including meningitis, pneumonia, and sepsis
Other serious bacterial respiratory infections spread by droplet transmission, including:
Diphtheria (pharyngeal)
Mycoplasma pneumonia
Pertussis
Pneumonic plague
Streptococcal pharyngitis, pneumonia, or scarlet fever in infants and young children
Serious viral infections spread by droplet transmission, including those caused by:
Adenovirus*
Influenza
Mumps
Parvovirus B19
Rubella
Contact Precautions
In addition to standard precautions, use contact precautions for patients known or suspected to have serious illnesses easily transmitted by direct patient contact or by contact with items in the patient's environment. Examples of such illnesses include:
Gastrointestinal, respiratory, skin, or wound infections or colonization with multidrug-resistant bacteria judged by the infection control program, based on current state, regional, or national recommendations, to be of special clinical and epidemiologic significance
Enteric infections with a low infectious dose or prolonged environmental survival, including those caused by:
Clostridium difficile
For diapered or incontinent patients: enterohemorrhagic *Escherichia coli* 0157:H7, *Shigella*, hepatitis A, or rotavirus
Respiratory syncytial virus, parainfluenza virus, or enteroviral infections in infants and young children
Skin infections that are highly contagious or that may occur on dry skin, including:
Diphtheria (cutaneous)
Herpes simplex virus (neonatal or mucocutaneous)
Impetigo
Major (noncontained) abscesses, cellulitis, or decubiti
Pediculosis
Scabies
Staphylococcal furunculosis in infants and young children
Zoster (disseminated or in the immunocompromised host)*
Viral/hemorrhagic conjunctivitis
Viral hemorrhagic infections (Ebola, Lassa, or Marburg)

* Reprinted from Garner JS and the Hospital Infection Control Practices Advisory Committee.[1]
† Certain infections require more than one type of precaution.
‡ See Centers for Disease Control and Prevention.[2]

hands that are not washed and gloves that are not changed between patients.

Droplet Transmission

Droplet transmission, theoretically, is a form of contact transmission. However, the mechanism of transfer of the pathogen to the host is quite distinct from either direct- or indirect-contact transmission. Therefore, droplet transmission is considered a separate route of transmission in this guideline. Droplets are generated from the source person primarily during coughing, sneezing, and talking, and during the performance of certain procedures such as suctioning and bronchoscopy. Transmission occurs when droplets containing microorganisms generated from the infected person are propelled a short distance through the air and deposited on the host's conjunctivae, nasal mucosa, or mouth. Because droplets do not remain suspended in the air, special air handling and ventilation are not required to prevent droplet transmission; that is, droplet transmission *must not* be confused with airborne transmission.

Airborne Transmission

Airborne transmission occurs by dissemination of either airborne droplet nuclei (small-particle residue [5 μm or smaller] of evaporated droplets containing microorganisms that remain suspended in the air for long periods) or dust particles containing the infectious agent. Microorganisms carried in this manner can be dispersed widely by air currents, and may be inhaled by a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air handling and ventilation are required to prevent airborne transmission. Microorganisms transmitted by airborne transmission include *Mycobacterium tuberculosis* and the measles and varicella viruses.

These new guidelines provide summary tables for

TABLE 2. Clinical Syndromes or Conditions Warranting Additional Empiric Precautions to Prevent Transmission of Epidemiologically Important Pathogens Pending Confirmation of Diagnosis*

Clinical Syndrome or Condition†	Potential Pathogens‡	Empiric Precautions
Diarrhea		
Acute diarrhea with a likely infectious cause in an incontinent or diapered patient	Enteric pathogens§	Contact
Diarrhea in an adult with a history of recent antibiotic use	*Clostridium difficile*	Contact
Meningitis	*Neisseria meningitidis*	Droplet
Rash or exanthems, generalized, etiology unknown		
Petechial/ecchymotic with fever	*Neisseria meningitidis*	Droplet
Vesicular	Varicella	Airborne and contact
Maculopapular with coryza and fever	Rubeola (measles)	Airborne
Respiratory infections		
Cough/fever/upper lobe pulmonary infiltrate in an HIV-negative patient or a patient at low risk for HIV infection	*Mycobacterium tuberculosis*	Airborne
Cough/fever/pulmonary infiltrate in any lung location in an HIV-infected patient or a patient at high risk for HIV infection	*Mycobacterium tuberculosis*	Airborne
Paroxysmal or severe persistent cough during periods of pertussis activity	*Bordetella pertussis*	Droplet
Respiratory infections, particularly bronchiolitis and croup, in infants and young children	Respiratory syncytial or parainfluenza virus	Contact
Risk of multidrug-resistant microorganisms		
History of infection or colonization with multidrug-resistant organisms‖	Resistant bacteria	Contact
Skin, wound, or urinary tract infection in a patient with a recent hospital or nursing home stay in a facility where multidrug-resistant organisms are prevalent	Resistant bacteria	Contact
Skin or wound infection		
Abscess or draining wound that cannot be covered	*Staphylococcus aureus*, group A streptococcus	Contact

* Infection control professionals are encouraged to modify or adapt this table according to local conditions. To ensure that appropriate empiric precautions are implemented always, hospitals must have systems in place to evaluate patients routinely according to these criteria as part of their preadmission and admission care. (Reprinted with permission from Garner JS and the Hospital Infection Control Practices Advisory Committee.[1])

† Patients with the syndromes or conditions listed herein may present with atypical signs or symptoms (eg, neonates and adults with pertussis may not have paroxysmal or severe cough). The clinician's index of suspicion should be guided by the prevalence of specific conditions in the community, as well as clinical judgment.

‡ The organisms listed are not intended to represent the complete, or even most likely, diagnoses, but rather possible etiologic agents that require additional precautions beyond standard precautions until they can be ruled out.

§ These pathogens include enterohemorrhagic *Escherichia coli* 0157:H7, *Shigella*, hepatitis A, and rotavirus.

‖ Resistant bacteria judged by the infection control program, based on current state, regional, or national recommendations, to be of special clinical or epidemiological significance.

different settings. A synopsis of the precautions and patients requiring these precautions is presented in Table 1. Table 2 describes empiric precautions for clinical syndromes pending confirmation of diagnosis. Table 3 outlines the specific procedures indicated for each type of precaution. Footnotes document the acceptable changes for children. Appendix A in the guidelines, which is not reproduced here, is the specific recommendation on type and duration of precautions needed when the specific infection or condition is known.

PEDIATRIC CONSIDERATIONS

These guidelines are intended to be not only epidemiologically sound but also simple and readily implemented for the care of both adults and children. Practically, however, unique requirements of pediatric care necessitate modifications of these guidelines, par-

TABLE 3. Recommendations for Transmission-Based Precautions for Hospitalized Patients

Category of Precautions	Hand Washing for Patient Contact	Single Room	Masks	Gowns	Gloves
Airborne	Yes	Yes, with negative-pressure ventilation	Yes	No	No
Droplet	Yes	Yes*	Yes, for those close to patient	No	No
Contact	Yes	Yes*	No	Yes	Yes

* Preferred but not required for crib-confined patients. Cohorting of children infected with the same pathogen is acceptable.

ticularly concerning 1) use of gloves for routine diaper changing, 2) private rooms and cohorting, and 3) common-use areas such as playrooms and schoolrooms.

Diaper Changing

When dealing with infants and preschool-age children who require routine diaper changing, the use of gloves is not mandatory. The routine use of gloves, however, for diaper changing in hospitalized children could minimize the potential transmission of colonizing microbes (eg, cytomegalovirus, *Clostridium difficile*, and *Citrobacter freundii*) to another patient who might become infected. While exceptions to routine glove use in units such as the normal newborn nursery or outpatient surgical suites are acceptable, the lack of a uniform policy for glove use may be confusing and actually impede implementation of recommended and consistent infection control practices.

Private Rooms and Cohorting

The CDC guidelines recommend private rooms for all patients requiring isolation precautions (airborne, droplet, or contact). For any patient with an infection requiring airborne precautions, a single room with negative pressure ventilation is indicated. The guidelines also recommend that patients who do not control body excretions should be in single rooms. However, because the majority of young pediatric patients are incontinent, by definition, this recommendation is inappropriate for routine care of uninfected children. Even with infection in settings such as nurseries, intensive care units, and infant wards, single room isolation for droplet and contact precautions, although preferred, is not mandatory because these infants are confined to cribs or incubators. However, for young children who are not confined to their cribs or incubators who require droplet or contact precautions, single rooms are indicated because young children are unable to limit the spread of their secretions and excretions. The exception to the need for a single room is for children infected with the same pathogen (such as respiratory syncytial virus) who can be separated by cohorts.

Common Use Areas (Hospital Schoolrooms, Playrooms, Etc)

Hospital playrooms and schoolrooms are unique to the field of pediatrics. Any child being treated with isolation precautions should be excluded from these general use areas.

RECOMMENDATIONS

In general, the revised CDC guidelines are endorsed for the care of hospitalized infants and children.

Modification of these guidelines for the care of hospitalized infants and children should be considered specifically as they relate to glove use for routine diaper changing, private room isolation, and common use areas such as playrooms and schoolrooms.

These new guidelines replace those provided in the 1994 *Red Book* and have been incorporated into the 1997 *Red Book*.

REFERENCES

1. Garner JS and the Hospital Infection Control Practices Advisory Committee. Guideline for isolation precautions in hospitals. *Infect Control Hosp Epidemiol.* 1996;17:53–80
2. Centers for Disease Control and Prevention. Guidelines for preventing the transmission of *Mycobacterium tuberculosis* in health-care facilities, 1994. *MMWR.* 1994;43:1–132

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