The Centers for Disease Control (CDC) has developed a new set of definitions for surveillance of nosocomial infections. The new definitions combine specific clinical findings with results of laboratory and other tests that include recent advances in diagnostic technology; they are formulated as algorithms. For certain infections in which the clinical or laboratory manifestations are different in neonates and infants than in older persons, specific criteria are included. The definitions include criteria for common nosocomial infections as well as infections that occur infrequently but have serious consequences. The definitions were introduced into hospitals participating in the CDC National Nosocomial Infections Surveillance System (NNIS) in 1987 and were modified based on comments from infection control personnel in NNIS hospitals and others involved in surveillance, prevention, and control of nosocomial infections. The definitions were implemented for surveillance of nosocomial infections in NNIS hospitals in January 1988 and are the current CDC definitions for nosocomial infections. Other hospitals may wish to adopt or modify them for use in their nosocomial infections surveillance programs. (Am J Infect Control 1988;16:128-40)

During the past two decades, the Centers for Disease Control (CDC) has published several sets of definitions for nosocomial infections. The definitions used during the Comprehensive Hospital Infections Project (CHIP) from 1969 to 1972 and in the National Nosocomial Infections Study (NNIS) from 1970 to 1974 appeared in the Proceedings of the First International Conference on Nosocomial Infections conducted by CDC in 1970. They were subsequently expanded in 1974 for hospitals participating in NNIS. Algorithms were used for diagnosing infections in the Study on the Efficacy of Nosocomial Infection Control (SENIC Project) in 1975-1976.

The Hospital Infections Program, Center for Infectious Diseases, CDC, has developed a new set of definitions for surveillance of nosocomial infections. The definitions were introduced into hospitals participating in NNIS in 1987 and were modified based on comments from infection control personnel in NNIS hospitals and others involved in surveillance, prevention, and control of nosocomial infections. The definitions were implemented in NNIS hospitals in January 1988 and are the current CDC definitions for nosocomial infections.

**PRINCIPLES USED IN DEFINITIONS**

The definitions are based on several important principles. First, information used to determine the presence and classification of an infection involves various combinations of clinical findings and results of laboratory and other diagnostic tests. Clinical evidence is derived
from direct observation of the patient or review
of information in the patient's chart or other
ward or unit records, for example, temperature
sheet or Kardex. Laboratory evidence consists
of results of cultures, antigen- or antibody-
detection tests, and microscopic visualization
methods. Supportive data are derived from
other diagnostic studies, such as results of
x-ray studies, ultrasound examination, com-
puted tomography (CT) scan, magnetic reso-
nance imaging, radiolabel scans, endoscopic
procedures, biopsies, and needle aspiration. For
infections in which clinical manifestations are
different in neonates and infants than in older
persons, specific criteria are included.

Second, a physician's or surgeon's diagnosis
of infection derived from direct observation
during surgery, endoscopic examination, or
other diagnostic study, or based on clinical
judgment, is an acceptable criterion for an
infection, unless there is compelling evidence
to the contrary (e.g., information written on the
wrong patient's record or a presumptive diag-
nosism that was not substantiated by subsequent
studies). For infections at some sites, however,
a physician's clinical diagnosis in the absence
of supportive data must be accompanied by ini-
tiation of appropriate antimicrobial therapy to
satisfy the criterion.

Third, for an infection to be defined as nos-
ocomial, there must be no evidence that the
infection was present or incubating at the time
of hospital admission. An infection that occurs
in the following special situations is considered
nosocomial: (1) infection that is acquired in the
hospital and becomes evident after hospital dis-
charge and (2) newborn infection that is the
result of passage through the birth canal.

Fourth, infection that occurs as the result of
the following special situations is not consid-
ered nosocomial: (1) infection that is associated
with a complication or extension of infection(s)
already present on admission, unless a change
in pathogen or symptoms strongly suggests
the acquisition of a new infection and (2) in-
fection in an infant that is known or proved
to have been acquired transplacentally (e.g.,
herpes simplex, toxoplasmosis, rubella, cyto-
megalovirus, and syphilis) and becomes evident
shortly after birth.

Fifth, except for a few situations that are re-
ferred to in the definitions, no specific time dur-
ing or after hospitalization is given to deter-
mine whether an infection is nosocomial or
community-acquired. Thus each infection must
be assessed for evidence that links it to hospi-
talization.

DEFINITIONS FOR NOSOCOMIAL
INFECTIONS

Definitions for surgical wound infection, pri-
mary bloodstream infection, pneumonia, and
urinary tract infection are presented first and
are followed by other sites of infection listed
alphabetically.

SURGICAL WOUND INFECTION

Surgical wound infection includes incisional
surgical wound infection and deep surgical
wound infection.

Incisional surgical wound infection must
meet the following criterion: Infection occurs
at incision site within 30 days after surgery
AND
involves skin, subcutaneous tissue, or muscle
located above the fascial layer AND any of the
following:
1. Purulent drainage from incision or drain lo-
cated above fascial layer
2. Organism isolated from culture of fluid from
wound closed primarily
3. Surgeon deliberately opens wound, unless
wound is culture-negative
4. Surgeon's or attending physician's diagnosis
of infection

Deep surgical wound infection must meet the
following criterion: Infection occurs at opera-
tive site within 30 days after surgery if no im-
plant* is left in place or within 1 year if implant
is in place AND infection appears related to sur-
gery AND infection involves tissues or spaces
at or beneath fascial layer AND any of the
following:
1. Purulent drainage from drain placed be-
neth fascial layer
2. Wound spontaneously dehisces or is delib-

* A nonhuman-derived implantable foreign body (e.g., prosthetic heart valve, nonhuman vascular graft, mechanical heart,
or hip prosthesis) that is permanently placed in a patient during
surgery.
erately opened by surgeon when patient has fever (>38°C) and/or localized pain or tenderness, unless wound is culture-negative
3. An abscess or other evidence of infection seen on direct examination, during surgery, or by histopathologic examination
4. Surgeon's diagnosis of infection

**PRIMARY BLOODSTREAM INFECTION**

Primary bloodstream infection includes laboratory-confirmed bloodstream infection and clinical sepsis. The definition of clinical sepsis is intended primarily for infants and neonates.

**Laboratory-confirmed bloodstream infection** must meet one of the following criteria:
1. Recognized pathogen isolated from blood culture and pathogen is not related to infection at another site.*
2. One of the following: fever (>38°C), chills, or hypotension and any of the following:
   a. Common skin contaminant† isolated from two blood cultures drawn on separate occasions and organism is not related to infection at another site*
   b. Common skin contaminant isolated from blood culture from patient with intravascular access device and physician institutes appropriate antimicrobial therapy
   c. Positive antigen test on blood‡ AND organism is not related to infection at another site
3. Patient ≤12 months of age§ has one of the following: fever (>38°C), hypothermia (<37°C), apnea, or bradycardia AND any of the following:
   a. Common skin contaminant isolated from two blood cultures drawn on separate occasions AND organism is not related to infection at another site*
   b. Common skin contaminant isolated from blood culture from patient with intravascular access device AND physician institutes appropriate antimicrobial therapy
   c. Positive antigen test on blood AND pathogen is not related to infection at another site

**Clinical sepsis** must meet either of the following criteria:
1. One of the following clinical signs or symptoms with no other recognized cause: fever (>38°C), hypotension (systolic pressure ≤90 mm Hg), or oliguria (>20 ml/hr) AND all of the following:
   a. Blood culture not done or no organism or antigen detected in blood
   b. No apparent infection at another site
   c. Physician institutes appropriate antimicrobial therapy for sepsis
2. Patient ≤12 months of age has one of the following clinical signs or symptoms with no other recognized cause: fever (>38°C), hypothermia (<37°C), apnea, or bradycardia AND all of the following:
   a. Blood culture not done or no organism or antigen detected in blood
   b. No apparent infection at another site
   c. Physician institutes appropriate antimicrobial therapy for sepsis

**PNEUMONIA**

Pneumonia is defined separately from other infections of the lower respiratory tract. The criteria for pneumonia involve various combinations of clinical, radiographic, and laboratory evidence of infection. In general, expecto-

*When an organism isolated from blood culture is compatible with a related nosocomial infection at another site, the bloodstream infection is classified as a secondary bloodstream infection. Exceptions to this are intravascular device–associated bloodstream infections, all of which are classified as primary even if localized signs of infection are present at the access site.
†Organisms that are normal skin flora (e.g., diphtheroids, Bacillus sp., Propionibacterium sp., coagulase-negative staphylococci, or micrococci).
‡Detection of bacterial, fungal, or viral antigen (e.g., Candida sp., herpes simplex, varicella zoster, Haemophilus influenzae, Streptococcus pneumoniae, Neisseria meningitidis, group B streptococci) by rapid diagnostic test (e.g., counterimmunoelectrophoresis, coagulation, or latex agglutination).
§These criteria apply specifically to infants ≤12 months of age; they may infrequently apply to older infants and children.
rated sputum cultures are not useful in diagnosing pneumonia but may help identify the etiologic agent and provide useful antimicrobial susceptibility data. Findings from serial chest x-ray studies may be more helpful than those from a single x-ray film.

**Pneumonia** must meet one of the following criteria:

1. Rales or dullness to percussion on physical examination of chest AND any of the following:
   a. New onset of purulent sputum or change in character of sputum
   b. Organism isolated from blood culture
   c. Isolation of pathogen from specimen obtained by transtracheal aspirate, bronchial brushing, or biopsy

2. Chest radiographic examination shows new or progressive infiltrate, consolidation, cavitation, or pleural effusion AND any of the following:
   a. New onset of purulent sputum or change in character of sputum
   b. Organism isolated from blood culture
   c. Isolation of pathogen from specimen obtained by transtracheal aspirate, bronchial brushing, or biopsy
d. Isolation of virus or detection of viral antigen in respiratory secretions
e. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen
f. Histopathologic evidence of pneumonia

3. Patient ≤12 months of age has two of the following: apnea, tachypnea, bradycardia, wheezing, rhonchi, or cough AND any of the following:
   a. Increased production of respiratory secretions
   b. New onset of purulent sputum or change in character of sputum
   c. Organism isolated from blood culture
d. Isolation of pathogen from specimen obtained by transtracheal aspirate, bronchial brushing, or biopsy
e. Isolation of virus or detection of viral antigen in respiratory secretions
f. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen
g. Histopathologic evidence of pneumonia

4. Patient ≤12 months of age has chest radiologic examination that shows new or progressive infiltrate, cavitation, consolidation, or pleural effusion AND any of the following:
   a. Increased production of respiratory secretions
   b. New onset of purulent sputum or change in character of sputum
   c. Organism isolated from blood culture
d. Isolation of pathogen from specimen obtained by transtracheal aspirate, bronchial brushing, or biopsy
e. Isolation of virus or detection of viral antigen in respiratory secretions
f. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen
g. Histopathologic evidence of pneumonia

**URINARY TRACT INFECTION**

Urinary tract infection includes symptomatic urinary tract infection, asymptomatic bacteriuria, and other infections of the urinary tract. **Symptomatic urinary tract infection** must meet one of the following criteria:

1. One of the following: fever (>38°C), urgency, frequency, dysuria, or suprapubic tenderness AND a urine culture* of ≥10⁶ colonies/ml urine with no more than two species of organisms

2. Two of the following: fever (>38°C), urgency, frequency, dysuria, or suprapubic tenderness AND any of the following:
   a. Dipstick test positive for leukocyte esterase and/or nitrate
   b. Pyuria (≥10 white blood cells [WBC]/μl or ≥3 WBC/high-power field of unspun urine)
   c. Organisms seen on Gram stain of unspun urine
d. Two urine cultures with repeated isolation of the same uropathogen† with ≥10⁶ colonies/ml urine in nonvoided specimens

*For urine specimens to be of value in determining whether a nosocomial infection exists, they must be obtained aseptically using an appropriate technique, such as clean catch collection, bladder catheterization, or suprapubic aspiration.

†Gram-negative bacteria or *Staphylococcus saprophyticus*. 
e. Urine culture with $\leq 10^5$ colonies/ml urine of single uropathogen in patient being treated with appropriate antimicrobial therapy
f. Physician's diagnosis
g. Physician institutes appropriate antimicrobial therapy

3. Patient $\leq$12 months of age has one of the following: fever ($>38^\circ$ C), hypothermia ($<37^\circ$ C), apnea, bradycardia, dysuria, lethargy, or vomiting AND urine culture of $\geq 10^8$ colonies/ml urine with no more than two species of organisms

4. Patient $\leq$12 months of age has one of the following: fever ($>38^\circ$ C), hypothermia ($<37^\circ$ C), apnea, bradycardia, dysuria, lethargy, or vomiting AND any of the following:
   a. Dipstick test positive for leukocyte esterase and/or nitrate
   b. Pyuria
   c. Organisms seen on Gram stain of unspun urine
d. Two urine cultures with repeated isolation of same uropathogen with $\geq 10^2$ organisms/ml urine in nonvoided specimens
e. Urine culture with $\leq 10^5$ colonies/ml urine of a single uropathogen in patient being treated with appropriate antimicrobial therapy
f. Physician's diagnosis
g. Physician institutes appropriate antimicrobial therapy

Asymptomatic bacteriuria must meet either of the following criteria:
1. An indwelling urinary catheter is present within 7 days before urine is cultured AND patient has no fever ($>38^\circ$ C), urgency, frequency, dysuria, or suprapubic tenderness AND has urine culture of $\geq 10^5$ organisms/ml urine with no more than two species of organisms.
2. No indwelling urinary catheter is present within 7 days before the first of two urine cultures with $\geq 10^5$ organisms/ml urine of the same organism with no more than two species of organisms, AND patient has no fever ($>38^\circ$ C), urgency, frequency, dysuria, or suprapubic tenderness.

Other infections of the urinary tract (kidney, ureter, bladder, urethra, or tissues surrounding the retroperitoneal or perinephric spaces) must meet one of the following criteria:
1. Organism isolated from culture of fluid (other than urine) or tissue from affected site
2. An abscess or other evidence of infection seen on direct examination, during surgery, or by histopathologic examination
3. Two of the following: fever ($>38^\circ$ C), localized pain, or tenderness at involved site AND any of the following:
   a. Purulent drainage from affected site
   b. Organism isolated from blood culture
c. Radiographic evidence of infection
   
4. Patient $<12$ months of age has one of the following: fever ($>38^\circ$ C), hypothermia ($<37^\circ$ C), apnea, bradycardia, lethargy, or vomiting AND any of the following:
   a. Purulent drainage from affected site
   b. Organism isolated from blood culture
c. Radiographic evidence of infection
d. Physician's diagnosis
e. Physician institutes appropriate therapy

Bone and joint infection includes osteomyelitis, joint or bursa infection, and vertebral disk infection.

Osteomyelitis must meet one of the following criteria:
1. Organism cultured from bone
2. Evidence of osteomyelitis seen during surgery or by histopathologic examination
3. Two of the following with no other recognized cause: fever ($>38^\circ$ C), localized swelling, tenderness, heat, or drainage at suspected site of infection AND any of the following:
   a. Organism isolated from blood culture
   b. Positive antigen test on blood
c. Radiographic evidence of infection

Joint or bursa infection must meet one of the following criteria:
1. Organism isolated from culture of joint fluid or synovial biopsy
2. Evidence of joint or bursa infection seen

*Radiographic evidence of infection includes abnormal results of ultrasound examination, CT scan, magnetic resonance imaging, or radiolabel scan (e.g., gallium or technetium).
during surgery or by histopathologic examination.
3. Two of the following with no other recognized cause: joint pain, swelling, tenderness, heat, evidence of effusion or limitation of motion AND any of the following:
   a. Organisms and white blood cells seen on Gram stain of joint fluid
   b. Positive antigen test on blood, urine, or joint fluid
   c. Cellular profile and chemistries of joint fluid compatible with infection and not explained by underlying rheumatologic disorder
   d. Radiographic evidence of infection

Vertebral disk space infection must meet one of the following criteria:
1. Organism isolated from culture of involved site tissue obtained during surgery or needle aspiration
2. Evidence of infection at involved site seen during surgery or by histopathologic examination
3. Fever (>38°C) with no other recognized cause or pain at involved site AND radiographic evidence of infection
4. Fever (>38°C) with no other recognized cause AND pain at involved site AND positive antigen test on blood or urine.

**CARDIOVASCULAR SYSTEM INFECTION**

Cardiovascular system infection includes arterial or venous infection, endocarditis, myocarditis or pericarditis, and mediastinitis. Mediastinitis is grouped with cardiovascular system infections because it most often occurs after cardiac surgery.

**Arterial or venous infection** must meet one of the following criteria:
1. Organism isolated from culture of arteries or veins removed during surgery AND blood culture not done or no organism isolated from blood culture
2. Evidence of infection at involved vascular site seen during surgery or by histopathologic examination
3. One of the following: fever (>38°C), pain, erythema, or heat at involved vascular site AND both of the following:
   a. More than 15 colonies cultured from intravascular cannula tip using semiquantitative culture method
   b. Blood culture not done or no organism isolated from blood culture
4. Purulent drainage at involved vascular site AND blood culture not done or no organism isolated from blood culture
5. Patient ≤12 months of age has one of the following:
   a. More than 15 colonies cultured from intravascular cannula tip using semiquantitative culture method
   b. Blood culture not done or no organism isolated from blood culture

Endocarditis of natural or prosthetic heart valve must meet one of the following criteria:
1. Organism isolated from culture of valve or vegetation
2. Two of the following with no other recognized cause: fever (>38°C), new or changing murmur; embolic phenomena, skin manifestations (i.e., petechiae, splinter hemorrhages, painful subcutaneous nodules), congestive heart failure, or cardiac conduction abnormality AND physician institutes appropriate antimicrobial therapy if diagnosis is made antemortem AND any of the following:
   a. Organism isolated from two blood cultures
   b. Organisms seen on Gram stain of valve when culture is negative or not done
   c. Valvular vegetation seen during surgery or autopsy
   d. Positive antigen test on blood or urine
   e. Evidence of new vegetation seen on echocardiogram
3. Patient ≤12 months of age has two or more of the following with no other recognized cause: fever (>38°C), hypothermia (<37°C), apnea, bradycardia, new or changing murmur, embolic phenomena, skin manifestations, congestive heart failure, or cardiac conduction abnormality AND physician institutes appropriate antimicrobial therapy if diagnosis is made antemortem AND any of the following:
   a. Organism isolated from two blood cultures
   b. Organisms seen on Gram stain of valve when culture is negative or not done
c. Valvular vegetation seen during surgery or autopsy
d. Positive antigen test on blood or urine
e. Evidence of new vegetation seen on echocardiogram

**Myocarditis or pericarditis** must meet one of the following criteria:
1. Organism isolated from culture of pericardial tissue or fluid obtained by needle aspiration or during surgery
2. Two of the following with no other recognized cause: fever (>38°C), chest pain, paradoxical pulse, or increased heart size and any of the following:
   a. Abnormal electrocardiogram (ECG) consistent with myocarditis or pericarditis
   b. Positive antigen test on blood
   c. Evidence of myocarditis or pericarditis on histologic examination of heart tissue
   d. Fourfold rise in type-specific antibody with or without isolation of virus from pharynx or feces
   e. Pericardial effusion identified by echocardiogram, CT scan, magnetic resonance imaging, angiography, or other radiographic evidence of infection
3. Patient ≤12 months of age has two of the following with no other recognized cause: fever (>38°C), hypothermia (<37°C), apnea, bradycardia, paradoxical pulse, or increased heart size and any of the following:
   a. Abnormal ECG consistent with myocarditis or pericarditis
   b. Positive antigen test on blood
   c. Histologic examination of heart tissue shows evidence of myocarditis or pericarditis
   d. Fourfold rise in type-specific antibody with or without isolation of virus from pharynx or feces
   e. Pericardial effusion identified by echocardiogram, CT scan, magnetic resonance imaging, angiography, or other radiographic evidence of infection

**Mediastinitis** must meet one of the following criteria:
1. Organism isolated from culture of mediastinal tissue or fluid obtained during surgery or needle aspiration
2. Evidence of mediastinitis that is seen during surgery or by histopathologic examination
3. One of the following: fever (>38°C), chest pain, or sternal instability and any of the following:
   a. Purulent drainage from mediastinal area
   b. Organism isolated from blood culture or culture of drainage from mediastinal area
   c. Mediastinal widening on x-ray examination
4. Patient ≤12 months of age has one of the following: fever (>38°C), hypothermia (<37°C), apnea, bradycardia, or sternal instability and any of the following:
   a. Purulent drainage from mediastinal area
   b. Organism isolated from blood culture or culture of drainage from mediastinal area
   c. Mediastinal widening on x-ray examination

**CENTRAL NERVOUS SYSTEM INFECTION**

Central nervous system infection includes intracranial infection, meningitis or ventriculitis, and spinal abscess without meningitis.

**Intracranial infection** (brain abscess, subdural or epidural infection, and encephalitis) must meet one of the following criteria:
1. Organism isolated from culture of brain tissue or dura
2. Abscess or evidence of intracranial infection seen during surgery or by histopathologic examination
3. Two of the following with no other recognized cause: headache, dizziness, fever (>38°C), localizing neurologic signs, changing level of consciousness, or confusion, and physician institutes appropriate antimicrobial therapy if diagnosis is made antemortem and any of the following:
   a. Organism seen on microscopic examination of brain or abscess tissue obtained by needle aspiration or by biopsy during surgery or autopsy
   b. Positive antigen test on blood or urine
   c. Radiographic evidence of infection
   d. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen
4. Patient ≤12 months of age has two of the following with no other recognized cause: fever (>38°C), hypothermia (<37°C), apnea, bradycardia, localizing neurologic signs, or changing level of consciousness AND physician institutes appropriate antimicrobial therapy if diagnosis is made antemortem AND any of the following:
   a. Organisms seen on microscopic examination of brain or abscess tissue obtained by needle aspiration or by biopsy during surgery or autopsy
   b. Positive antigen test on blood or urine specimen
   c. Radiographic evidence of infection
   d. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen

Meningitis or ventriculitis must meet one of the following criteria:
1. Organism isolated from culture of cerebrospinal fluid (CSF)
2. One of the following with no other recognized cause: fever (>38°C), headache, stiff neck, meningeal signs, cranial nerve signs, or irritability, AND physician institutes appropriate antimicrobial therapy if diagnosis is made antemortem AND any of the following:
   a. Increased white cells, elevated protein, and/or decreased glucose in CSF
   b. Organisms seen on Gram stain of CSF
   c. Organism isolated from blood culture
   d. Positive antigen test on CSF, blood, or urine
   e. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen

Meningitis or ventriculitis

EYE, EAR, NOSE, THROAT, AND MOUTH INFECTION

Eye infection includes conjunctivitis and other eye infections. Ear infections include otitis externa, otitis media, otitis interna, and mastoiditis. Nose, throat, and mouth infections include oral cavity infections, upper respiratory infections, and sinusitis.

Conjunctivitis must meet either of the following criteria:
1. Pathogen isolated from culture of purulent exudate obtained from conjunctiva or contiguous tissues, such as eyelid, cornea, meibomian glands, or lacrimal glands
2. Pain or redness of conjunctiva or around eye AND any of the following:
   a. WBCs and organisms seen on Gram stain of exudate
   b. Purulent exudate
   c. Positive antigen test on exudate or conjunctival scraping
   d. Multinucleated giant cells seen on microscopic examination of conjunctival exudate or scrapings
   e. Positive viral culture on conjunctival exudate

Spinal abscess without meningitis (an abscess of the spinal epidural or subdural space, without involvement of the CSF or adjacent bone structures) must meet one of the following criteria:
1. Organism isolated from culture of abscess in spinal epidural or subdural space
2. Abscess in spinal epidural or subdural space seen during surgery or autopsy or by histopathologic examination
3. One of the following with no other recognized cause: fever (>38°C), back pain, focal tenderness, radiculitis, paraparesis, or paraplegia AND physician institutes appropriate antimicrobial therapy if diagnosis is made antemortem AND either of the following:
   a. Organism isolated from blood culture
   b. Radiographic evidence of spinal abscess
f. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen

**Eye infections other than conjunctivitis** must meet either of the following criteria:
1. Organism isolated from culture of anterior or posterior chamber or vitreous fluid
2. Two of the following with no other recognized cause: eye pain, visual disturbance, or hypopyon AND any of the following:
   a. Physician’s diagnosis
   b. Positive antigen test on blood
   c. Organism isolated from blood culture

**Otitis externa** must meet either of the following criteria:
1. Pathogen isolated from culture of purulent drainage from ear canal
2. One of the following: fever (>38°C), pain, redness, or drainage from ear canal AND organisms seen on Gram stain of purulent drainage

**Otitis media** must meet either of the following criteria:
1. Organism isolated from culture of fluid from middle ear obtained by tympanocentesis or surgery
2. Two of the following: fever (>38°C), pain in eardrum, inflammation, retraction or decreased mobility of eardrum, or fluid behind eardrum

**Otitis interna** must meet either of the following criteria:
1. Organism isolated from culture of fluid from inner ear obtained at surgery
2. Physician’s diagnosis

**Mastoiditis** must meet either of the following criteria:
1. Organism isolated from culture of purulent drainage from mastoid
2. Two of the following with no other recognized cause: fever (>38°C), pain, tenderness, erythema, headache, or facial paralysis AND either of the following:
   a. Organisms seen on Gram stain of purulent material from mastoid
   b. Positive antigen test on blood

**Oral cavity infection** (mouth, tongue, or gums) must meet one of the following criteria:
1. Organism isolated from culture of purulent material from tissues or oral cavity
2. Abscess or other evidence of oral cavity infection seen on direct examination, during surgery, or by histopathologic examination
3. One of the following: abscess, ulceration, or raised white patches on inflamed mucosa, or plaques on oral mucosa AND any of the following:
   a. Organisms seen on Gram stain
   b. Positive potassium hydroxide (KOH) stain
   c. Multinucleated giant cells seen on microscopic examination of mucosal scrapings
   d. Positive antigen test on oral secretions
   e. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen
   f. Physician’s diagnosis and treatment with topical or oral antifungal therapy

**Sinusitis** must meet either of the following criteria:
1. Organism isolated from culture of purulent material obtained from sinus cavity
2. One of the following: fever (>38°C), pain or tenderness over the involved sinus, headache, purulent exudate, or nasal obstruction AND either of the following:
   a. Positive transillumination
   b. Radiographic evidence of infection

**Upper respiratory tract infection** (pharyngitis, laryngitis, epiglottis) must meet one of the following criteria:
1. Two of the following: fever (>38°C), erythema of pharynx, sore throat, cough, hoarseness, or purulent exudate in throat, AND any of the following:
   a. Organism isolated from culture of specific site
   b. Organism isolated from blood culture
   c. Positive antigen test on blood or respiratory secretions
   d. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen
   e. Physician’s diagnosis
2. Abscess seen on direct examination, during surgery, or by histopathologic examination
3. Patient ≤12 months of age has two of the following: fever (>38°C), hypothermia (<37°C), apnea, bradycardia, nasal discharge, or purulent exudate in throat, AND any of the following:
a. Organism isolated from culture of specific site  
b. Organism isolated from blood culture  
c. Positive antigen test on blood or respiratory secretions  
d. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen  
e. Physician’s diagnosis  

**GASTROINTESTINAL SYSTEM INFECTION**  

Gastrointestinal system infections include gastroenteritis, hepatitis, necrotizing enterocolitis, gastrointestinal tract infections, and intraabdominal infections not specified elsewhere.  

**Gastroenteritis** must meet either of the following criteria:  
1. Acute onset of diarrhea (liquid stools for more than 12 hours) with or without vomiting or fever (>38° C) and no likely noninfectious cause (e.g., diagnostic tests, therapeutic regimen, acute exacerbation of a chronic condition, psychologic stress)  
2. Two of the following with no other recognized cause: nausea, vomiting, abdominal pain, or headache AND any of the following:  
a. Enteric pathogen isolated from stool culture or rectal swab  
b. Enteric pathogen detected by routine or electron microscopy examination  
c. Enteric pathogen detected by antigen or antibody assay on feces or blood  
d. Evidence of enteric pathogen detected by cytopathic changes in tissue culture (toxin assay)  
e. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen  

**Hepatitis** must meet the following criterion:  
Two of the following with no other recognized cause: fever (>38° C), anorexia, nausea, vomiting, abdominal pain, jaundice, or history of transfusion within the previous 3 months AND any of the following:  
1. Positive antigen or antibody test for hepatitis A, hepatitis B, or delta hepatitis  
2. Abnormal liver function tests (e.g., elevated alanine/aspartate aminotransferase [ALT/AST] and bilirubin)  

3. Cytomegalovirus (CMV) detected in urine or oropharyngeal secretions  

**Infant necrotizing enterocolitis** must meet the following criterion: Two of the following with no other recognized cause: vomiting, abdominal distention, or prefeeding residuals AND persistent microscopic or gross blood in stools AND any of the following abdominal radiographic abnormalities:  
1. Pneumoperitoneum  
2. Pneumotosis intestinalis  
3. Unchanging “rigid” loops of small bowel  

**Gastrointestinal (GI) tract infection** (esophagus, stomach, small bowel, large bowel, and rectum), excluding gastroenteritis and appendicitis, must meet either of the following criteria:  
1. Abscess or other evidence of infection seen during surgery or by histopathologic examination  
2. Two of the following with no other recognized cause and compatible with infection of the organ or tissue involved: fever (>38° C), nausea, vomiting, abdominal pain, or tenderness AND any of the following:  
a. Organism isolated from culture of drainage or tissue obtained during surgery or endoscopy or from surgically placed drain  
b. Organisms seen on Gram or KOH stain or multinucleated giant cells seen on microscopic examination of drainage or tissue obtained during surgery or endoscopy or from surgically placed drain  
c. Organism isolated from blood culture  
d. Radiographic evidence of infection  
e. Pathologic findings on endoscopic examination (e.g., *Candida* esophagitis or proctitis)  

**Intraabdominal infection** (including gallbladder, bile ducts, liver [other than viral hepatitis], spleen, pancreas, peritoneum, subphrenic or subdiaphragmatic space, or other intraabdominal tissue or area not specified elsewhere) must meet one of the following criteria:  
1. Organism isolated from culture of purulent material from intraabdominal space obtained during surgery or needle aspiration
2. Abscess or other evidence of intraabdominal infection seen during surgery or by histopathologic examination
3. Two of the following with no other recognized cause: fever (>38°C), nausea, vomiting, abdominal pain, or jaundice AND any of the following:
   a. Organism isolated from culture of drainage from surgically placed drain (e.g., closed suction drainage system, open drain, or T-tube drain)
   b. Organisms seen on Gram stain of drainage or tissue obtained during surgery or needle aspiration
   c. Organism isolated from blood culture and radiographic evidence of infection

**LOWER RESPIRATORY TRACT INFECTION (EXCLUDING PNEUMONIA)**

Lower respiratory tract infection (excluding pneumonia) includes infections such as bronchitis, tracheobronchitis, bronchiolitis, tracheitis, lung abscess, and empyema.

**Bronchitis, tracheobronchitis, bronchiolitis, tracheitis, without evidence of pneumonia,** must meet either of the following criteria:
1. Patient has no clinical or radiographic evidence of pneumonia AND has two of the following: fever (>38°C), cough, new or increased sputum production, rhonchi, wheezing, AND either of the following:
   a. Organism isolated from culture obtained by deep tracheal aspirate or bronchoscopy
   b. Positive antigen test on respiratory secretions
2. Patient ≤12 months of age has no clinical or radiographic evidence of pneumonia AND has two of the following with no other recognized cause: fever (>38°C), cough, new or increased sputum production, rhonchi, wheezing, respiratory distress, apnea, or bradycardia AND any of the following:
   a. Organism isolated from culture of material obtained by deep tracheal aspirate or bronchoscopy
   b. Positive antigen test on respiratory secretions
   c. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen

**REPRODUCTIVE TRACT INFECTION**

A group of infections that occur in obstetric and gynecology patients and in male urology patients is defined as reproductive tract infection. Such infections include endometritis, episiotomy infection, vaginal cuff infection, and other infections of the male or female reproductive tract.

**Endometritis** must meet either of the following criteria:
1. Organism isolated from culture of fluid or tissue from endometrium obtained during surgery, by needle aspiration, or by brush biopsy
2. Purulent drainage from uterus AND two of the following: fever (>38°C), abdominal pain, or uterine tenderness

**Episiotomy site infection** must meet either of the following criteria:
1. Purulent drainage from episiotomy
2. Episiotomy abscess

**Vaginal cuff infection** must meet one of the following criteria:
1. Purulent drainage from vaginal cuff
2. Abscess at vaginal cuff
3. Pathogen isolated from culture of fluid or tissue obtained from vaginal cuff

**Other infections of the male or female reproductive tract** (epididymis, testes, prostate, vagina, ovaries, uterus, or other deep pelvic tissues, excluding endometritis or vaginal cuff infection) must meet one of the following criteria:
1. Organism isolated from culture of tissue or fluid from affected site
2. Abscess or other evidence of infection seen during surgery or by histopathologic examination
3. Two of the following: fever (>38°C), nausea, vomiting, pain, tenderness, or dysuria AND either of the following:
   a. Organism isolated from blood culture
   b. Physician’s diagnosis
SKIN AND SOFT TISSUE INFECTION

Skin and soft tissue infection includes skin infection (other than incisional wound infection), soft tissue infection, decubitus ulcer infection, burn infection, breast abscess or mastitis, omphalitis, infant pustulosis, and newborn circumcision infection. Separate criteria are presented for each infection.

**Skin infection** must meet either of the following criteria:

1. Purulent drainage, pustules, vesicles, or boils
2. Two of the following at affected site: localized pain or tenderness, swelling, redness, or heat and any of the following:
   a. Organism isolated from culture of aspirate or drainage from affected site; if organism is normal skin flora, must be pure culture of single organism
   b. Organism isolated from blood culture
   c. Positive antigen test on infected tissue or blood
   d. Multinucleated giant cells seen on microscopic examination of affected tissue
   e. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen

**Soft tissue infection** (necrotizing fasciitis, infectious gangrene, necrotizing cellulitis, infectious myositis, lymphadenitis, or lymphangitis) must meet one of the following criteria:

1. Organism isolated from culture of tissue or drainage from affected site
2. Purulent drainage from affected site
3. Abscess or other evidence of infection seen during surgery or by histopathologic examination
4. Two of the following at affected site: localized pain or tenderness, redness, swelling, or heat and any of the following:
   a. Organism isolated from blood culture
   b. Positive antigen test on blood or urine
   c. Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen

**Decubitus ulcer infection**, including both superficial and deep infection, must meet the following criterion: Two of the following: redness, tenderness, or swelling of wound edges AND either of the following:

1. Organism isolated from culture of fluid obtained by needle aspiration or biopsy of tissue obtained from ulcer margin
2. Organism isolated from blood culture
3. Fever (>38°C), local inflammation of the breast, and physician's diagnosis

**Burn infection** must meet one of the following criteria:

1. Change in burn wound appearance or character, such as rapid eschar separation, or dark brown, black, or violaceous discoloration of the eschar, or edema at wound margin, and histologic examination of burn biopsy specimen that shows invasion of organisms into adjacent viable tissue
2. Change in burn wound appearance or character, such as rapid eschar separation, or dark brown, black, or violaceous discoloration of the eschar, or edema at wound margin and either of the following:
   a. Organism isolated from blood culture
   b. Isolation of herpes simplex virus, histologic identification of inclusions by light or electron microscopy, or visualization of viral particles by electron microscopy in biopsy specimens or lesion scrapings

**Breast abscess or mastitis** must meet one of the following criteria:

1. Organism isolated from culture of affected breast tissue or fluid obtained by incision and drainage or needle aspiration
2. Breast abscess or other evidence of infection seen during surgery or by histopathologic examination
3. Fever (>38°C), local inflammation of the breast, and physician's diagnosis
Omphalitis in newborn (≤30 days of age) must meet either of the following criteria:
1. Erythema and/or serous drainage from umbilicus and either of the following:
   a. Organism isolated from culture of drainage or needle aspirate
   b. Organism isolated from blood culture
2. Erythema and purulent drainage at umbilicus

Pustulosis in infant (≤12 months of age) must meet the following criterion:
1. Infant has pustules AND physician’s diagnosis or
2. Physician institutes appropriate antimicrobial therapy

Circumcision infection in newborn (≤30 days of age) must meet one of the following criteria:
1. Newborn has purulent drainage from circumcision site.
2. Newborn has one of the following: erythema, swelling, or tenderness at circumcision site AND pathogen isolated from culture of site.
3. Newborn has one of the following: erythema, swelling, or tenderness at circumcision site, and skin contaminant isolated from culture of site AND physician’s diagnosis or physician institutes appropriate antimicrobial therapy.

SYSTEMIC INFECTION

Systemic infection is defined as infection that involves multiple organs or systems, without an apparent single site of infection. Such infections are usually of viral origin and can usually be identified by clinical criteria alone (e.g., measles, mumps, rubella, and varicella); they occur infrequently as nosocomial infections.

COMMENTS

Although the definitions presented here were developed for use in hospitals participating in NNIS to standardize and improve the quality of nosocomial infection data reported to CDC, other hospitals may wish to adopt these definitions for use in their surveillance programs. By doing so and by using similar surveillance methods, comparisons may be made with NNIS data. In addition to use in routine surveillance programs for endemic nosocomial infections, these definitions can be used for prevalence surveys, special studies, and outbreak investigations.

Our thanks to infection control practitioners in NNIS hospitals, pediatric infection control practitioners, and members of the Scientific Liaison Committee of the Surgical Infection Society for critical review and comments, to Karen Foster for editorial assistance, and to Patricia Skousen for preparing the manuscript.

References