

**TABLE 93-2** CLUES TO THE LIKELY PATHOGEN IN INFECTIVE ENDOCARDITIS

EPIDEMIOLOGIC FEATURES	PATHOGENS
Intravenous drug abuse	<i>Staphylococcus aureus</i> <i>Pseudomonas aeruginosa</i> β-Hemolytic streptococci Aerobic GNB Polymicrobial Fungi
Indwelling cardiovascular device	<i>S. aureus</i> CoNS Aerobic GNB <i>Corynebacterium</i> spp
Genitourinary disorders, infection, manipulation	<i>Enterococcus</i> spp Group B streptococci (<i>Streptococcus agalacti</i> , <i>Listeria monocytogenes</i>) Aerobic GNB
Chronic skin disorders	<i>S. aureus</i> β-Hemolytic streptococci
Poor dentition, dental procedures	Viridans streptococci Nutritionally variant streptococci (<i>Abiotrophia</i> spp, <i>Granulicatella</i> spp) <i>Gemella</i> spp HACEK organisms [†]
Alcoholic cirrhosis	<i>Streptococcus pneumoniae</i> <i>Bartonella</i> spp <i>L. monocytogenes</i> β-Hemolytic streptococci
Burns	<i>S. aureus</i> Aerobic GNB <i>P. aeruginosa</i> Fungi
Diabetes mellitus	<i>S. aureus</i> β-Hemolytic streptococci <i>S. pneumoniae</i>
Early PVE	<i>S. aureus</i> Aerobic GNB Fungi <i>Corynebacterium</i> spp
Late PVE	CoNS <i>S. aureus</i> Viridans streptococci <i>Enterococcus</i> spp <i>Corynebacterium</i> spp <i>Legionella</i> spp
Dog or cat exposure	<i>Bartonella</i> spp <i>Pasteurella</i> spp <i>Capnocytophaga</i> spp
Contact with contaminated milk or infected farm animals	<i>Brucella</i> spp <i>Coxiella burnetii</i> (Q fever) <i>Erysipelothrix rhusiopathiae</i>
Homelessness	<i>Bartonella</i> spp.
Human immunodeficiency virus infection	<i>S. pneumoniae</i> <i>Salmonella</i> spp <i>S. aureus</i>
Pneumonia and meningitis*	<i>S. pneumoniae</i>
Solid organ transplants	<i>S. aureus</i> <i>Aspergillus fumigatus</i> <i>Enterococcus</i> spp <i>Candida</i> spp
Gastrointestinal lesions	<i>Streptococcus bovis</i> <i>Enterococcus</i> spp

Modified from Baddour LM, Wilson WR, Bayer AS, et al: Infective endocarditis: diagnosis, antimicrobial therapy, and management of complications: a statement for healthcare professionals from the Committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease, Council on Cardiovascular Disease in the Young, and the Councils on Clinical Cardiology, Stroke, and Cardiovascular Surgery and Anesthesia, American Heart Association; endorsed by the Infectious Diseases Society of America, *Circulation* 111:e394–e433, 2005.

CoNS, Coagulase-negative staphylococci; GNB, gram-negative bacilli; PVE, prosthetic valve endocarditis.

*With alcoholic cirrhosis.

[†]HACEK organisms: *Haemophilus* spp, *Aggregatibacter actinomycetemcomitans*, *Cardiobacterium hominis*, *Eikenella corrodens*, and *Kingella kingae*.

TABLE 93-3 MODIFIED DUKE CRITERIA FOR DIAGNOSIS OF INFECTIVE ENDOCARDITIS

DIAGNOSTIC CRITERIA
Definite IE (any of the following): Positive findings for IE in the pathology or microbiology of the vegetation Two major criteria One major and three minor criteria Five minor criteria
Possible IE (any of the following): One major and one minor criteria Three minor criteria
Not IE (any of the following): Definite alternative diagnosis or resolution with <4 days of antibiotic therapy Does not meet the criteria of possible IE
MAJOR CRITERIA
Positive blood cultures for IE (any of the following): Typical microorganism for IE from two separate blood cultures: <ul style="list-style-type: none"> Viridans streptococci, <i>Streptococcus gallolyticus</i> (formerly <i>Streptococcus bovis</i> biotype I), or the nutritional variant strains (<i>Granulicatella</i> spp and <i>Abiotrophia defectiva</i>) HACEK group: <i>Haemophilus</i> spp, <i>Aggregatibacter actinomycetemcomitans</i>, <i>Cardiobacterium hominis</i>, <i>Eikenella corrodens</i>, and <i>Kingella kingae</i> <i>Staphylococcus aureus</i> Community-acquired enterococci, in the absence of a primary focus Persistently positive blood culture, defined as recovery of a microorganism consistent with IE from any of the following: Blood cultures drawn more than 12 hr apart All of three or a majority of four or more separate blood cultures, with first and last drawn at least 1 hr apart *Single positive blood culture for <i>Coxiella burnetii</i> or antiphase I IgG antibody titer >1:800
Evidence of endocardial involvement Positive echocardiogram for IE: *TEE is recommended in patients with prosthetic valves rated at least “possible IE” by clinical criteria, or with complicated IE (paravalvular abscess); TTE as first test in other patients Definition of positive echocardiogram (any of the following): <ul style="list-style-type: none"> Oscillating intracardiac mass, on valve or supporting structures, or in the path of regurgitant jets, or on implanted material, in the absence of an alternative anatomic explanation Abscess New partial dehiscence of prosthetic valve New valvular regurgitation (increase in or change in preexisting murmur is not sufficient)
MINOR CRITERIA (*Echocardiographic minor criteria have been eliminated)
Predisposition: predisposing heart condition or intravenous drug use Fever: 38.0° C (100.4° F) Vascular phenomena: major arterial emboli, septic pulmonary infarcts, mycotic aneurysm, intracranial hemorrhage, conjunctival hemorrhages, Janeway’s lesions Immunologic phenomena: glomerulonephritis, Osler’s nodes, Roth’s spots, rheumatoid factor Microbiologic evidence: positive blood culture but not meeting major criterion (excluding single positive cultures for coagulase-negative staphylococci and organisms that do not cause endocarditis) or serologic evidence of active infection with organism consistent with IE

Modified from Li JS, Sexton DJ, Mick N, et al: Proposed modifications to the Duke criteria for the diagnosis of infective endocarditis, *Clin Infect Dis* 30:633–638, 2000.

IE, Infective endocarditis; IgG, immunoglobulin G; TEE, transesophageal echocardiography; TTE, transthoracic echocardiography.

*Represents a change from the previously published Duke criteria.