

INFECTIVE ENDOCARDITIS

Comorbidities, Risk Recognition, and Nursing Priorities

Audience: RN | Contact hrs: 1.5 hrs | Pharmacology hrs: 0.0 hr
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The clinical problem

Infective endocarditis (IE) is an infection of the endocardial surface, usually involving a native or prosthetic valve, repaired valve material, an intracardiac device, or another site where microorganisms can adhere to endovascular tissue. Although IE is less common than many other infections encountered in acute care, its consequences are disproportionate. Valve destruction can precipitate acute heart failure; infected material can extend into adjacent tissue; emboli can reach the brain, spleen, kidneys, extremities, or lungs; and persistent bacteremia can seed the spine, joints, implanted devices, and other distant sites. A contemporary Lancet seminar also highlights the changing epidemiology and growing importance of multidisciplinary care (Li et al., 2024). The 2026 American Heart Association (AHA) scientific statement emphasizes that IE incidence has continued to rise and that the modern patient population is increasingly shaped by advanced age, complex comorbidity, injection drug use, and the expanding use of prosthetic valves and cardiovascular implantable electronic devices (DeSimone et al., 2026).

Comorbidity affects IE in at least three clinically important ways. First, some conditions increase the probability that a bloodstream infection will seed the endocardium. Second, other conditions create portals of entry or repeated exposure to bacteremia, such as hemodialysis access, indwelling vascular catheters, skin breakdown, and repeated healthcare procedures. Third, chronic illness can alter the presentation, obscure classic findings, increase procedural risk, or constrain antimicrobial choices. A patient with chronic kidney disease, for example, may have greater exposure to vascular access and also be more vulnerable to drug toxicity or hemodynamic complications once IE develops.

For nurses, the practical question is not whether a patient has a diagnosis on a list of “IE comorbidities.” The useful question is whether the patient’s background changes the probability that bacteremia is endovascular, persistent, or disseminated. Comorbidities should therefore sharpen pattern recognition rather than become shortcuts to diagnosis.

Purpose and learning outcomes

This article focuses on the significance of comorbidities and associated infectious syndromes in IE. It preserves the source article’s emphasis on *Staphylococcus aureus*, skin and soft-tissue infection, osteoarticular infection, sep-

tic arthritis, kidney disease, and malignancy, while re-framing those topics around current diagnostic criteria and modern clinical reasoning.

By the end of the reading, the RN learner should be able to: identify important cardiac and non-cardiac conditions that increase IE risk or complicate recognition; explain why *S. aureus* bacteremia requires deliberate evaluation for endovascular and metastatic infection; distinguish a portal of entry from a metastatic complication; recognize osteoarticular and renal clues that may signal disseminated infection; describe how malignancy, immunosuppression, diabetes, frailty, and hemodialysis modify assessment; and prioritize nursing actions that support timely cultures, imaging, antimicrobial safety, source control, and multidisciplinary communication.

Risk is contextual, not diagnostic

The 2023 European Society of Cardiology (ESC) guideline emphasizes that previous IE and prosthetic valves or valve-repair material identify especially vulnerable patients. Other clinically important predisposing conditions include degenerative or rheumatic valve disease, congenital valve abnormalities, cardiovascular implantable electronic devices, hypertrophic cardiomyopathy, injection drug use, central vascular access, hemodialysis, immunosuppression, and recent healthcare exposure (Delgado et al., 2023).

Bicuspid aortic valve (BAV) is a useful example. A 2023 systematic review and meta-analysis found that patients with BAV had a substantially higher risk of native valve IE than the general population, confirming that BAV is more than an incidental structural finding (Pereira et al., 2023). That increased risk does not mean that every patient with BAV belongs in the highest antibiotic prophylaxis category. Prevention recommendations depend on the patient’s exact cardiac history and the applicable guideline. For bedside assessment, the important point is that known valve abnormalities change pretest probability when fever or bacteremia is present.

The same principle applies to diabetes, cancer, chronic kidney disease, and older age. These diagnoses do not satisfy a major IE diagnostic criterion by themselves. They matter because they often cluster with wounds, devices, repeated procedures, impaired host defense, altered inflammatory responses, and reduced physiologic reserve. Risk context should influence how quickly new findings are escalated, but diagnosis still re-

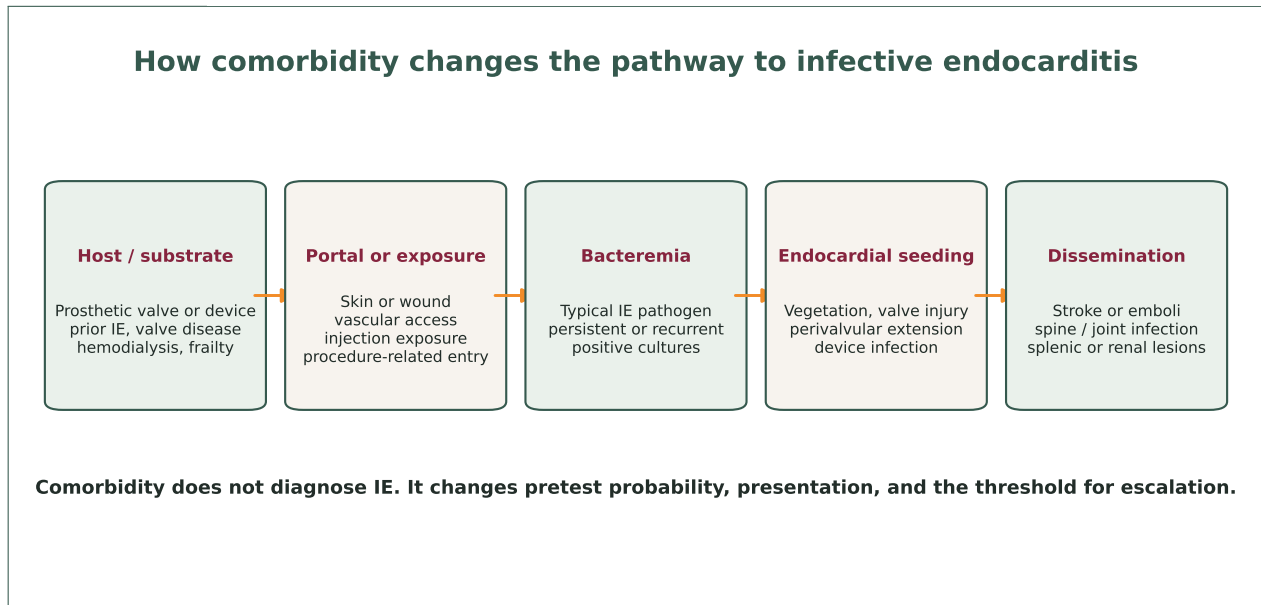


Figure 1. Comorbidity changes several steps in the pathway to IE: the susceptible host, the opportunity for bacteremia, endocardial seeding, and the likelihood or visibility of disseminated complications.

Sources: DeSimone et al. (2026); Delgado et al. (2023); Tong et al. (2025).

quires integration of microbiology, imaging, clinical manifestations, and alternative explanations.

Cardiac substrate and exposure

A damaged or artificial surface is easier for circulating microorganisms to colonize than normal endothelium. Prosthetic valves, prior valve repair, transcatheter valve material, previous IE, intracardiac devices, and significant native-valve abnormalities therefore deserve attention; contemporary AHA guidance also emphasizes structured evaluation of cardiovascular implantable electronic device infection (Baddour et al., 2024). These conditions deserve attention whenever bacteremia is documented. The same history should be communicated during transfers and hand-offs because it changes the urgency of echocardiographic evaluation and the threshold for specialist consultation. Exposure is the other half of the risk equation. Hemodialysis, central venous catheters, repeated invasive procedures, injection drug use, infected wounds, and healthcare-associated bloodstream infection increase opportunities for pathogens to reach the circulation. A person can therefore have both an anatomic substrate and repeated microbial exposure. The combination is more informative than either factor alone.

The nurse's assessment should identify both. Ask about prior endocarditis, valve surgery or repair, congenital valve disease, pacemakers or defibrillators, vascular access, dialysis, recent procedures, injection exposure, wounds, and recent antimicrobial treatment. Document the presence of implanted material accurately. "Heart surgery" or "device" is not enough when the distinction between a coronary stent, prosthetic valve, left atrial appendage device, or pacemaker may affect the clinical differential.

Do not let a familiar comorbidity explain everything

Anchoring is a recurrent hazard. A dialysis patient with chills may be assumed to have an access infection; a patient with diabetes and a foot ulcer may be assumed to have bacteremia solely from the foot; an older adult with back pain may be labeled as having degenerative disease. Each explanation can be partly correct and still incomplete. IE can coexist with the apparent source, and bacteremia can generate a second focus after the initial source has begun to improve.

CASE 1 - MARIA LOPEZ, 63

The source is not the whole story. Maria receives hemodialysis through a tunneled catheter. She presents with fever, rigors, and hypotension shortly after dialysis. Blood cultures grow *S. aureus*. The catheter exit site is mildly erythematous, so the team initially focuses on a catheter-related bloodstream infection. During the next shift Maria reports new, constant lumbar pain that is different from her chronic intermittent low-back discomfort. The new pain changes the problem. *S. aureus* bacteremia, hemodialysis, and an indwelling catheter already create a high-risk context. Focal back pain adds a localization clue for vertebral osteomyelitis or another metastatic focus. Nursing priorities include documenting the change precisely, supporting follow-up blood cultures and echocardiographic evaluation, communicating the new focal pain promptly, and anticipating targeted imaging rather than attributing the symptom to bed rest. The access site may be the portal of entry, but it does not exclude IE or vertebral infection.

A practical risk map

Table 1 summarizes how common comorbidities should influence bedside thinking. The table is an orientation aid, not an independent diagnostic system.

A practical risk map

Condition	Clinical implication
Previous IE	Strong predisposing history; recurrent disease must be considered with compatible symptoms or bacteremia.
Prosthetic valve / repair material	Raises concern for prosthetic infection and may reduce the sensitivity of routine echocardiography.
CIED	Consider lead or pocket infection and hematogenous seeding when bacteremia is present.
Hemodialysis	Repeated vascular access increases bacteremia risk; kidney disease also complicates antimicrobial safety.
Diabetes	Often clusters with wounds, vascular disease, renal dysfunction, and healthcare exposure.
Cancer / immunosuppression	May blunt classic inflammatory signs and introduces noninfectious mimics such as NBTE.
Injection drug use	Increases exposure to bacteremia and is associated with right-sided and recurrent IE in some populations.

S. aureus bacteremia changes the frame

Staphylococcus aureus is a central organism in contemporary IE because it combines efficient tissue adhesion, immune evasion, biofilm formation, and the ability to seed distant sites. A 2025 JAMA review estimated that metastatic infection occurs in more than one-third of *S. aureus* bacteremia episodes and that IE is found in roughly 12 percent, with septic arthritis, vertebral osteomyelitis, epidural abscess, splenic abscess, and device seeding among the other recognized complications (Tong et al., 2025).

The practical implication is simple: once *S. aureus* is recovered from blood, the clinician must move beyond the question “Where did it enter?” and ask “Where else has it gone?” A skin abscess, infected catheter, or postoperative wound may be the portal of entry, but the presence of a plausible portal does not exclude endovascular infection. Persistent bacteremia, persistent fever, implanted cardiac material, hemodialysis, new focal pain, embolic manifestations, or no removable source should increase

concern for IE or another deep focus.

Current review evidence supports transthoracic echocardiography for patients with *S. aureus* bacteremia and transesophageal echocardiography when the risk of IE is high, including persistent bacteremia, persistent fever, metastatic infection, or an implanted cardiac device (Tong et al., 2025). Local protocols and specialist assessment determine the final imaging sequence. The RN role is to make sure that the risk information needed for that decision is visible: timing of positive cultures, persistence of fever, device history, hemodialysis status, and any new localizing symptom.

Persistent bacteremia is a clinical event

A repeated positive culture is not merely a laboratory result to be filed. It can indicate uncontrolled endovascular infection, an undrained abscess, infected prosthetic material, or another source that has not been removed. When cultures remain positive, reassessment of source control and metastatic sites becomes increasingly important. Accurate documentation of when cultures were drawn, when antibiotics were administered, and which specimens remained positive helps the team interpret the trend.

SAFETY NOTE - CULTURES BEFORE ANTIBIOTICS, WHEN SAFE

When IE is suspected in a hemodynamically stable patient, blood cultures should be obtained before antimicrobial therapy whenever this can be accomplished without clinically harmful delay. In shock or another immediately life-threatening condition, treatment should not be dangerously postponed simply to satisfy an ideal sampling sequence. Nursing practice should follow the institutional sepsis and IE pathway while documenting prior antimicrobial exposure because even a few doses can reduce culture yield.

Skin and soft-tissue infection: portal, not proof

The original source devoted substantial space to community-associated MRSA skin epidemiology, virulence factors, impetigo, cellulitis, necrotizing infection, and surgical-site infection. Those topics remain relevant only insofar as they help explain invasive *S. aureus* disease and portals of entry. Impetigo is a superficial skin infection, most often presenting with localized lesions and crusting; it is not a clinical feature of IE. Uncomplicated cellulitis is likewise not evidence of endocarditis by itself.

The clinical connection becomes stronger when infection is deep, bacteremic, device-associated, recurrent, or accompanied by systemic findings. Deep abscesses, necrotizing soft-tissue infection, infected vascular access, postoperative wound infection, and injection-related infection can produce sustained bacteremia. In a bacteremic patient, the nurse should inspect wounds and device sites

Risk context: which comorbidities should lower the threshold for IE evaluation?

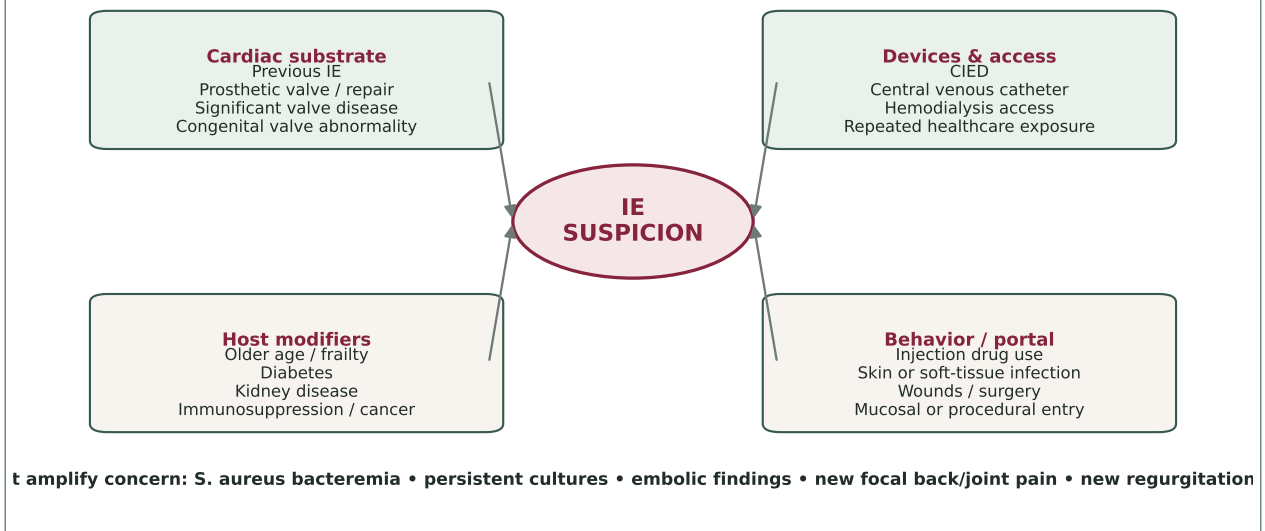


Figure 2. Risk context becomes more informative when grouped into cardiac substrate, devices or access, host modifiers, and portals of entry.

Sources: Delgado et al. (2023); DeSimone et al. (2026); Pereira et al. (2023).

but also continue a whole-patient assessment. New dyspnea, a focal neurologic deficit, persistent rigors, abdominal or splenic pain, hematuria, new back or joint pain, or signs of heart failure require escalation even if the skin lesion appears to be improving.

CASE 2 - JASON REED, 41

The abscess is drained - but the cultures are still positive. Jason presents with a large forearm abscess after injection drug use. The abscess is drained and the local erythema improves, but blood cultures remain positive for *S. aureus* on follow-up. He develops pleuritic chest pain and mild hypoxemia. The improving arm does not establish source control. Persistent *S. aureus* bacteremia requires reassessment for endovascular infection and additional foci. In a patient with injection exposure, right-sided IE and septic pulmonary emboli enter the differential. The nurse should communicate the persistent culture result, trend oxygenation and respiratory findings, document the timing of new chest symptoms, and support echocardiographic and chest imaging decisions. The important reasoning step is to recognize that local improvement and systemic clearance are different outcomes.

When IE looks like vasculitis

IE can generate immune phenomena that mimic primary autoimmune disease. Antineutrophil cytoplasmic antibodies (ANCA) are strongly associated with ANCA-associated vasculitis, but they are not specific to those disorders. A systematic review of ANCA-positive IE described substantial overlap between IE and ANCA-associated vasculitis, including renal impairment, purpura,

constitutional symptoms, and glomerulonephritis. In that review, ANCA positivity was reported in a meaningful minority of IE cases evaluated in the contributing studies, and immune-complex findings were common on kidney biopsy (Van Gool et al., 2022).

This distinction is clinically consequential because immunosuppression can worsen an unrecognized infection. A patient with positive ANCA, hematuria, rising creatinine, and a rash still requires a careful search for infection when fever, a new murmur, bacteremia, embolic findings, or predisposing cardiac disease is present. Blood cultures and cardiac imaging may be more urgent than assuming that the antibody result establishes primary vasculitis.

The 2023 Duke-ISCVID criteria recognize immunecomplex glomerulonephritis as an immunologic phenomenon that can support the diagnosis of IE in the appropriate context (Fowler et al., 2023). For nursing assessment, urine output, creatinine trends, urinalysis findings when available, rash characteristics, blood-culture results, and exposure to nephrotoxic medications should be integrated rather than handled as unrelated problems.

CASE 3 - ELIAS MORGAN, 57

Positive ANCA does not end the differential. Elias presents with fatigue, weight loss, purpuric lesions on the legs, microscopic hematuria, and rising creatinine. Testing is positive for PR3-ANCA, and vasculitis is considered. During the same admission he has intermittent fever and a new systolic murmur; two blood-culture sets later grow a viridans-group streptococcus. The antibody result does not make infection disappear. IE can produce immune-complex

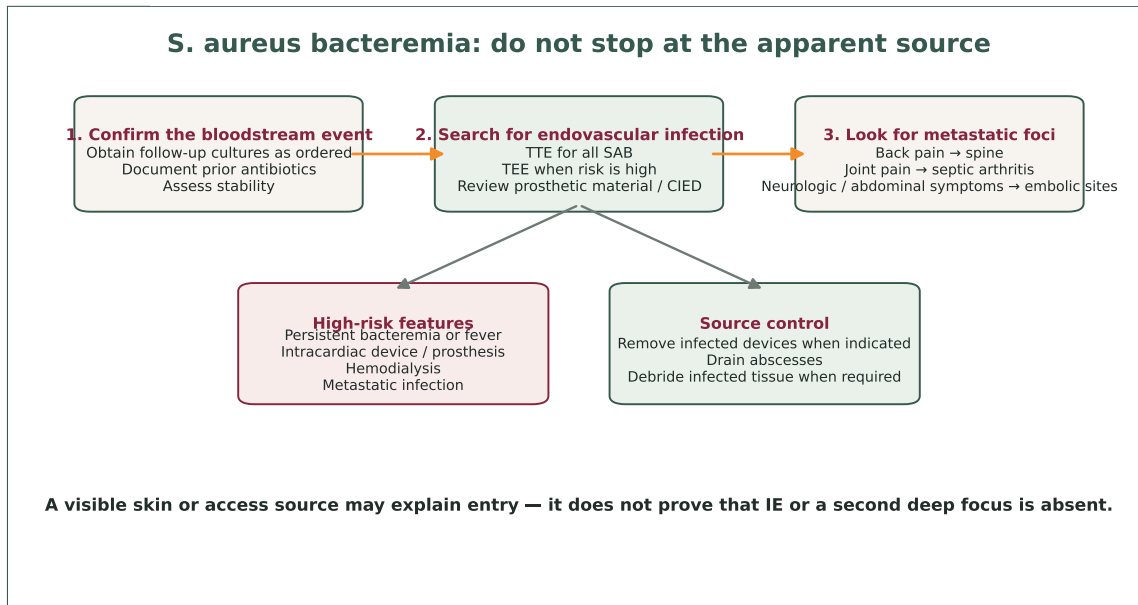


Figure 3. A structured *S. aureus* bacteremia assessment connects follow-up cultures, echocardiographic risk, symptom-directed imaging, and source control rather than treating each problem in isolation.
Sources: Tong et al. (2025); DeSimone et al. (2026).

phenomena and ANCA positivity. The immediate priority is to communicate the bacteremia and new cardiac finding, support echocardiographic evaluation, and avoid framing immunosuppression as routine until infection has been appropriately assessed. This is a highstakes example of why laboratory specificity must be interpreted in clinical context.

Diagnostic criteria have evolved

The 2023 Duke-International Society for Cardiovascular Infectious Diseases (Duke-ISCVID) criteria updated both microbiologic and imaging evidence. The framework retains the major/minor structure but broadens how causative organisms can be demonstrated and recognizes cardiac CT and selected ¹⁸F-FDG PET/CT findings as major imaging evidence in defined settings. It also recognizes additional predisposing conditions and disseminated manifestations (Fowler et al., 2023).

These updates matter especially in comorbid patients. Prosthetic material and intracardiac devices can make echocardiographic interpretation more difficult; prior antibiotics can make cultures negative; cancer can create noninfectious vegetations; and chronic kidney disease can produce laboratory abnormalities that have several plausible explanations. A structured criterion set improves consistency, but it does not remove the need to interpret probability and alternative diagnoses.

Osteoarticular infection: source, complication, or both?

S. aureus is a major pathogen in osteomyelitis, septic arthritis, and prosthetic joint infection. The relationship with IE is bidirectional. A deep musculoskeletal infection can generate bacteremia that seeds the endocardium; conversely,

IE can seed bone or joints during persistent bacteremia. The 2023 ESC diagnostic framework explicitly recognizes hematogenous osteoarticular septic complications, including spondylodiscitis, as evidence of vascular dissemination (Delgado et al., 2023).

Contemporary cohort data reinforce the link between IE and vertebral osteomyelitis, particularly in older adults and selected microbiologic groups (Douiye et al., 2025; Ulas et al., 2024). Vertebral osteomyelitis can be easy to miss because the most important symptom may be persistent focal back pain rather than dramatic redness or swelling. In *S. aureus* bacteremia, the threshold for investigating new back pain should be low because metastatic infection is well documented. Pain that is constant, focal, progressive, nocturnal, or associated with weakness, sensory change, or bladder or bowel dysfunction requires urgent communication. Neurologic compromise can signal epidural extension and may become time-critical.

Septic arthritis is another potential manifestation of hematogenous seeding. Recent observational data in *S. aureus* bacteremia with bone and joint infection reinforce the clinically important overlap with IE (Papadimitriou-Oliveris et al., 2024). A bacteremic patient who develops an acutely painful, warm, swollen joint should not be assumed to have gout or an inflammatory flare without further evaluation. The joint may require aspiration and source control while the endovascular source is investigated. Prosthetic joints add complexity because implanted material supports biofilm and can be seeded during bacteremia. New pain or reduced function in a previously well-functioning prosthetic joint during *S. aureus* bacteremia deserves prompt attention.

The concept of “one source” can be misleading. A patient

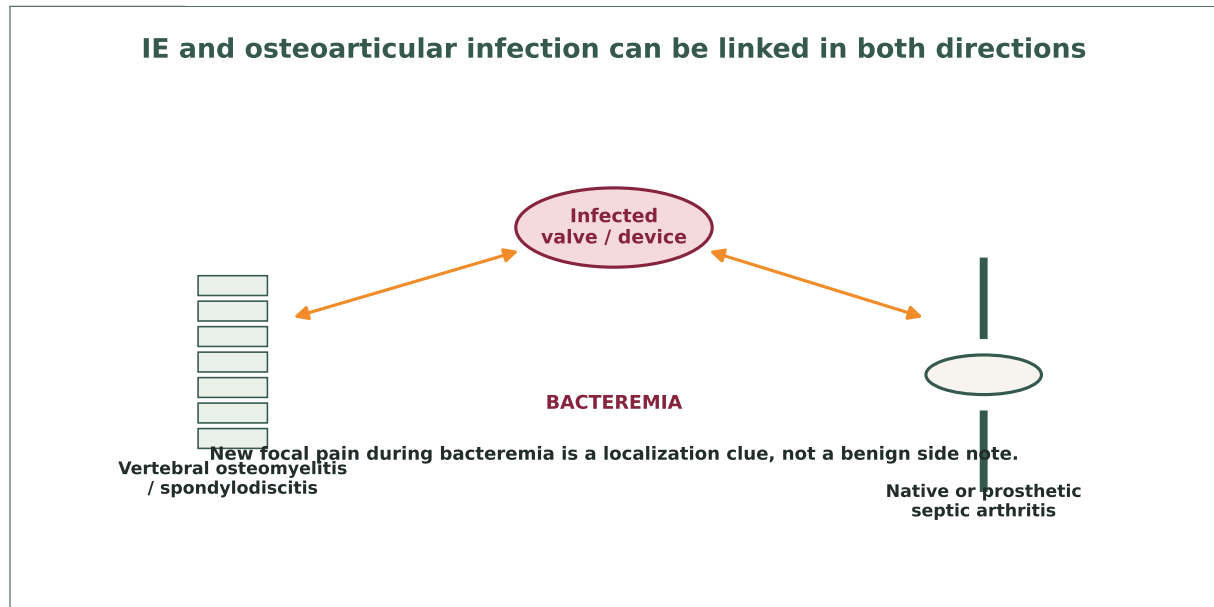


Figure 4. The bloodstream can connect cardiac and osteoarticular infection in either direction; new focal pain during bacteremia is a localization clue.

Sources: Delgado et al. (2023); Douiyeb et al. (2025); Ulas et al. (2024).

may have a primary catheter infection, secondary IE, and a tertiary vertebral focus. Alternatively, the spine or joint may be the original source that produced the bacteremia. The bedside task is to recognize that multiple clinically important sites can be part of one bloodstream process.

CASE 4 - ROBERT CHEN, 72

A prosthetic knee becomes painful during bacteremia. Robert has a prosthetic knee and is admitted with *S. aureus* bacteremia after a recent skin infection. On day 2 he reports new knee pain and difficulty bearing weight. The knee is warmer than the opposite side and the range of motion is reduced. Mechanical wear does not adequately explain an acute change during bacteremia. The joint may be a metastatic focus, a source, or one part of multisite infection. The nurse should document the new functional change, inspect the joint, communicate the finding promptly, maintain fall precautions if mobility is impaired, and support coordinated evaluation for septic arthritis while IE is being assessed. A painful prosthetic joint in this context is not “background orthopedic history.”

Source control and surveillance belong together

Successful treatment of invasive *S. aureus* infection requires both active antimicrobial therapy and source control when an infected device, abscess, necrotic tissue, or other removable focus is present. Nurses often see the first evidence that source control may be incomplete: persistent fever, recurrent rigors, continued positive cultures, new pain, drainage, device-site erythema, or deterioration after apparent initial improvement. These changes should be treated as new data, not as expected noise in a long hospitalization.

Source control decisions are multidisciplinary and may involve infectious disease, cardiology, cardiac surgery, orthopedics, interventional radiology, vascular access teams, or other services. The RN does not independently decide which device should be removed, but accurate longitudinal assessment helps the team recognize when a focus is not controlled.

Hemodialysis and kidney disease

Patients receiving hemodialysis have a particularly important intersection of infection risk and treatment complexity. Repeated vascular access creates recurrent opportunities for bacteremia, while chronic kidney disease is frequently accompanied by calcific or degenerative valve disease. A 2024 review described IE in the hemodialysis population as a serious complication with challenging management and poor outcomes, emphasizing vascular access, host frailty, and comorbidity as central features (Ding et al., 2024).

Tunneled dialysis catheters carry substantial bloodstream-infection risk, but the presence of an arteriovenous fistula does not make IE impossible. Fever during or after dialysis, rigors, access-site inflammation, unexplained hypotension, or *S. aureus* bacteremia should prompt rapid communication. The evaluation should not stop after an access source is identified if persistent bacteremia or other red flags are present.

Kidney dysfunction also influences antimicrobial safety. Several drugs used in IE require renal dose adjustment, therapeutic drug monitoring, or heightened surveillance for toxicity. Acute kidney injury during IE may result from sepsis, hemodynamic compromise, nephrotoxic exposure, embolic renal infarction, or immune-complex glomerulonephritis. Trending creatinine or eGFR, urine output,

ordered drug levels, and concurrent nephrotoxic medications is therefore part of the infection assessment rather than a separate renal problem.

The practical handoff should be specific: baseline kidney function, dialysis schedule, access type and site, last dialysis, urine output if the patient still produces urine, current creatinine trend, recent contrast exposure, antimicrobial timing relative to dialysis, and whether repeat cultures have cleared. These details help the multidisciplinary team distinguish expected renal variability from a new complication.

Diabetes, frailty, and immunosuppression

Diabetes is not a stand-alone major diagnostic criterion for IE, yet it repeatedly appears in clinical cohorts because it clusters with vascular disease, chronic kidney disease, foot wounds, skin infection, invasive procedures, and healthcare exposure. Hyperglycemia during severe infection can also complicate wound healing and contribute to dehydration and metabolic instability. The nursing value of the diabetes history is therefore contextual: inspect feet and skin, review wounds and vascular access, monitor glucose according to the treatment plan, and avoid assuming that a visible diabetic wound explains all systemic findings.

Frailty and older age can make IE less obvious. Fever may be absent, baseline murmurs may already exist, and nonspecific changes such as anorexia, weakness, dyspnea, falls, delirium, or functional decline may be more prominent than classic peripheral stigmata. An older adult who suddenly becomes confused while bacteremic should be evaluated for sepsis, medication effects, metabolic disorders, and neurologic complications rather than having the change attributed automatically to age or baseline cognitive impairment.

Immunosuppression creates a similar problem. Corticosteroids, cytotoxic therapy, transplantation, hematologic malignancy, and other immunomodulating treatments can blunt inflammatory responses. A normal or modest temperature does not reliably reassure when the patient has bacteremia, an intracardiac device, prosthetic material, or a new embolic manifestation. The threshold for escalation should reflect the risk context, not only the intensity of fever.

Table 2. Findings that should change the bedside plan

New finding	Why it matters
Persistent positive cultures	Suggests uncontrolled source, endovascular infection, or metastatic focus.
New focal back pain	Localizes possible vertebral osteomyelitis or epidural extension.
Hot swollen joint	Raises concern for hematogenous septic arthritis.
New neurologic deficit	May represent cerebral embolism, hemorrhage, abscess, or another urgent complication.
Rising creatinine / hematuria	May reflect hemodynamic injury, drug toxicity, embolic disease, or immune-complex glomerulonephritis.
New dyspnea / congestion	Can signal valve dysfunction and heart failure.

Contemporary diagnosis: integrate evidence streams

The diagnosis of IE is rarely made by a single test. Blood cultures identify the pathogen in many cases and remain foundational. The 2023 Duke-ISCVID criteria broadened the list of typical pathogens and incorporated molecular approaches for selected fastidious organisms. The same update expanded imaging evidence to include cardiac CT and selected ¹⁸F-FDG PET/CT findings, reflecting the increasing complexity of prosthetic and device-associated disease (Fowler et al., 2023).

Echocardiography remains central; multimodality strategies are increasingly important when prosthetic material, devices, or equivocal echocardiography complicate the assessment (Vinod et al., 2025; Haouzi et al., 2025; Boyle et al., 2025). Transthoracic echocardiography is noninvasive and provides information about valve function, vegetations, chamber effects, and heart failure. Transesophageal echocardiography has

greater sensitivity for many lesions and is particularly valuable when prosthetic material, intracardiac devices, or high clinical suspicion make a negative transthoracic study insufficiently reassuring. A negative test should always be interpreted against pretest probability.

Cardiac CT can add information about perivalvular complications and prosthetic structures. ¹⁸F-FDG PET/CT can contribute major diagnostic evidence in selected contexts, particularly when prosthetic valves or devices are involved and timing criteria are met. These modalities are not interchangeable screening tests; they are selected according to the clinical question, device history, prior surgery, local expertise, and guideline criteria.

The criteria also recognize disseminated and immuno-

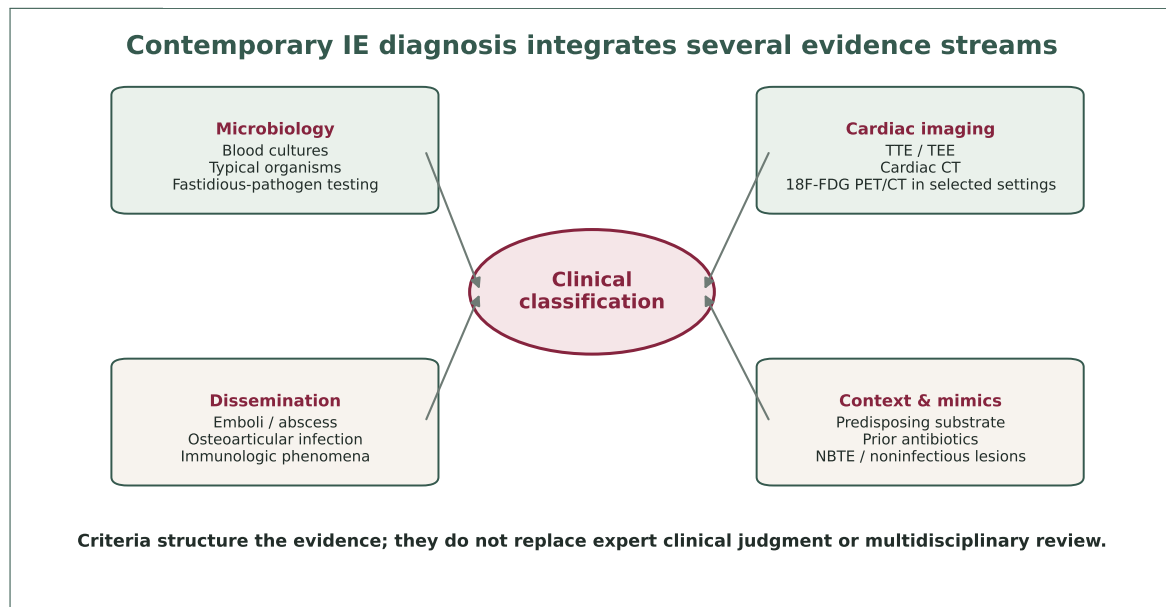


Figure 5. Modern IE diagnosis combines microbiology, cardiac imaging, evidence of dissemination, and clinical classification. Sources: Fowler et al. (2023); Delgado et al. (2023); Vinod et al. (2025); Haouzi et al. (2025).

logic manifestations. Cerebral or splenic abscesses, embolic phenomena, and osteoarticular infection can strengthen the overall picture. Immune-complex glomerulonephritis can support the diagnosis when it occurs in the appropriate setting. The value of these findings lies in their combination, not in using one nonspecific abnormality to force a diagnosis.

Cancer: infection, association, and mimic

The relationship between cancer and endocarditis must be described carefully. The most established microbiologic association is between *Streptococcus gallolyticus* bacteremia or IE and colorectal neoplasia; when this organism is identified, evaluation for colonic pathology is generally part of the clinical workup according to the individual patient's circumstances and current guideline practice. IE itself is not a nonspecific "marker of occult cancer" that should trigger indiscriminate cancer screening. Cancer can also increase infection risk through central venous access, mucosal disruption, repeated procedures, neutropenia or other immunosuppression, and prolonged healthcare exposure. At the same time, malignancy creates an important mimic: nonbacterial thrombotic endocarditis (NBTE). NBTE consists of sterile platelet-fibrin vegetations associated most strongly with hypercoagulable states such as malignancy and autoimmune disease. It often presents through systemic embolization rather than infection and can resemble IE on echocardiography (Ahmed et al., 2025).

The distinction is high stakes. Recurrent embolic stroke in a patient with metastatic adenocarcinoma and repeatedly negative cultures may point toward NBTE, but prior antibiotics, fastidious organisms, and culture-negative IE remain possible. The team must integrate cultures, inflammatory findings, imaging, cancer status, exposure his-

tory, and sometimes pathology. A vegetation is a morphologic finding, not a synonym for infection.

CASE 5 - NORA PATEL, 66

A vegetation does not always mean infection. Nora has metastatic pancreatic adenocarcinoma and presents after multiple ischemic strokes in different vascular territories. Echocardiography shows a small mitral-valve vegetation. She is afebrile, repeated blood cultures remain negative, and no infectious source is identified. The image is important but not self-interpreting. IE remains in the differential, especially if prior antibiotics or other microbiologic limitations exist, but the combination of advanced malignancy, recurrent multifocal emboli, and negative cultures raises concern for NBTE. The nursing role is to preserve diagnostic clarity: document prior antimicrobial exposure, fever trends, culture timing, neurologic changes, bleeding risk, and anticoagulant use while the team distinguishes infectious from noninfectious endocardial disease.

Management and nursing priorities

Definitive antimicrobial therapy depends on the organism, susceptibility pattern, native versus prosthetic material, complications, renal function, allergy history, drug interactions, and whether adequate source control has been achieved. The 2026 AHA statement emphasizes individualized treatment, multidisciplinary Endocarditis Team care, timely procedural decisions, and evolving options for selected patients who may transition from prolonged intravenous therapy to carefully supervised alternative strategies after an appropriate initial phase (DeSimone et al., 2026). These decisions require authorized prescribers and specialist input; they are not bedside protocol substitu-

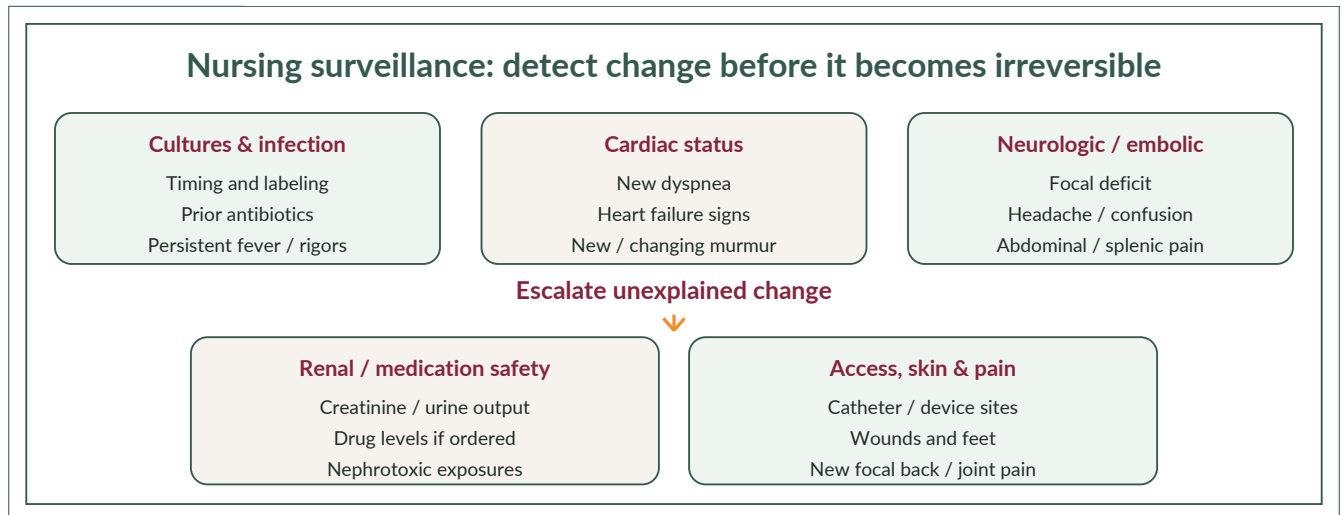


Figure 6. Nursing surveillance connects microbiology, hemodynamics, neurologic change, renal safety, access-site findings, and new focal pain.

Sources: DeSimone et al. (2026); Tong et al. (2025); Ding et al. (2024).

tions.

Medication safety remains a major nursing responsibility even when pharmacotherapy is not the main educational focus of this article. Verify the ordered drug, dose, route, schedule, renal-adjustment plan, infusion requirements, allergies, and compatibility. Monitor for nephrotoxicity, hypersensitivity, infusion reactions, cytopenias, hepatic abnormalities, and other drug-specific adverse effects according to the regimen. The 2026 AHA statement specifically advises avoiding gentamicin in staphylococcal prosthetic-valve IE because the risks outweigh the benefit (DeSimone et al., 2026). Do not assume that older combination regimens remain current simply because they appeared in a historical reference.

Blood cultures and communication

Record when cultures were drawn, from which sites, and whether antibiotics had already been administered. Report persistent or recurrent positive cultures promptly. During transfers, include the last positive culture, the first documented negative culture if clearance has occurred, organism identification, known susceptibilities, current antimicrobial regimen, and the status of suspected source control. These details help the receiving team reconstruct the trajectory without repeating avoidable delays.

Heart failure and embolic complications

New dyspnea, orthopnea, pulmonary congestion, hypotension, or signs of poor perfusion may indicate worsening valve dysfunction or sepsis. New focal neurologic deficits, aphasia, altered consciousness, severe headache, visual change, or seizures require urgent evaluation because IE can cause ischemic emboli, intracranial hemorrhage, mycotic aneurysm, or cerebral abscess. Abdominal or flank pain can signal splenic or renal embolic disease. A sudden change in a previously stable patient should be treated as a new event, not as an expected feature of a

prolonged infection.

Source and metastatic sites

Inspect vascular access and device pockets, wounds, pressure injuries, injection sites when relevant, and the lower extremities in patients with diabetes or vascular disease. Ask directly about new back, neck, joint, or limb pain. Pain history is particularly important because a patient may not volunteer a symptom that seems unrelated to the original reason for admission. New focal pain during bacteremia can be the earliest sign of a deep metastatic infection.

Renal and functional surveillance

Trend kidney function, urine output, fluid balance, and medication-related laboratory monitoring. In older or frail adults, follow mobility, mentation, oral intake, and ability to perform usual activities. Functional deterioration can be a clinically meaningful change even when the patient does not mount a dramatic fever response.

COMMUNICATION RULE - SAY WHAT CHANGED

A useful escalation statement links the new finding to the risk context: “She has *S. aureus* bacteremia, a prosthetic aortic valve, and new focal thoracic back pain that was not present yesterday.” That sentence is more actionable than “still uncomfortable” because it identifies the pathogen, the predisposing substrate, and the localization clue that changes the differential.

Prevention, follow-up, and patient teaching

Prevention is broader than antibiotic prophylaxis (Wilson et al., 2021). Good oral hygiene, treatment of dental and skin disease, careful vascular-access care, harm-reduction strategies for injection drug use, and appropriate device management reduce opportunities for bacteremia. Antibiotic prophylaxis for dental procedures is reserved for specific high-risk cardiac conditions under current guide-

line criteria and should not be generalized to every murmur or valve abnormality.

Before discharge, patients should understand why persistent or recurrent fever, rigors, new dyspnea, neurologic symptoms, or new focal back or joint pain require prompt medical evaluation. Patients with prosthetic valves or prior IE should know their cardiac history accurately and should tell clinicians about it during future episodes of bacteremia or before relevant procedures. Medication adherence, line care when outpatient intravenous therapy is used, follow-up blood testing, and scheduled imaging or specialist review should be reinforced according to the individualized plan.

Clinical synthesis

Comorbidities do not diagnose infective endocarditis, but they strongly influence when clinicians should suspect it, how they should interpret new findings, and how safely treatment can be delivered. The most important bedside pattern is the convergence of a susceptible host, a pathogen capable of endovascular infection, and evidence that bacteremia is persistent or disseminated.

S. aureus bacteremia, hemodialysis, prosthetic valves or devices, new focal back or joint pain, embolic findings, renal abnormalities, and atypical illness in immunocompromised or frail adults should widen the assessment rather than narrow it prematurely. Cancer introduces both infection risk and an important mimic in NBTE; ANCA positivity can similarly mislead when IE produces immune phenomena. Current diagnosis combines microbiology, echocardiography, multimodality imaging when appropriate, and clinical criteria. The nursing contribution is continuous pattern recognition: noticing when the local explanation no longer explains the whole patient and communicating that change early enough to alter the course of care.

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