

INFECTIVE ENDOCARDITIS

Contemporary Diagnosis, Antimicrobial Therapy, and Source Control

Audience: APRN | Contact hrs: 1.5 hrs | Pharmacology hrs: 0.5 hr

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Pharmacology hours are included in the total contact hours.

When “bacteremia” becomes a valve emergency

Infective endocarditis (IE) is not simply a bloodstream infection that happens to involve the heart. It is an infection of the endocardial surface - most often a native or prosthetic valve, but sometimes an intracardiac device or adjacent tissue - in which organisms can become embedded in platelet-fibrin material, damage valves, seed distant organs, and persist despite apparently active antibiotics. The syndrome remains clinically dangerous because diagnosis can be delayed, microbiology may be incomplete, and the need for antimicrobial therapy, source control, and surgery often has to be decided in parallel rather than in sequence. Contemporary practice therefore treats IE as a multidisciplinary problem from the outset (DeSimone et al., 2026; Delgado et al., 2023).

The epidemiology has also shifted. IE now occurs across a wider range of patients: older adults with degenerative valve disease or prosthetic material, people with cardiovascular implantable electronic devices (CIEDs), patients receiving repeated invasive care, and younger people with injection drug use-associated infection. The 2026 American Heart Association (AHA) scientific statement emphasizes rising incidence, more complex device- and prosthesis-associated disease, and persistent high mortality despite better diagnostics and procedural options (DeSimone et al., 2026).

Purpose and learning outcomes

This article is designed to help APRNs integrate contemporary diagnostic criteria, microbiology, imaging, antimicrobial strategy, procedural source control, medication safety, and follow-up into a coherent plan. By the end of the reading, the learner should be able to: (1) recognize clinical patterns that raise pretest probability for IE; (2) apply the 2023 Duke-ISCVID framework and select appropriate

microbiologic and imaging tests; (3) compare pathogen-directed antimicrobial strategies and monitoring priorities; (4) identify situations in which partial oral therapy, OPAT, or long-acting agents may be considered only after stabilization; (5) recognize indications for early surgery or device extraction; and (6) individualize care for older adults, people with CIEDs or prosthetic valves, and people who inject drugs.

Audience and scope

The intended audience is advanced practice registered nurses caring for adults in acute, specialty, or ambulatory settings. Diagnostic, prescribing, procedural, and surgical decisions depend on local law, credentialing, institutional pathways, infectious-diseases and cardiology expertise, and patient-specific factors. Drug doses in this article are educational examples from contemporary guidance; renal or hepatic dysfunction, obesity, organism susceptibility, allergy history, drug interactions, and site-specific resistance patterns may require modification.

Start with probability, not a single hallmark

Fever and a new murmur remain important, but neither is required. IE may present as persistent bacteremia, unexplained sepsis, new or worsening regurgitation, heart failure, stroke or other embolic phenomena, vertebral pain, splenic or renal infarction, conduction abnormality suggesting periannular extension, or constitutional decline. Prosthetic valves, prior IE, congenital heart disease, intracardiac devices, hemodialysis, injection drug use, and prolonged vascular access raise risk. In older adults, delirium, functional decline, anorexia, or decompensation of chronic disease may be more prominent than classic peripheral stigmata. The practical question is whether the combination of host risk, microbiology, and organ findings makes an endocardial source plausible enough to trigger the IE pathway (DeSimone et al., 2026; Delgado et al., 2023).

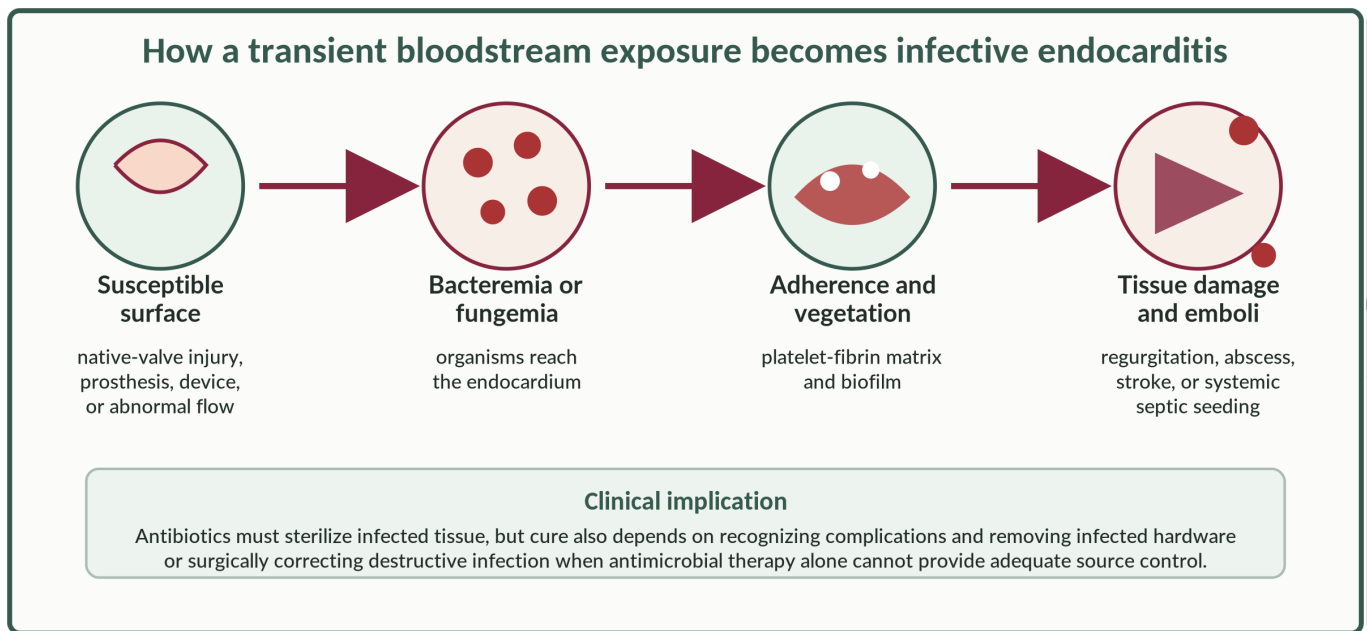


Figure 1. A simplified pathogenesis model links host susceptibility, bloodstream exposure, vegetation formation, and downstream structural or embolic complications. Evidence basis: DeSimone et al. (2026); Delgado et al. (2023).

Pathogenesis explains why cure can require more than “the right antibiotic”

The infected vegetation is a biologically protected environment. Organisms embedded within platelet-fibrin material and biofilm may have high local density, slow growth, and reduced antimicrobial penetration. This helps explain why pathogen-directed bactericidal therapy is prolonged, why persistent bloodstream infection is clinically important, and why infected prosthetic material or an abscess can defeat an otherwise active regimen. Left-sided vegetations may embolize to the brain, spleen, kidneys, or limbs; right-sided disease commonly produces septic pulmonary emboli. Local extension can create leaflet perforation, severe regurgitation, fistulae, pseudoaneurysm, or periannular abscess, with new atrioventricular block serving as an important warning sign (DeSimone et al., 2026).

For APRN assessment, the pathophysiology should change the history. Ask about prosthetic valves and transcatheter valves, prior IE, implanted pacemakers or defibrillators, hemodialysis access, recent bacteremia, vascular catheters, dental disease or invasive procedures, skin and soft-tissue infection, injection practices, recent antimicrobial exposure, and unexplained focal pain or neurologic symptoms. Do not let a known extracardiac infection source automatically end the search; *Staphylococcus aureus* bacteremia, enterococcal bacteremia, and persistent bloodstream infection can coexist with an endocardial focus.

CASE 1 • FICTIONAL

A “urinary” *Enterococcus* bacteremia that does not close the case

Marian, 78, has a transcatheter aortic valve, stage 3 chronic kidney disease, and three days of fatigue and confusion. Two blood-culture sets grow Enterococcus faecalis. Urinalysis shows pyuria, so the initial assumption is urinary sepsis. She has no loud murmur and no peripheral lesions.

The prosthetic valve and organism keep IE in the differential despite a plausible urinary source. The immediate priorities are to document culture clearance, obtain echocardiographic evaluation, and involve an Endocarditis Team. If initial transthoracic imaging is nondiagnostic, transesophageal echocardiography (TEE) and, when suspicion remains high, multimodality imaging may be needed. The teaching point is not that every enterococcal bacteremia is IE; it is that high-risk hardware and a typical organism change pretest probability and the threshold for imaging (DeSimone et al., 2026; Fowler et al., 2023).

Build the diagnosis from microbiology, imaging, and clinical context

The 2023 Duke-International Society for Cardiovascular Infectious Diseases (Duke-ISCVID) criteria retain the familiar categories of definite, possible, and rejected IE but modernize what counts as evidence. The update expands the list of typical pathogens, recognizes molecular detection in appropriate specimens, incorporates cardiac computed tomography (CT) and 18F-fluorodeoxyglucose positron

emission tomography/CT (FDG-PET/CT) in selected settings, and adds a major surgical criterion. These changes improve sensitivity compared with the older modified Duke framework while preserving the need for clinical judgment; classification criteria support diagnosis but do not replace bedside reasoning (Fowler et al., 2023; DeSimone et al., 2026).

Blood cultures: obtain high-quality microbiology before antibiotics whenever the patient can safely wait

In a hemodynamically stable patient with suspected IE, blood cultures should be obtained before starting antimicrobial therapy. Contemporary Duke-ISCVID criteria no longer require the historic timing and separate-venipuncture rules for classification, but diagnostic stewardship still matters: adequate blood volume, properly collected sets, labeling, and communication with the microbiology laboratory improve yield. When sepsis or shock requires

immediate therapy, cultures should be drawn promptly without creating an unsafe treatment delay. Repeat cultures are used to document clearance because persistent bacteremia can signal uncontrolled infection, an abscess, infected hardware, an inadequate regimen, or a metastatic focus (Goehring et al., 2025; DeSimone et al., 2026; Fowler et al., 2023).

Prior antibiotics are the most common reason for blood culture-negative endocarditis (BCNE), but fastidious organisms and noninfectious mimics must also be considered. When cultures remain negative and suspicion persists, the diagnostic plan may include serology, targeted polymerase chain reaction (PCR), broad-range PCR, metagenomic sequencing, and testing of excised valve tissue. The 2025 AHA BCNE statement emphasizes tailoring this workup to epidemiologic exposures and avoiding an indiscriminate “everything panel” that delays focused interpretation (DeSimone et al., 2025).

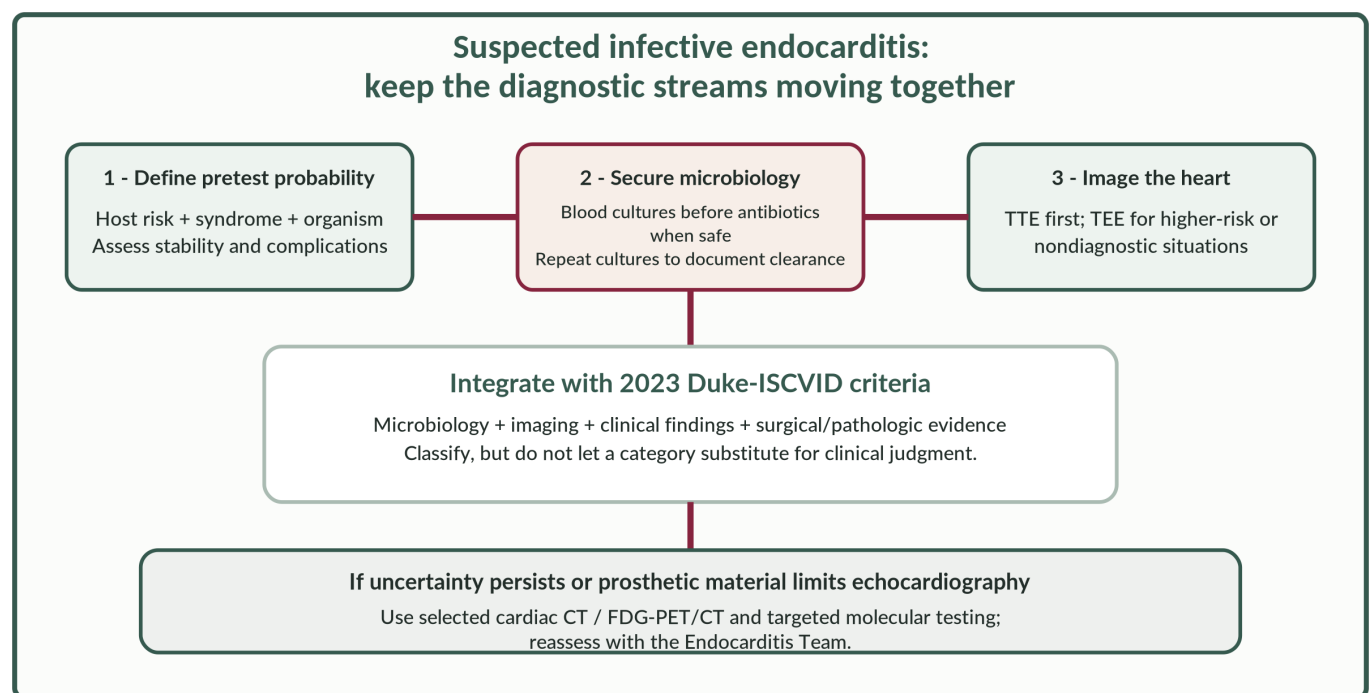


Figure 2. Contemporary IE diagnosis is an integrated process rather than a serial checklist. Evidence basis: Fowler et al. (2023); DeSimone et al. (2025, 2026).

Echocardiography remains first-line, but a negative TTE does not end every evaluation

Transthoracic echocardiography (TTE) is the initial imaging test for most patients because it is rapidly available and noninvasive. Its specificity is high, but sensitivity is limited, particularly with prosthetic material and periannular complications. The 2026 AHA statement reports typical TTE sensitivities of roughly 40% to 66%, whereas TEE provides greater than 90% sensitivity and specificity in many settings. TEE is

especially important when prosthetic valves or CIEDs are present, when TTE is negative or inconclusive despite intermediate or high clinical probability, or when complications such as abscess, perforation, or fistula are suspected. If an initial study is nondiagnostic and suspicion remains high, repeat echocardiography within about one week can reveal evolving changes (DeSimone et al., 2026).

Cardiac CT can add anatomic definition, especially for perivalvular complications, while FDG-PET/CT can be particularly valuable in prosthetic-valve and transcatheter-valve infection where acoustic shadowing reduces echocardiographic sensitivity. The modalities are complementary rather than interchangeable. Imaging selection should answer a clinical question: Is there endocardial infection? Has infection extended beyond the valve? Is prosthetic material involved? Is there a complication that changes surgical timing? (DeSimone et al., 2026; Delgado et al., 2023).

CASE 2 • FICTIONAL

The “negative” TTE is not the final answer

Jorge, 61, has persistent methicillin-susceptible Staphylococcus aureus bacteremia 48 hours after source-directed therapy for a skin abscess. He has a new PR-interval prolongation and mild aortic regurgitation. TTE is reported as “no vegetation seen.”

The test result does not fit the clinical probability. Persistent *S. aureus* bacteremia plus new conduction change raises concern for invasive aortic-root disease. TEE should be expedited, and cardiac CT may be useful if periannular extension remains uncertain. The Endocarditis Team should be engaged early because an abscess or fistula would change source-control planning. A negative screening study lowers probability only in proportion to the test’s sensitivity and the patient’s pretest probability (DeSimone et al., 2026).

Antimicrobial treatment: identify the organism, sterilize the vegetation, protect the patient

Empiric therapy is necessary when a patient is unstable or when a high-probability syndrome cannot safely wait for full microbiologic identification, but definitive therapy should narrow promptly to the organism and susceptibility profile. Valve type, prosthetic material, renal function, allergy phenotype, prior antimicrobial exposure, site of infection, and whether surgical source control has occurred all influence the regimen. Because treatment commonly lasts several weeks, medication toxicity and interaction management are not side issues; they are part of the therapeutic plan (DeSimone et al., 2026; Delgado et al., 2023).

When the patient is hemodynamically stable, obtain adequate blood cultures before the first new antimicrobial dose whenever this can be done without dangerous delay. Empiric therapy is a bridge, not the final regimen: coverage should reflect whether disease is native-valve or prosthetic/device-associated, community- or healthcare-associated, prior antibiotic

exposure, local resistance patterns, and the likelihood of staphylococci, streptococci, or enterococci. As soon as the organism, susceptibility profile, and source-control needs are defined, unnecessary spectrum should be removed. Persistent bacteremia despite apparently active therapy should trigger a search for an abscess, infected prosthetic material, metastatic focus, incorrect susceptibility assumptions, or inadequate source control rather than an automatic sequence of additional antibiotics (DeSimone et al., 2026).

Older adults require deliberate pharmacokinetic and toxicity review rather than reflex dose reduction. Reduced renal clearance, low muscle mass that can make serum creatinine deceptively reassuring, altered protein binding, changing volume status, and polypharmacy can all affect exposure. Review the renal estimate used for dosing, recent contrast and other nephrotoxins, diuretics and renin-angiotensin system drugs, hepatic function, sodium or fluid burden, and clinically important interactions. Use drug-specific exposure monitoring when indicated - including AUC-guided vancomycin dosing - and reassess after renal function, weight, volume status, or interacting medications change. Fear of toxicity should not produce ineffective underdosing; the safer approach is an effective regimen with measured monitoring and prompt adjustment (Rybak et al., 2020; DeSimone et al., 2026).

For susceptible viridans-group streptococci or *Streptococcus gallolyticus*, contemporary AHA regimens include high-dose penicillin G or ceftriaxone; a typical duration is four weeks for native-valve disease and six weeks for prosthetic-valve disease. Selected short-course regimens use gentamicin, but aminoglycoside exposure should never be treated as routine when renal risk is high. For *Enterococcus faecalis*, ampicillin 2 g IV every 4 hours plus ceftriaxone 2 g IV every 12 hours is a contemporary favored combination and avoids the nephrotoxicity of prolonged aminoglycoside therapy. In the 2026 AHA statement, native- and prosthetic-valve *E. faecalis* regimens are generally treated for six weeks (DeSimone et al., 2026).

For methicillin-susceptible staphylococcal IE, an antistaphylococcal beta-lactam is preferred when tolerated; cefazolin is a common alternative when appropriate. Methicillin-resistant *S. aureus* (MRSA) therapy commonly uses vancomycin or daptomycin, with regimen selection individualized to susceptibility, prior exposure, renal function, and clinical response.

For serious MRSA infections, AUC-guided vancomycin monitoring targeting an AUC/MIC of 400 to 600 mg·h/L (assuming MIC 1 mg/L by broth microdilution) is preferred over trough-only targets because it better balances exposure and nephrotoxicity risk (Rybak et al., 2020).

MEDICATION SAFETY • Staphylococcal prosthetic-valve IE has changed

Older guidance commonly added both gentamicin and rifampin to antistaphylococcal therapy for prosthetic-valve endocarditis. The 2026 AHA scientific statement concludes that the risk of gentamicin outweighs potential benefit in staphylococcal PVE. Consensus was not reached for routine rifampin; potential biofilm activity must be weighed against hepatotoxicity, drug interactions, and resistance, and the choice should be discussed by the Endocarditis Team (DeSimone et al., 2026).

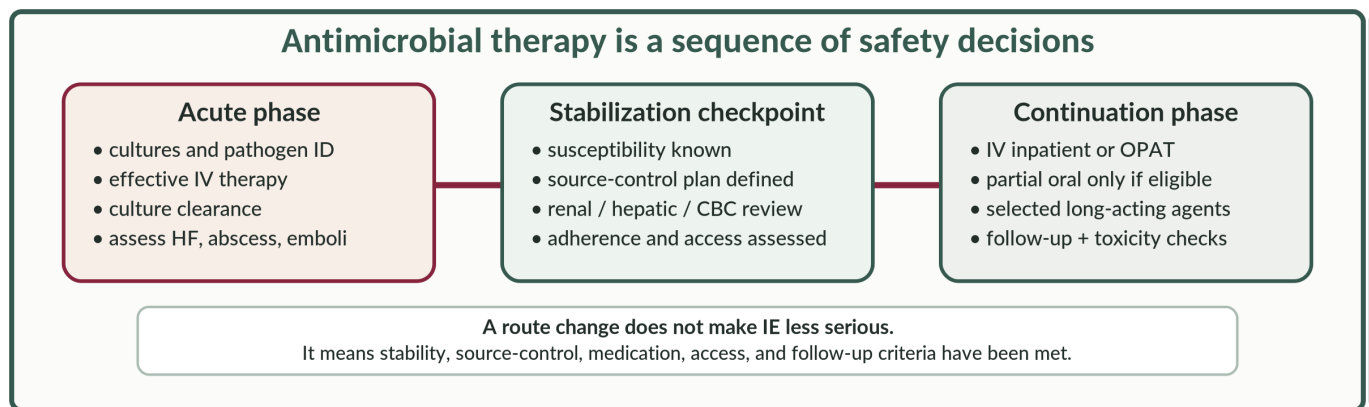


Figure 3. Contemporary therapy separates the acute stabilization phase from carefully selected continuation strategies. Evidence basis: DeSimone et al. (2026); Iversen et al. (2019).

Use organism-specific therapy, but do not turn tables into autopilot

Susceptibility results, valve type, source control, allergy evaluation, and patient physiology should be reviewed before a regimen is finalized. The concise table below highlights representative contemporary approaches rather than every possible regimen. Infectious-diseases consultation is strongly appropriate for IE, and local antimicrobial stewardship and susceptibility patterns remain essential.

The treatment clock depends on what is being treated

Duration is not determined by a single rule such as “six weeks from admission.” It varies by organism, valve type, regimen, procedural source control, and complications. Culture clearance is important because persistent positivity suggests that the infection is not yet controlled, but the total course should be documented as one continuous plan that accounts for effective preoperative therapy and what happened at surgery. When valve replacement occurs during active IE, the postoperative duration should be discussed explicitly rather than automatically restarting an entire course.

Conversely, a short postoperative plan is not appropriate when there is uncontrolled extracardiac infection, inadequate source control, or an organism requiring a different duration. A dated antimicrobial timeline in the progress note prevents both accidental undertreatment and unnecessary duplication (DeSimone et al., 2026; Delgado et al., 2023).

Verify allergy history before giving up the most effective beta-lactam

A reported penicillin or cephalosporin allergy can shift therapy toward alternatives that are less effective, more toxic, or harder to deliver for several weeks. Clarify the index reaction, timing, treatment, subsequent beta-lactam exposures, and whether the label reflects intolerance rather than immune-mediated hypersensitivity. When clinically appropriate, structured allergy evaluation or testing can restore a preferred beta-lactam option. In an unstable patient, however, allergy workup must not delay immediately effective treatment. The goal is not to “challenge every allergy”; it is to avoid allowing an unverified label to become a permanent treatment constraint without examining the actual risk (DeSimone et al., 2026).

Table 1. Representative pathogen-directed treatment approaches for adult IE

Pathogen / setting	Representative contemporary approach	Clinical monitoring emphasis
Penicillin-susceptible VGS or <i>S. gallolyticus</i>	Penicillin G 24 million units/24 h IV (continuous or divided) or ceftriaxone 2 g IV/IM every 24 h. Typical duration: NVE 4 wk; PVE 6 wk. Selected 2-wk regimens require specific eligibility and gentamicin.	Renal function if aminoglycoside used; allergy history; culture clearance. Consider colon evaluation with <i>S. gallolyticus</i> .
<i>E. faecalis</i>	Ampicillin 2 g IV every 4 h + ceftriaxone 2 g IV every 12 h is favored by the 2026 AHA writing group; usual duration 6 wk for NVE or PVE.	Renal function, sodium load, cytopenias, beta-lactam reactions; avoid unnecessary aminoglycoside exposure.
MSSA	Antistaphylococcal beta-lactam (e.g., nafcillin/oxacillin) or cefazolin when appropriate. Duration commonly 6 wk, individualized to valve type and source control.	Renal/hepatic function, CBC, line complications, metastatic foci; verify allergy phenotype rather than defaulting to vancomycin.
MRSA	Vancomycin or daptomycin; dose and adjuncts individualized by susceptibility, renal function, prior therapy, and response.	AUC-guided vancomycin monitoring when used; renal function; daptomycin CK and muscle symptoms; persistent bacteremia.
HACEK	Ceftriaxone 2 g IV every 24 h preferred when susceptible. Typical duration: NVE 4 wk; PVE 6 wk.	Beta-lactam tolerance, clinical response, complications; consider oral fluoroquinolone continuation only in selected stable patients.
Fungal IE	Specialist-directed antifungal therapy plus early surgical evaluation; prolonged or suppressive therapy may be needed.	Drug levels when indicated, hepatic/renal toxicity, interactions, embolic risk, surgical source control.

VGS = viridans-group streptococci; NVE = native-valve endocarditis; PVE = prosthetic-valve endocarditis. This table is educational and not a substitute for complete guideline tables or patient-specific prescribing. Based primarily on DeSimone et al. (2026).

CASE 3 • FICTIONAL

A renal-safety decision in enterococcal IE

Thomas, 74, has native-mitral-valve IE due to ampicillin-susceptible *E. faecalis*. His estimated GFR is 34 mL/min/1.73 m² and he recently received IV contrast. A proposed regimen includes six weeks of ampicillin plus gentamicin.

Combination therapy is appropriate for *E. faecalis* IE, but the specific combination matters. Ampicillin plus ceftriaxone provides dual beta-lactam synergy and is favored by the 2026 AHA writing group, particularly when aminoglycoside toxicity is a concern. The APRN should review renal trajectory, fluid/sodium burden, beta-lactam tolerance, culture clearance, and the full medication list. The lesson is not to “avoid gentamicin at all costs”; it is to choose a validated regimen that achieves bacterial killing with the lowest reasonable toxicity for this patient (DeSimone et al., 2026).

Allergy labels can change outcomes

A vague penicillin-allergy label can push a patient away from a preferred beta-lactam toward a less effective or more toxic alternative. Clarify the index reaction,

timing, severity, treatment, subsequent beta-lactam exposure, and features of severe cutaneous or organ-specific reactions. When the history is low risk, institutionally supported allergy evaluation or delabeling can improve access to preferred therapy. Conversely, a true immediate hypersensitivity reaction or severe delayed reaction requires appropriate avoidance and specialist planning. In IE, medication reconciliation should include not only antibiotics but anticoagulants, antiplatelets, serotonergic drugs, statins, anticonvulsants, and other agents that may interact with rifampin, linezolid, azoles, or other selected therapies.

Monitoring is therapy, not paperwork

Long treatment courses create cumulative risk. Serial renal function, hepatic tests, complete blood counts, and drug-specific monitoring should be planned before discharge, not improvised after an abnormal result. Vancomycin requires exposure monitoring; daptomycin requires attention to creatine kinase and muscle symptoms; aminoglycosides require renal and level monitoring when used; rifampin has extensive CYP-mediated interactions and hepatotoxicity concerns; linezolid can cause cytopenias, neuropathy with

prolonged exposure, and serotonergic interactions; and azole antifungals can produce major interaction and QT-related issues. OPAT programs should provide scheduled laboratory surveillance and rapid access to clinicians when results or symptoms change (Norris et al., 2019; Rybak et al., 2020).

IV for everyone, for the entire course, is no longer the only evidence-based model

The source article reflected an era when prolonged intravenous therapy was treated as the default for virtually all IE. The POET randomized trial changed that assumption for carefully selected patients with stable left-sided IE caused by streptococci, *E. faecalis*, methicillin-susceptible *S. aureus*, or coagulase-negative staphylococci. After an initial IV phase and stabilization, combination oral therapy was noninferior to continued IV therapy for the trial's composite outcome; long-term follow-up did not reveal late loss of efficacy (Iversen et al., 2019; Bundgaard et al., 2019). Real-world implementation studies have since supported carefully structured use, but selection remains restrictive (Pries-Heje et al., 2023; DeSimone et al., 2026).

The 2026 AHA statement supports considering partial oral therapy after at least 10 days of appropriate IV treatment (and at least seven days after valve surgery) when the patient is clinically stable, afebrile for at least three days, inflammatory markers and leukocyte count show response, susceptibility data permit a reliable oral combination, and TEE performed near transition shows no progression, abscess, or new surgical indication. Reduced absorption, a concurrent infection requiring IV therapy, major adherence concerns, clinically important interactions, and other instability argue against oral transition. Most patients screened for POET were not eligible, so “there is an oral option” should never be shortened to “endocarditis can be treated orally” (DeSimone et al., 2026).

Traditional OPAT remains appropriate for many patients who have achieved stability but still require parenteral therapy. A safe plan addresses vascular access, home environment, infusion capability, laboratory surveillance, drug levels when required, transportation, follow-up, and rapid reassessment for fever, dyspnea, neurologic symptoms, line problems, or medication toxicity. Long-acting lipoglycopeptides such as dalbavancin or oritavancin may be used as alternative continuation strategies in selected patients, but IE use is off-label in the United States, evidence is less mature

than for standard regimens, relapse and resistance remain concerns, and Endocarditis Team review is essential (Norris et al., 2019; DeSimone et al., 2026).

CASE 4 • FICTIONAL

Discharge is not a route change - it is a new safety system

Elaine, 58, has left-sided streptococcal native-valve IE. She has received 12 days of active IV therapy, has been afebrile for five days, blood cultures are sterile, CRP is falling, renal function is stable, and TEE shows no abscess, progression, or new surgical indication. She has reliable medication access and follow-up.

This is the kind of patient in whom the team may consider a validated partial-oral pathway rather than assuming that a central line is mandatory for the entire course. The decision requires organism-specific susceptibility, an appropriate oral combination, interaction review, adherence assessment, and scheduled follow-up. If any of those pieces are weak, OPAT or continued inpatient therapy may be safer. The nurse or APRN handoff should state the total planned duration, the exact date/criteria for transition, laboratory schedule, warning symptoms, and who owns follow-up (Iversen et al., 2019; DeSimone et al., 2026).

Surgery is not “what happens after antibiotics fail”

Surgical evaluation should occur while antimicrobial therapy is underway when IE has produced structural or uncontrolled infection. Contemporary indications cluster around three problems: heart failure or severe valve dysfunction; uncontrolled infection such as abscess, fistula, persistent bacteremia, difficult-to-eradicate organisms, or infected prosthetic material; and embolic risk from large or recurrently embolizing vegetations. Once an indication for surgery during active IE is established, the 2026 AHA writing group favors early surgery within 48 to 72 hours, unless major stroke or cerebral hemorrhage changes the neurologic risk-benefit calculation. This contemporary approach is consistent with randomized and guideline evidence supporting early intervention in appropriately selected high-risk disease (Kang et al., 2012; Otto et al., 2021; DeSimone et al., 2026).

The practical role of the APRN is to recognize and communicate the trigger early. Worsening dyspnea, pulmonary edema, hypotension, new severe regurgitation, persistent positive cultures despite active therapy, new conduction disease, recurrent emboli, or imaging evidence of abscess should not wait for a

routine follow-up discussion. Cardiovascular surgery, cardiology, infectious diseases, imaging, neurology when needed, microbiology, pharmacy, and nursing should be aligned around the same problem list. The

Endocarditis Team model is associated with faster surgery, more consistent care, and improved short-term outcomes (DeSimone et al., 2026).

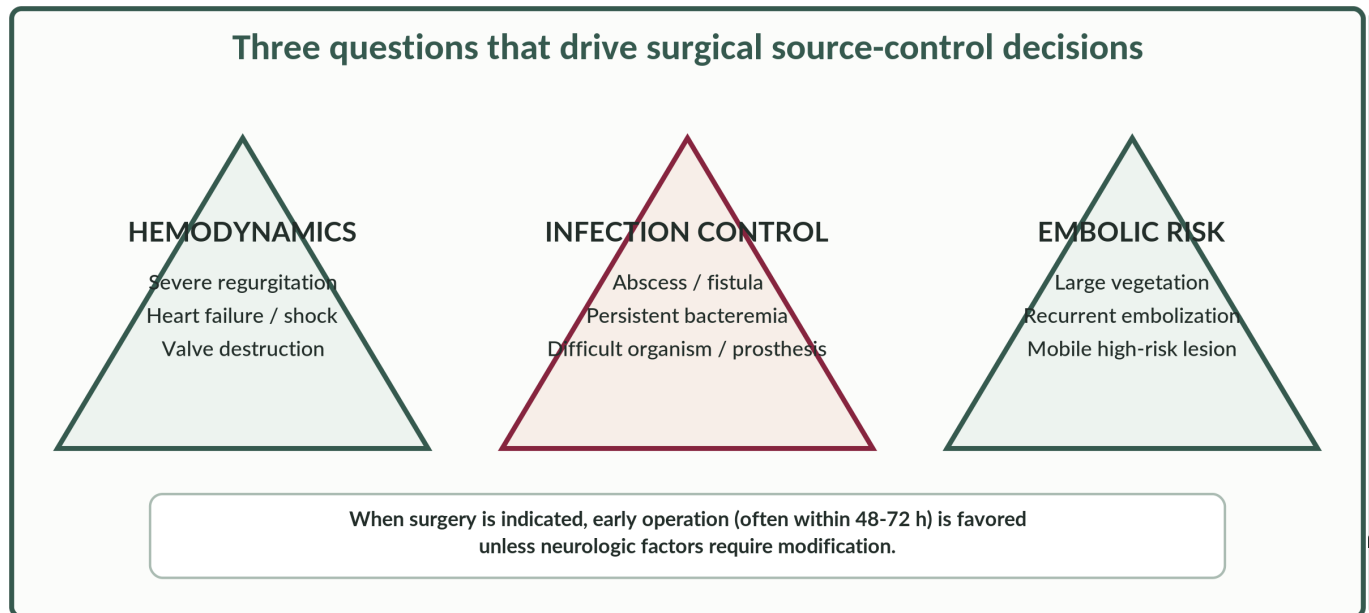


Figure 4. Surgical timing is driven by physiology, infection control, and embolic risk rather than by completion of an antibiotic course. Evidence basis: DeSimone et al. (2026); Delgado et al. (2023).

Stroke complicates timing, but it does not erase the surgical indication

Neurologic complications require coordinated decisions about brain imaging, hemorrhage risk, anticoagulation, and surgical timing. Ischemic stroke without major hemorrhage may not require a prolonged delay when the cardiac indication is urgent, whereas intracranial hemorrhage or major neurologic injury can alter timing substantially. The key is to avoid rigid delay rules. Neurology and cardiac surgery should interpret the type, size, and stability of the neurologic lesion against the immediate risk from uncontrolled IE (DeSimone et al., 2026; Delgado et al., 2023).

Postoperative antibiotics are being reconsidered

Another important contemporary change is the assumption that positive valve cultures automatically require restarting an entire four- to six-week course after surgery. Observational data summarized in the 2026 AHA statement suggest that two weeks of postoperative antimicrobial therapy may be reasonable after surgical valve replacement in many patients, regardless of valve-tissue culture results, when the total preoperative course, organism, abscess status, and source control are considered. This is a nuanced Endocarditis Team decision, not a universal two-week rule. The total treatment plan should be documented

explicitly so preoperative and postoperative days are not accidentally double-counted or truncated (DeSimone et al., 2026).

CASE 5 • FICTIONAL

“Let us finish six weeks first” is the wrong sequence

Devon, 46, has MSSA aortic-valve IE. After 48 hours of active beta-lactam therapy he develops pulmonary edema, a new diastolic murmur, and TEE shows severe acute aortic regurgitation with a periannular abscess.

Completing a prolonged antibiotic course before surgical referral would expose him to progressive hemodynamic and invasive infection risk. The current priority is urgent Endocarditis Team and cardiac-surgical evaluation while effective antimicrobial therapy continues. The indication is structural: acute severe regurgitation plus abscess. If surgery is performed, the postoperative antimicrobial duration is determined from the organism, preoperative exposure, operative findings, and source control rather than by an automatic restart of the original clock (DeSimone et al., 2026).

Hardware changes both diagnosis and source control

CIED infection may involve the generator pocket, leads, valves, or more than one component. Echocardiography can miss lead or prosthetic infection, and FDG-PET/CT

can improve diagnostic confidence in selected cases. When definite CIED infection is present, cure usually requires complete device-system removal in addition to antimicrobial therapy; attempting to sterilize retained infected hardware carries substantial relapse risk. Reimplantation timing and location should be individualized after infection control and reassessment of whether the device is still needed (Baddour et al., 2024).

Prosthetic-valve and transcatheter-aortic-valve IE also pose diagnostic challenges. Both TTE and TEE may be less sensitive because prosthetic material causes shadowing and because infection can track around the sewing ring or frame. Cardiac CT and FDG-PET/CT are therefore especially useful adjuncts. The threshold for an Endocarditis Team discussion should be low because surgery may be technically complex and the balance between procedural risk and uncontrolled infection is often narrow (DeSimone et al., 2026; Delgado et al., 2023).

People who inject drugs: treat the infection and the substance-use disorder

Injection drug use-associated IE commonly affects the tricuspid valve and may present with persistent bacteremia, septic pulmonary emboli, pleuritic pain, or

pulmonary abscess. Management should include evidence-based treatment of opioid or other substance-use disorder, harm-reduction counseling, infection care, and a nonpunitive plan for antimicrobial completion. AHA guidance emphasizes addiction-medicine expertise as part of the Endocarditis Team. Decisions about surgery should be based on clinical indications rather than on moral judgments about recurrence risk (Baddour et al., 2022; DeSimone et al., 2026).

Older adults and frailty

The older-adult emphasis of the original article remains clinically relevant but requires a more contemporary frame. Chronologic age alone is not a contraindication to TEE, surgery, or intensive therapy. Frailty, cognition, baseline function, renal reserve, nutrition, medication burden, goals of care, and the likelihood of meaningful recovery provide more useful context. Older adults are also more likely to have prosthetic valves, transcatheter valves, CIEDs, chronic kidney disease, and polypharmacy, so nephrotoxicity and drug interactions deserve deliberate prevention. A geriatric or palliative-care consultation may clarify risk and goals without using age as a shortcut to undertreatment.

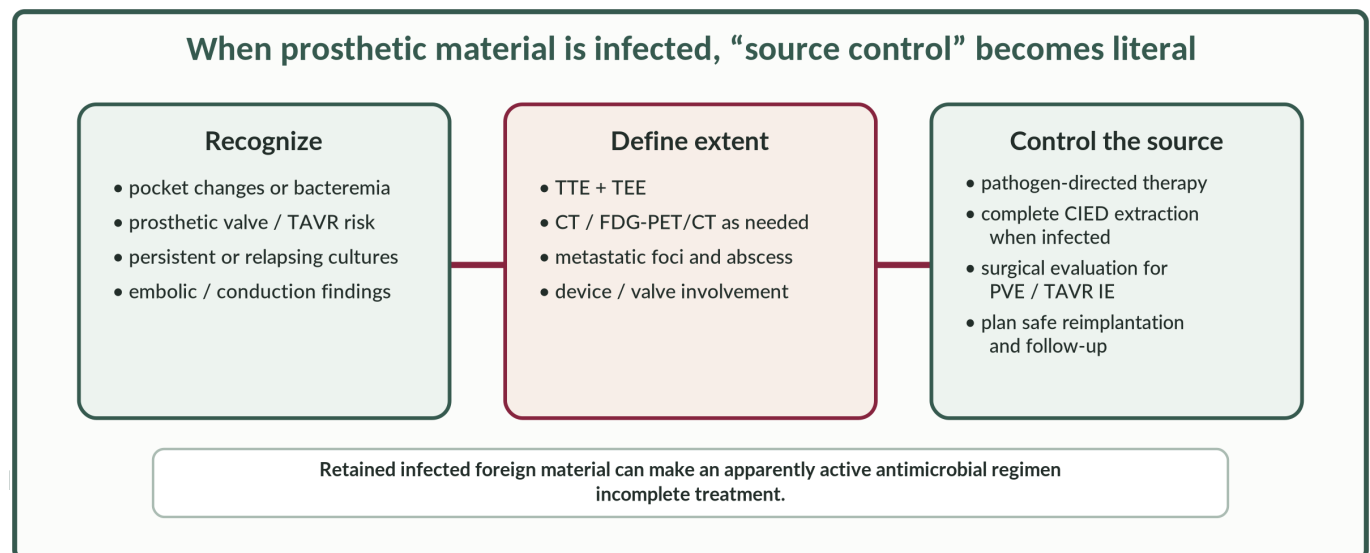


Figure 5. Device- and prosthesis-associated IE requires precise imaging and explicit source-control planning. Evidence basis: Baddour et al. (2024); DeSimone et al. (2026).

Look beyond the valve: complications may define the urgency

Metastatic infection is common enough that new focal symptoms deserve deliberate evaluation. Back pain may indicate vertebral osteomyelitis or epidural infection; left-upper-quadrant pain can signal splenic infarct or abscess; hematuria and renal dysfunction may reflect

embolic or immune-mediated injury; headache or focal deficits may signal ischemic stroke, hemorrhage, mycotic aneurysm, or cerebral abscess. Right-sided IE can produce recurrent septic pulmonary emboli. The workup should be symptom-directed rather than automatically ordering whole-body imaging for every patient, but a persistent fever or bacteremia after an

apparently appropriate regimen should prompt renewed search for an uncontrolled focus (DeSimone et al., 2026).

Antithrombotic therapy is not treatment for IE

Do not start aspirin or anticoagulation to prevent septic emboli from IE. When a patient already has another indication for anticoagulation - for example, a mechanical valve or atrial fibrillation - management becomes individualized because intracranial hemorrhage, ischemic stroke, mycotic aneurysm, and the need for urgent surgery may alter the balance. The medication should neither be reflexively continued nor reflexively stopped without considering the competing indication and neurologic findings. Coordination among cardiology, neurology, surgery, and the prescribing team is appropriate.

Prevention is focused, not indiscriminate

Good oral health and regular dental care are central preventive strategies. AHA prophylaxis recommendations continue to reserve antibiotic prophylaxis before certain dental procedures for patients at highest risk of an adverse outcome from viridans-group streptococcal IE, such as those with prosthetic cardiac valves or prosthetic material used for valve repair, previous IE, certain congenital heart diseases, and cardiac-transplant recipients who develop valvular regurgitation from a structurally abnormal valve. The presence of an elevated lifetime risk alone is not an indication for prophylaxis, and routine prophylaxis for most nondental invasive procedures is not recommended solely to prevent IE (Wilson et al., 2021).

Discharge and long-term follow-up

A completed antibiotic order is not the endpoint. Before discharge or route transition, document the total planned antimicrobial duration, date of first effective therapy, culture-clearance date, operative dates, vascular-access plan if applicable, laboratory schedule, drug-level plan, and responsible follow-up clinician. An end-of-therapy

TTE can establish a new structural baseline in selected patients. Educate patients to seek prompt evaluation for recurrent fever, chills, unexplained dyspnea, new neurologic symptoms, worsening edema, or focal pain. Dental evaluation, management of portals of entry, addiction treatment when relevant, and device or valve follow-up reduce preventable recurrence and improve continuity (DeSimone et al., 2026).

Clinical synthesis: five decisions that prevent the most dangerous shortcuts

First, keep IE in the differential when the host, organism, and syndrome fit - even when a second infection source seems plausible. Second, obtain high-quality microbiology and use TTE, TEE, cardiac CT, FDG-PET/CT, and molecular testing according to the question being asked rather than as interchangeable “more testing.” Third, narrow antimicrobial therapy to the pathogen and susceptibility profile while treating renal, hepatic, hematologic, and interaction monitoring as part of the regimen. Fourth, recognize that OPAT, partial oral therapy, and long-acting agents are continuation strategies for selected stable patients, not shortcuts around acute-phase assessment or source control. Fifth, involve the Endocarditis Team early when there is prosthetic material, persistent bacteremia, heart failure, invasive infection, embolic risk, CIED involvement, or a potential surgical indication.

The most important change from older management models is conceptual: diagnosis, antimicrobial therapy, source control, and disposition planning occur in parallel. IE remains a high-risk infection, but contemporary criteria, imaging, targeted microbiology, safer pharmacotherapy, structured outpatient pathways, and earlier procedural decisions give clinicians more ways to match treatment intensity to the actual problem. For APRNs, the practical contribution is precision - recognizing when the story does not fit a benign explanation, communicating the specific reason for escalation, and ensuring that every transition preserves the diagnostic and therapeutic work already done.

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