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Duke Criteria for Infective Endocarditis

The Duke Criteria provides diagnostic criteria for endocarditis.

About the Score

The Duke Criteria tool provides formal criteria for diagnosing and stratifying patients suspected of having infective endocarditis (IE) into "definite," "possible," and "rejected" groups. The criteria should be applied to patients for whom there is a high clinical suspicion of IE.

Patients with IE have a wide range of clinical features, and diagnosing IE is challenging. The Duke Criteria tool is sensitive for disease detection and has a high negative predictive value. Negative blood cultures may be confounded by a recent history of treatment with antibiotics. Clinicians should suspect IE and consider using the Duke Criteria in patients with: prolonged fever (fever of unknown origin); fever with vascular phenomena (stroke, limb ischemia, physical findings of septic emboli); persistently positive blood cultures (2 or more); patients who have prosthetic valves and are febrile; injection drug users who are febrile; patients who have a predisposing heart condition and are febrile; or patients who have a recent history of hospitalization and are febrile. An IE diagnosis must be made as soon as possible to initiate therapy. If a patient is determined to be in the "definite" group by the Duke Criteria, antibiotic treatment should be started based on guidelines and microbiology, and candidates who need surgical treatment should be identified.

For patients in the "possible" group, clinical

judgment should be used to decide whether the patient has IE. For patients in this group, transesophageal echocardiography can be considered, if not already done; candidates for surgical treatment should be identified; patients should be regularly watched for major or minor signs of IE (Roth spots, Osler nodes, Janeway lesions); and blood cultures should be drawn regularly (if not positive earlier) to look for microbiologic evidence. If patients are in the "rejected" group, other causes of fever should be considered, such as other infectious sources and rheumatologic or oncologic causes.

If clinical suspicion for IE is high and the patient is in the "possible" group, transesophageal echocardiography should be considered. IE should be considered, if not previously suspected, if the patient has persistently positive (2 or more) blood cultures. For patients who have subacute IE and are hemodynamically stable, empiric antibiotics can be avoided so that additional blood cultures can be obtained without the confounding effect of empiric treatment.

Evidence Appraisal

In the original study by Durack et al, 405 consecutive cases of suspected IE in 353 patients were evaluated in a tertiary hospital from 1985 to 1992.

The Duke Criteria improved upon the older von Reyn criteria. Eighty percent of the 69 pathologically confirmed cases were classified as clinically definite endocarditis by Duke Criteria, whereas the von Reyn criteria classified only 35 (51%) of the pathology-confirmed cases into the probable category ($P < .0001$). Twelve (17%) of the pathology-confirmed cases were rejected by the von Reyn criteria, but none were rejected by the Duke Criteria.

CALCULATOR REVIEW AUTHOR

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Among the 150 cases rejected by von Reyn criteria, 11 were definite, 87 were probable, and 52 were rejected by the Duke Criteria.

The Duke Criteria tool was validated during the late 1990s with 11 major studies, which included 1700 geographically and clinically diverse patient groups (adult, pediatric, and geriatric patients; patients from the community; patients with and without injection drug use; patients with both native and prosthetic valves; and patients treated outside of the United States). It showed high sensitivity (> 80%) and a high negative predictive value in these studies.

Use the Calculator Now

[Click here to access the Duke Criteria on MDCalc.](#)

Calculator Creator

David Durack, MD

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References

Original/Primary Reference

- Durack DT, Lukes AS, Bright DK. New criteria for diagnosis of infective endocarditis: utilization of specific echocardiographic findings. Duke Endocarditis Service. *Am J Med.* 1994;96(3):200-209.

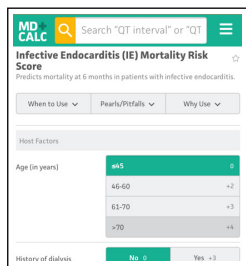
DOI: <https://doi.org/10.1086/313753>

Validation References

- Li JS, Sexton DJ, Mick N, et al. Proposed modifications to the Duke criteria for the diagnosis of infective endocarditis. *Clin Infect Dis.* 2000;30(4):633-638.

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Infective Endocarditis (IE) Mortality Risk Score

The infective endocarditis mortality risk score predicts mortality at 6 months in patients with confirmed infective endocarditis.

About the Score

The infective endocarditis (IE) mortality score provides an objective 6-month mortality estimate in patients with confirmed IE. IE has an overall 6-month mortality of approximately 25% in all patients. Older age and history of dialysis are the highest risk factors. IE complications also suggest a high mortality. Surgery is associated with a lower mortality rate but is infrequent in high-risk patients. Mortality ranges from 10% in the lowest-risk quintile to 53% in the highest-risk quintile.

Patients with IE may benefit from consultation with cardiothoracic surgery and infectious disease services. It is important to note that surgery in the Park 2016 study was associated with lower mortality, but the highest-risk patients were less likely to receive surgery, probably because they were high-risk surgical patients as well. This study was performed in referral centers experienced with endocarditis and cardiac surgery (likely tertiary and quaternary academic centers).

Evidence Appraisal

The c-statistics for the derivation and validation models are 0.715 and 0.682, respectively. The derivation cohort contained 4049 patients, and the validation cohort included 1197 subjects.

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Use the Calculator Now

[Click here to access the IE Mortality Risk Score on MDCalc.](#)

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Original/Primary Reference

- Park LP, Chu VH, Peterson G, et al. Validated risk score for predicting 6-month mortality in infective endocarditis. *J Am Heart Assoc.* 2016;5(4):e003016.
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