

Updated GRACE ACS Risk and Mortality Calculator

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Keywords: GRACE ACS Risk and Mortality Calculator, grace calc, grace ACS risk, grace ACS mortality, 6 month mortality ACS, grace prognosis, grace prognosis ACS, acute coronary syndrome prognosis, acs prognosis, acs 6 months, 6 month acs death, s/p acs death, s/p acs mortality, grace mortality, grace acs, calc, grace acs score, grace risk calc, grace risk score, grace 2.0, NSTEMI

Evidence to Action: Official Journal of MDCalc

Vol. 042025, Issue 01, 2025

Article Information

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<https://doi.org/10.65357/001c.145098>

Submitted: August 18, 2025
EST

Accepted: September 23,
2025 EST

Published: October 28, 2025
EST

Abstract

The GRACE (and GRACE 2.0) risk score is a well-validated, internationally derived prognostic model for mortality after acute coronary syndrome (ACS). Its primary strengths are large multicenter derivation, consistent discrimination, and the extension in GRACE 2.0 to non-linear modeling and 1–3-year mortality estimates. However, the potential calibration drift over time and across health systems, under- or over-estimation in older/frail patients, and omission of social determinants (socioeconomic deprivation) and frailty which independently affect outcomes are some of the important limitations of the tool. For safe local use, clinicians should consider confirming external validation and calibration in their own setting. They should also be cautious applying the score where data elements are missing or when doing time-sensitive interventions (do not delay reperfusion).

I. HOW TO USE

When to Use

Apply the GRACE score to patients with confirmed acute coronary syndromes to estimate mortality risk, guide timing of invasive strategies, and support prognostic discussions. It should not be used in patients with undifferentiated chest pain before ACS is diagnosed

Pearls / Pitfalls

Strengths:

1. This is a widely validated, guideline-endorsed prognostic model.
2. GRACE 2.0 improves accuracy with non-linear modeling and extended (1–3 year) mortality predictions.
3. The tool uses readily available clinical, ECG, and lab variables.
4. The score has strong discrimination across multiple populations (>20,000 patients in external validations).
5. It helps guide timing of invasive strategies.

6. The tool is very useful for structured communication of risk with patients/families.

Pitfalls:

7. The tool is prognostic only and is not designed for diagnosing ACS or undifferentiated chest pain.
8. Use of this tool should not delay time-sensitive reperfusion in STEMI.
9. Calibration can drift over time or vary by setting; local validation/recalibration may be required.
10. The tool may over- or underestimate risk in elderly/frail patients; does not include frailty or comorbidity burden.
11. The score omits social determinants (e.g., socioeconomic deprivation) that might influence outcomes.
12. The tool requires Killip class and creatinine. Missing or subjective inputs can affect accuracy.

Why to Use

The GRACE score can be used because it is extensively validated and a guideline-endorsed tool for risk stratification in acute coronary syndromes. By combining readily available clinical, ECG, and laboratory data, it pro-

vides a reliable estimate of short- and long-term mortality, helping clinicians identify high-risk patients who benefit most from early invasive strategies and intensified medical therapy. Beyond guiding management, the score supports meaningful prognostic discussions with patients and families, promotes standardized decision-making across providers, and aligns care with evidence-based recommendations. Its consistent performance across large, diverse international cohorts makes it a valuable tool for improving both clinical outcomes and communication in the care of ACS patients.

II. NEXT STEPS

Advice

The GRACE Score is a prognostic tool to support decision-making. Use it alongside clinical judgment, ECG, troponin, and patient stability. Discuss results with patients and families to guide expectations and shared decisions.

Management

The [ESC 2023](#) and [ACC/AHA 2025](#) acute coronary syndrome guidelines support the use of the GRACE score to identify high-risk patients with acute coronary syndrome for risk stratification to early invasive strategy (GRACE Score >140). In patients with STEMI, GRACE score should not delay invasive strategy but can be used to provide prognostic information.

Critical Actions

Mortality estimate increases as the GRACE score increases.

This tool can be used as one factor in determining a course of care and may assist in communication with the patient about their risk. It should not be used in isolation when determining a treatment plan.

Ensure high-risk patients have guideline-directed care during their hospitalization, as well as appropriate specialist and primary care follow-up upon discharge.

III. EVIDENCE

Evidence Appraisal

The GRACE 2.0 score is a well-validated, guideline-endorsed tool for risk stratification in acute coronary syndromes, with strong discrimination (Area Under the Curve [AUC] ≈ 0.8) and clear clinical utility in guiding invasive strategy timing and prognostic discussions. Derived from a large, multinational registry (N=21,688) and externally validated in diverse populations, it demonstrates broad applicability, though calibration may drift over time and across healthcare systems, requiring local validation and potential recalibration. Its strengths include clinical relevance, feasibility, and ease of use, but

limitations include reliance on subjective inputs (e.g., Killip class), lack of frailty or socioeconomic factors, and risk over- or underestimation in elderly or deprived groups. Overall, GRACE 2.0 should be used as a robust prognostic aid to inform management and communication in ACS, but always alongside clinical judgment, local validation, and consideration of patient context.

Formula

Cumulative model, see: <https://pubmed.ncbi.nlm.nih.gov/24561498/>

Fox KA, Fitzgerald G, Puymirat E, et al. Should patients with acute coronary disease be stratified for management according to their risk? Derivation, external validation and outcomes using the updated GRACE risk score. *BMJ Open*. 2014;4(2):e004425.

Facts & Figures

Score Interpretation:

GRACE Score >140 suggests consideration for early invasive strategy.

Risk estimates of mortality can be found in the original derivation and validation study: <https://pubmed.ncbi.nlm.nih.gov/24561498/>

Fox KA, Fitzgerald G, Puymirat E, et al. Should patients with acute coronary disease be stratified for management according to their risk? Derivation, external validation and outcomes using the updated GRACE risk score. *BMJ Open*. 2014;4(2):e004425.

Literature

Original/Primary

<https://pubmed.ncbi.nlm.nih.gov/17032691/>

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Validation

<https://pubmed.ncbi.nlm.nih.gov/19699862/>

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