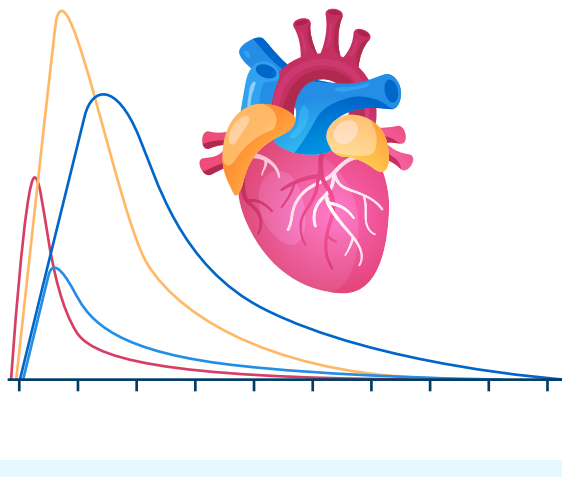


Cardiac Biomarkers & Rapid Algorithms for NSTEMI-ACS

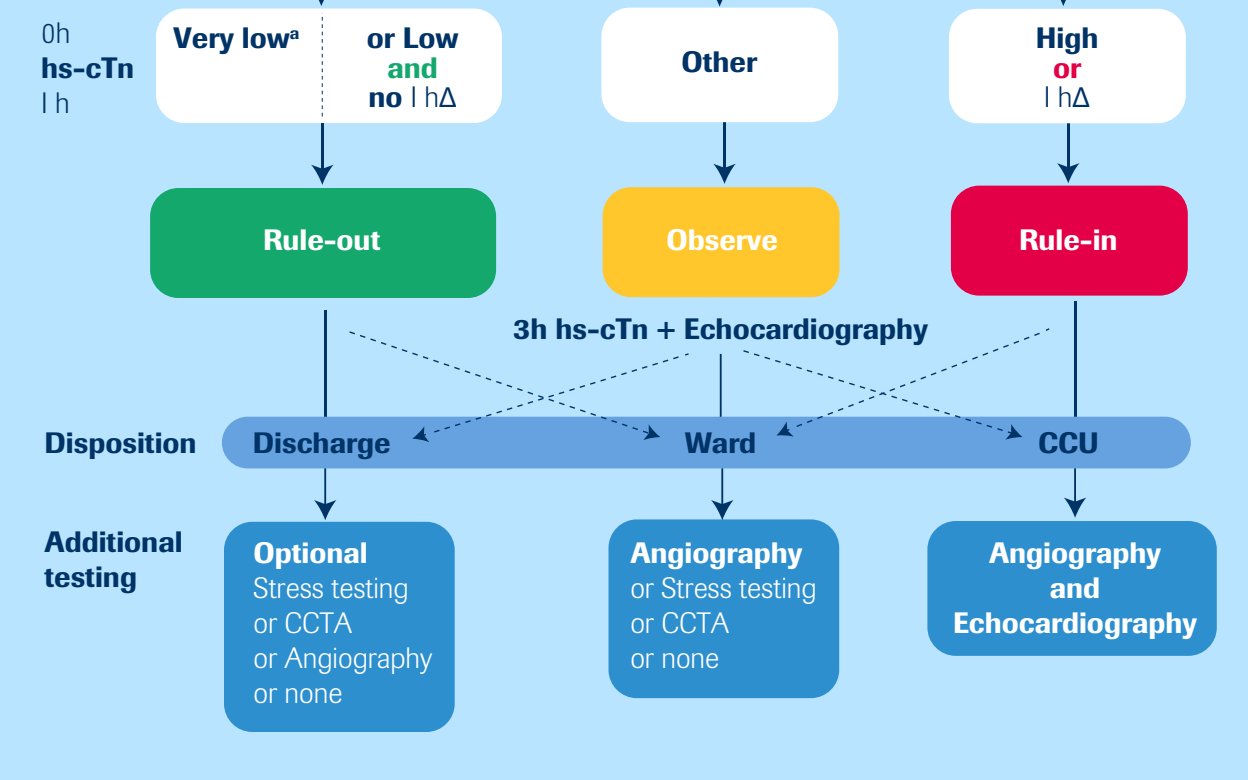
ESC 2020 Updates



ESC 0h/1h Algorithm is Now the Preferred Diagnostic Strategy in Suspected NSTEMI-ACS¹

- The 2020 ESC guidelines recommend ESC 0h/1h algorithm preferentially over the ESC 0h/3h algorithm (Class IB).¹
- The 0h/2h algorithm is the preferred alternative to the ESC 0h/1h-algorithm (Class IB)¹
- The ESC 0h/3h algorithm recommendation has been downgraded (Class IIa B)¹

ESC 0h/1h Algorithm - Accelerates Triage of Patients with Suspected NSTEMI-ACS¹



¹ Only applicable if CPO>3h.

Adapted and reproduced by permission of Oxford University Press on behalf of ESC.¹

Caveats to Consider with Rapid Algorithms

Algorithms should always be used together with clinical and ECG findings.¹

Troponin elevations are time-dependent. Additional cTn measurement at 3h is suggested in patients presenting <1h and triaged towards rule-out.¹

Late elevations in cardiac troponin concentration is possible. Serial cardiac troponin testing should be carried out.¹

For CKD patients, the same diagnostic and therapeutic plan (may require dose adjustments) should be followed as in patients with normal kidney function. (Class IC)¹

Practical Guidance for the Implementation of ESC 0h/1h Algorithm

Collect blood samples for hs-cTn measurement at admission (0h) and 1h later, regardless of any other clinical details or pending results.¹ Early measurements may seem unnecessary in some patients*. However, this promotes patient safety by easing the entire process.¹

The exact time of 0h blood draw should be recorded to accurately estimate the time window (±10 min) of the 1h blood draw.¹

In case the 1h (±10 min) collection is not possible, blood should be collected at 2h and the ESC 0h/2h algorithm should be used.¹

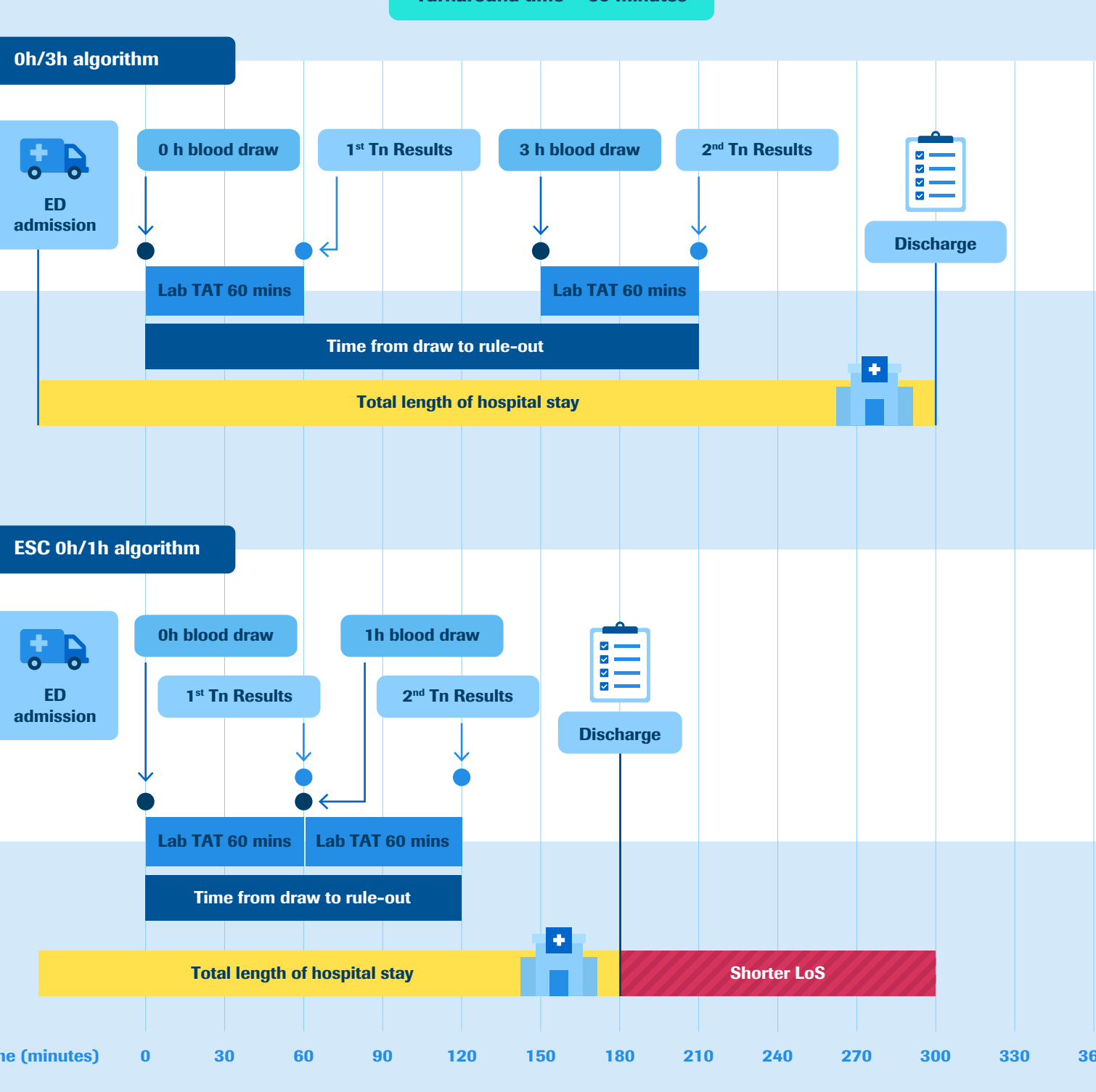
*Those with very low 0h concentrations/chest pain onset > 3h.

ESC 2020 recommends the measurement of cardiac troponins with high-sensitivity assays immediately after admission. The results should be read within 60 minutes of blood sampling. (Class IB)¹

In the ESC 0h/1h algorithm, 0h and 1h refer to the time point at which blood is taken. To calculate the earliest time point for clinical decision, the local TAT should be added to the time of blood collection.¹

Timing of the Blood Draws and Clinical Decisions are Different: An Important Point to Consider when Using the ESC 0h/1h Algorithm¹

Estimated Total length of ED stay based on different algorithm and TAT scenarios

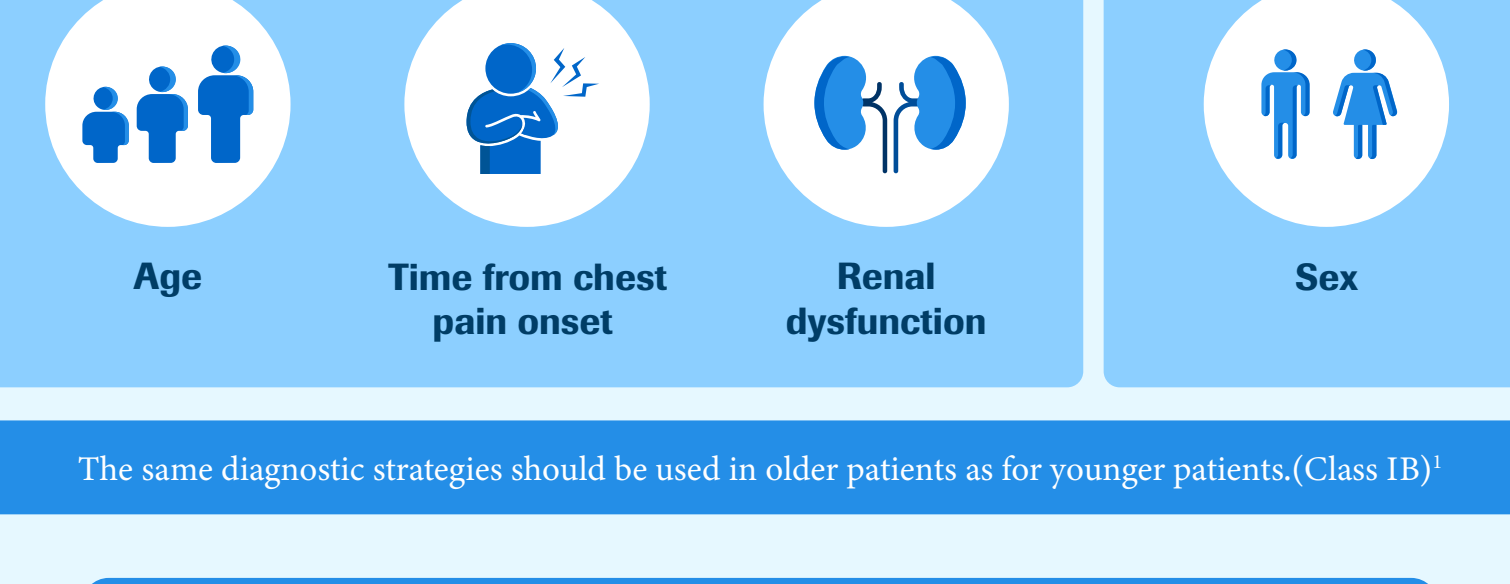


Compared to other algorithms, ESC 0h/1h algorithm possesses clinical and economic benefit, independent of the local TAT.¹

- ✓ Quicker diagnosis + shorter hospital stay = Reduced resource utilisation.²
- ✓ Additional blood draws, ECGs and imaging studies can be avoided.²
- ✓ Reduced length of observation time.³
- ✓ Reduced overall length of stay in ED.³
- ✓ Lowers hospital and overall AMI diagnostic cost.^{2,3}

Use of Uniform Cut-off Concentrations is Recommended¹

The 4 Confounders of Cardiac Troponin Concentration¹



The same diagnostic strategies should be used in older patients as for younger patients.(Class IB)¹

To date, there are no tools that takes into account the 4 variables of cardiac troponin concentration. ESC 2020 recommends the use of uniform cut-off concentrations as the standard of care in the early diagnosis of MI.¹

Biomarkers as Tools for Prognostication and Risk Assessment

- Beyond its diagnostic role, it is recommended to measure hs-cTn serially for the estimation of prognosis. (Class IB)¹
- hs-cTnT and I possess comparable diagnostic accuracy. However, hs-cTnT has greater prognostic accuracy.¹
- hs-cTn adds prognostic information with regards to short- and long-term mortality to clinical and ECG variables.¹
- The higher the hs-cTn levels, the greater the risk of death. Serial measurements can be used to detect peak levels of cardiac troponin and risk stratify patients with established MI.¹
- BNP/NT-proBNP, serum creatinine and eGFR also affect prognosis and should be measured concomitantly.¹

Abbreviations: ESC: European Society of Cardiology; NSTEMI-ACS: Non ST-elevation acute coronary syndrome; ACS: Acute coronary syndrome; CKD: Chronic kidney disease; hs-cTn: high-sensitivity cardiac troponin; ED: Emergency department; AMI: Acute myocardial infarction; MI: Myocardial infarction; BNP: B-type natriuretic peptide; NT-proBNP: N-terminal pro-B-type natriuretic peptide; eGFR: Estimated glomerular filtration rate; TAT: Turn-around time; ECG: Electrocardiogram; LoS: Length of stay; MACE: Major adverse cardiovascular events; CCTA: Coronary computed tomography angiography; CCU: Coronary care unit.

References:
 1. Collet JP, Thiele H, Barbato E, et al. 2020 ESC Guidelines for the management of ACS in patients presenting without persistent ST-segment elevation: The taskforce for the management of ACS patient without persistent ST-segment elevation of the ESC. *European Heart Journal* 2020; 42 (14): 1289-1367 <https://doi.org/10.1093/eurheartj/ehaa575>.
 2. Ambavane A, Lindahl B, Giannitsis E, et al. Economic evaluation of the one-hour rule-out and rule-in algorithm for acute myocardial infarction using the high-sensitivity cardiac troponin T assay in the emergency department [published correction appears in PLoS One. 2018 Jan 11;13(1):e0191348]. *PLoS One*. 2017;12(11):e0187662.
 3. Giannitsis E, Blankenberg S, Christenson RH, et al. Critical appraisal of the 2020 ESC guideline recommendations on diagnosis and risk assessment in patients with suspected non-ST-segment elevation acute coronary syndrome [published online ahead of print, 2021 Feb 26]. *Clin Res Cardiol*. 2021;10.1007/s00392-021-01821-2. d