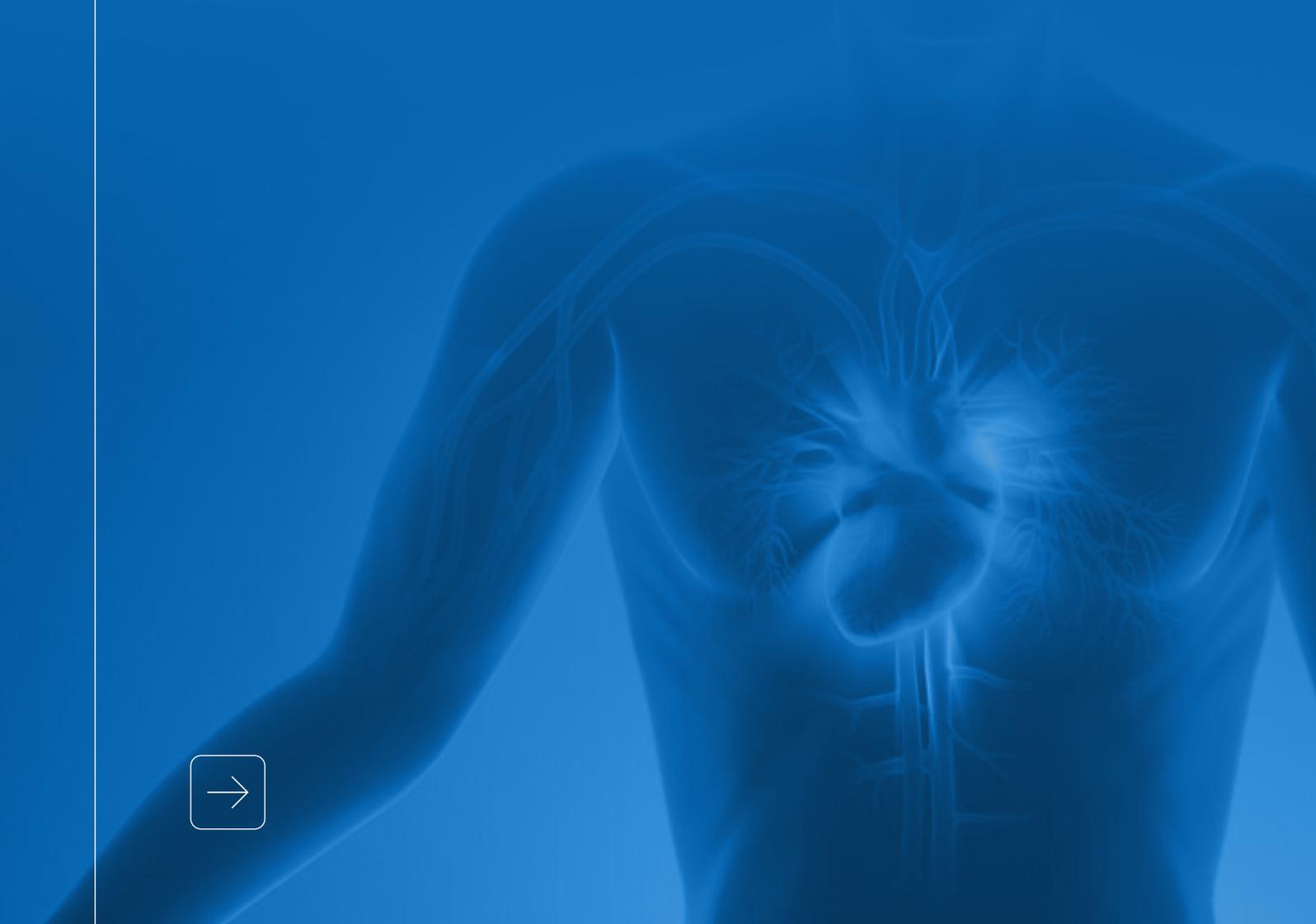
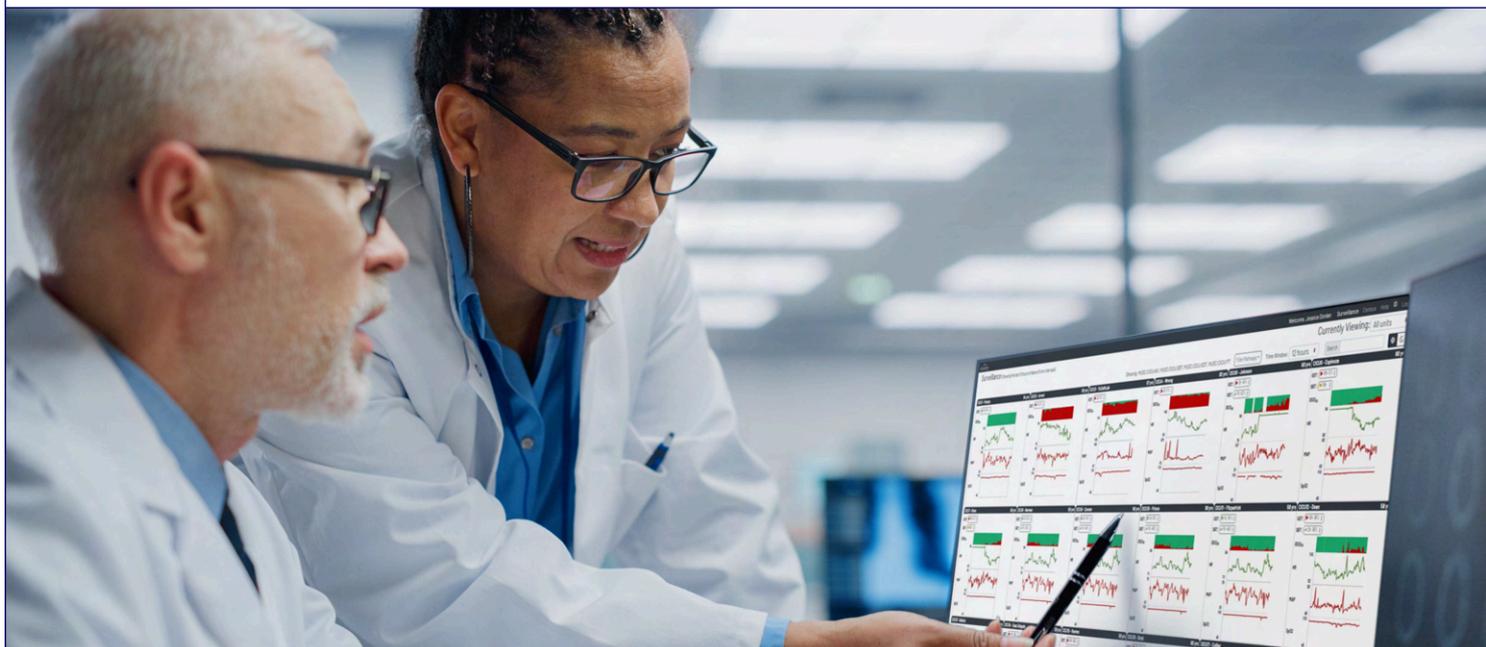




Unrecognized Cardiogenic Shock: A Costly Gap In Hospital Care





Introduction

The Critical Importance of Early Cardiogenic Shock Recognition

Cardiogenic shock (CS) continues to pose a major challenge for hospitals nationwide, largely because delayed recognition contributes to poor patient outcomes. Even with significant progress in interventional cardiology, mortality remains high, with one-year rates often approaching or surpassing 50%. Timely clinical recognition of CS is consistently linked with improved patient outcomes. According to the American College of Cardiology, the chances of patient survival markedly increase when shock is recognized in its initial stages, allowing clinicians to intervene before multi-organ failure ensues. Early recognition can also reduce the strain on critical resources by preventing prolonged ICU stays and extensive interventions.¹

High mortality in CS is partly due to the difficulty in recognizing and treating the condition early enough to reverse patients' negative clinical outcomes. Often, patient deterioration occurs gradually, obscuring the urgency of the situation until it's critical. Subtle signs like changes in heart rate, blood pressure, and respiratory rate may initially appear innocuous, delaying clinician response.²

Even in cardiac ICUs, delays happen when newer nurses and APPs are managing complex, high-acuity patients and physicians are stretched across competing tasks.

Tehrani et al, in their review of the pathophysiology and phenotypes of CS, conclude that early diagnosis, triage and risk classification improves disease prognosis.

They state that best practices for shock management remain nonuniform across the US with clinicians often facing challenges in detecting, evaluating and identifying CS. This results in suboptimal triage of patients, and subsequent transfer of patients to specialized centers in a timely manner.³

Financial realities of Cardiogenic Shock

Clinical challenges of CS identification and management not only contribute to poor health outcomes but also have important implications for hospital operations and financial performance.

Cardiogenic shock is classified by CMS as a major complication or comorbidity (MCC), which shifts many cardiac cases into higher-weighted Diagnosis Related Group (DRG) and can significantly increase reimbursement.

DRGs classify hospital inpatients into categories that share similar clinical conditions and expected resource use. Each admission is assigned to a DRG based on diagnosis, procedures, age, discharge status, and the presence of complications or comorbidities. Hospitals receive a fixed amount for each case in a DRG, regardless of actual costs. This model incentivizes efficiency but also relies on accurate clinical documentation to reflect illness severity.

The extent of the DRG financial impact depends on the payer, region, and underlying diagnosis. However, what is clear is that unrecognized or undocumented cases will often result in significant lost revenue for hospitals.



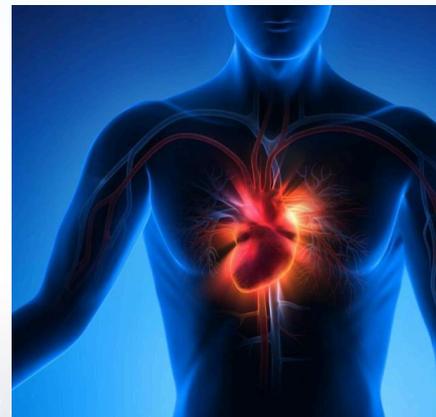
Why condition severity matters – the evolution to MS-DRGs

Previously, DRGs didn't adequately differentiate between sicker, higher-cost patients and less complex ones, leading to reimbursement inequities. To address this, CMS introduced Medicare Severity-DRGs (MS-DRGs), which divide base DRGs into subclasses:⁴

- Without CC/MCC (no complication or comorbidity)
- With CC (complication or comorbidity)
- With MCC (major complication or comorbidity)

Cardiogenic Shock is listed as an MCC when the patient is discharged alive. This means that when cardiogenic shock is correctly coded as a secondary diagnosis, the patient's case shifts into a higher-weighted DRG.

Hospitals that recognize and document CS therefore receive payments that better reflect the true cost of care. Conversely, missed or undocumented shock results in assignment to a lower-weight DRG and lost revenue.



How hospitals can realize additional revenues through more timely and accurate DRG coding

To identify CS in a timely and accurate manner, hospitals need real-time surveillance platforms. Relying solely on traditional EHR systems, which typically record information retrospectively, fall short of these requirements. Hospitals need a platform that can surface deterioration early and ensure clinical documentation accurately reflects patient severity.

Etiometry's clinical intelligence software platform is already providing real-time decision support for over 50 hospitals across the world. Etiometry's AI-powered platform integrates with existing EHR systems and bedside monitors, ensuring minimal disruption to current workflows while maximizing data utility.

The AI technology uses its customers' own practices and standards to stage shock progression and to continuously report physiologic risks associated with CS. By giving teams earlier visibility of shock and shock progression, the platform helps hospitals reduce the risk of missed or undocumented CS cases—supporting more accurate DRG assignment and protecting revenue.

Key Etiometry platform capabilities, leveraging the hospital's CS identification and staging criteria, include:

- **Real-time SCAI and other shock staging protocols:** Enables teams to monitor patient progression and regression through stages of CS.
- **Hospital-wide surveillance:** Assists early identification of patient deterioration across the hospital, not just in the ICU.
- **Informational Flags:** Identifies patients who meet criteria for risk review based on hospital protocols.
- **Team-wide coordination:** Ensures that interdisciplinary teams are aligned, from cardiologists and intensivists to emergency physicians and nurses.
- **Proactive clinician notification:** Can notify clinicians when hospital-defined criteria related to shock staging are met, via tools such as Epic OPAs, nurse-call integrations, or the Etiometry mobile app, helping bring potential changes to clinicians' attention.

The platform is not an active patient monitoring or alarm system.

About Etiometry

Founded in 2010, Etiometry is the leader in clinical decision-support software designed to help clinicians in the intensive care setting make data-based decisions regarding their patients' care and treatment. Etiometry's technologies provide valuable clinical insight and analysis to support early recognition of subtle changes in patients' conditions to avoid complications and speed recovery.

Etiometry has ten FDA clearances and four Health Canada approvals and CE markings. Etiometry is utilized by some of the world's top academic medical centers as well as leading children's hospitals ranked by US News and World Report and Newsweek. Etiometry is committed to improving patient outcomes, increasing clinical efficiency, and lowering the cost of care through the more effective use of data.

The Etiometry Platform is the only critical care software solution, supported by published clinical outcome data, that leverages AI to reveal deep insights into patient physiology. It helps critical care teams deliver standardized and individualized care and supports visibility into patient state changes, helping clinicians manage escalation or de-escalation of care. It is designed to facilitate the use of all available data to support the anticipation and management of the dynamic condition of patients requiring intensive care.

Contact Us

Contact us if you're seeking to automate the efficient escalation and safe de-escalation of care workflows, or equip your team with AI-based clinical intelligence to enhance outcomes, reduce length of stay and realize additional patient revenues.

Note: Etiometry's platform is a clinician-configured decision-support tool and does not independently identify or treat cardiogenic shock.

¹ Sinha, S, Morrow, D, Kapur, N. et al. 2025 Concise Clinical Guidance: An ACC Expert Consensus Statement on the Evaluation and Management of Cardiogenic Shock: A Report of the American College of Cardiology Solution Set Oversight Committee. JACC. 2025 Apr, 85 (16) 1618–1641. <https://doi.org/10.1016/j.jacc.2025.02.018>

² Artificial Intelligence in the Early Prediction of Cardiogenic Shock in Acute Heart Failure or Myocardial Infarction Patients: A Systematic Review and Meta-Analysis <https://pmc.ncbi.nlm.nih.gov/articles/PMC10783597/>

³ A standardized and comprehensive approach to the management of cardiogenic shock. Tehrani BN, Truesdell AG, Psotka MA, et al. JACC Heart Fail. 2020;8:879–891. doi: 10.1016/j.jchf.2020.09.005. [DOI][PMC free article][PubMed]

⁴ <https://hcup-us.ahrq.gov/db/nation/nis/APS-DRGsDefManualV27Public.pdf>