UPMC
LIFE CHANGING MEDICINE

Emergency Sepsis Care :

Opportunity Abounds -
Early Decisions and Actions.
Measurable Outcomes.
Lives Saved.
Team Care.

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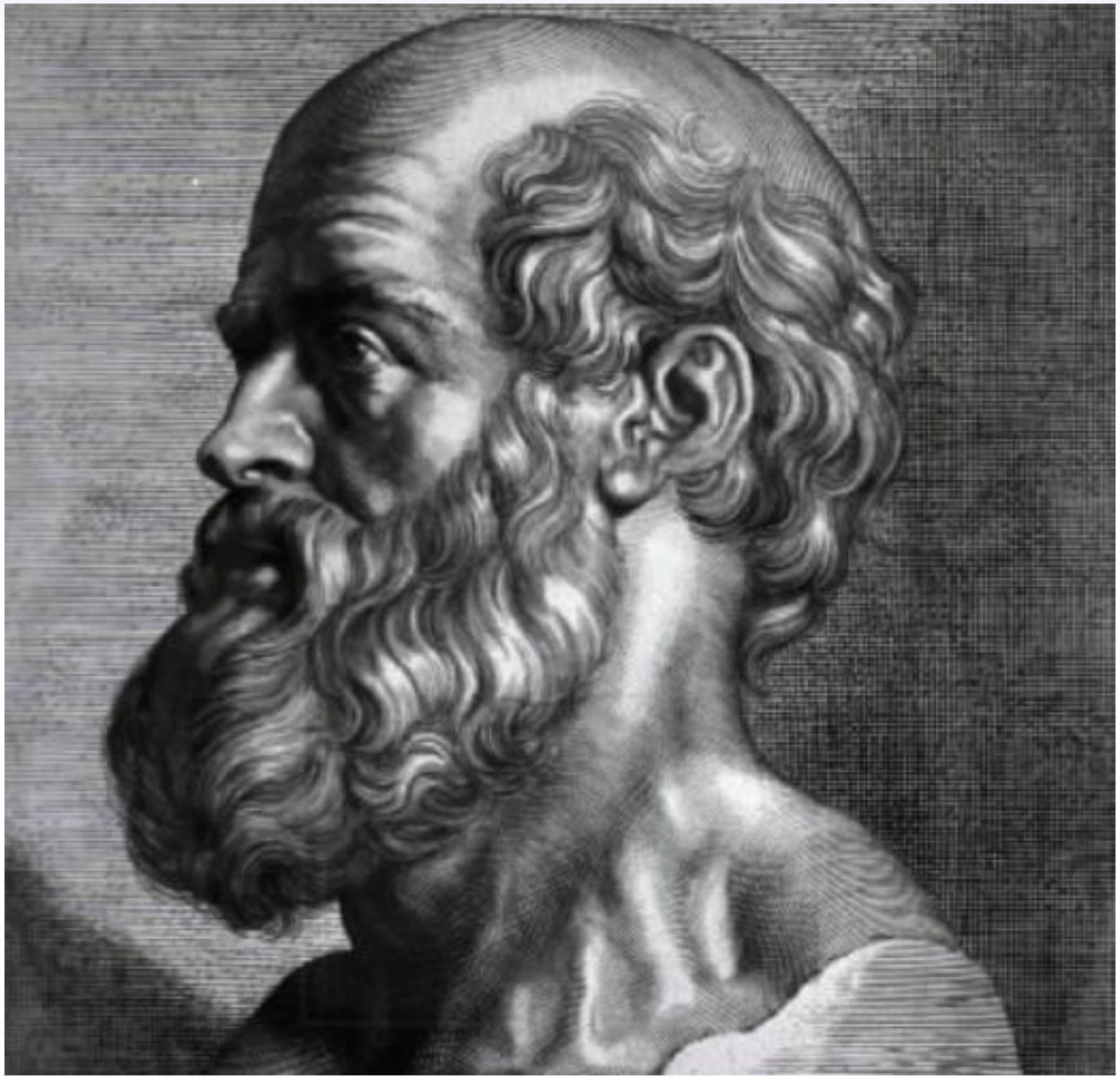
My Disclosures

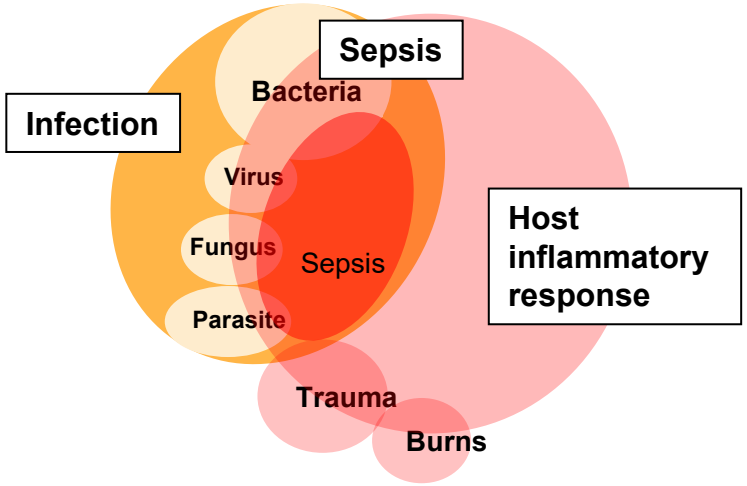
- I receive stipends or royalties for editing *Annals of Emergency Medicine, Tintinalli's Study Guide,* and *The Trauma Manual and Acute Care Surgery*, and for authoring an *UpToDate* chapter.
- I do expert consulting
- T32 Grant NHLBI PI
- None is in area(s) I am speaking on today.

Origins of sepsis



- **Hippocrates (BC ~460-370)**
  - Sepsis (σῆψις)
    - The process by which flesh rots, swamps generate foul airs at night, and wounds fester
    - It is rank, disease-producing, and evil

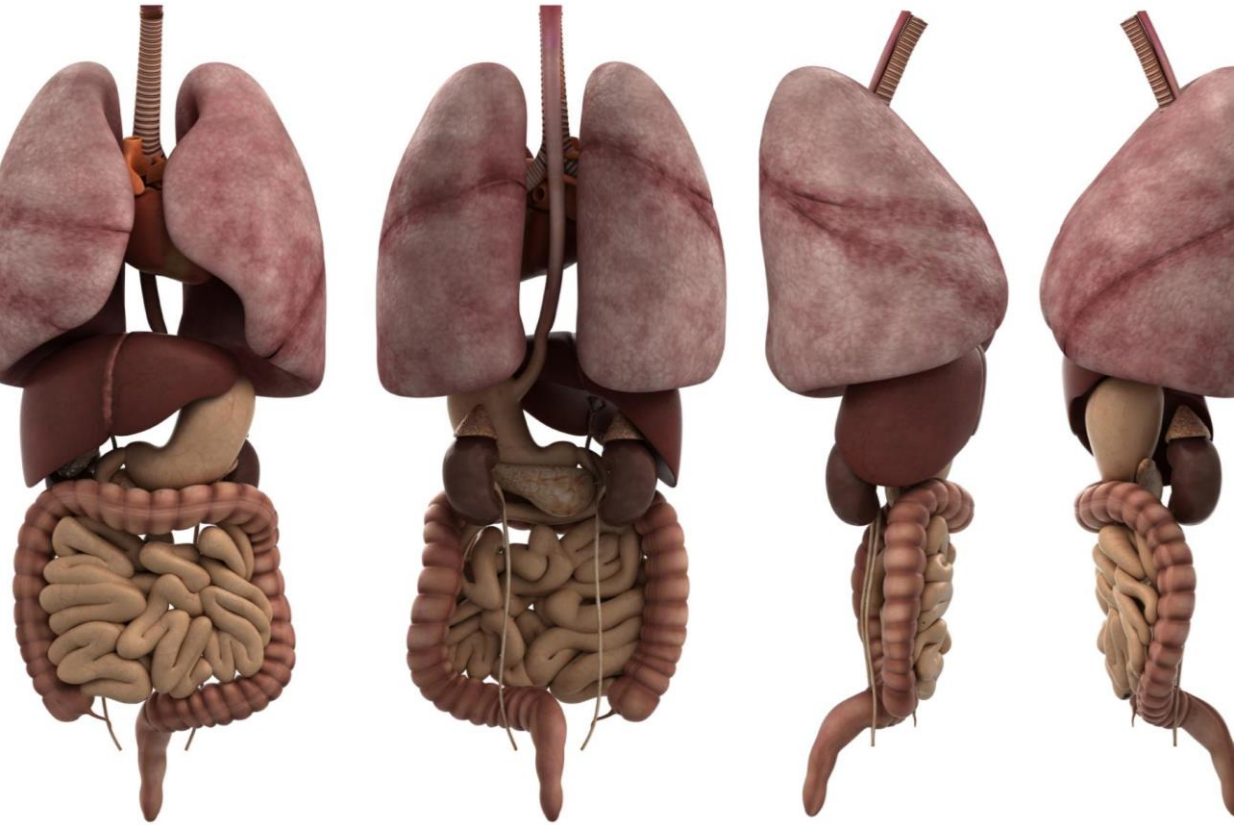
What do we think sepsis ‘is’?



- **Patients still die DESPITE effective antibiotics**
- **Sepsis is a host response to infection gone awry!**
  - A case of harm by friendly fire
- **When organs fail, the sepsis is called ‘severe’**
  - 1992 and 2003 International Consensus Definition

Bone et al. Ann Intern Med 1992; Levy et al. CCM 2003

Sepsis Burden



Global Impact

Sepsis affects > 1.5 million in US with 350k deaths, worldwide 49 million people yearly and causes about 11 million deaths.

Economic and Long-Term Effects

Sepsis leads to high costs and long-term complications including cognitive impairment.

>75% who survive ICU are “not right” a year later

Critical Role of Early Care

Emergency care – EMS and ED - are essential for early sepsis detection and initiating life-saving treatments.

Rivers et al 2001 NEJM – first “positive trial”, framework that doing multiple things early, based on attention and structure, mattered.

Why ED/EMS Care is Critical for Sepsis

First Point of Contact

Emergency departments are often (75%+) the initial care setting for sepsis patients, enabling rapid diagnosis and treatment.

EMS brings 75% of those

Timely Treatment Saves Lives

Delays in antibiotic administration or resuscitation increase mortality risk by up to 8% per hour, highlighting the importance of rapid care.

Sepsis Protocol Implementation

Sepsis care needs multiple steps and tailoring plus consistency – recognition, antibiotics, fluids, and re-checks improve patient outcomes.

Care Coordination and Outcomes

ED coordination of transitions to intensive care limits gaps, reduces hospital stays/ICU needs, and preventing organ failure while enhancing recovery.

Incidence and Outcomes of Sepsis in ED Settings

Sepsis Frequency in ED

Up to 10% of emergency department admissions involve suspected or confirmed sepsis, reflecting a high clinical burden.

High Mortality Rates

Sepsis mortality rates between 10-30%, higher when undertreated, underscoring the critical need for early treatment.

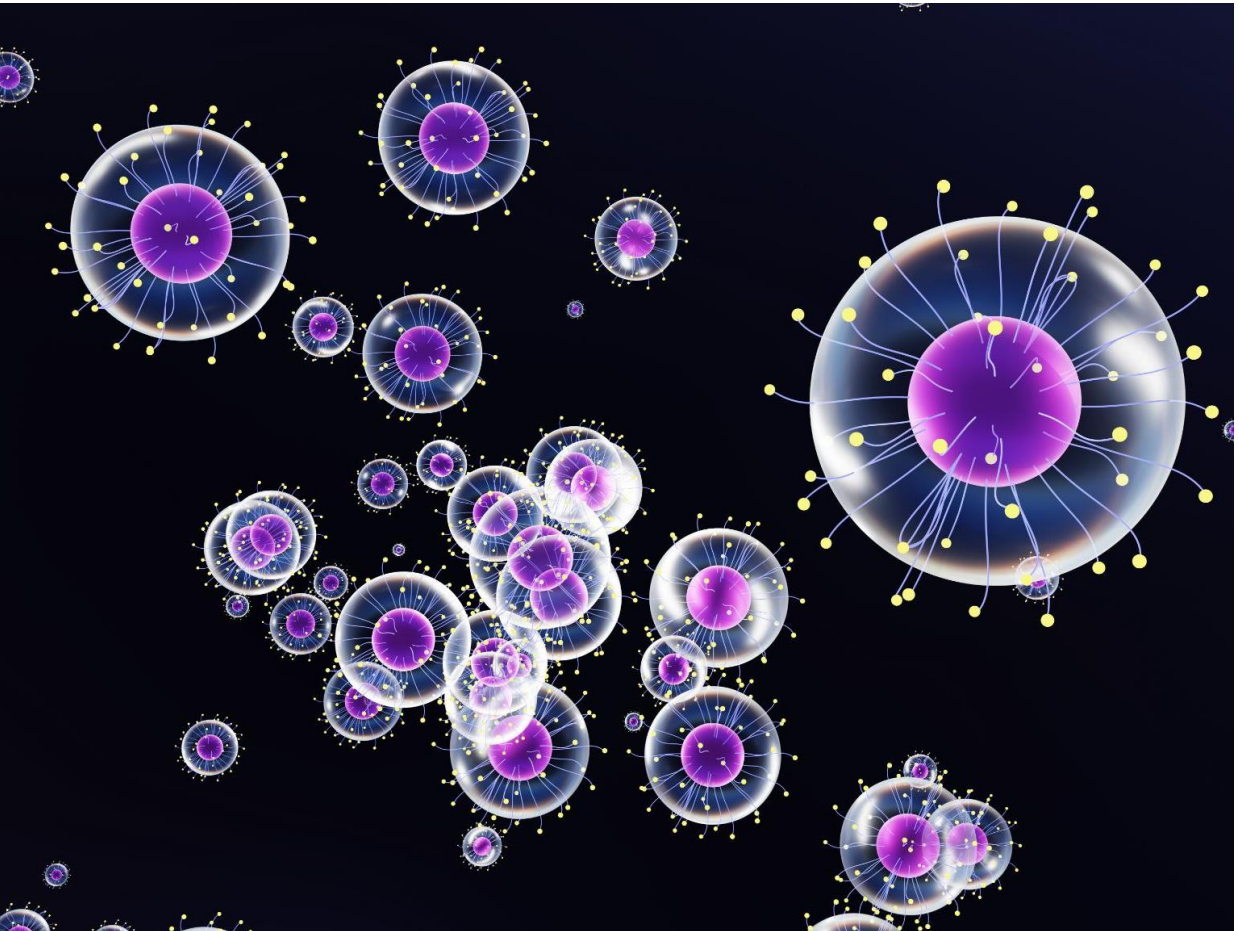
Early Antibiotic Intervention and Perfusion Restoration

Administering antibiotics earlier improves patient survival rates.

Long-Term Complications

Sepsis survivors often face chronic kidney disease and post-sepsis syndrome, requiring ongoing care beyond ICU discharge.

Why Time Matters in Sepsis Care



Rapid Progression of Sepsis

Sepsis causes tissue hypoperfusion and cellular **injury** at varying rates, increasing organ failure risk over time.

Critical Times Before Entrenchment – Minutes to Hour

Like trauma, STEMI, acute stroke care, things are better when key care happens **quickly**.

Key Interventions in Care

Early broad-spectrum antibiotics, fluid and vasopressor resuscitation, and select lactate monitoring **with bedside attention** halt sepsis progression effectively.

No “one way” – doing and assessing/reassessing is key

Consequences of Delay

Delays lead to septic shock, unchecked inflammation, multi-organ failure, and **more frequent death and disability**.

Screening Tools and Triage in ED

Sepsis Screening Tools

Tools like qSOFA, SIRS, and NEWS assist clinicians in early sepsis risk assessment and prioritization.

Triage Protocols in ED

Triage protocols integrate scoring systems to flag sepsis cases early for rapid diagnosis and treatment.

Diagnostic Aids

Point-of-care lactate testing and bedside ultrasound help evaluate perfusion and infection sources effectively.

Staff Training and Outcomes

Training staff to recognize subtle signs and following standardized pathways improves sepsis detection and reduces mortality.

Components of Sepsis Management in ED

Rapid Recognition Then –

Prompt Antibiotic Administration

Broad-spectrum antibiotics should be administered within the first hour if vascular collapse and as soon as possible in others to combat infection.

- 40% never have a bacterial pathogen identified

Aggressive Resuscitation

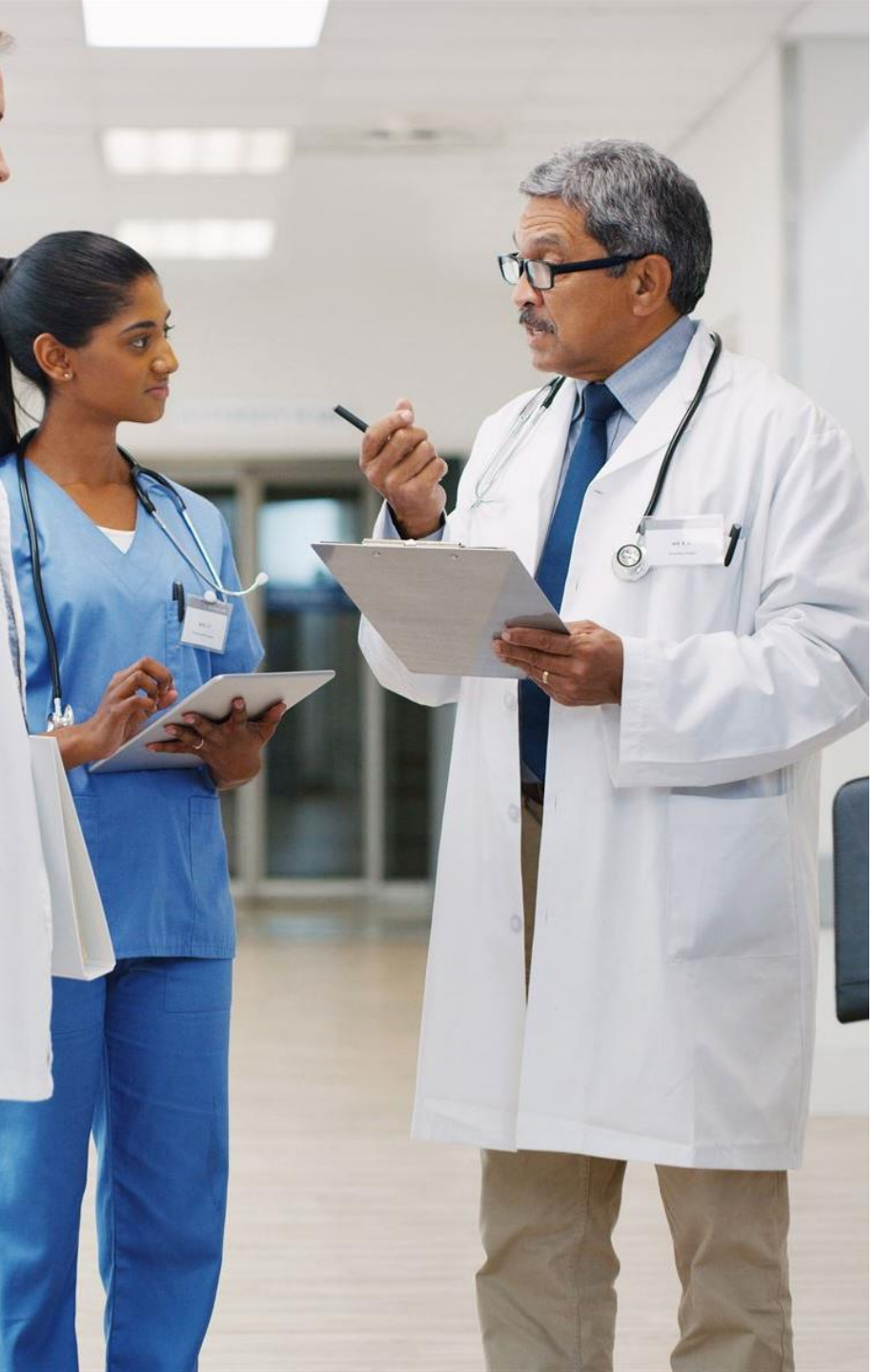
Fluid resuscitation first and combined with vasopressor support restores perfusion and supports circulation in septic patients.

Early Source Control

Drainage or surgical intervention is essential to remove infection sources promptly.

Supportive Monitoring and Therapy

Oxygen and frequent monitoring.



Overcoming Barriers to Accurate Diagnosis

Diagnostic Challenges in Sepsis

Sepsis diagnosis is difficult due to nonspecific symptoms overlapping with other conditions like heart failure or embolism.

- 4 phenotypes, only one being classic (“septic shock”)
- Misclassification common

Early Tests

Laboratory markers and imaging help identify infection but are not definitive and may delay diagnosis.

Strategies for Overcoming Barriers

Emergency departments use protocols, rapid tests, decision support systems, and clinician training to improve diagnosis accuracy.

Leveraging Technology for Early Recognition

Electronic health records and predictive analytics enhance early sepsis detection and timely treatment initiation.

Consequences of Treatment Delays

Impact on Mortality

Each hour delay in antibiotic treatment increases sepsis mortality risk by about 8%, significantly worsening outcomes.

Organ Dysfunction Risks

Delayed treatment causes prolonged hypotension and inadequate fluids, leading to septic shock and multi-organ failure, death.

Healthcare Burden

Treatment delays increase ICU stays, healthcare costs, and long-term complications like chronic organ impairment.

Mitigating Delays

Streamlined triage, rapid diagnostics, and sepsis teams help reduce treatment delays and improve survival rates.

ED/EMS as a Hub for Multidisciplinary Care

Multidisciplinary Coordination

The ED and EMS can coordinate next steps /handoffs to ensure seamless care for sepsis patients.

Communication Tools

Standardized protocols and electronic health records facilitate effective information sharing.

Pharmacy and Surgical Collaboration

Pharmacy teams support antibiotic stewardship, and surgical teams enable rapid source control.

Enhanced Outcomes and Efficiency

This integrated approach improves patient outcomes and hospital efficiency while ensuring quality compliance.

Measuring Success in ED Sepsis Care

Key Quality Metrics

Important quality metrics include time -to-antibiotic in shock, initial lactate measurement within the first hour, and specific protocol use.

Benchmarking and Accountability

Benchmarking performance against national standards ensures accountability and drives ongoing improvements in sepsis care – but those agreed upon steps are elusive.

Real-Time Feedback Systems

Real-time dashboards and audit-feedback mechanisms help ED teams identify gaps and implement corrections quickly.

Impact on Outcomes and Accreditation

Measuring performance influences patient outcomes, reimbursement, and hospital accreditation, highlighting clinical excellence.

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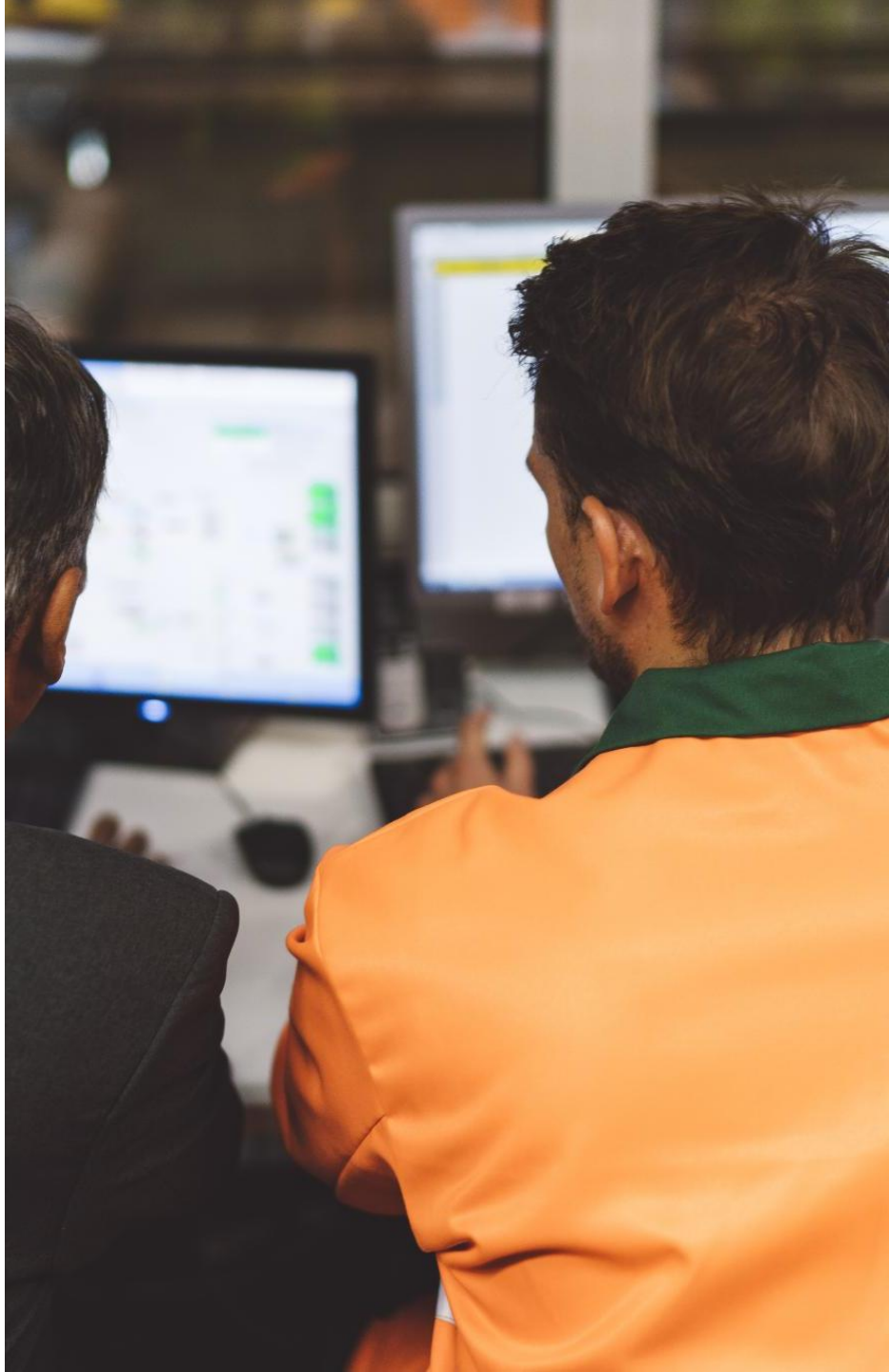

Innovations and Emerging

AI for Sepsis Prediction

AI and machine learning predict sepsis risk early using real-time patient data for timely intervention.

Point-of-Care Diagnostics

Rapid molecular tests enable fast pathogen identification and personalized antibiotic treatment in emergency care.

Telemedicine and Remote Monitoring

Telemedicine tools extend emergency expertise to remote areas, improving patient access to timely care.

Education and Simulation Training

Ongoing staff training and simulation improve emergency department preparedness and protocol adherence.

Addressing Barriers to Optimal ED Sepsis Care

Common Challenges in ED Sepsis Care

Overcrowding, limited resources, and diagnostic uncertainty hinder timely sepsis intervention in emergency departments.

Solutions for Better Sepsis Care

Implementing sepsis response teams, early alert technology, and ongoing education enhances care delivery.

Improving Workflow and Accountability

Streamlining workflows, adequate staffing, and fostering a culture of accountability improve protocol adherence and outcomes.

Why ED Care Saves Lives in Sepsis

Rapid Recognition

Timely identification of sepsis in the emergency department is critical for initiating life-saving treatments without delay.

Timely Intervention

Immediate and coordinated treatment interventions in ED reduce mortality and complications from sepsis.

Training and Protocols

Hospitals must invest in sepsis protocols and staff education to ensure effective emergency responses.

Moral and Clinical Imperative

Enhancing ED care for sepsis saves lives and improves long-term patient outcomes.