



Unlocking ED Throughput and Hospital Capacity

Through Smarter Acute Infection Decisions

A USA Health case study in clinical quality and financial impact

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Decades of emergency medicine, sepsis research, and clinical education leadership



- 1 **Chair, Department of Emergency Medicine, USA Health since 2015**
- 2 **Board certified:** American Board of Emergency Medicine
- 3 **Trained at UC Davis:** Residency and fellowship at the University of California, Davis School of Medicine; M.D. from the University of South Alabama College of Medicine
- 4 **National research leader:** Recognized national and international leader in emergency medicine research and education, with a focus on sepsis

Honors include Lifetime Achievement Award in EM Research • ACEP Heroes of Emergency Medicine • ACEP Research Award • SAEM Hal Jayne Academic Excellence Award • ABEM Meritorious Service Award

Source: USA Health provider profile, usahealthsystem.com/providers/edward-panacek.

About USA Health University Hospital

The region's leading academic medical center

406

licensed beds,
acute-care referral center

~40K

ED visits
per year

80%+

of inpatients admitted
through the ED

28%

ED admission rate
(high-acuity case mix)



What We'll Cover Today

An executive view of the capacity, quality, and financial case

- 01 The Capacity Challenge** Acute infection volume, ED throughput, and what hospitals spend to fix it
- 02 Why Today's Diagnostics Fall Short** The information gap behind costly disposition decisions
- 03 TriVerity® & Host Response Testing** How What it measures and how it works in ~30 minutes
- 04 The USA Health Experience** Clinical quality and disposition results from our ED
- 05 The Financial Case** \$687K financial impact (>8:1 ROI) documented impact, annualized projection
- 06 What This Means for Your Institution** Implementation and the executive conversation

Part 1

The Capacity Challenge at the Front Door

Sepsis: A Time-Critical — and Costly — Emergency

A life-threatening, dysregulated response — and the most expensive condition treated in U.S. hospitals

What is sepsis?

**The body's extreme response to infection
— a life-threatening medical emergency.**

- Often begins with common infections of the lungs, urinary tract, skin, or gut
- Without fast treatment, it can progress to tissue damage, organ failure, and death
- Recognition and intervention in the first hours are decisive

1.7M+

adult hospitalizations
for sepsis each year (U.S.)

350K+

adults die from sepsis or
during sepsis care each year

THE FISCAL STAKES

~\$24B / yr

most expensive condition

~\$18K

mean cost per sepsis stay

\$22K → \$70K

cost climbs if caught late

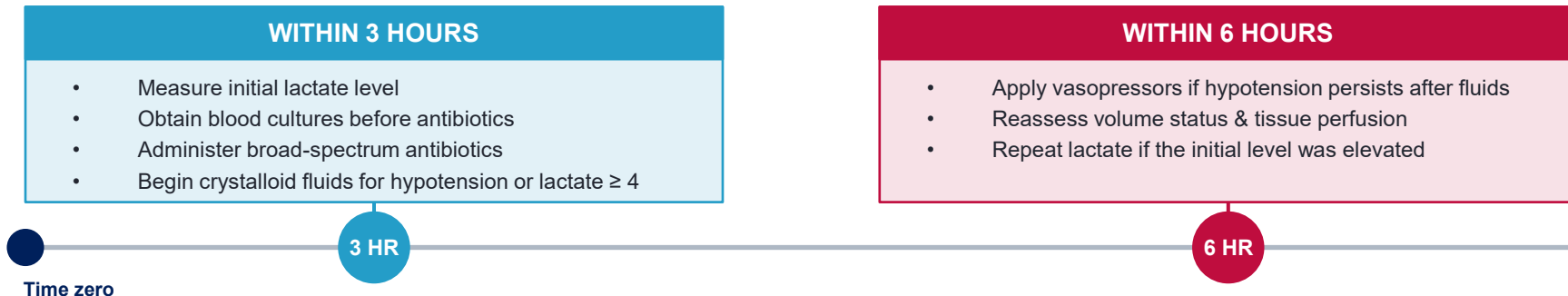
+4–8%

mortality per hour of delay

Sources: CDC, About Sepsis & MMWR 2023;72(34); HCUP/AHRQ Most Expensive Conditions; Premier; Kumar et al. (per-hour mortality).

SEP-1: The CMS Sepsis Bundle — and Why It Matters

The CMS Severe Sepsis & Septic Shock bundle is built around two time-zero deadlines



Why these clocks matter

Clinical

Every hour of delay raises mortality; the bundle forces early action

Operational

Demands tight ED – lab – pharmacy – nursing – ICU coordination

Documentation

All-or-none: one missed element or timestamp fails the case

Financial

Hospital IQR measure, in the FY 2026 VBP Safety Domain — tied to payment

Sources: CMS/QualityNet Inpatient Specifications Manuals; CMS Hospital VBP & IQR Programs (cms.gov, qualitynet.cms.gov). Exact timing/applicability per CMS spec.

Acute Infection: The Throughput Burden You Own

Up to 28% of ED visits — and disposition decisions are made on incomplete information

18–28%

of ED visits are
infection-related

30–55%

of those are
suspected sepsis

30–35%

of suspected sepsis
lack bacterial cause

60%+

empiric antibiotic
use in the ED

The consequence is operational, not just clinical:

- Monitored beds occupied by patients who didn't need that level of care
- Unnecessary admissions consuming your highest-cost real estate
- Premature discharges driving readmissions, complications, and quality penalties
- Antibiotic overuse and stewardship gaps that erode quality scores and pharmacy budgets

The Cost of Disposition Uncertainty

Wrong-direction decisions are happening every day, in every ED — and they don't cancel out

OVER-ADMISSION

Monitored bed days: consumed by patients who didn't need them

Short inpatient stays: often non-reimbursed under current payer rules

Downstream cascade: diversions, boarding, delayed elective volume

Opportunity cost: every occupied bed blocks a higher-acuity admission

UNDER-ADMISSION / WRONG LEVEL

Missed sepsis admissions: discharged patients returning sicker, often by ambulance

Readmissions: 30-day penalties and reputational impact

Wrong level of care: floor patients deteriorating to ICU within 48 hours

Documentation gaps: missed POA, MCC/CC coding — denied claims downstream

Part 2

A Smarter Lever: Better Decisions, Not More Beds

Current Diagnostics Answer the Wrong Question

Each generation solved part of the problem — none answers the disposition question

Culture

1960s–1980s

- The gold standard for pathogen identification.
- 48–72 hour turnaround and misses an estimated 98% of ambulatory bacterial infections
- **Far too slow for a front-door decision.**

Antigen / PCR

1990s–2010s

- Rapid, specific molecular targets and multiplex respiratory panels.
- Excellent for directing antivirals
- **Limited impact on antibiotic prescribing or admission decisions.**

Biomarkers

Ongoing

- Procalcitonin, WBC, and lactate offer speed.
- Lacks sensitivity and specificity to aid in clinical decision-making.
- **High false-positive rates contribute to alert fatigue and over-treatment.**

The Result: Clinicians have to decide admit vs. discharge without a tool built for that question.

TriVerity: Reading the Patient's Own Biology

Host response testing – the patient's immune system helps inform what is the appropriate next step

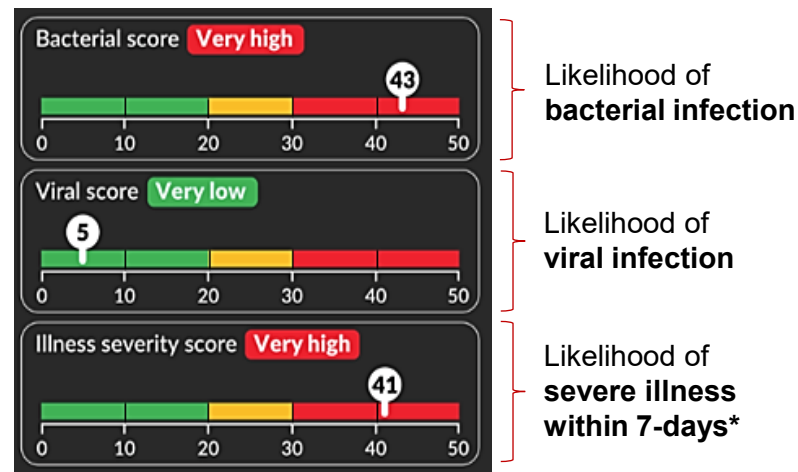
- **Single blood draw:** Results in ~30 minutes — runs alongside CBC at triage
- **Bacterial score:** Differentiates bacterial vs. viral infection with high accuracy
- **Viral score:** Identifies viral etiology — supports antiviral and de-escalation decisions
- **All cause illness severity score:** Predicts clinical deterioration and level-of-care need
- **FDA 510(k)-cleared:** January 2025 — validated in N=1,222 patients, 22 hospitals



What the ED Actually Needs to Know

TriVerity® answers the four questions that actually drive ED decisions

- 1 Is infection present — bacterial or viral?
- 2 How sick is this patient? Will they deteriorate?
- 3 What treatment should I start — or hold?
- 4 Where should this patient go — discharge, floor, PCU, ICU?



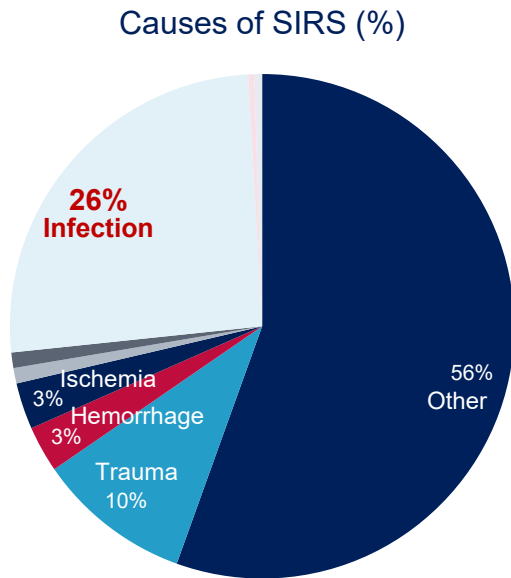
*Need for ICU-level care specifically vasopressors, mechanical ventilation, or renal replacement therapy

Part 3

The USA Health Experience: Clinical Quality & Disposition

USA Health: What We Were Trying to Solve

Over 25% of our ED patients were SIRS-positive — but most had no infection at all



- **Sepsis over-alerting:** Over 25% of ED patients were SIRS-positive, but only ~26% of those had a confirmed infection or sepsis.
- **Admission uncertainty:** We were admitting patients we weren't sure needed admission — and occasionally discharging patients we shouldn't have.
- **Weak biomarkers:** Procalcitonin wasn't giving us the full picture. WBC and lactate were too crude for the borderline patient.
- **Alert fatigue:** Sepsis alerts were generating noise, not confidence — our team was experiencing real alarm fatigue.

Case 1: Catching the Hidden Infection

Clinical Presentation:

- 48M, one week post endovascular TAA repair
- Comes in with non-specific complaints other than subjective fever at home (but no fever in ER)
- Labs unremarkable, chest CTA showed just postop changes
- Seen by CT surgery, clinical impression: Low risk, maybe viral, plan to discharge

TriVerity Result:

Bacterial: **HIGH** | Viral: **LOW** | Severity: **MOD-HIGH**

Disposition:

Admitted → **Found endovascular graft infection** → 6 weeks of antibiotics

Takeaway:

TriVerity identified a bacterial infection early, before other labs picked up a problem.

Without TriVerity, patient could have worsened substantially before antibiotics were administered.

Case 2: Confirming A Safe Discharge

Clinical Presentation:

- 52F cancer patient on active chemo
- Low-grade fever at home
- ED eval nonspecific
- Oncology consult with usual recs: blood cultures, admit for 2-3d abx & observation

TriVerity Result:

Bacterial: LOW | **Viral:** MOD | **Severity:** LOW

Disposition:

Confirmed ED impression → **Discharged home with follow-up**

Takeaway:

TriVerity confirmed ED clinical impression and convinced the oncologist that patient was safe to send home with outpatient follow-up.

The value isn't just catching the sicker patient — it's safely liberating the lower-risk one.

Case 3: Right Level of Care for Borderline Patient

Clinical Presentation:

- 67F presents with apparent pneumonia
- Labs mildly elevated
- CURB-65 borderline for admission
- Hospitalist unsure about admission vs discharge

TriVerity Result:

Bacterial: **HIGH** | Severity: **MOD-HIGH**

Disposition:

Admitted to intermediate care → **Patient worsened in 48 hrs** → Transferred to ICU

Takeaway:

TriVerity identified the ‘sneaky sick’ — the patient whose biology was ahead of the presentation.

Without TriVerity, this patient could have gone home & deteriorated.

What Changed in How We Practice

Beyond the financial impact — the operational and cultural shifts at the front door

01

Discharging with confidence

We stopped defaulting to admission as the 'safe' choice — data supported sending patients home, and we could stand behind it.

02

Better admit decisions, right level of care

Bundle compliance improved. TriVerity helped us activate early in the right patients and pull back where the full pathway wasn't needed.

03

Better conversations with patients and fellow clinicians (e.g., hospitalists)

We could explain the 'why' behind our decisions — transparency changed the dynamic at the bedside and with inpatient services.

04

SEP-1 and antibiotic stewardship

Objective bacterial/viral differentiation gave us confidence to de-escalate or defer antibiotics in appropriate patients.

Part 4

The Financial Case

124-Patient Cohort: Results & Clinical Quality

Pre/post disposition EHR analysis — clinician intent captured before and after TriVerity®

124

Patients
pre/post EHR

54

Disposition
changes (44%)

32

Downgrades
cost avoidance (26%)

22

Upgrades
safety & revenue (18%)

Clinical quality — near-misses caught, safe discharges confirmed:

- **Severity–mortality alignment:** every in-hospital death or hospice discharge was classified High/Very High severity
- **Safe discharge accuracy:** *8% overall reduction in admissions* with *17% reduction in ED bounce backs*
- **Escalation accuracy:** *3 avoided catastrophic discharges* who were admitted with TriVerity High Severity – avg LOS 8 days, one admitted to ICU

Combined Financial Impact — 124-Patient Cohort

Cost avoidance from downgrades + incremental revenue from upgrades

Cost Avoidance — \$523,400		Incremental Revenue — \$163,200	
13 admissions avoided	\$84,500	3 missed admissions caught	\$75,000
19 monitored beds freed	\$267,900	Sepsis DRG uplift (12 cases)	\$78,000
12 sepsis early intervention	\$96,000	High-acuity ED facility fees (12 cases)	\$10,200
3 high-risk catches	\$75,000	POA / MCC coding value	upside
Combined financial impact — 124 patients		\$5,537 / patient avg	\$686,600

Cost avoidance benchmarks: AHRQ HCUP. Revenue benchmarks: CMS. POA/MCC coding value to be quantified with HIM — additional upside.

Annualized Projection: What This Looks Like at Scale

Per-patient impact of \$5,537 applied to projected annual ED volumes

Annual patients	Cost avoidance	Revenue	Year 1 combined	3-year	5-year
500 / yr	\$2.11M	\$0.66M	\$2.8M	\$8.3M	\$13.9M
1,000 / yr	\$4.22M	\$1.32M	\$5.5M	\$16.6M	\$27.7M
2,000 / yr	\$8.44M	\$2.63M	\$11.1M	\$33.2M	\$55.4M

What This Means for Your Institution

Three pillars for your next capacity and infection-control discussion

CLINICAL QUALITY

- Earlier identification of high-risk sepsis
- Safer discharges backed by objective data
- Fewer missed or delayed diagnoses
- SEP-1 and stewardship support

OPERATIONAL IMPACT

- Improved throughput at the front door
- Monitored bed optimization
- Fewer non-reimbursed short stays
- No new staff or construction required

FINANCIAL RETURN

- \$3M–\$11M annualized at typical volumes
- Accurate DRG & POA/MCC documentation
- Quantifiable POA/MCC upside

“The biology was always there. We just didn’t have a window into it. Now we do.”

Smarter Decisions at the Front Door

TriVerity® gives ED clinicians and hospital leaders a window into acute infection biology that didn't exist before.

- In 124-patient cohort, 44% of disposition decisions informed or changed by TriVerity
- Documented \$687K financial impact (>8:1 ROI) at USA Health
- \$3M–\$11M annualized return at typical institutional ED volumes

Hospital administrators saw the value in enabling earlier, more confident disposition of acute infection patients to the appropriate level of care, with clear clinical, operational, and financial benefits.

Questions