Med Center Health

Improving Outcomes: Sepsis Tips, Tools & Automation

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Improving Outcomes: Sepsis Tips, Tools, & Automation

- MCBG SEP-1 Bundle Performance

Tips, Tools & Automation:

- EMR-based Automation & Software
  - Blood Culture alerting
  - Surveillance software
- Documentation Templates
  - Sepsis Event Note
  - Audit Trail Reports & CDAC Records Request workflows
- Transparency & Education
  - Audit Template & ER Peer-to-Peer Reviews
  - Provider-level performance distribution
  - New provider orientation

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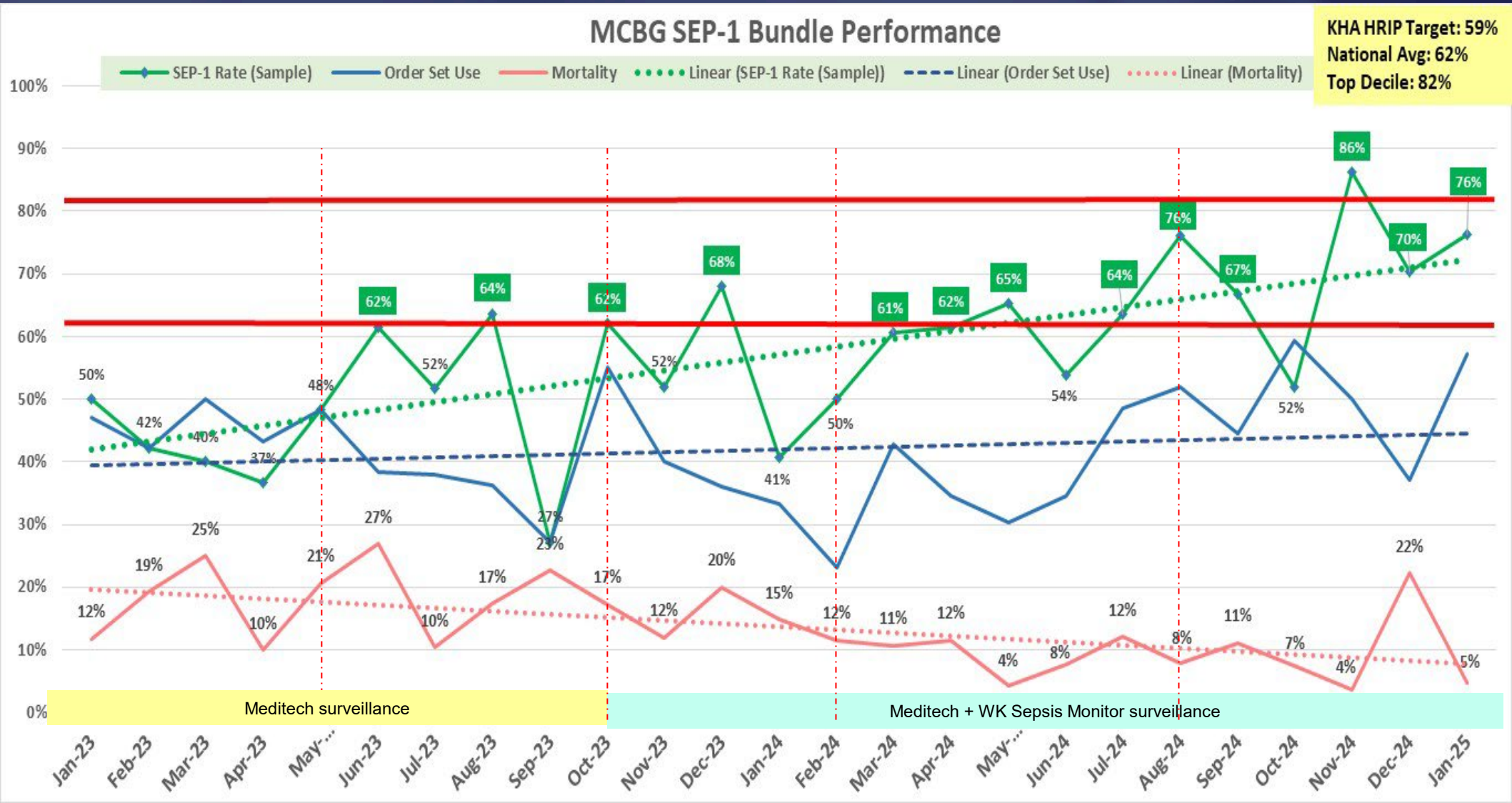
Improving Outcomes: SEP-1 Performance



Sept22: EMR-based surveillance LIVE
May23: Blood Culture Alerting in EMR LIVE
Oct23: Sepsis Monitor surveillance LIVE (ER only)
Feb24: Lactic Acid w/Reflex order updated with 3rd collection logic
Aug24: Lactic Acid POC test in LIVE (ER only)

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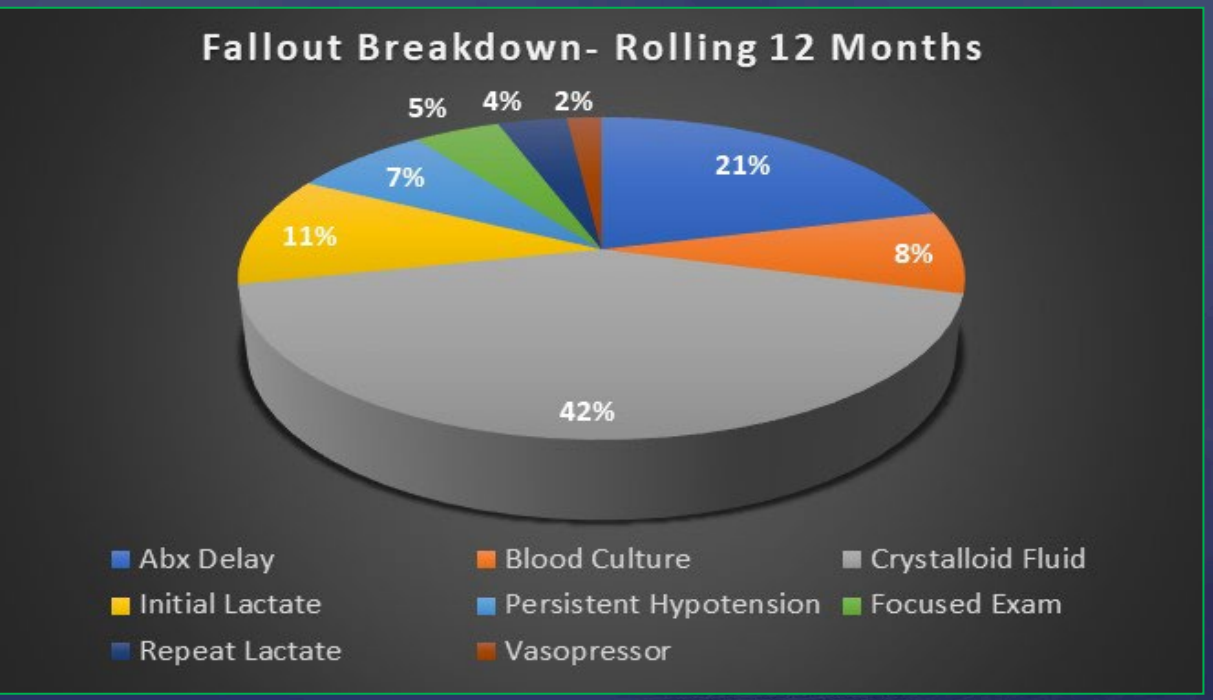
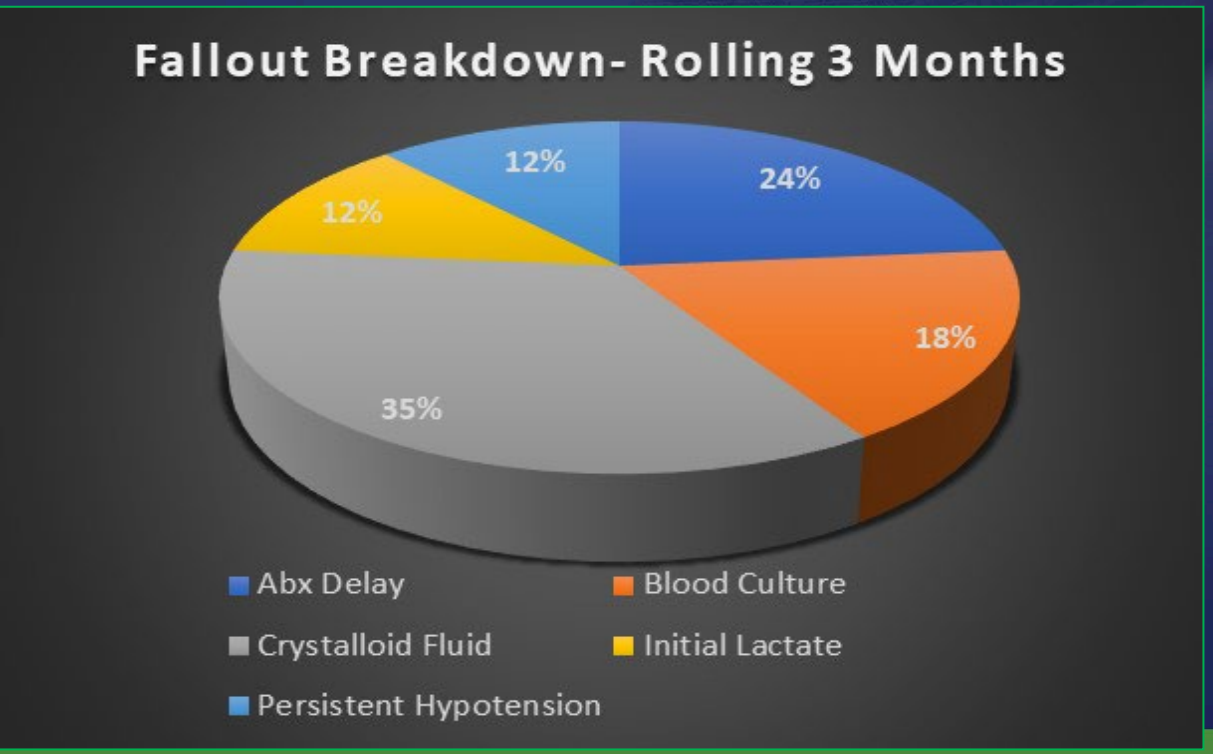
Improving Outcomes: SEP-1 Performance





Analyzing Top Fallout reasons underscores opportunity with Crystalloid Fluids but declining.

Jan25: No Crystalloid fluid fallouts!

- 2 fallouts for Persistent Hypotension
- 2 fallouts for Initial Lactic Acid
- 1 fallout for Abx Delay

Blood Cx CDM rules interrupted by EMR update.

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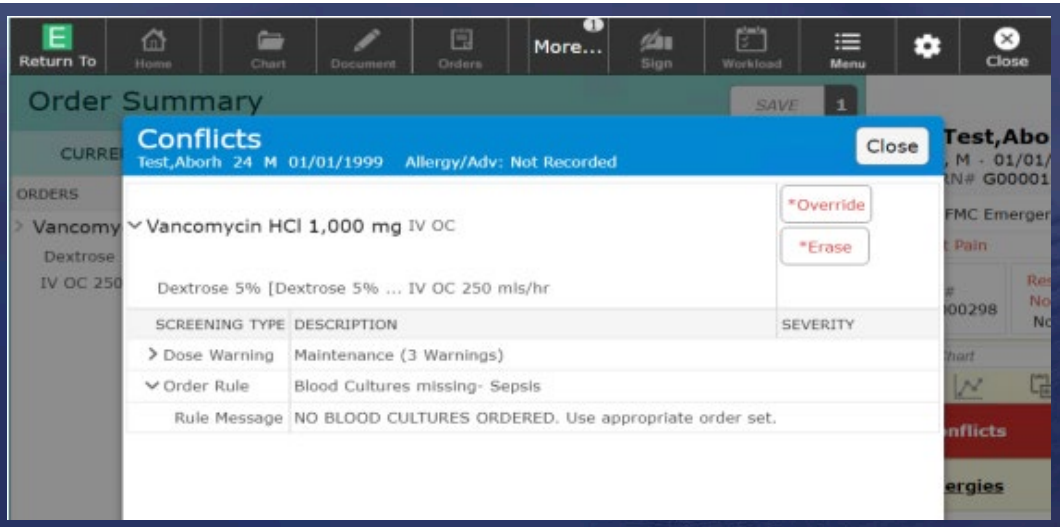
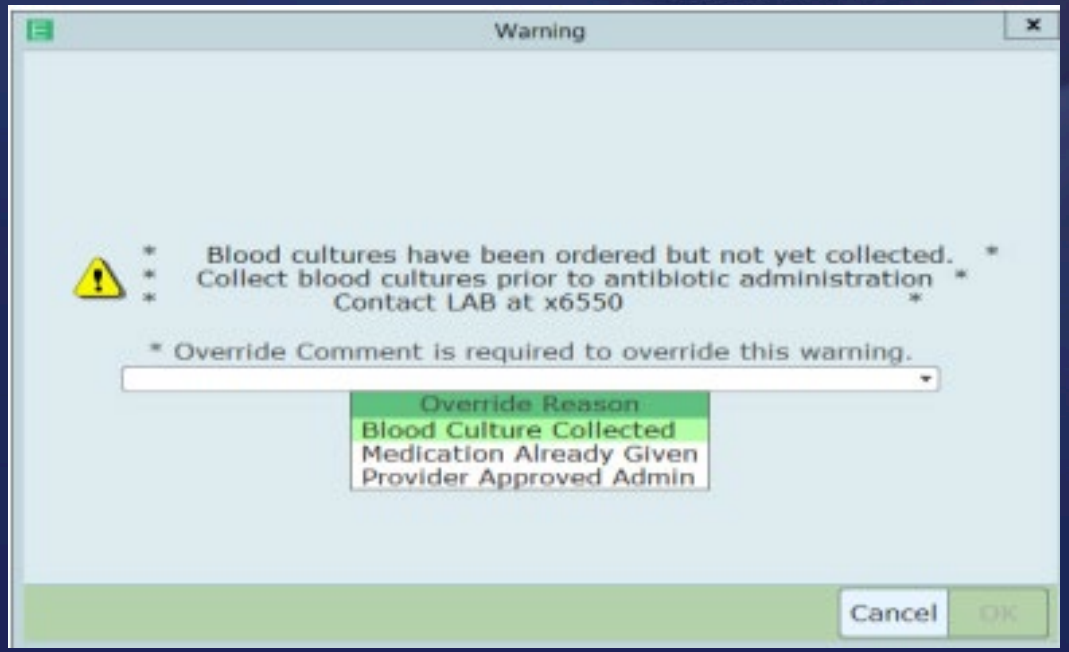
Improving Outcomes: EMR-based Automation-BCx Logic

Blood Culture CDS Project:

- Implement new clinical decision support (CDS) rules in the order management (OM) application and the medication administration record (MAR) to improve compliance with blood cultures being drawn prior to administration of IV antibiotics.





Blood Culture Clinical Decision Support Automation:

May23: Utilized EMR functionality to alert nursing and providers at different workflow junctures to consider blood culture order or collection.
TWO workflow scenarios alert clinicians to consider blood cultures with variation based on patient setting and abx order indication/status:

1. Providers at IV Abx order entry:

- When ordering an IV abx in the ER setting for any clinical indication other than "surgical Prophylaxis," providers are flagged with a medication conflict alert to consider adding Blood Cultures.
- When ordering an IV abx in the inpatient setting for a clinical indication of "sepsis" only, providers are flagged with the medication conflict alert.

2. Nursing at IV Abx scanning:

- When scanning an IV abx to the MAR, nursing is alerted when blood cultures are on order in an uncollected status.

- Workflow also includes reporting functionality to search for clinician alerting for both scenarios.

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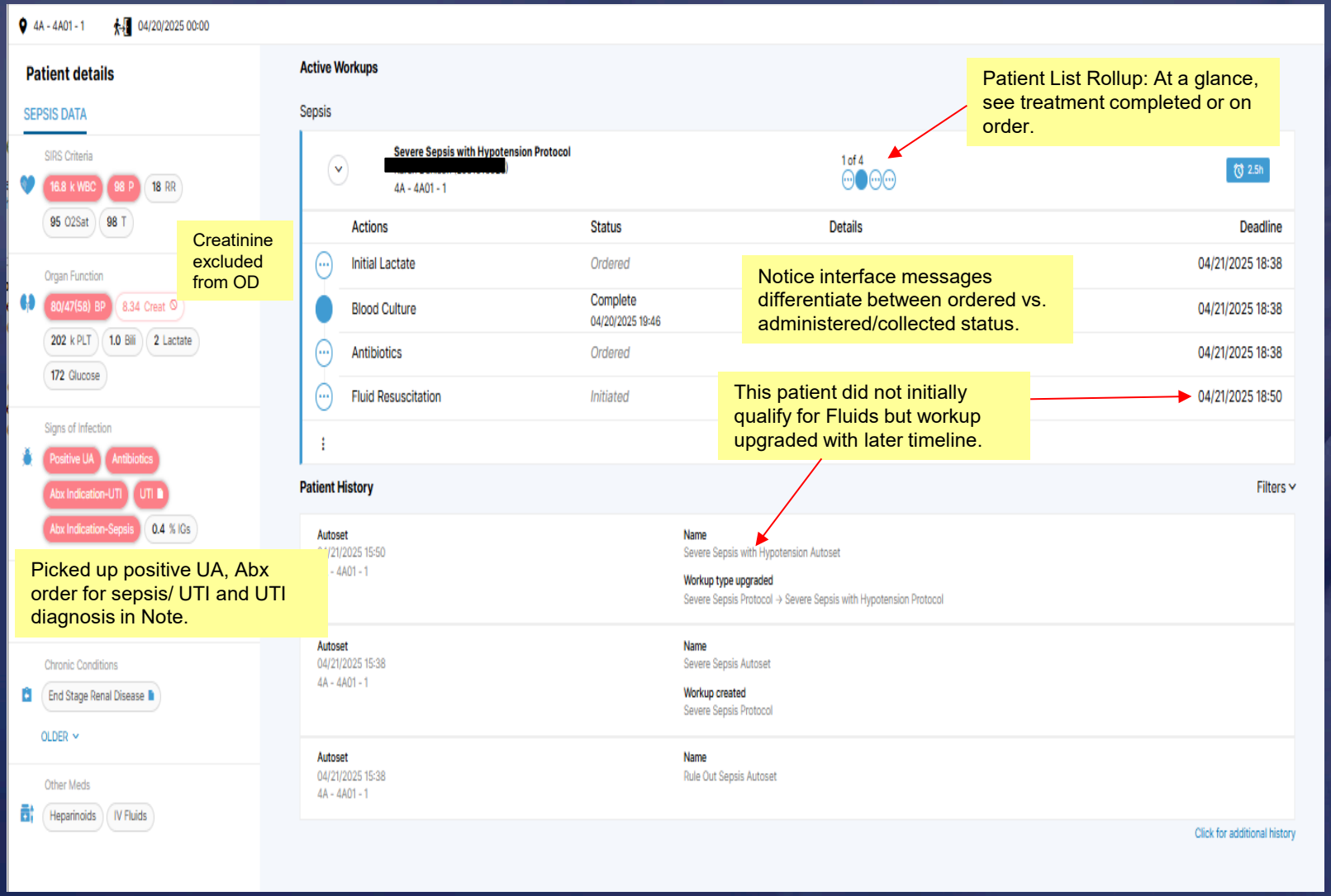
Improving Outcomes: EMR-based Automation- Surveillance



Sept22: EMR-based sepsis surveillance enabled early detection-- 97% sensitivity. Only 79% specificity & no improvement in SEP-1 performance from baseline (45% Year 1).

EMR-based surveillance automation alerted clinicians with qualifying time and quick links to order sets & Sepsis Event Note but ***no guidance on patient-specific treatment***.

Oct23: MCH deployed WK Sepsis Monitor web-based product in the MCBG ER interfacing with our EMR. It features NLP to detect infection in unstructured text and guides clinicians on customized sepsis treatment plan for all 3-hour elements.

SEP-1 performance improved to 59% in Year 1 (vs. 46% EMR) with the last 6 months 62%, better than national average.

WK Sepsis Monitor surveillance product not only detects sepsis but ***guides users on missing treatment and deadlines***.

Opportunities: Meditech does not accept third party messages so must be logged into website or setup to receive email alerts. NLP is not “intelligent.”

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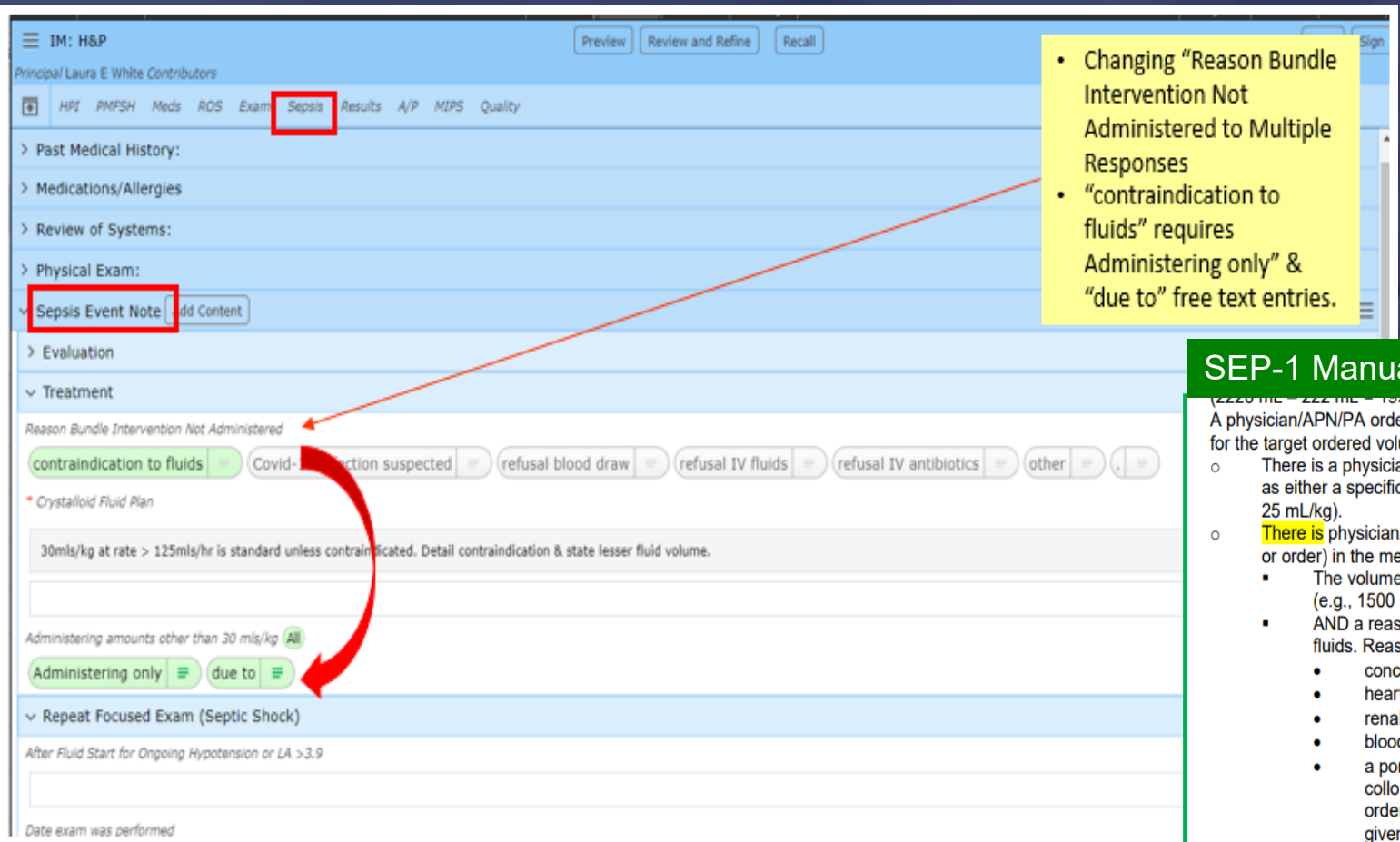
Improving Outcomes: Documentation & Templates

Sepsis Event Note: Changed physician sepsis documentation template to prompt lesser volume fluid plan AND contraindication details to meet SEP-1 Manual Guideline for Crystalloid Fluid exclusion.
Increased ER physician usage through peer-to-peer feedback on crystalloid fluid fallouts.



- Changing "Reason Bundle Intervention Not Administered to Multiple Responses
- "contraindication to fluids" requires Administering only" & "due to" free text entries.

SEP-1 Manual Guideline:

A physician/APN/PA order for less than 30 mL/kg of crystalloid fluids is acceptable for the target ordered volume if all of the following criteria were met:

- There is a physician/APN/PA order for the lesser volume of crystalloid fluids as either a specific volume (e.g., 1500 mL) or a weight-based volume (e.g., 25 mL/kg).
- There is physician/APN/PA documentation within a single source (e.g., note or order) in the medical record including all of the following:
  - The volume of fluids to be administered as either a specific volume (e.g., 1500 mL) or a weight-based volume (e.g., 25 mL/kg).
  - AND a reason for ordering a volume less than 30 mL/kg of crystalloid fluids. Reasons include and are not limited to:
    - concern for fluid overload
    - heart failure
    - renal failure
    - blood pressure responded to lesser volume
    - a portion of the crystalloid fluid volume was administered as colloids (if a portion consisted of colloids, there must be an order and documentation that colloids were started or noted as given)

PDOC View:

Sepsis Event Note

Treatment

Reason Bundle Intervention Not Administered: contraindication to fluids

Administering amounts other than 30 mls/kg: Administering only (500mls) and due to (CHF w/ EF 25%)

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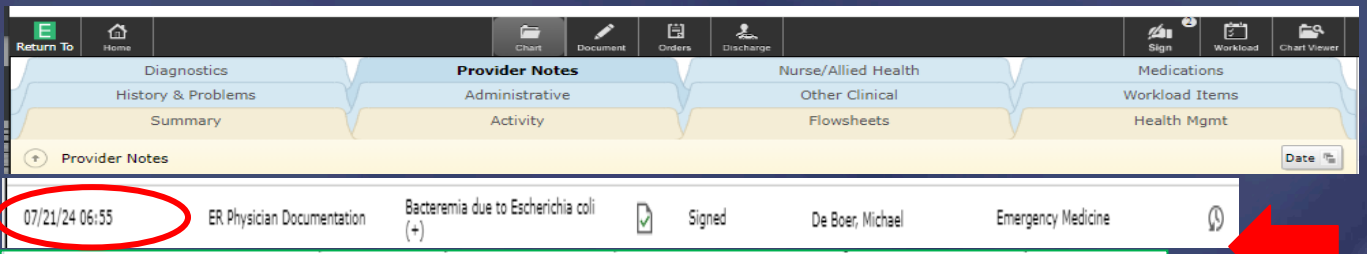


Critical Care Time:
Critical Care Time
Critical Care Time: Yes
Total Critical Care Time (excluding separate services): 30-74 minutes (60)
Attestation:
Septic shock hypotension requiring Levophed, stabilization with fluids and antibiotics, critical care,

Discharge Plan
RN Discharge Info
ED Provider: De Boer,Michael H

ED Status: Hold

Time Seen by Provider: 07/21/24 05:08

Triaged At: 07/21/24 05:01

Patient Disposition: Admitted As Inpatient

Interventions:
ED Vital Signs Last Done: 07/21/24 08:24

Condition: critical

Physician Discharge Info
Clinical Impressions:
Sepsis

Chief Complaint: ED Skin/Abscess/Foreign Body

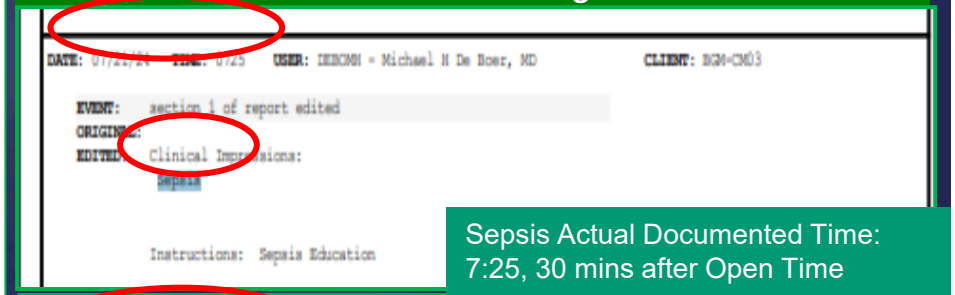
Document Initialized On: 07/21/24 0657
Documented By: Michael H De Boer, MD
Signed By: <Electronically signed by Michael H De Boer, MD>

ER Note Open Time: 6:55

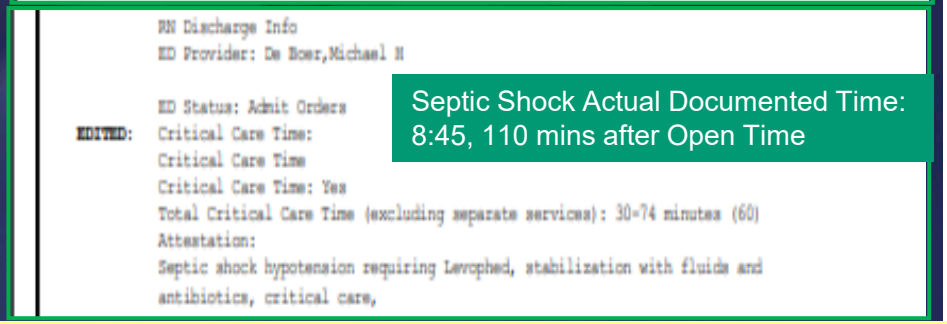
07/21/24 0655
07/21/24 1707

Due to SEP-1 Manual Guidelines, often cases were held to inaccurate Severe Sepsis/Septic Shock times based on provider note open times.

How Audit Trail submission changes SEP-1 Timeline:



Sepsis Actual Documented Time: 7:25, 30 mins after Open Time



Septic Shock Actual Documented Time: 8:45, 110 mins after Open Time

SEP-1 Manual Guideline for Infection element:

a. Documentation of an infection.

- Physician/APN/PA or nursing documentation referencing the presence of an infection is acceptable.
- Physician/APN/PA, nursing, or pharmacist documentation indicating a patient is receiving an IV or IO antibiotic for an infection and that antibiotic is documented as administered within six hours of criteria b and c is acceptable.
  Example:
  Levaquin is documented in MAR for pneumonia and nursing documentation within six hours of criteria b and c indicates the antibiotic was given.
- If documentation of an infection within a physician/APN/PA, nursing, or pharmacist note does not have a specific date and time or is documented using the acronym POA, use the date and time the note was started or opened.

After identifying that our EMR provides date/time stamps as providers document, we met with abstraction AND third party vendors who transmit CDAC requests on our behalf to discuss which documents are included in submission. **Workflow changed to include specific Provider Note Audit Trails for more accurate and often later infection documentation time stamps.**

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Improving Outcomes: Transparency & Education

Feedback: All SEP-1 sampled cases that fail the Bundle have a secondary review by Performance Excellence. This secondary review audits for any documentation missed, coding challenges, or Manual interpretation opportunities. If agreement, Performance Excellence assigns fallout attribution and sends to physician champion or physician via email.
Transparency: performance is publically and routinely shared at Team Health & Sepsis Steering Committee meetings.

Provider SEP-1 Fallout Audit Template:

SEP-1 Core Measure Bundle

Encounter ID	L00043547751

Responsible Provider #1	Brooks
Responsible Provider #2	ER Nursing

Arrival & Transfer Details	Date/Time
Arrival Time	12/14/2024 12:08
Admit Time	12/14/2024 16:12
Depart ER Time	12/14/2024 18:05
Discharge Disposition	SNF

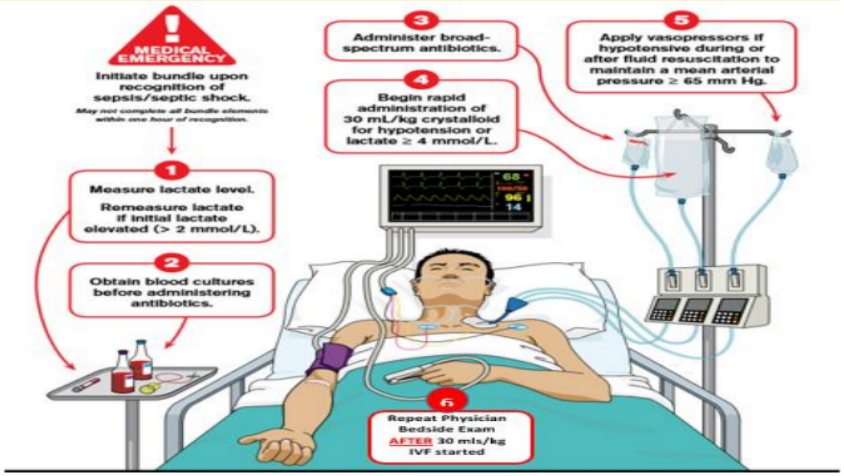
Sepsis Details	
Code Sepsis	No
Sepsis Order Set Use	No
Sepsis Event Note Use	Yes
Infection Type	urinary

SEP-1 Timer Details	Date/Time
Severe Sepsis Time (SST)	12/14/2024 13:32
Severe Sepsis Location	ER
Initial Hypotension Time	n/a
Surveillance Indicator Time	12/14/2024 13:32
Septic Shock Time	12/14/2024 15:26

Clinical Criteria	Values	Source	Time
SIRS	Pulse 110	Triage	12:14
SIRS	Resp Rate 30	Vitals	12:45
SIRS	WBC 13.8	Labs	13:18
Infection	infection	Chest x-ray	13:20
OD	Lactic Acid 2.2	Labs	13:32
Other	UA +	Labs	14:46
Infection	UTI, cystitis	Rocephin order	15:48

SEP-1 Treatment			
IV Antibiotic Administration - 3hrs	12/14/2024 17:05	FAIL	Deadline 16:32, ordered 15:48 by Brooks for UTI
Blood Culture Collection - 3 hrs	12/14/2024 12:56	PASS	Deadline 16:32, ordered 16:11 by Essandoh
Initial Lactic Acid Collection - 3 hrs	12/14/2024 12:58	PASS	Deadline 16:32, ordered 12:43
Repeat Lactic Acid Collection - 6 hrs	12/14/2024 15:21	PASS	Deadline 19:32, reflexed from critical initial result
Crystalloid Fluid Administration - 3 hrs	12/14/2024 16:16	PASS	Deadline 18:26, ordered 15:48 by Brooks via 30 mLs/kg NS order
Vasopressor Administration - 6 hrs		n/a	
Provider Focused Re-Exam - 6 hrs	12/14/2024 20:48	PASS	H&P by Essandoh notes exam

12:14, arrives from SNF with AMS and tachycardia with ED AMS Set ordered per chief complaint. 13:18, WBC results 13.8 and 13:20 chest x-ray notes "could be infection." 13:32, Lactic Acid results 2.2 starting SEP-1 3-hour timer. 14:46, UA results positive with Leuk Esterase 4+ and WBC >100. 15:26, repeat lactic acid results increased to 5.4. 15:33, Brooks documents Sepsis Event Note diagnosing "severe sepsis." 15:48, Brooks orders IV Rocephin 1 gm for "UTI, cystitis" and 30 mLs/kg of NS. 16:00, ER Note by Brooks adds UTI as clinical impression. 16:11, Essandoh adds missing Blood Culture order and orders admission for "severe sepsis/UTI." 16:16, ER nursing hangs 1st liter of 30 mls/kg volume. 17:05, ER nursing hangs IV Rocephin, 1hr 17 mins after order.



SEP-1 Performance by Attribution

SEP-1 Performance by Provider

Period: 2024Q4

1st Reponsible Provider	Abx Delay	Blood Culture	Crystalloid Fluid	Initial Lactate	PASS	Persistent Hypotension	Total SEP-1 Cases	PASS Rate
Bryant			2		10		12	83%
Bondick			1		10		11	91%
Collins	4		2		5		11	45%
Wasson					8		8	100%
Strode	1		1	1	3		6	50%
Harris					6		6	100%
Brooks	1	1			2		4	50%
NURSING	1	1		1		1	4	0%
De Boer					4		4	100%
Shapiro					3		3	100%
Blackwell			2				2	0%
Williams					2		2	100%
Spurlin					2		2	100%
Goyal		1					1	0%
Chaffin					1		1	100%
Vachon					1		1	100%
Zul			1				1	0%
Edwards			1				1	0%
Avula			1				1	0%
Nemec			1				1	0%
Streckert					1		1	100%
Total	**7**	**3**	**12**	**2**	**58**	**1**	**83**	**70%**
ER Providers	6	1	6	1	57	0	71	80%
Hospitalist Providers	0	0	3	0	1	0	4	25%
Critical Care	0	1	0	0	0	0	1	0%

ER Physicians continue to improve nearing top decile performance!

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Improving Outcomes: Transparency & Education

New providers and RNA classes participate in Sepsis Pathway orientation which reviews clinical criteria, SEP-Bundle EBC treatment, documentation best practices and EMR infrastructure.

Provider Orientation Presentation:

Identify Infection Progressed to Sepsis: Sepsis-2 Definition

Clinical Criteria:

SIRS:
- **Temperature** > 100.9 or < 96.8 F
- **Heart rate/Pulse** > 90
- **Respiration** > 20 per minute
- **WBC** > 12,000 or < 4,000 or > 10% bands

Maternal SIRS:
- **Temperature** >=100.4 or < 96.8
- **Heart rate/Pulse** > 110
- **Respiration** > 24 per minute
- **WBC** >15,000 or < 4,000 or > 10% bands

Organ Dysfunction:
- **Circulatory** — •SBP <90 or decrease more than 40 pts •MAP <65
- **Renal** — •Creatinine > 2.0 •Urine Output < 0.5 ml/kg/hr. for 2 hrs.
- **Hepatic** — •Bilirubin > 2.0
- **Metabolic** — * Lactic Acid >2.0
- **Respiratory** — New Need for CPAP, BiPAP, v60, MV
- **Hematologic** — Platelet Count <100,000 INR > 1.5 or aPTT > 60 sec

Diagnosis:

SEVERE SEPSIS

Definition:
- **Infection**
- **SIRS x2** *linked to infection*
- ***Sepsis-induced*** **Organ dysfunction**

SEPTIC SHOCK

Definition:
- **Infection**
- **SIRS x2** *linked to infection*
- ***Sepsis-induced*** **Organ dysfunction**
- **Lactate >= 4 or Persistent Hypotension 1 hr. after aggressive fluids**

Confounding Variables: Link clinical criteria to other factors if not secondary to infection:
- **medication** (i.e. hypotension second to Propofol)
- **chronic condition** (Creatinine 2.3 due to CKD, T. Bilirubin due to chronic cirrhosis)
- **acute non-infectious cause** (i.e. Lactic acidosis second to cardiac arrest or seizure).

Documentation:

Problem: *Septic shock secondary to community-acquired pneumonia with fever, leukocytosis, dyspnea, elevated PCT, AKI, elevated liver enzymes, and lactic acidosis.*
Plan: *Starting septic shock protocol of 30 mls/kg IV NS, IV Rocephin and Azithromycin, blood cultures pending.*

Nursing Sepsis Clinical Scenarios:

CASE STUDY #2:

Mr. Colon Tare, age 80, arrived for elective colon resection after detection of new, suspicious mass. On Day 3, AM labs reveal WBC dropped from 9.1 to 2.3, urinary output is low, and Pulse spikes 115, but BP stable and afebrile. At 14:00, nursing infection screen answers YES noting new fever/chills following recent procedure. Staff measure weight at 155 lbs.

Day 3 @ 7:15
- WBC 2.3
- Pulse 115
- RR 19
- Temp 98.9

Day 3 @ 14:01
- BP 93/41, MAP 58
- Resp Rate 20
- Pulse 98
- Temp 100.7

QUIZ:
1a. Sepsis indicator flag on nursing status board?
If so, which indicators?
Qualifying Values?
What is Qualifying Time?
2. Did indicator flag for physicians?
3. What is the suspected infection(s)?
4. What action should be taken?

CASE STUDY #2 continued:

Mr. Colon Tare, age 80, arrived for elective colon resection after detection of new, suspicious mass. On Day 3, AM labs reveal WBC dropped from 9.1 to 2.3, urinary output is low, and Pulse spikes 115, but BP stable and afebrile. At 14:00, nursing infection screen answers YES noting new fever/chills following recent procedure. Staff measure weight at 155 lbs.

Day 3 14:01
- BP 93/41, MAP 58
- Resp Rate 20
- Pulse 98
- Temp 100.7

14:20 Nurse calls attending notifying of positive sepsis screen citing Qualifying Values and asking to enter Sepsis protocol. Provider states he will review chart and enter orders.
14:45 CBC, CT abdomen/pelvis, Lactic Acid and PCT orders entered
15:30 PCT results 5.9, Lactic Acid results 1.9
15:40 Resp Rate spikes to 31, Pulse Ox 90%.
BP drops 88/50, MAP 63
16:00 IM provider orders IV Zosyn & 1L NS

QUIZ:
1. Organ Dysfunction present?
2. Septic Shock present?
3. Repeat Lactic Acid required?
4. What is the deadline to start IV abx?
5. What did provider miss?
6. What is the deadline to start IVF?
6a. How much?