

Hospitalist Role in Telehealth and Case Reviews

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Board Certified in Family Medicine
2012

Outpatient Provider and Hospitalist at
180 bed hospital

Full-time Telehealth provider with
Teledigm Health since 2015

Hospitalist at 600 bed Acute Care
Hospital since 2015

Hospitalist at Critical Access Hospital
since 2017

Irene Carrothers, MD

Board Certified in Internal Medicine
2012

Inpatient Hospitalist Physician at 189
bed hospital in Dallas, TX (2012 – 2021)

Locum Hospitalist (2021 -2023)

Full-time Telehealth physician
with Teledigm Health since 2023

Hospitalist Role in Telehealth

Answer the Questions

Why?

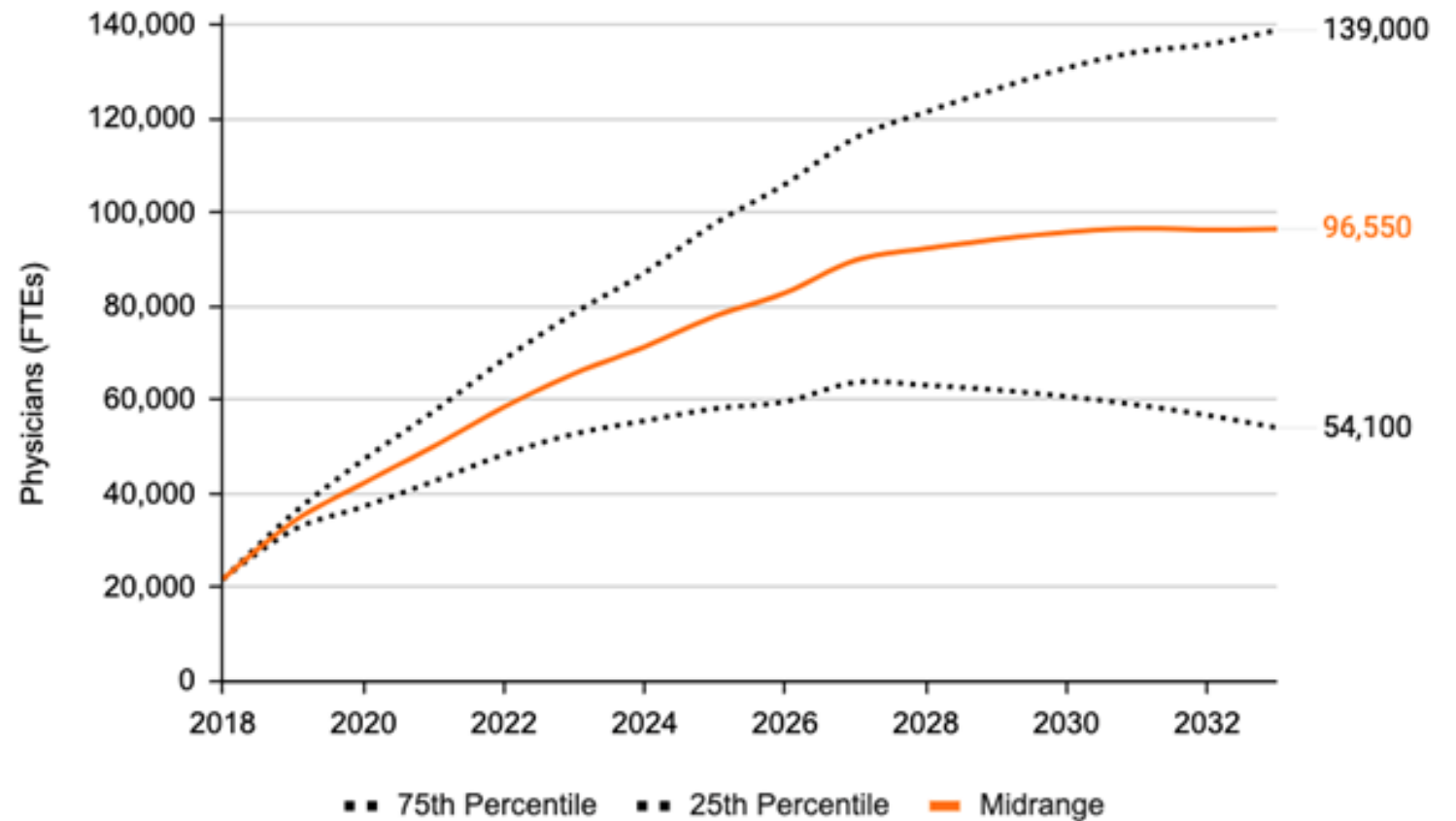
Who?

How?



The Why

Figure 2. Total Projected Physician Shortfall



Source: Association of American Medical Colleges

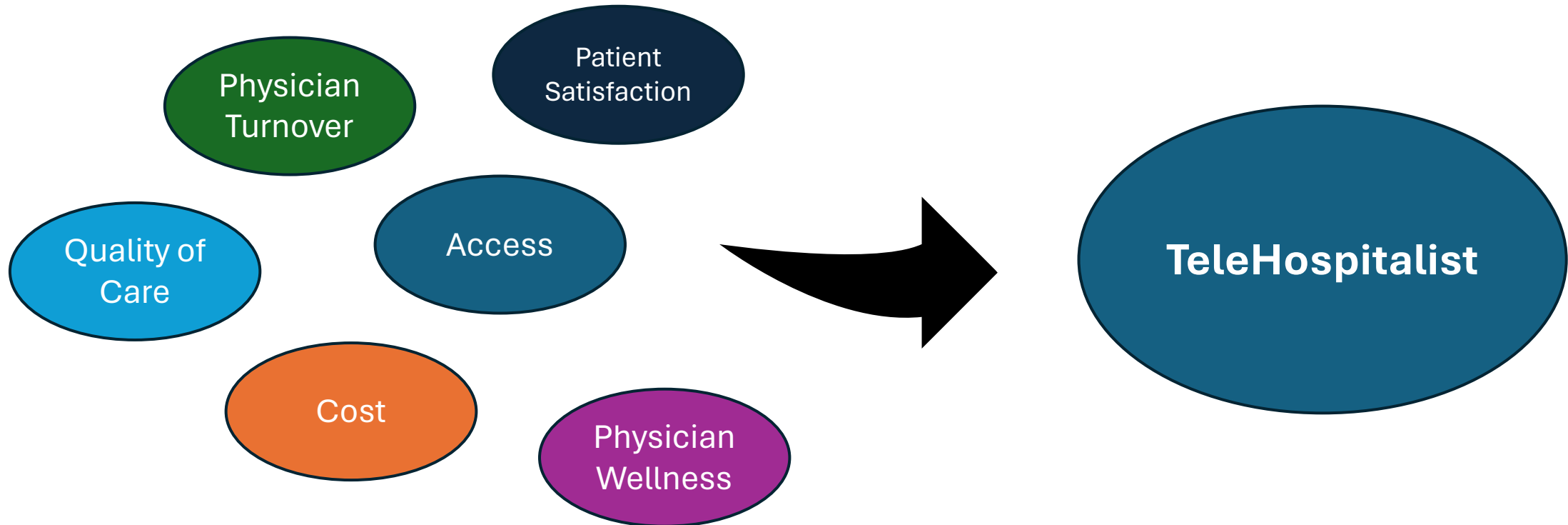
The Why

**Scenario 1:
Avoidable
Interfacility
Transfers**

**Scenario 2:
Locations with
Low Volume and
Limited Resources**

**Scenario 3: Patient
Satisfaction**

Pain Points of Hospitals



The Who

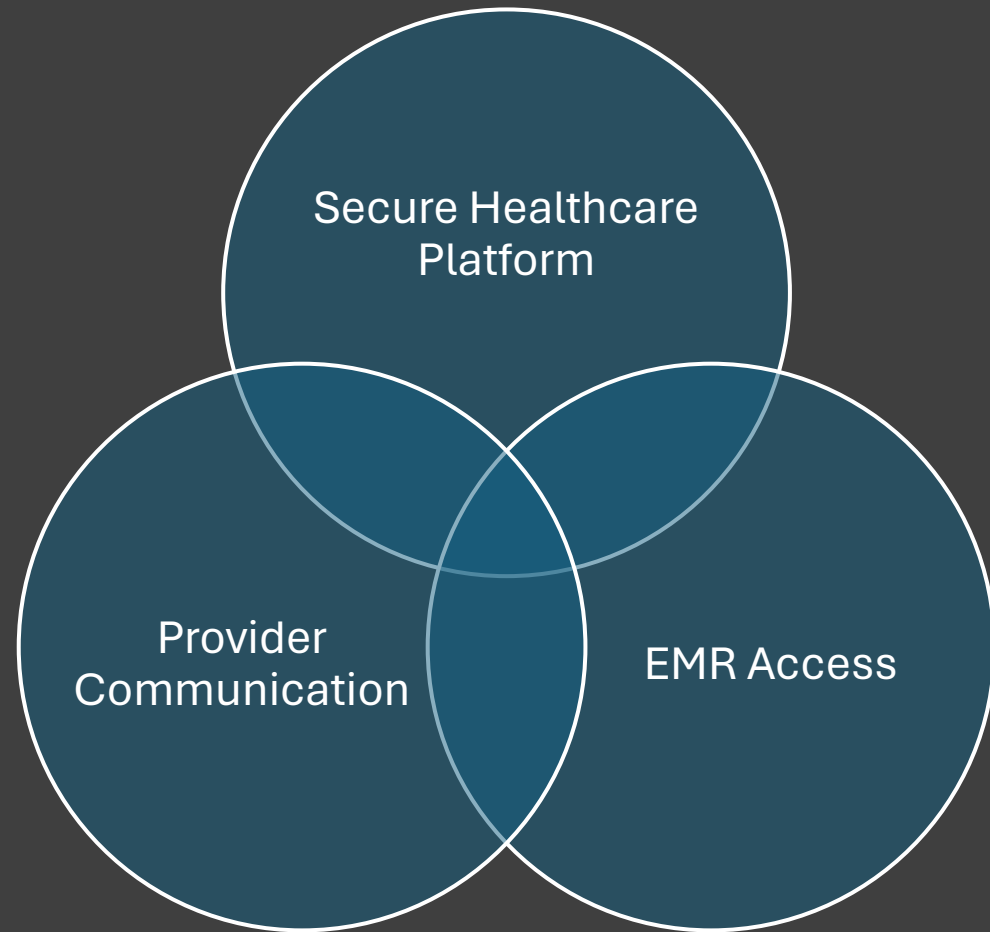


Board Certified Providers

- Family Medicine
- Internal Medicine
- Pediatricians

State Specific Credentials

The How



Case Reviews

Case 1:

- 41 year old female presented with 2 day hx of RLE pain.
- She denied fevers or chills. She reported a similar episode in the past diagnosed as cellulitis treated with antibiotics.
- Vitals → Temp: 103.1; HR: 121; RR: 36, BP: 90's/40's in ED.
- Labs → WBC: 28.2/Neutrophils: 93.3; Cr: 1.26 (Baseline = 0.69); Lactate: 2.4
- Exam → RLE with erythema, warmth, TTP up to mid thigh region.

Case 1: Cellulitis/Septic Shock

- 41 year old female presented with 2 day hx of RLE pain.
- She denied fevers or chills. She reported a similar episode in the past diagnosed as cellulitis treated with antibiotics.
- Vitals → Temp: 103.1; HR: 121; RR: 36, BP: 90's/40's in ED.
- Labs → WBC: 28.2/Neutrophils: 93.3; Cr: 1.26 (Baseline = 0.69); Lactate: 2.4
- Exam → RLE with erythema, warmth, TTP up to mid thigh region.
- Action: Blood cx drawn
- Treatment: NS sepsis bolus (IDW); Vancomycin/Zosyn
- Reassessment:
 - Repeat Lactate: 1.8
 - SBP: 81; MAP: 57
 - Persistent hypotension: Levophed

Case 2:

- 75 year old male presented with 2 days hx of AMS, abdominal pain, nausea and vomiting.
- He was found to have worsening lethargy and brought to ED.
- Vitals → Temp: 103.4; HR: 110; RR: 22; BP: 93/55
- Labs → WBC: 29.3; Bands: 13; Cr: 4.01 (baseline = 1.2); Lactate: 3.3
- UA: cloudy, 2+ leuk esterase, 100 WBC, 3+ bacteria.

Case 2: UTI/Septic Shock

- 75 year old male presented with 2 days hx of AMS, abdominal pain, nausea and vomiting.
- He was found to have worsening lethargy and brought to ED.
- Vitals → Temp: 103.4; HR: 110; RR: 22; BP: 93/55
- Labs → WBC: 29.3; Bands: 13; Cr: 4.01 (baseline = 1.2); Lactate: 3.3
- UA: cloudy, 2+ leuk esterase, 100 WBC, 3+ bacteria.
- Action: Urine/blood cx sent
- Treatment:
 - 30ml/kg NS bolus in ED; IV zosyn.
- Reassessment:
 - Repeat Lactate: 1.7
 - Persistent hypotension with BP: 80s – 90s/40s- 50s → Levophed.

Case 3:

- 70-year-old female with hx of HLD/HTN/Cirrhosis of the liver presented to ED with c/o SOB and cough (nonproductive) for 4 days.
- She denied any fevers/chills or any known sick contacts.
- Vitals → Temp: 101.2; SpO2: 84% room air; RR: 21; HR: 92; BP: 122/69
- Labs → WBC: 5.6; Lactate: 5.1; BG: 248
- Exam: Bibasilar crackles.
- CT chest: Bibasilar vascular prominence with interstitial prominence, particularly on the left.

Case 3: Pneumonia/Sepsis

- 70-year-old female with hx of HLD/HTN/Cirrhosis of the liver presented to ED with c/o Sob and cough (nonproductive) for 4 days.
- She denied any fevers/chills or any known sick contacts.
- Vitals → Temp: 101.2; SpO2: 84% room air; RR: 21; HR: 92; BP: 122/69
- Labs → WBC: 5.6; Lactate: 5.1; BG: 248
- Exam: Bibasilar crackles.
- CT chest: Bibasilar vascular prominence with interstitial prominence, particularly on the left.
- Action: Blood cx sent.
- Treatment:
 - 500cc NS (Sepsis bolus held 2/2 evidence of volume overload/ascites).
 - IV Rocephin/Azithromycin
 - Repeat Lactate 2.3
- Reassessment: BP: 121/71

Case 4:

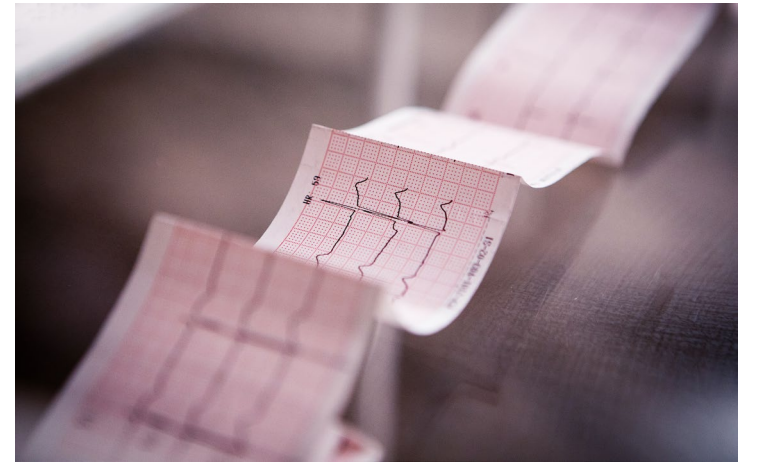
- 69 year old male with hx of DM 2/GERD/ETOH cirrhosis/HTN presented to ED with c/o SOB and dysphagia for 3 days.
- Suddenly developed dysphagia with intolerance to liquids/solids.
- On day of admission, c/o worsening SOB.
- Vitals → Temp: 97.5; HR: 124;BP: 133/69 RR: 33; SpO2: 88% on room air
- Labs → WBC: 22.3; Lactate: 5.1
- Exam → Diminished breath sounds throughout with bibasilar crackles.
- CTA chest → bibasilar consolidation c/w pneumonia/aspiration and interval development of large soft tissue mass in the hypopharynx; Airway narrowed but patent.
- CT soft tissue neck → thickening of the epiglottis indicative of epiglottitis.

Case 4: Epiglottitis/Asp PNA/Septic Shock

- Treatment:
 - NS sepsis bolus.
 - Action: blood cx sent/ENT consult → Laryngoscope/Intubation
 - IV dexamethasone 6mg IV X 1.
 - Racemic epinephrine 0.5mg X 1.
 - IV Vancomycin/Cefepime
 - BIPAP
- Reassessment:
 - BP: 80s/50s
 - Lactate: 11.3
 - Started on Levophed

SEPSIS

- Organ Dysfunction caused by Dysregulation of host immune response to infection
- Risk factors: Age, Immunosuppression, co-morbidities
- Based on Clinical Criteria



Sepsis

- All the names: Sepsis, ~~Sepsis Syndrome~~, ~~Severe Sepsis~~, Septic Shock
 - Sepsis based on Sepsis-3
 - SIRS criteria is no longer sufficient
 - Septic Shock with key features:
 - Sepsis with persistent hypotension despite adequate fluid resuscitation, requiring vasopressors to maintain blood pressure (MAP \geq 65 mm Hg)
 - Serum lactate levels $>$ 2 mmol/L despite adequate fluid resuscitation

SEPSIS-3

Sepsis-3 criteria updated 2016

- Infection suspected or confirmed
- Sequential Organ Failure Assessment (SOFA)
 - score ≥ 2 indicating organ dysfunction
 - Associated with mortality $>10\%$
- Quick Sequential Organ Failure Assessment (qSOFA)
 - ≥ 2 indicating organ dysfunction

SEPSIS-3

Sequential Organ Failure Assessment (SOFA) Score

	Central nervous system	Cardiovascular system	Respiratory system	Coagulation	Liver	Renal function
Score	Glasgow coma scale	Mean arterial pressure OR administration of vasopressors required	PaO ₂ /FiO ₂ [mmHg (kPa)]	Platelets (×10 ³ /μl)	Bilirubin (mg/dl) [μmol/L]	Creatinine (mg/dl) [μmol/L] (or urine output)
+0	15	MAP ≥ 70 mmHg	≥ 400 (53.3)	≥ 150	< 1.2 [< 20]	< 1.2 [< 110]
+1	13–14	MAP < 70 mmHg	< 400 (53.3)	< 150	1.2–1.9 [20–32]	1.2–1.9 [110–170]
+2	10–12	dopamine ≤ 5 μg/kg/min or dobutamine (any dose)	< 300 (40)	< 100	2.0–5.9 [33–101]	2.0–3.4 [171–299]
+3	6–9	dopamine > 5 μg/kg/min OR epinephrine ≤ 0.1 μg/kg/min OR norepinephrine ≤ 0.1 μg/kg/min	< 200 (26.7) and mechanically ventilated including CPAP	< 50	6.0–11.9 [102–204]	3.5–4.9 [300–440] (or < 500 ml/day)
+4	< 6	dopamine > 15 μg/kg/min OR epinephrine > 0.1 μg/kg/min OR norepinephrine > 0.1 μg/kg/min	< 100 (13.3) and mechanically ventilated including CPAP	< 20	> 12.0 [> 204]	> 5.0 [> 440] (or < 200 ml/day)

Maximum SOFA Score	Mortality
0 to 6	< 10%
7 to 9	15 - 20%
10 to 12	40 - 50%
13 to 14	50 - 60%
15	> 80%
15 to 24	> 90%

CORRELATION OF TOTAL SCORE AND HOSPITAL MORTALITY

Vincent, JL; de Mendonca, A; Cantraine, F; Monero, R; Takala, J; Suter, PM; Sprung, CL (November 1998). "Use of the SOFA score to assess the incidence of organ dysfunction/failure in intensive care units: results of a multicenter, prospective study. Working group on "sepsis-related problems" of the European Society of Intensive Care Medicine". *Critical Care Medicine*. 26 (11): 1793–800.



SEPSIS-3

- qSOFA
 - Altered mental status with GCS ≤ 14
 - Respiratory rate ≥ 22 breaths/min
 - Systolic blood pressure ≤ 100 mm Hg
- qSOFA ≥ 2
higher likelihood poor outcomes

Sepsis Management

Society of Critical Care Medicine

Hour-1 Bundle for SEPTIC SHOCK

- Measure lactate level*
 - Obtain blood cultures before administering antibiotics.
 - Administer broad-spectrum antibiotics.
 - Begin rapid administration of 30mL/kg crystalloid for hypotension or lactate level ≥ 4 mmol/L.
 - Apply vasopressors if hypotensive during or after fluid resuscitation to maintain MAP ≥ 65 mm Hg.
- * Remeasure lactate if initial lactate is elevated (> 2 mmol/L).

SEPSIS CORE MEASURE PATIENT CHECK-LIST			TIME ZERO		TIME ZERO IS THE EARLIEST OF 3:
Time	MEASURE	Completed	Date	Time	1. An ICU Triage Time 2. An ED Triage Time 3. A Nurse, Physician or Physician Extension Provider
0 Min	*CODE SEPSIS Callout	<input type="checkbox"/>		1	CODE TO BE CALLED OVERHEAD AND SENT ON MOBILE
5 Min	BLOOD CULTURE	<input type="checkbox"/>		1	Drawn BEFORE or AFTER (CODE 1-10) If ATTEMPTED AND FAILED, DOCUMENT "Blood Cultures ATTEMPTED AND FAILED" (JRS 1-10)
5 Min	LACTATE # 1	<input type="checkbox"/>	Result	1	If ATTEMPTED AND FAILED, DOCUMENT "LACTATE ATTEMPTED AND FAILED" (JRS 1-10)
10 Min	ANTIBIOTIC START	<input type="checkbox"/>	Result	1	START ADMINISTRATION WITHIN 60 MINUTES See BACK PAGE FOR APPROPRIATE ANTIBIOTIC CHOICES (JRS 1-10)
60 Min	LACTATE # 2	<input type="checkbox"/>	Result	1	DRAW ASAP AFTER 1ST FLUID BOLUS (JRS 1-10)
IF SEPTIC SHOCK PRESENT, CONTINUE BELOW					
10 Min	IV FLUID BOLUS (Consider 30-40)	<input type="checkbox"/>	Result	1	If MAP ≥ 65 mm Hg or MAP ≥ 65 mm Hg on 1st or 2nd 30 mL/kg fluid bolus, Patient can be discharged. If MAP < 65 mm Hg on 1st or 2nd 30 mL/kg fluid bolus, Patient can be discharged. If MAP < 65 mm Hg on 1st or 2nd 30 mL/kg fluid bolus, Patient can be discharged. If MAP < 65 mm Hg on 1st or 2nd 30 mL/kg fluid bolus, Patient can be discharged.
ONE HOUR IF BUNDLE COMPLETION	RN REASSESSMENT Document IBS	<input type="checkbox"/>	BP ≥ 90	1	INFORM MD OF HYPOENSION OR ELATED LACTATE PROBLEMS
	RENEW PROVIDER SEPTIC SHOCK FOCUSED EXAM	<input type="checkbox"/>	BP ≥ 90	1	EXAMPLE: TTP 1000, MAP 65, INTRACRANIAL PRESSURE 1500, PRIORITY 2 BLOOD PRESSURE MONITORING BETWEEN 1200-1400
	VASOPRESSORS If Persistent Hypotension	<input type="checkbox"/>	BP ≥ 90	1	If Patient has Septic Shock AND IS ON VASOPRESSORS, Patient can be discharged. If Patient has Septic Shock AND IS ON VASOPRESSORS, Patient can be discharged. If Patient has Septic Shock AND IS ON VASOPRESSORS, Patient can be discharged.

TABLE 2. Sepsis and septic shock bundles^{14,18}

<p>Sepsis Within 3 hours of presentation</p>	<ul style="list-style-type: none"> • Measure lactate level. • Obtain blood cultures prior to administering antibiotics. • Administer broad-spectrum or other antibiotics. • Administer 30 mL/kg crystalloid for hypotension or lactate ≥ 4 mmol/L
<p>Sepsis or septic shock Within 6 hours of presentation</p>	<p>Repeat lactate if initial lactate is elevated (>2 mmol/L).</p>
<p>Septic shock Within 6 hours of presentation</p>	<ul style="list-style-type: none"> • Administer vasopressors to maintain a MAP ≥ 65 mm Hg. • Reassess volume status and tissue perfusion by either option (licensed independent practitioner): <ul style="list-style-type: none"> Option 1: Focused exam with all five components; vital signs, cardiopulmonary exam, capillary refill exam, peripheral pulse exam, and skin exam Option 2: Any two of the following: central venous pressure central venous oxygen saturation, bedside cardiovascular ultrasound, passive leg raise or fluid challenge

Seckel, M.A. (2018). OPTIMIZING PATIENT SURVIVAL FROM DISTRIBUTIVE SHOCK: A guidelines-based approach.

SEP-1

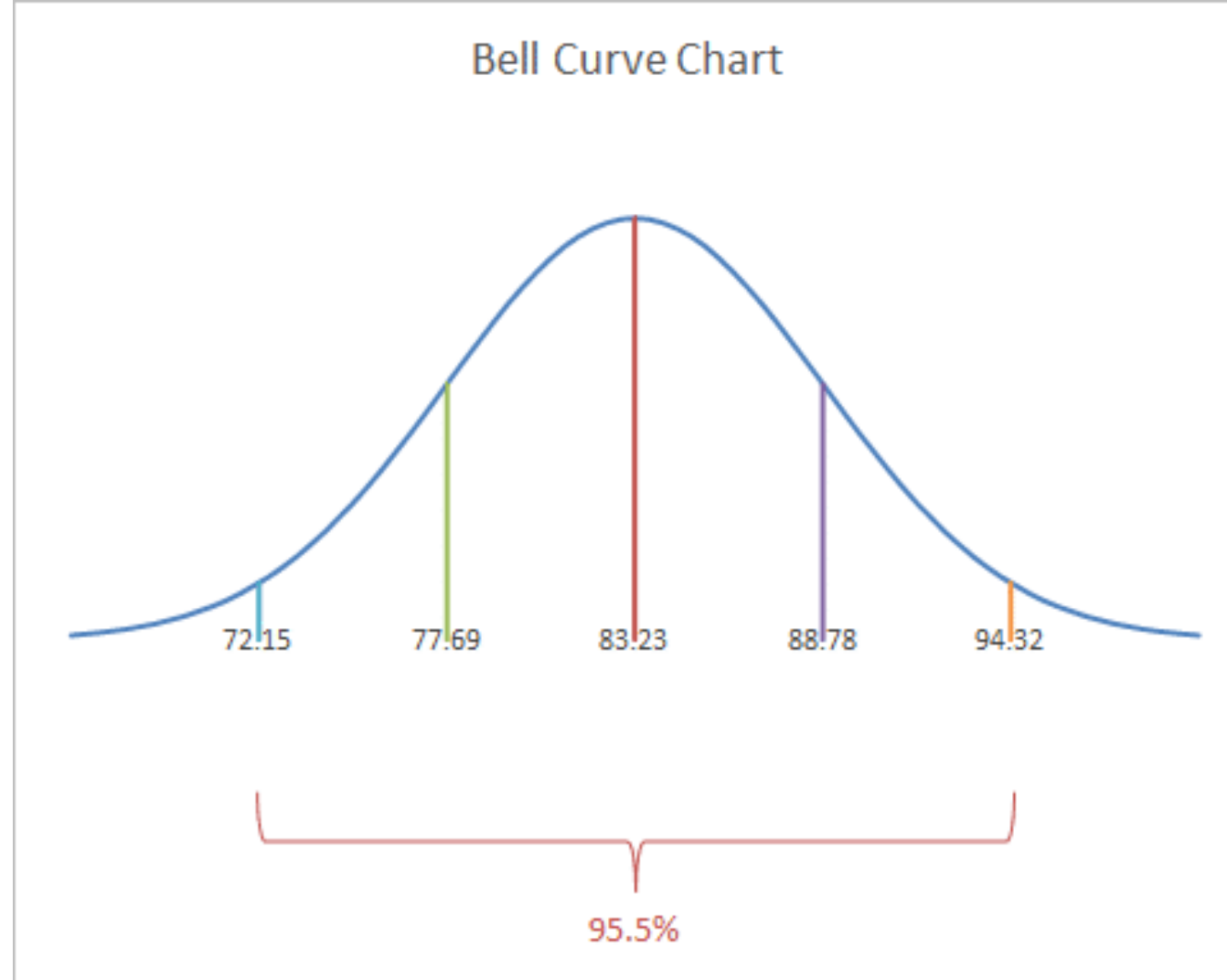
- Sepsis and Septic Shock Management Bundle
- Any hospital receiving reimbursement from Medicare or Medicaid will have to report compliance
- Explicit intention is to begin management immediately with time-specific actions and documentation



SEP-1

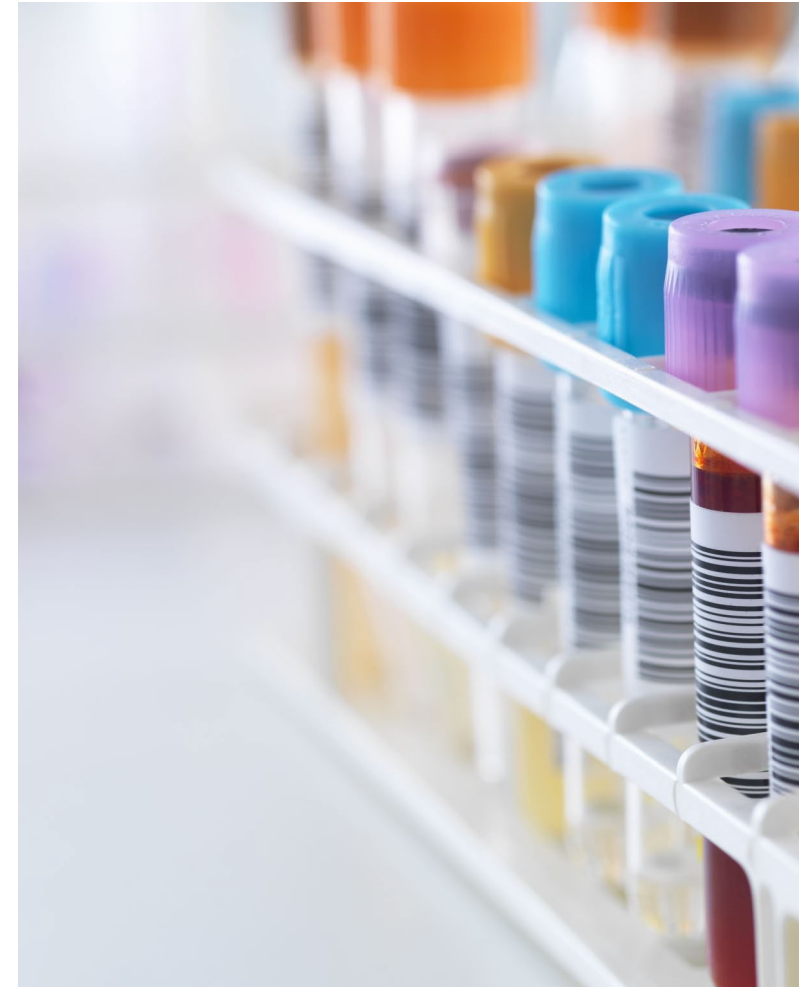
CMS adoption of adding Severe Sepsis and Septic Shock bundle as a core quality measure

- Pay for Performance period began January 2024
- Penalty or Reward based on hospital performance based on comparison of hospitals nationwide



Other considerations

- Biomarkers
 - Procalcitonin:
 - Rise within four hours after onset of an infection and peak at 12 to 48 hours.
 - Levels have a statistically significant relationship with the severity of sepsis.
 - Because of its short half-life, procalcitonin levels are also useful to monitor response to therapy and to provide guidance for antibiotic discontinuation
 - Adjunctive Therapies
 - Vitamin C, Thiamine, Hydrocortisone still need larger clinical trials to prove efficacy



Quick Review

- Sepsis-3 defines Sepsis as increase in SOFA or qSOFA score ≥ 2 associated with infection
- Sepsis Management: Timing and Documentation Important
 - Lactate, Blood Cultures prior to Abx, Broad-Spectrum Abx, IVF resuscitation within 3 hours
 - Repeat Lactate within 6 hours
- Septic Shock Management: Within 6 hours
 - Vasopressors to maintain MAP > 65 mm Hg
 - Document Reassessment of Volume Status and Tissue Perfusion
 - Vitals signs, Cardiopulmonary Exam, Capillary Refill, Peripheral Pulse, Skin Exam
- Goal: Improved Patient Outcomes with Consequences to follow

Questions?