STARTER PACK: Webinar #1

SEPSIS

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Accelerating Improvement at the Point of Care

Welcome to the Sepsis Starter Pack

- Webinar #1
  - Why this is important
  - Establishing a Team
  - Best practices
  - Understanding the Measures
  - Completing a gap analysis
  - First Steps
- Gap Analysis Tool
- Webinar #2
  - How to prioritize the identified gaps
  - Using science of improvement concepts
  - How to create a good action plan
- Action Plan

TIME IS TISSUE: IMPROVING OUTCOMES FOR PATIENTS WITH SEPSIS

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Accelerating Improvement at the Point of Care

Why is this Important?

- Statistics
  - Sepsis kills someone in the U.S. every 2 minutes, over 258,000 Americans each year – more than prostate cancer, breast cancer and AIDS combined.
- Costs:
  - Healthcare – In 2013, 400,000 Medicare beneficiaries were hospitalized because of sepsis at a cost of $5.5 billion.
  - Patients and Families – Education so patients and families understand what sepsis is and to advocate for care toward treatment of sepsis symptoms
  - Staff – Educate that sepsis should be treated as a medical emergency. A 2006 Study showed that “the risk of death from sepsis increases by 7.6% with every hour that passes before treatment begins”

Severe Sepsis: A Significant Healthcare Challenge

- **Major cause of morbidity and mortality worldwide**
  - Leading cause of death in noncoronary ICU (US)[1]
  - 10th leading cause of death overall (US)[2]*
- **More than 750,000 cases of severe sepsis in the US annually[3]**
- **Sepsis occurs in just 10% of U.S. hospital patients, but it contributes to as many as half of all hospital deaths,**
- **1 of every 2-3 deaths in hospital are the result of sepsis[4]**
- **In the US, more than 500 patients die of severe sepsis daily[3†]**

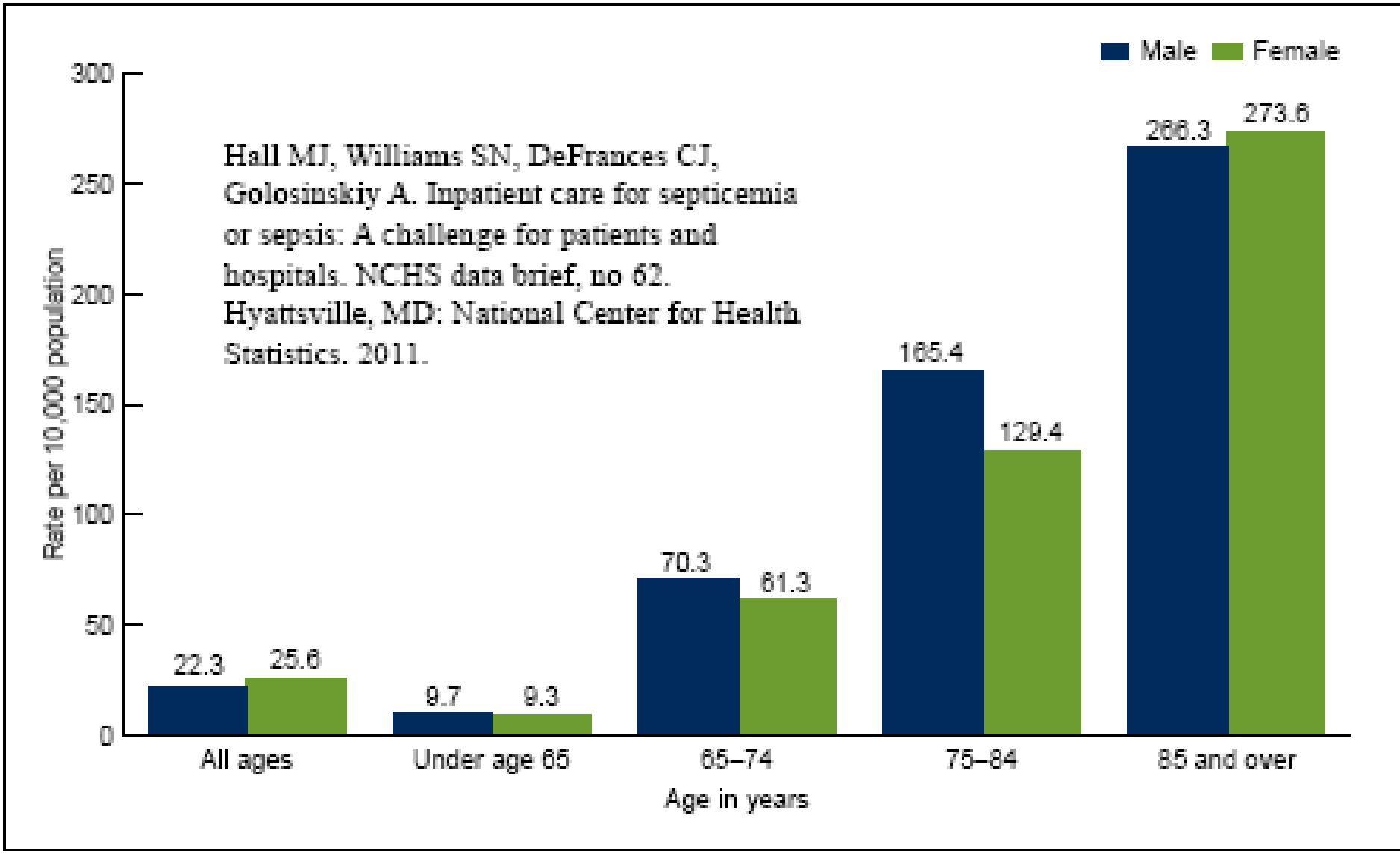
Based on data for septicemia

†Reflects hospital-wide cases of severe sepsis as defined by infection in the presence of organ dysfunction

1. Sands KE, Bates DW, Lanken PN, et al. Epidemiology of sepsis syndrome in 8 academic medical centers. *JAMA* 1997;278:234-40.
2. National Vital Statistics Reports. 2005.
3. Angus DC, Linde-Zwirble WT, Lidicker J, et al. Epidemiology of severe sepsis in the United States: analysis of incidence, outcome and associated costs of care. *Crit Care Med* 2001;29:1303-10.
4. JAMA published on line May 18, 2014

Hospitalization rates for sepsis or septicemia were similar for males and females and increased with age.

Figure 2. Rates of hospitalization for septicemia or sepsis, by sex and age, 2008



NOTES: Rates are significantly higher for males and females in each successive age group.
SOURCE: CDC/NCHS, National Hospital Discharge Survey, 2008.

Project Goal

- The HIIN Bold Goal – 20% Reduction of all-cause patient harm including Severe and Septic Shock Mortality and the incidence of Post-Operative Sepsis from 9-30-16 to 9-30-19.
- The HIIN will assist hospitals in implementing CMS SEP-1 bundles, with emphasis on early identification (screening) for severe sepsis and septic shock with execution of the 3-hour bundle; education and support for the 6-hour bundles and prevention of post-op sepsis. Early identification and treatment may reduce the likelihood that a patient will die from severe sepsis or septic shock.
- Hospital baseline and goals

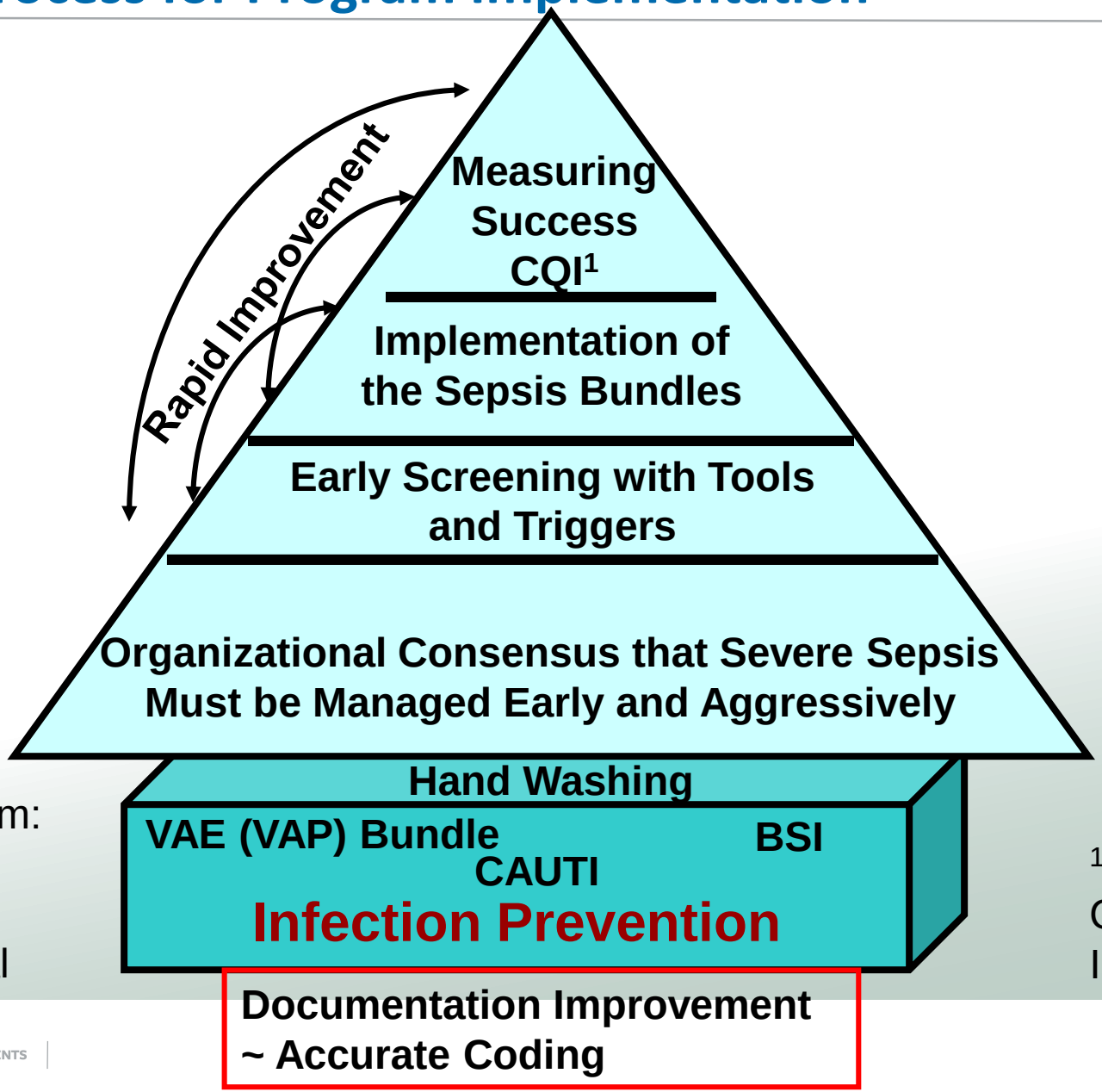
First Things First

- Ask yourself and your group:
  - Are we ready?
  - Is there urgency?
  - Is there leadership support?
  - Who owns this effort?
  - What resources are needed?
  - What if we are not ready for full-scale change?
- Assess the readiness before you proceed

Overview

- Discuss the four tier process for program implementation: I-Organizational Commitment II-Screening III-Sepsis Bundles Implementation IV-Measurement
- Define the sepsis continuum: sepsis, severe sepsis and septic shock
- Identify common barriers to program implementation and discuss strategies to overcome common barrier
- Review PSI 13: post-op sepsis definition and strategies for improvement
- Define next steps in program

Sepsis Practice Collaborative Model
4 Tier Process for Program Implementation



Adapted from: Sepsis Solutions International

[1]Continuous Quality Improvement

Tier I: Organizational Consensus and Support Milestones and Checklist

1. Define Sepsis Program Goal and aligned with organizational goals
2. Identify Executive sponsor
3. Collect Baseline Data—essential step
4. Develop sepsis team(do we have all the right people here?) and schedule monthly(minimum) meeting for at least 6 months
5. Identify nursing and physician champions in ED and ICU and ensure champions attend team meeting
   - **Create a sepsis coordinator position to oversee program**
6. Begin to define action plan and timeline for program development and implementation

Establishing Your Team

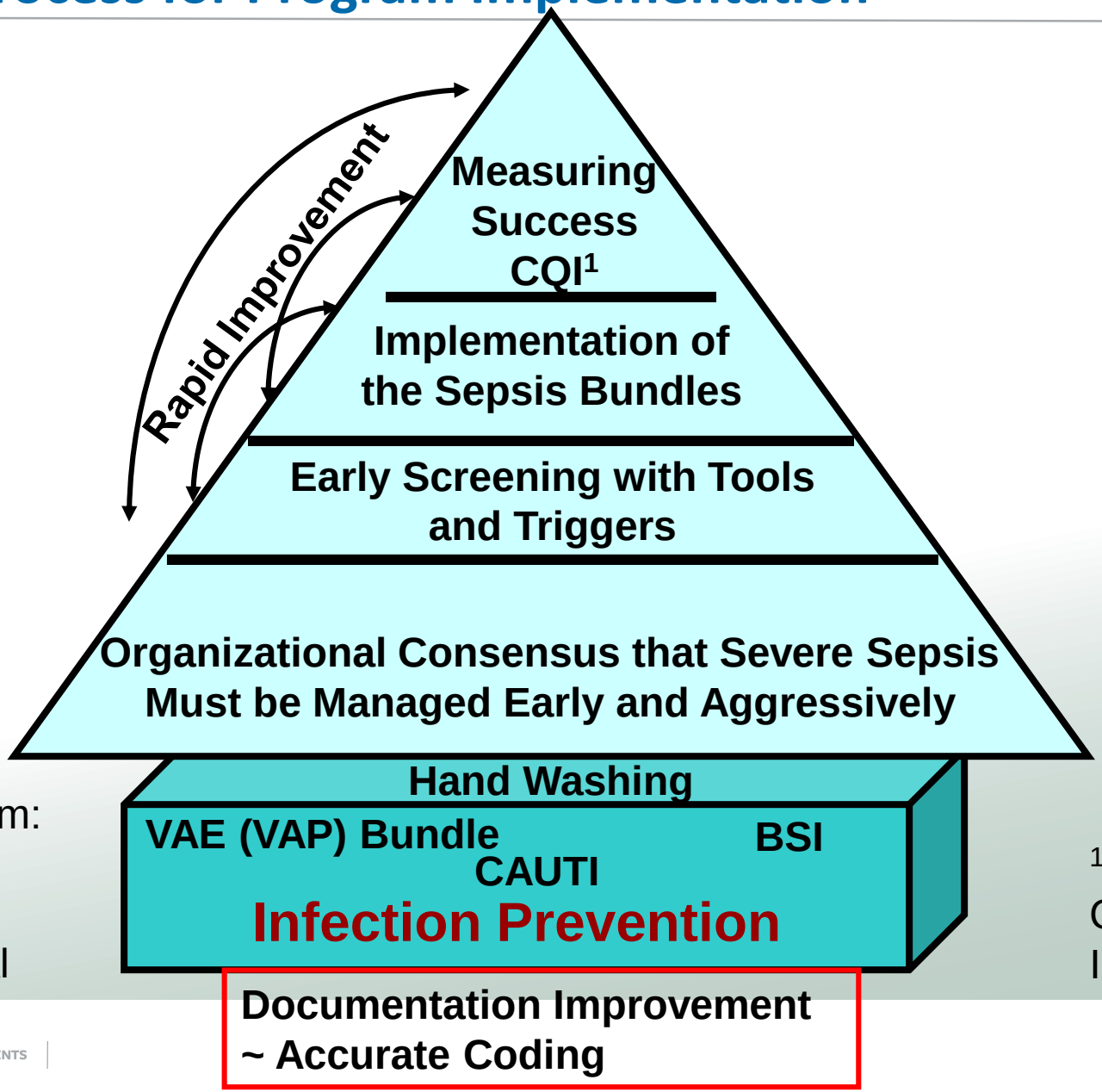
- Successful improvement work relies on a team
- Project Champion – senior leader who will provide support
- Team Leader – a person with authority to make the changes needed
- Team members – staff that do the daily work
  - Staff Nurse, Sepsis Coordinator, Infection preventionist

The Team Is KEY!
Can Be Major Barrier If Not Functioning Well

- **Must** have nurse and physician champions from ED and ICU (need at least one physician at all meetings)
- **Must** be linked in the organization's quality or operational structure— **Are you linked?**
- **Must** meet at least 1-2 times per month
- Team members **must** be well educated on the evidence and armed with tools and knowledge to change behavior at the bedside— **Does the team need more education?**
- **MUST** have bedside nurses on team—provide reality check and best knowledge of barriers— **Do you?**

Consider developing nurse champions on each patient care unit and shift

Sepsis Practice Collaborative Model
4 Tier Process for Program Implementation



Adapted from: Sepsis Solutions International

[1]Continuous Quality Improvement

Surviving Sepsis Campaign Guidelines: 2012

- Consensus committee of 68 international experts presenting 30 international organizations
- Used GRADE system to guide assessment of quality of evidence from high (A) to very low (D) and to determine the strength of recommendations as strong (1) or weak (2)
- Some recommendations were ungraded (UG)
- Guidelines included recommendations in 3 areas:
  1. Directly targeting severe sepsis
  2. Targeting general care of critically ill patient, considered high priority in severe sepsis
  3. Pediatric considerations

Updated guidelines in January 2017

SSC Guidelines

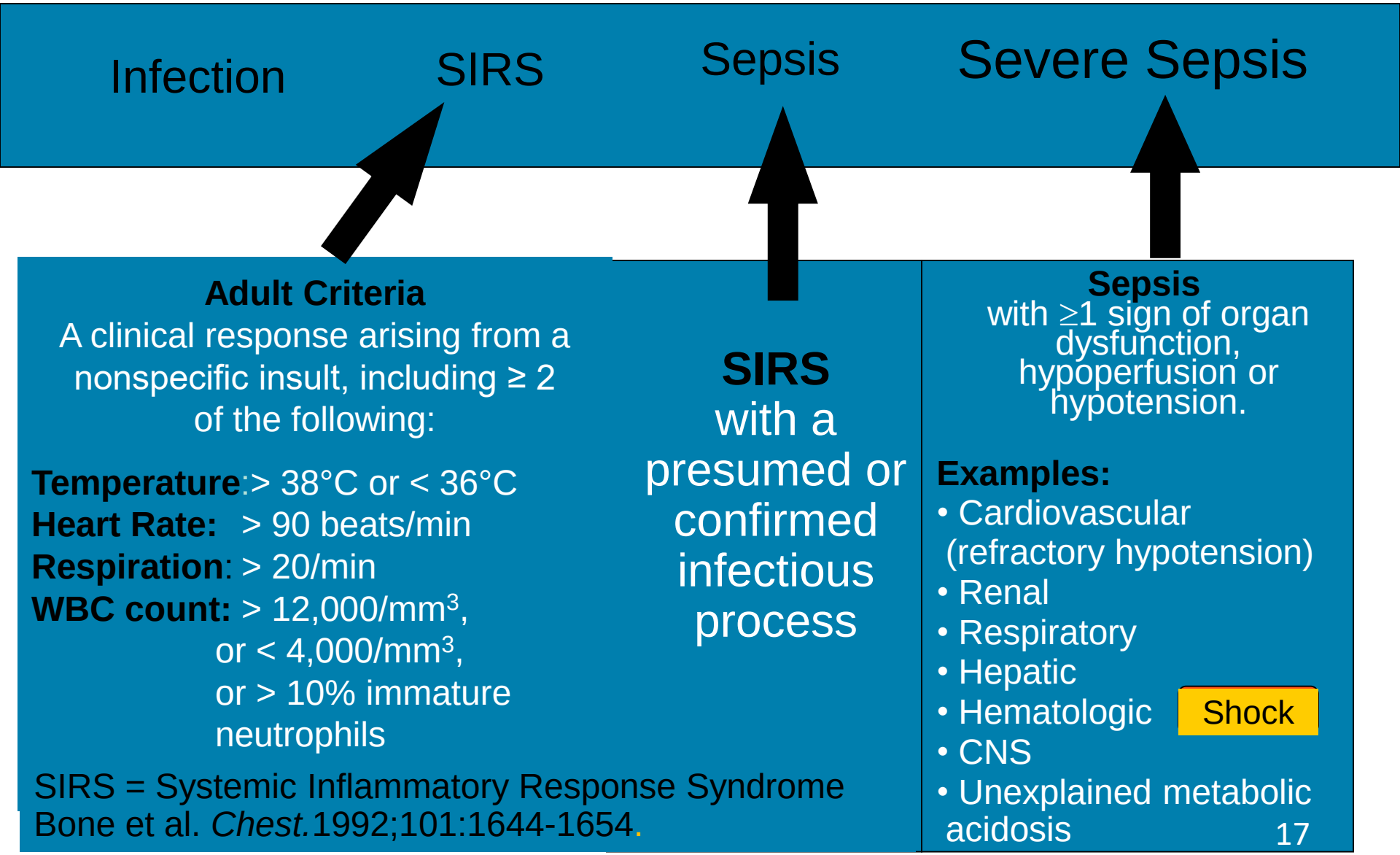
Screening

- We recommend routine screening of potentially infected seriously ill patients for severe sepsis to increase the early identification of sepsis and allow implementation of early sepsis therapy (1C)

- Performance improvement efforts in severe sepsis should be used to improve patient outcomes (UG)

Surviving Sepsis Guidelines, CCM, 2012

Severe Sepsis: Defining a Disease Continuum



SIRS = Systemic Inflammatory Response Syndrome

Bone et al. *Chest.*1992;101:1644-1654.

Definitions

- **Sepsis**: presence of infection (suspected or confirmed) with systemic manifestations of infection
- **Severe Sepsis**: Sepsis-induced tissue hypoperfusion or organ dysfunction
- **Septic Shock**: Hypotension that persists despite adequate fluid resuscitation

Sepsis 3:

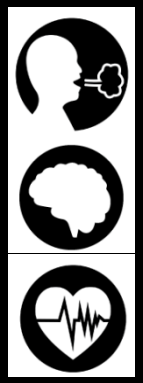
Singer et al, JAMA 2016. PMID: 26903338

- Sepsis is: 'life-threatening organ dysfunction caused by a dysregulated host response to infection'
- Sepsis-3 does away with:
  - SIRS criteria (sepsis is pro- and anti-inflammatory)
  - Severe sepsis (sepsis = the old severe sepsis)
  - Antiquated concepts: sepsis syndrome; septicemia
- Sepsis-3 codifies the quantification of organ dysfunction through the SOFA score (Sequential Organ Failure Assessment)
- Septic shock: vasopressor-dependent hypotension + lactate >2
- Sepsis-3 includes clinical criteria to predict life-threatening disease

Developing New Criteria

- Focus on timeliness, ease of use
- Studied 21 variables from Sepsis-2
- Multivariable logistic regression for in-hospital mortality

qSOFA



Respiratory rate ≥ 22 bpm

Altered mentation

Systolic blood pressure ≤ 100 mmHg

SOFA Scoring

	0	1	2	3	4
Respiratory PaO_2:FIO_2 ratio (mmHg)	>400	>400	≤300	≤200*	<100*
Renal Creatinine (mg/dL) or urine output (mL/d)	<1.2	1.2–1.9	2.0–3.4	3.5–4.9 or <500mL/d	≤5.0 or <200mL/d
Hepatic Bilirubin (mg/dL)	<1.2	1.2–1.9	2.0–5.9	6.0–11.9	12.0
Cardiovascular Mean arterial pressure (mmHg)	No hypotension	MAP >70	Dopamine ≤5 or dobutamine (any dose)†	Dopamine >5 or epinephrine ≤0.1 epinephrine ≤0.1†	Dopamine >15 or epinephrine >0.1 epinephrine >0.1†
Haematological Platelet count ($x10^3/mm^3$)	>150	≤150	≤100	≤50	≤20
Neurological Glasgow coma score	15	13–14	10–12	6–9	<6

* With ventilatory support; † Adrenergic agents administered for at least 1h (doses in mcg/kg/min).

New Definitions

- Sepsis is defined as life-threatening organ dysfunction caused by a dysregulated host response to infection. (>2 SOFA points above baseline or outside the ICU—2 or moreqSOFA)
- Septic shock is defined as a subset of sepsis in which underlying circulatory and cellular metabolism abnormalities are profound enough to substantially increase mortality.
  - Patient who is vasopressor dependent to keep MAP >65 with a lactate >2

So, What Now

- There is no consensus among other professional organizations including ACEP and ACCP (CMS usually does not like to make changes unless all professional societies in agreement)
- CMS is reviewing these changes to determine what changes (if any) to make to the Sepsis measure
- There is no planned changes to ICD-10

Keep Following Current CMS Definitions/Measurements

Tier II: Screening for Severe Sepsis Milestones and Checklist

- Develop screening process for ED, rapid response team, ICU and house-wide
- Develop audit process to evaluate compliance and effectiveness
- Ensure screening process has clear “next steps” defined for nursing staff

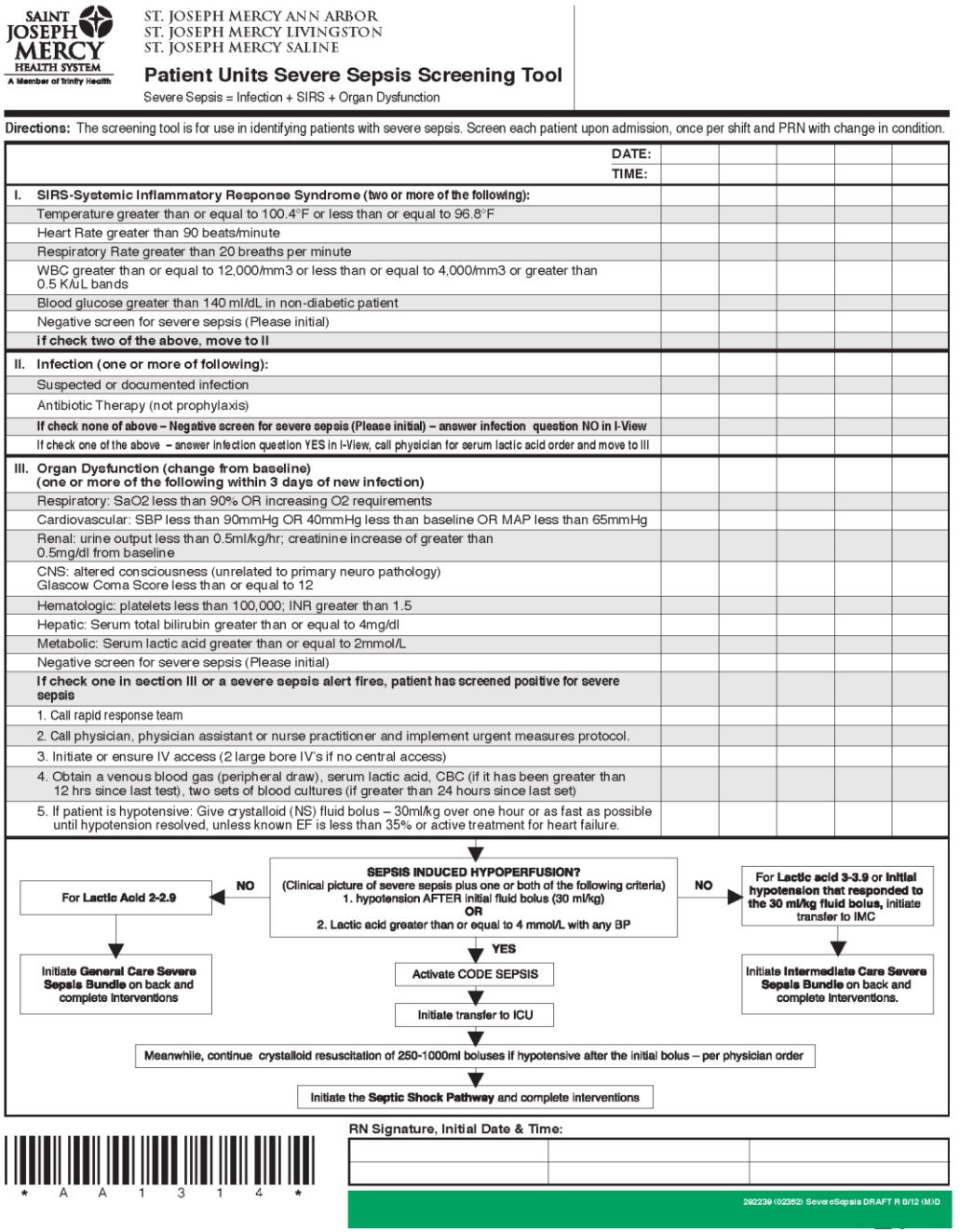
Paper or Electronic...That is the Question

Method	Pros	Limitations
Paper form	• Nurses critically think as they screen the patient • Easy and quick to develop • No cost	• Screening is intermittent • Paper can be misplaced • Static—no ability to automate an alert
EMR form	• Nurses critically thinks as they screen the patient • Can automate alerts for positive screens	• Screening is intermittent • Length of programming time • Cost
EMR—real time, continual screening	• 24 hour screening • Can automate alerts for positive screens	• Nurse does not screen patient—potential loss of screening knowledge and critical thinking • Computer not reliably able to identify patients who have infection • Computer not able to discern if SIRS is valid or organ dysfunction is new

Paper or Electronic...That is the Question

Method	Pros	Limitations
EMR—real time and scheduled	• Form fires and pre populates for nurse to screen upon admission and each shift—nurse critically thinks • 24 hour screening • Manual screen completed when EMR alert fires---nurse discerns/validates appropriateness/correctness of alert	• Screening form needs to be developed in EMR—programing time and costs

PATIENT CARE UNIT SEVERE SEPSIS SCREENING TOOL



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Patient Units Severe Sepsis Screening Tool

Severe Sepsis = Infection + SIRS + Organ Dysfunction

Directions: The screening tool is for use in identifying patients with severe sepsis. Screen each patient upon admission, once per shift and PRN with change in condition.

	DATE:					
	TIME:					
I.	**SIRS-Systemic Inflammatory Response Syndrome (two or more of the following):**					
	Temperature greater than or equal to 100.4°F or less than or equal to 96.8°F					
	Heart Rate greater than 90 beats/minute					
	Respiratory Rate greater than 20 breaths per minute					
	WBC greater than or equal to 12,000/mm3 or less than or equal to 4,000/mm3 or greater than 0.5 K/uL bands					
	Blood glucose greater than 140 ml/dL in non-diabetic patient					
	Negative screen for severe sepsis (Please initial)					
	If check two of the above, move to II					
II.	**Infection (one or more of following):**					
	Suspected or documented infection					
	Antibiotic Therapy (not prophylaxis)					
	If check none of above – Negative screen for severe sepsis (Please initial) – answer infection question NO in I-View					
	If check one of the above – answer infection question YES in I-View, call physician for serum lactic acid order and move to III					
III.	**Organ Dysfunction (change from baseline) (one or more of the following within 3 days of new infection)**					
	Respiratory: SaO2 less than 90% OR increasing O2 requirements					
	Cardiovascular: SBP less than 90mmHg OR 40mmHg less than baseline OR MAP less than 65mmHg					
	Renal: urine output less than 0.5ml/kg/hr; creatinine increase of greater than 0.5mg/dl from baseline					
	CNS: altered consciousness (unrelated to primary neuro pathology) Glascow Coma Score less than or equal to 12					
	Hematologic: platelets less than 100,000; INR greater than 1.5					
	Hepatic: Serum total bilirubin greater than or equal to 4mg/dl					
	Metabolic: Serum lactic acid greater than or equal to 2mmol/L					
	Negative screen for severe sepsis (Please initial)					
	If check one in section III or a severe sepsis alert fires, patient has screened positive for severe sepsis					
	1. Call rapid response team					
	2. Call physician, physician assistant or nurse practitioner and implement urgent measures protocol.					
	3. Initiate or ensure IV access (2 large bore IV's if no central access)					
	4. Obtain a venous blood gas (peripheral draw), serum lactic acid, CBC (if it has been greater than 12 hrs since last test), two sets of blood cultures (if greater than 24 hours since last set)					
	5. If patient is hypotensive: Give crystalloid (NS) fluid bolus – 30ml/kg over one hour or as fast as possible until hypotension resolved, unless known EF is less than 35% or active treatment for heart failure.					

SEPSIS INDUCED HYPOPERFUSION?
(Clinical picture of severe sepsis plus one or both of the following criteria)
1. hypotension AFTER initial fluid bolus (30 ml/kg)
OR
2. Lactic acid greater than or equal to 4 mmol/L with any BP

NO → For **Lactic Acid 2-2.9** → Initiate **General Care Severe Sepsis Bundle** on back and complete interventions

NO → For **Lactic acid 3-3.9** or **initial hypotension that responded to the 30 ml/kg fluid bolus,** initiate transfer to IMC → Initiate **Intermediate Care Severe Sepsis Bundle** on back and complete interventions.

YES → Activate CODE SEPSIS → Initiate transfer to ICU

Meanwhile, continue crystalloid resuscitation of 250-1000ml boluses if hypotensive after the initial bolus – per physician order

Initiate the **Septic Shock Pathway** and complete interventions

* A A 1 3 1 4 *

RN Signature, Initial Date & Time:

292239 (02352) SevereSepsis DRAFT R 8/12 (M)D

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Make Screening for Severe Sepsis Process-Dependent

- Weave into fabric of current practice
- Bedside nurse should do the screening—every shift and prn with condition changes
- Define expectation to screen during shift assessment and PRN with changes in patient's conditions
- Screen for severe sepsis with every rapid response or medical response team call
- Identify strategies for initiation of therapy once patient with positive screen for severe sepsis is identified

Strategies: Establish Trigger for Rapid Implementation of SSC Bundles

- Clearly define next steps for patients with positive screen for severe sepsis
  - Alert RRT/Med Team
  - Notify Physician
  - Begin 3 hour bundle: lactate, blood cultures, antibiotics, fluid

SBAR
Situation:
Screened Positive for Severe Sepsis
Background:
1. Positive Systemic Response to Infection
2. Known or suspected infection
3. Organ dysfunction: share which organs
Assessment:
Share any other clinical changes?
Recommendations:
1. I need you to come and evaluate the patient to confirm if they have severe sepsis
2. It is recommended that I get an ABG, lactate, blood cultures and a CBC (if > 12 hrs since last one). Can I proceed and get these?
3. Any other labs you would like me to obtain? Do you want to order antibiotics?
4. If patient is hypotensive: Can I start an IV and give a bolus of NS—30ml/kg
Date/time of call: _____
RRT called: Yes No

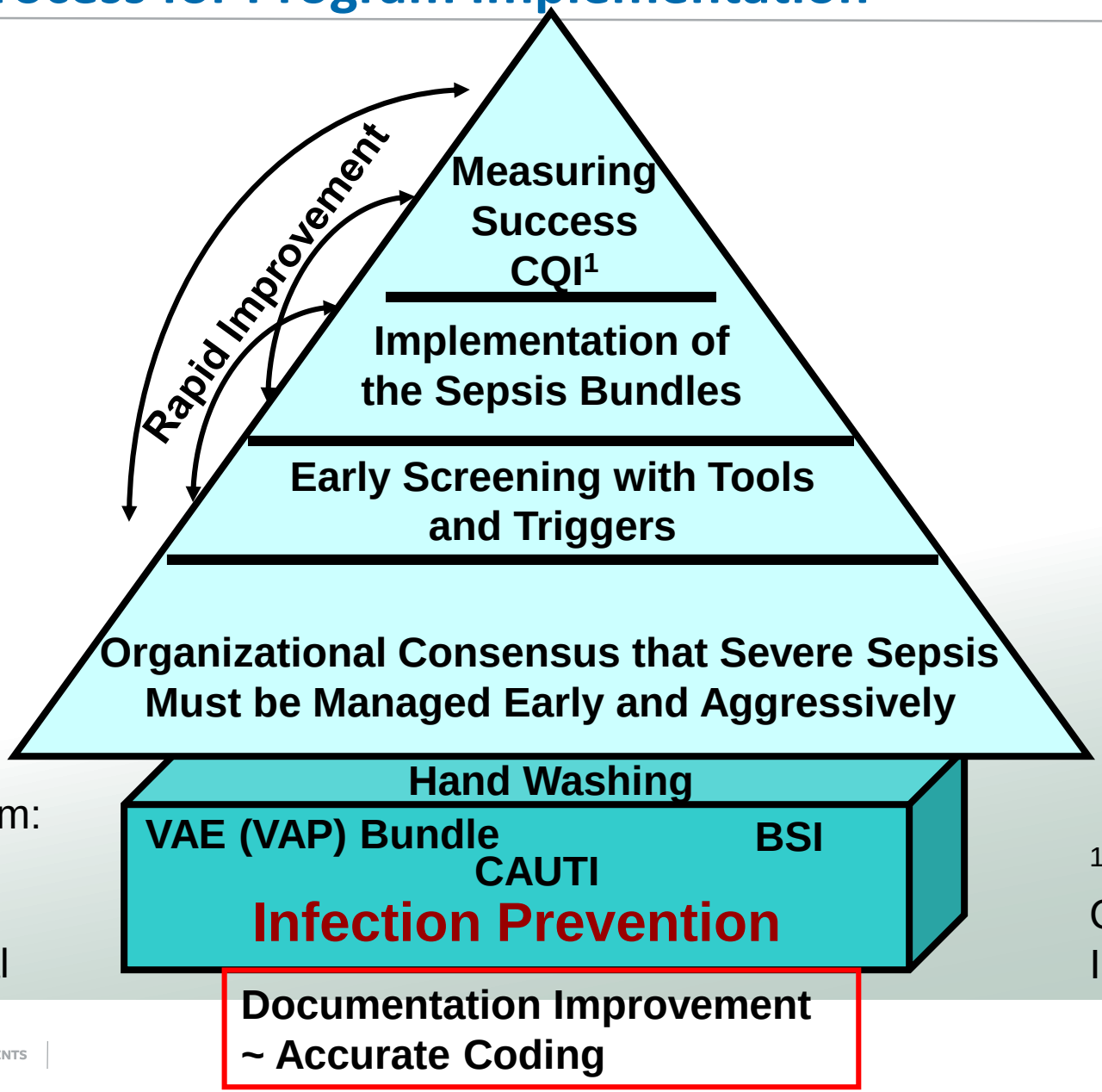
Audit Screening Process

What do we want to learn?

- **Screening compliance** = all of the patients are being screened for severe sepsis
- **Screens are valid** = Are the screens being done correctly
- **Screens are reliable** = Screens are consistent from RN to RN

- If patient screens positive for severe sepsis, were the appropriate interventions completed

Sepsis Practice Collaborative Model
4 Tier Process for Program Implementation



Adapted from: Sepsis Solutions International

[1]Continuous Quality Improvement

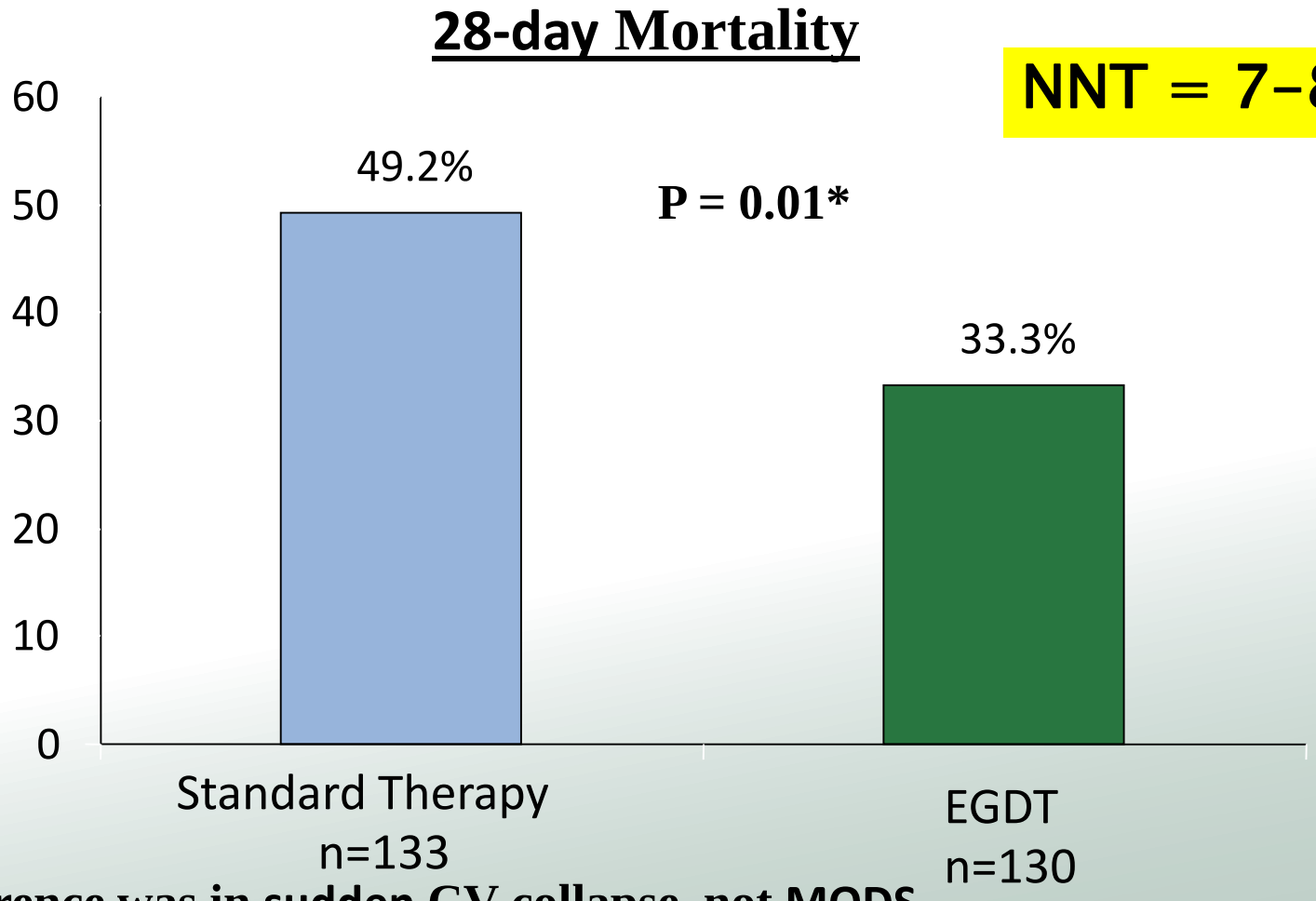
Early Goal Directed Therapy

Methodology: 263 severe sepsis patients

- Early Goal-Directed Therapy (EGDT)
  - Continuous ScvO2 monitoring & tx with fluids, blood, inotropes &/or vasoactives to maintain:
    - ScvO2 ≥70%, SaO2 ≥ 93%, Hct ≥ 30%, CI/VO2
    - CVP ≥ 8-12
    - MAP ≥ 65
    - UO ≥ .5ml/kg/hr
- Standard Therapy
  - CVP ≥ 8-12
  - MAP ≥ 65
  - UO ≥ .5ml/kg/hr

Rivers et. al. N Engl J Med. 2001;345;19:1368-1377.

Early Goal-Directed Therapy Results



***Key difference was in sudden CV collapse, not MODS**

Rivers et. al. N Engl J Med. 2001;345;19:1368-1377.

The Changing Paradigm of Septic Shock Management

- ProCESS trial-randomized, 31 centers, 1341 patients
- ARISE trial- randomized, 51 centers(mostly Australia and New Zealand), 1600 patients
- Promise—randomized, UK, 56 hospitals, 1260 patients

Results of 3 International Studies 2014-2015

- ARISE and Promise had two groups: EGDT and Usual care
- ProCess had three groups: EGDT, structured resuscitation and usual care
- Before randomization all patients received antibiotics and an average of 2500ml of NS had blood cultures and lactate drawn
- No statistically significant difference in mortality between groups
- Mortality rate 18% for ARISE & ProCess
- Mortality rate 30% for Promise

ProCESS Investigators, 2014; 370:1683-1693
ARISE Investigators et al. N Engl J Med 2014; 371:1496-1506
Mouncey PR, et al. N Engl J of Med, 2015; 372:1301-1311

Core Measure

- Sepsis management is a core measure that is reported to CMS starting October 1st 2015
- Compliance is All or None—so all measure on the 3 and 6 hour bundles need to be met in the appropriate timeframe to be compliant

SEP-1

TO BE COMPLETED WITHIN 3 HOURS OF TIME OF PRESENTATION † :

1. Measure lactate level
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L

† *"time of presentation" is defined as the time of earliest chart annotation consistent with all elements severe sepsis or septic shock ascertained through chart review.*

SEP-1

TO BE COMPLETED WITHIN 6 HOURS OF TIME OF PRESENTATION:

5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg
6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion and document findings according to table 1.
7. Re-measure lactate if initial lactate elevated.

SEP-1

TABLE 1

DOCUMENT REASSESSMENT OF VOLUME STATUS AND TISSUE PERFUSION WITH:

Either

- Repeat focused exam(after initial fluid resuscitation) by licensed independent practitioner including vital signs, cardiopulmonary, capillary refill, pulse and skin findings.

Or two of the following:

- Measure CVP
- Measure ScvO2
- Bedside cardiovascular ultrasound
- Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge

Components of TIER III
Milestones and checklist

- Understand current process for caring for septic shock patients
    - 'Go and See' work: walk your process; gap analysis
    - Baseline data
- Order sets
- Common Barriers/Issues: *identified Gaps from 'Go and See' work*
- Educational plan
- Implementation plan
    - Unit champions
    - Prospective rounding
    - Independent checks

Which components of the bundle did you find gaps in performance during “Go and See” and from baseline data collection?

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Common Barriers/Issues

- Lactate
- Antibiotics
- Fluid boluses
- Reassessment for volume status and perfusion
- Consistency in bundle application

Lactate measurement

- Lab vs POC
- Venous vs arterial
- Turnaround time
- Repeat lactate if initial greater than 2

Antibiotics

- Appropriate initial antibiotics
  - Guide for providers recommending the appropriate antibiotic based on whether hospital or community acquired, source and your hospitals antibiogram
- Turnaround time---from indication to hanging
  - ED vs ICU vs Floor
- Understand your current process and where the gaps are
- Make antibiotics rapidly available

SSC guidelines: Fluid therapy

1. We recommend crystalloids be used in the initial fluid resuscitation of severe sepsis (1B)

2. We suggest the use of albumin in the fluid resuscitation of severe sepsis and septic shock when patients require substantial amounts of crystalloids. (2C)

3. We recommend against the use of hydroxyethyl starches (HES) for fluid resuscitation of severe sepsis and septic shock patients (1B)

Dillinger, CCM, 2013

Fluid boluses

- How fast should they be given?
- Gravity or pressure bag not by infusion pump
- What about dialysis patients?
- What about patients with CHF or low EF?

Fluid bolus is given rapidly, IV wide open, pressure bag if necessary; goal is 500ml every 15-30 minutes

Why do all severe sepsis patients need volume?

1. Vascular volume is lost into interstitial space do to diffuse capillary leaking from cytokine release
2. Both venous and arteriolar tone is reduced & blood volume occupies a larger intravascular space than normal
3. Many patients also have GI and skin losses

Barriers

Fear of (Heart) Failure

"I will flood the patient"

Barriers-debunked

- From Rivers: *% Ventilated patients*

	Hours after start of Therapy		
	0-6	7-72	0-72
Standard Therapy	53.8%	16.8%	70.6%
Early Goal Directed Therapy	53%	2.6%	55.6%
P Value		<.001	0.02

Chronic coexisting conditions--CHF:

Control 30.2%

EGDT 36.7%

N Engl J Med 2001;345:1368-1377

Impact of early fluid and amount

- Prospective, observational cohort of all ED severe sepsis or septic shock patients during 13 months
- 90,000 average ER visits
- 1,866 subjects; 53.6% were men, 72.5% were white, mean age was 72 years (SD 16.6 years),
- Mean initial lactate level was 2.8 mmol/L.
- 86% received intravenous antibiotics within 180 minutes
- 64% had intravenous fluid initiated within 30 minutes

Leismean D, et al. Annals of Emerg Med, 2016 online

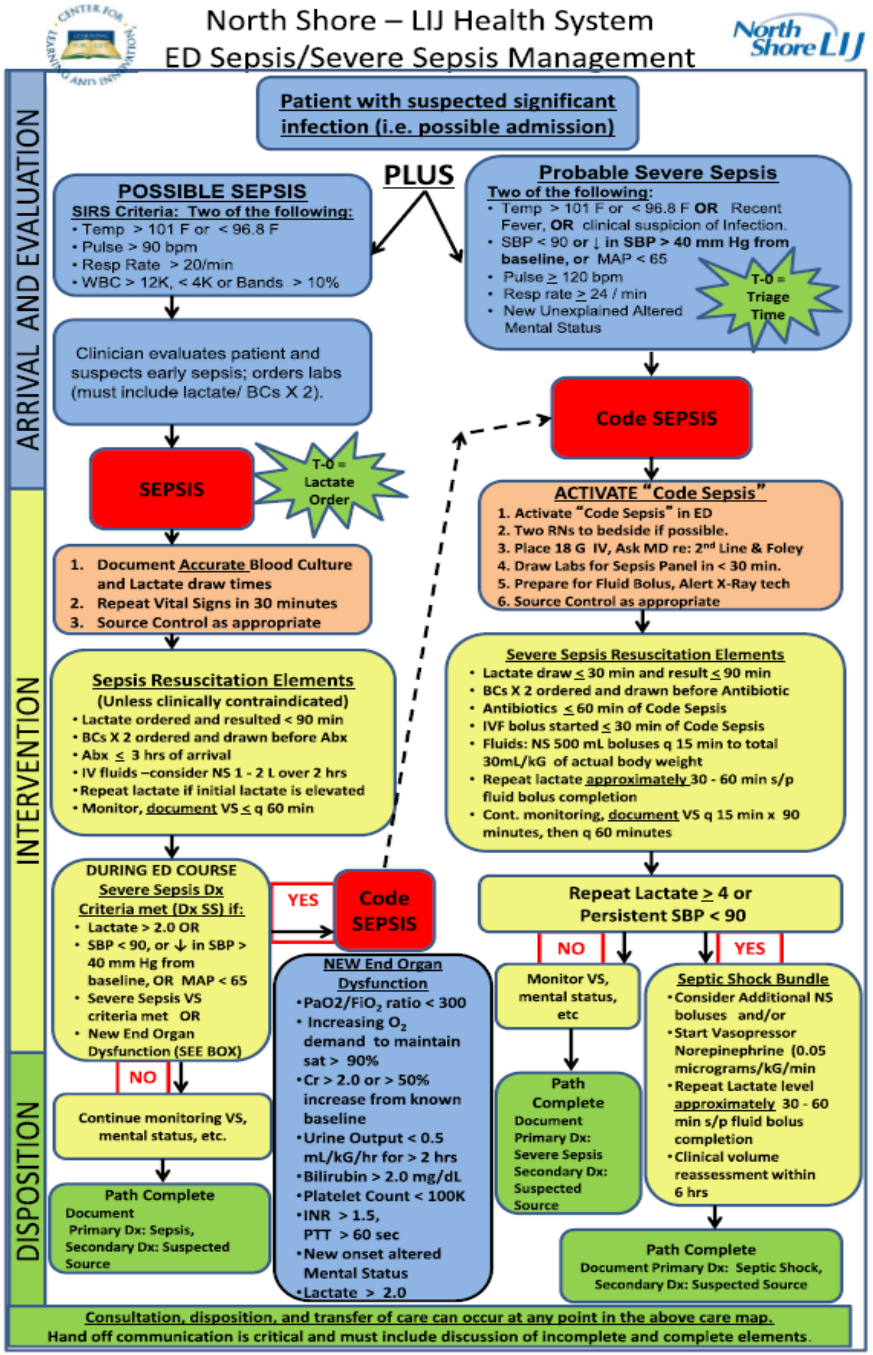

Figure 1. Sepsis algorithm and 3-hour bundle.

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Impact of early fluid and amount

Results:

- ↓ Mortality in 30 minutes group (159 [13.3%] versus 123 [18.3%])
- ↓ median hospital length of stay (6 days versus 7 days)
- Adjustment for age, lactate, hypotension, acute organ dysfunction, and Emergency Severity Index score, intravenous fluid within 30 minutes was associated with lower mortality
- ↑ mortality with later fluid administration
  - 13.3% (30 minutes) versus 16.0% (31 to 60 minutes) versus 16.9% (61 to 180 minutes) versus 19.7% (>180 minutes)

Leismean D, et al. Annals of Emerg Med, 2016 online

Multicenter Implementation of a Treatment Bundle for Patients with Sepsis and Intermediate Lactate Values

- Before and after implementation of the intermediate lactate bundle for patients with sepsis (POA) hospitalized at 21 community hospitals in northern California

- Sample: 18,122 with sepsis and intermediate lactate values

- Bundle included: after initial lactate obtained—antibiotics administered, repeat lactate (within 1-4 hrs from first lactate) and 30ml/kg fluid bolus or at least 2 Liters.

Multicenter Implementation of a Treatment Bundle for Patients with Sepsis and Intermediate Lactate Values

Results:

- Full bundle compliance increased from 32.1 to 44.9% (p<0.01)
- Hospital mortality went from 9.3% to 7.9% (p=0.02)
- Decrease in hospital mortality was observed primarily in patients with heart and/or kidney failure (p<0.04)

Table 4. Hospital Mortality in Heart Failure and Chronic Kidney Disease Subgroups

	n	Mortality (%)			P Value
		Prior (2011)	Prebundle (2012)	Postbundle (2013)	
All patients	18,122				
Hospital		8.8	9.3	7.9	0.02
30 d		13.7	14.1	12.6	0.03
History of heart failure	4,144				
Hospital		13.0	14.8	11.6	0.03
30 d		18.8	20.7	17.8	0.13
History of kidney disease	6,285				
Hospital		9.7	11.5	7.5	<0.01
30 d		15.9	17.7	13.3	<0.01
Heart failure or kidney disease	8,322				
Hospital		10.7	12.5	8.7	<0.01
30 d		16.8	18.3	14.5	<0.01
No heart failure or kidney disease	9,800				
Hospital		7.4	6.5	7.2	0.40
30 d		11.3	10.5	10.8	0.60

Reassessment for volume status and perfusion

- Team decide how to support all options in table 1
  - Focused exam—templated notes? Specific form? Making sure it is done between hour 3-6
  - Do you have all the correct equipment and tools and training for:
    - CVP (IJ, Subclav or femoral)
    - ScvO2 (intermittent vs continuous)
    - Bedside cardiovascular ultrasound
    - Dynamic assessment of fluid responsiveness with passive leg raise or fluid challenge (must be able to monitor CI, SV—pulse contour technology, non-invasive or PA catheter,)

Focused Examination

- Vital Signs
  - Temp, HR, BP, RR
- Cardiopulmonary
  - Rhythm, S1/2/3/4, presence of murmur and lung sounds
- Peripheral Pulses
  - 1+, 2+ or absent
- Capillary Refill
  - Brisk, <2 sec, >2 sec
- Skin
  - Mottled vs no mottling, to what level. Warm vs cold, etc

Tools to Assist with Consistent Application of the Evidence

- Identify tools to assist bedside staff to implement bundles
  - algorithm, pathway, checklist, pocket cards, (see appendix)
- Create protocols
  - For positive screen: lactate, blood cultures and fluids
  - When patients need ICU level care
- Code Sepsis
- Multidisciplinary Rounds
- Handoffs
- Real time review and feedback

Develop a Protocol Based on the SSC Guidelines

- Obtain lactate when have 2 SIRS and suspected infection
- When screen positive for severe sepsis:
  - Nurse protocol to draw labs and give fluid bolus
  - Protocol done by RRT/Medical Response Team or all nurses
- Get medical staff approval

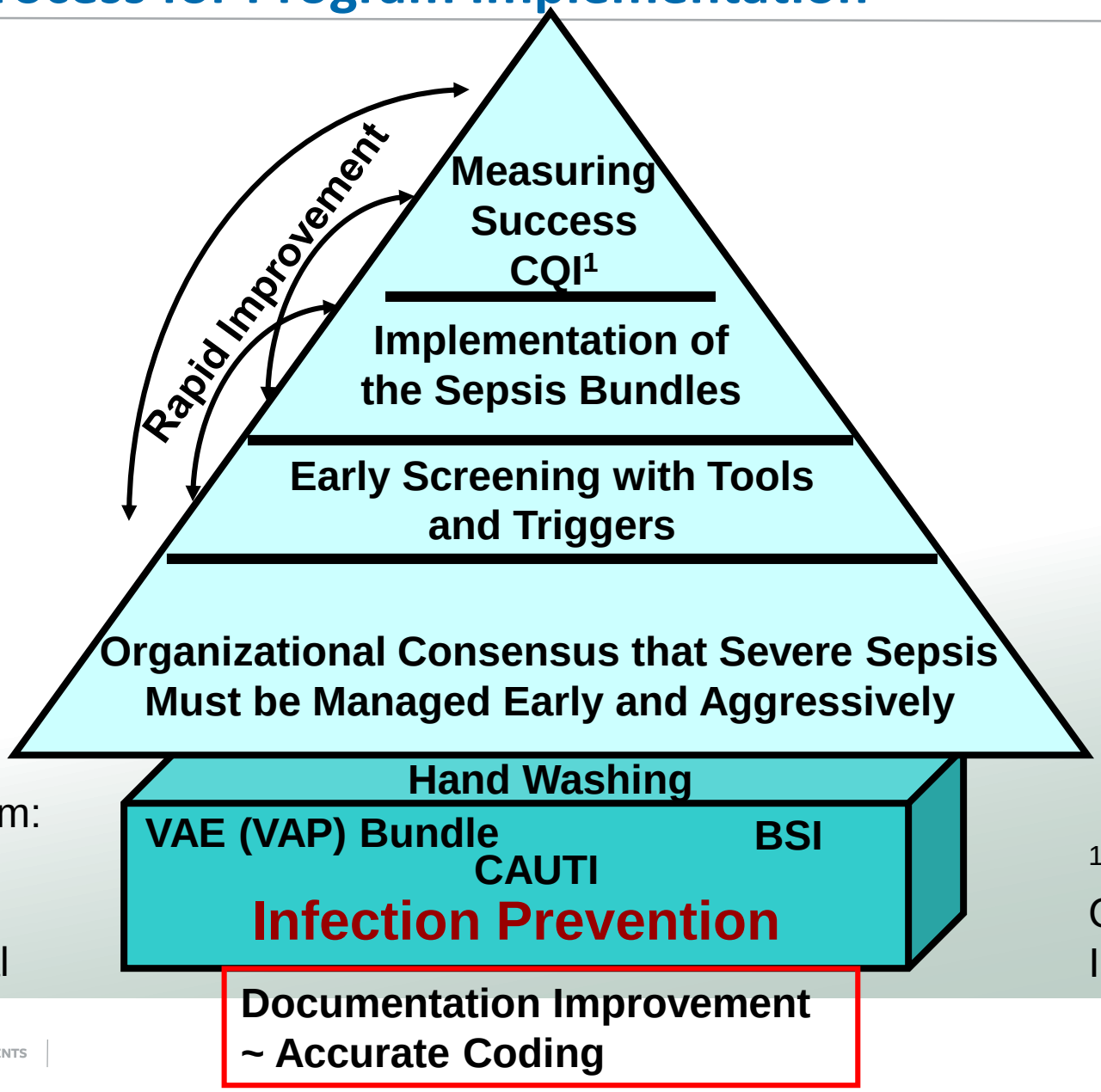
Tier III: Develop & Implement the Education Plan

- **Content:** (present to physicians, nurses and RTs)
  - Significance of problem
  - Sepsis continium
  - Pathophysiology of severe sepsis
  - Prevention and management (share the evidence)
  - Case studies for staff to practice with bedside tools
- **Methods**:
  - Self learning modules
  - Classroom and/or small groups of staff on unit
  - Web-based: IE: clinicaledonline.com
- **Ongoing**:
  - build into orientation,
  - monthly for residents,
  - one-on–one during rounds

TIER III: Develop Implementation Plan

- Identify who will oversee the implementation and the expectations of that person(sepsis nurse or program coordinator)
- Define ICU/ED resources for staff that they can call at any time for questions and assistance
- Create rounding schedule and process
  - Should begin as daily in the ICU and ED
  - Keep master list of all patients who go on the bundles (and those who should have but didn't if possible)
  - Do real time interventions to ensure patients get the evidence based practices
  - Define follow up process for review and evaluate missed opportunities

Sepsis Practice Collaborative Model
4 Tier Process for Program Implementation



Adapted from: Sepsis Solutions International

[1]Continuous Quality Improvement

Tier IV: Measurement Milestones and Checklist

- Define outcome and process data elements that will be collected
- Develop and implement a data collection process
- Revise and update goals and action plan as needed
- Execute implementation plan
- Continuous improvement

Data collection

- Patient log
  - Define how will find all patients that receive the bundles
  - Real time data collection is optimal — then used as checklist to ensure patient receives all appropriate interventions
- Outcome
  - Mortality (ICU and Hosp)
  - Hosp LOS
  - Cost per case (total and direct)
- Process
  - Core measures
  - Data elements that measure implementation of 3 hour and 6 hour bundle

Common challenge: Insufficient feedback, data and accountability

Strategies:

Sepsis Team (core group)

- Monthly multidisciplinary sepsis team meeting with consistent attendance
  - nursing and physician champions
  - lab, pharmacy, and radiology as needed
- Accountable executive understands the role, holds team accountable and assists with problem-solving and removing barriers
- Timely feedback (data) to the team providing care to the sepsis patients

Common challenge : Insufficient feedback, data and accountability

Strategies:

- Set goals/expectations for sepsis program
- Use examples of hospital patients in case studies for education of staff (good outcomes and bad)
- Review data at:
  - Sepsis team meeting
  - Quality meeting
  - Patient safety meeting
  - Unit based meetings
  - Medial staff/department meetings
  - Board meeting
- Provider specific data on compliance with bundle elements *and* patient outcomes, compared to the goal
- Individual case feedback based on case reviews

Feedback to individual providers

Patient Initials: **Abstractor Name & Date:**

Severe Sepsis/Septic Shock Feedback Report - MICU

The purpose of this report is to give feedback on the below listed patient recently treated for Severe Sepsis/Septic Shock, and to emphasize the current quality improvement initiative related to Sepsis. We welcome your input and clinical expertise on opportunities that might help us improve on any of these measures.

Performing all the elements within the resuscitation bundles listed below in a timely manner can significantly reduce mortality of our Severe Sepsis and Septic Shock patients. Thank you for your dedication and care for these patients. If you have any questions, please contact Dr._____, MICU Sepsis Champion

Patient Name:	**FIN:**
ED Arrival Date & Time:	**ED RN:**
ED Physician:	**ED Resident:**
Floor Arrival Date, Time, & Unit:	**Pt Transferred From:**
ICU Arrival Date & Time:	
Attending:	**Resident:**
RN:	**PRISM Score:**
Severe Sepsis:	**Septic Shock Time (Time Zero):**
Severe Sepsis/Septic Shock Clinical Pathway:	**Code Sepsis Paged:**
Date/Time Criteria Infection:	
Date/Time Criteria SIRS:	
Date/Time Criteria Organ Dysf:	

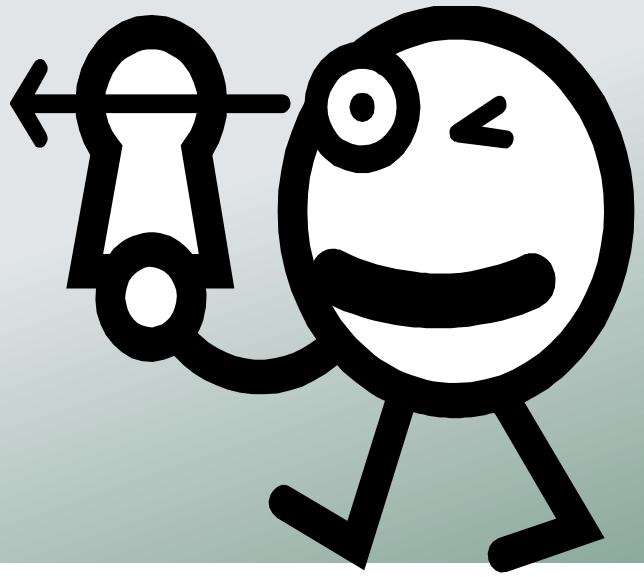
Sepsis Quality Indicators

	Date & Time	Result	Goal Met (Y/N)	Goal
3 Hour Measures				
Lactic Acid				Drawn within 3h of Severe Sepsis (Look 6hrs Prior)
Blood Cultures before Antibiotics				Drawn before ABX (Look 48hrs Prior)
Broad-Spectrum Antibiotics				Hung within 3h of Severe Sepsis (Look 24hrs Prior)
30mL/kg Fluid Bolus Weight in kg:				As Fast As Possible. Infused within 3h of Severe Sepsis
Central Line Placed, If Requires Vasopressors				Placed within 2h of Vasopressor Start
6 Hour Measures				
Vasopressor Started for SBP < 90 or MAP ≤ 65mmHG After Fluid Bolus				Started 1hr of Persistent Hypotension After Initial Fluid Bolus
CMS Requirement- Vasopressor Started for SBP < 90 or MAP ≤ 65mmHG After Fluid Bolus				CMS Requirement-Started within 6h of Septic Shock
Repeat Focused Exam by MD/AP (VS, Cardiopulm, Cap Refill, Pulse, AND Skin Findings) OR 2 Measures (CVP, ScVO2, Bedside Cardiovascular Ultrasound, SVOptimization with Fluid Challenge/Passive Leg Raise)				Documented within 6h of Time Zero
Repeat Lactic Acid				Repeat within 6h of Time Zero >2

Comments:

GREAT LAKES PARTNERS FOR PATIENTS

I have all this data, what's next??



Role of data

- Outcome data
  - Share with staff and administration to keep momentum going
  - Helps convince/move skeptics
- Process data
  - Celebrate small successes
  - Helps identify where opportunities for improvement still exist

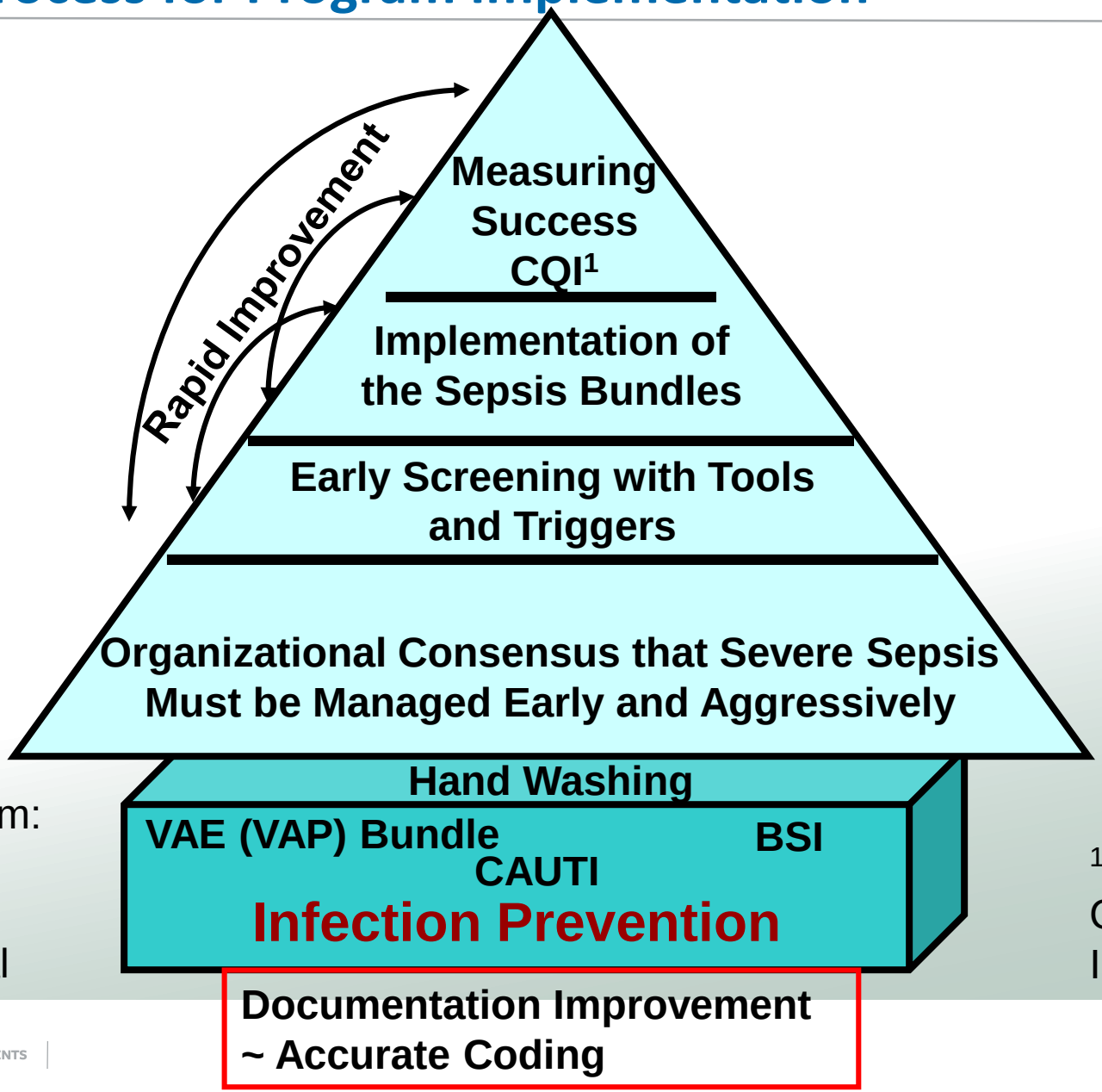
Where are you at now?

- Analyze your hospital's current state
  - Go and See process
  - Compare your current practices with the listed best practices (needs assessment)
  - Honest and non-judgmental: you want to understand variation now
- Create a list of gaps/opportunities

Identify gaps in application of evidence

- Set performance targets
  - IE: 90% compliance with obtaining lactates in 3 hours
- Prioritize area to work on first
  - Focus on screening and the 3 hour bundle first then move to the 6 hour bundle
- Understand the 'why' there are gaps
  - "Go and see" — walk the process, talk with front line staff
  - Cause and effect — Fishbone
- Define action plan
  - Can use IHI Model for Improvement
  - PDCA — tests of change

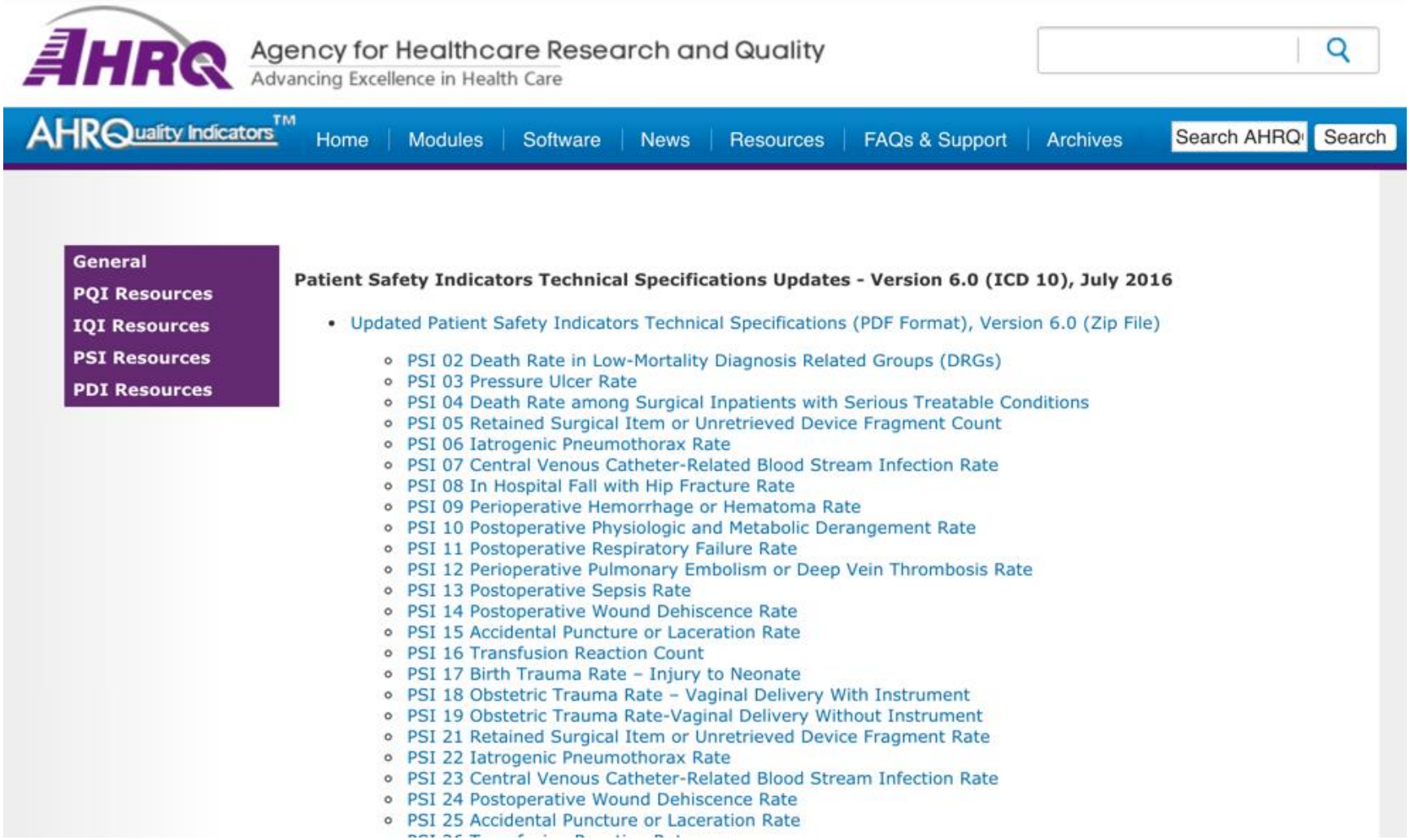
Sepsis Practice Collaborative Model
4 Tier Process for Program Implementation



Adapted from: Sepsis Solutions International

[1]Continuous Quality Improvement

What are patient safety Indicators anyway? They make up the PSI 90: part of VBP, Star, Hospital compare, USNWR, Leapfrog… etc. etc.



WHY PSI13?

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Postoperative sepsis in the United States

Todd R. Vogel, MD MPH, **Viktor Y. Dombrovskiy, MD PhD MPH**, **Jeffrey L. Carson, MD***, **Alan M. Graham, MD**, and **Stephen F. Lowry, MD**
Robert Wood Johnson Medical School, Department of Surgery, The Surgical Outcomes Research Group, New Brunswick, New Jersey.

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Table 3

Case-mix adjusted rates of postoperative sepsis and mortality in major groups of surgical procedures.

Groups of surgical procedures	Incidence rates of sepsis, %			Mortality rates, %					
				With sepsis			Without sepsis		
	mean	95% CI	rank	mean	95% CI	rank	mean	95% CI	Rank
Esophageal surgery	3.84	3.54,4.13	1	33.43	30.11, 36.76	4	1.94	1.72, 2.16	1
Pancreatic surgery	3.17	2.98,3.35	2	31.93	29.31, 34.54	6	1.52	1.39, 1.65	2
Gastric surgery	2.84	2.76,2.92	3	33.12	31.61, 34.63	5	1.31	1.25, 1.37	3
Small bowel surgery	2.75	2.61, 2.89	4	23.96	21.83,26.08	11	1.05	0.96, 1.14	8
Gallbladder surgery	1.80	1.70, 1.90	5	18.68	16.64, 20.73	13	0.76	0.70, 0.83	10
Hepatic surgery	1.74	1.59,1.89	6	36.37	32.48, 40.25	3	1.22	1.09, 1.35	4
Splenic surgery	1.59	1.38, 1.81	7	29.68	24.09, 35.27	9	1.13	0.95, 1.32	7
Adrenal surgery	1.48	1.20, 1.76	8	39.60	29.24, 49.96	2	0.68	0.49, 0.88	11
Vascular surgery	1.40	1.35, 1.44	9	31.63	30.15, 33.11	7	0.93	0.90, 0.97	9
Colorectal surgery	1.19	1.16, 1.22	10	24.50	23.50, 25.49	10	0.63	0.61, 0.65	12
Cardiac surgery	1.11	1.09, 1.14	11	30.79	29.65, 31.94	8	1.17	1.14, 1.20	6
Thoracic surgery	0.99	0.95, 1.04	12	45.90	43.83, 47.97	1	1.18	1.13, 1.23	5
Hernia surgery	0.84	0.78, 0.90	13	22.99	20.18, 25.80	12	0.40	0.36, 0.44	14
Thyroidectomy	0.49	0.37, 0.61	14	7.30	0.92, 13.69	15	0.59	0.46, 0.72	13
Breast surgery	0.29	0.23, 0.35	15	16.43	8.81, 24.05	14	0.37	0.31, 0.44	15

Table 1. Summary of Component Weights in PSI 90, v5.0 and v6.0

PSI	Indicator	Component Weight PSI 90 (v5.0)	Component Weight Modified PSI 90 (v6.0)	Percentage Difference in Weights
PSI 03	Pressure Ulcer Rate	0.033006	0.03633	10.1%
PSI 06	Iatrogenic Pneumothorax Rate	0.075069	0.09736	29.7%
PSI 07	Central Venous Catheter-Related Blood Stream Infection Rate	0.037684	—	n/a
PSI 08	In-Hospital Fall with Hip Fracture Rate	0.001796	0.00879	389.4%
PSI 09	Perioperative Hemorrhage and Hematoma Rate	—	0.15026	n/a
PSI 10	Postoperative Acute Kidney Injury Rate	—	0.04915	n/a
PSI 11	Postoperative Respiratory Failure Rate	—	0.21544	n/a

PSI	Indicator	Component Weight PSI 90 (v5.0)	Component Weight Modified PSI 90 (v6.0)	Percentage Difference in Weights
PSI 12	Perioperative Pulmonary Embolism and Deep Vein Thrombosis Rate	0.337900	0.18429	–45.5%
PSI 13	Postoperative Sepsis Rate	0.057308	0.24132	321.1%
PSI 14	Postoperative Wound Dehiscence Rate	0.018205	0.00890	–51.1%
PSI 15	Unrecognized Abdominopelvic Accidental Puncture/Laceration Rate	0.439030	0.00815	–98.1%

Note: Weights may differ in the final released version of the software.

AHRQ PSI 13

- **What is AHRQ PSI 13?**
  - Retrospective, observational, non clinical coded administrative data
  - Based on Hospital Technical/DRG bill
  - Coding is new data which is at least a generation or two removed from live patient data
  - Rationale: (guess based on inclusion/exclusion) How do I find elective surgical cases with complications that are significant.
  - Likely from the perspective of the community hospital (4 day LOS?)

What is the Focus?

- Your first and most important prevention goal for this measure is to do safe and effective surgery and perioperative care, with as few adverse events as possible

- IF patients do not have adverse events, they will not have PSI 13
- IF patient do not get infections, they will not have PSI 13
- IF patients do not get sepsis from their initial infections, they will not have PSI 13

What can you do to improve you PSI 13 rate?

- Team that will look at this metric (can be your sepsis or a surgical quality team)
- Partner with Infection Preventionist
- Join robust quality teams including subspecialty surgical teams related to quality collaboratives. National NSQIP as well as Michigan BCBS collaboratives. All tracking acuity adjusted outcomes. Surgical optimization and Surgical Home
- Understand your data --- who is getting PSI 13
- Understand the coding process for post op sepsis
  - Coding queue for review prior to billing
- Quality team can review case prior to final billing
  - Tend to find cases of POA infections, or misdocumentation, especially unspecificed shock… or sepsis as a working diagnosis that was not confirmed.
- CDI (clinical documentation specialists) teams working with infection teams
- Near Real Time electronic tools: finding infections early, finding sepsis and shock early and mobilizing CDI and IC team to interract with the team.

Keys to Success

- Team in place with key stakeholders overseeing implementation
- Project coordinator with lead clinical staff on each unit
- Sepsis resource/coordinator rounds frequently on units
- Strong physician leadership on team
- Reminders to staff through use of bedside sepsis tools/checklist
- Empowerment of nursing staff to prevent errors
- Administrative support to help manage barriers
- Review data monthly to identify opportunities for improvement-real time follow up whenever possible
- Provider specific feedback or report cards related to performance
- Support from a collaborative
- EDUCATION, EDUCATION, EDUCATION

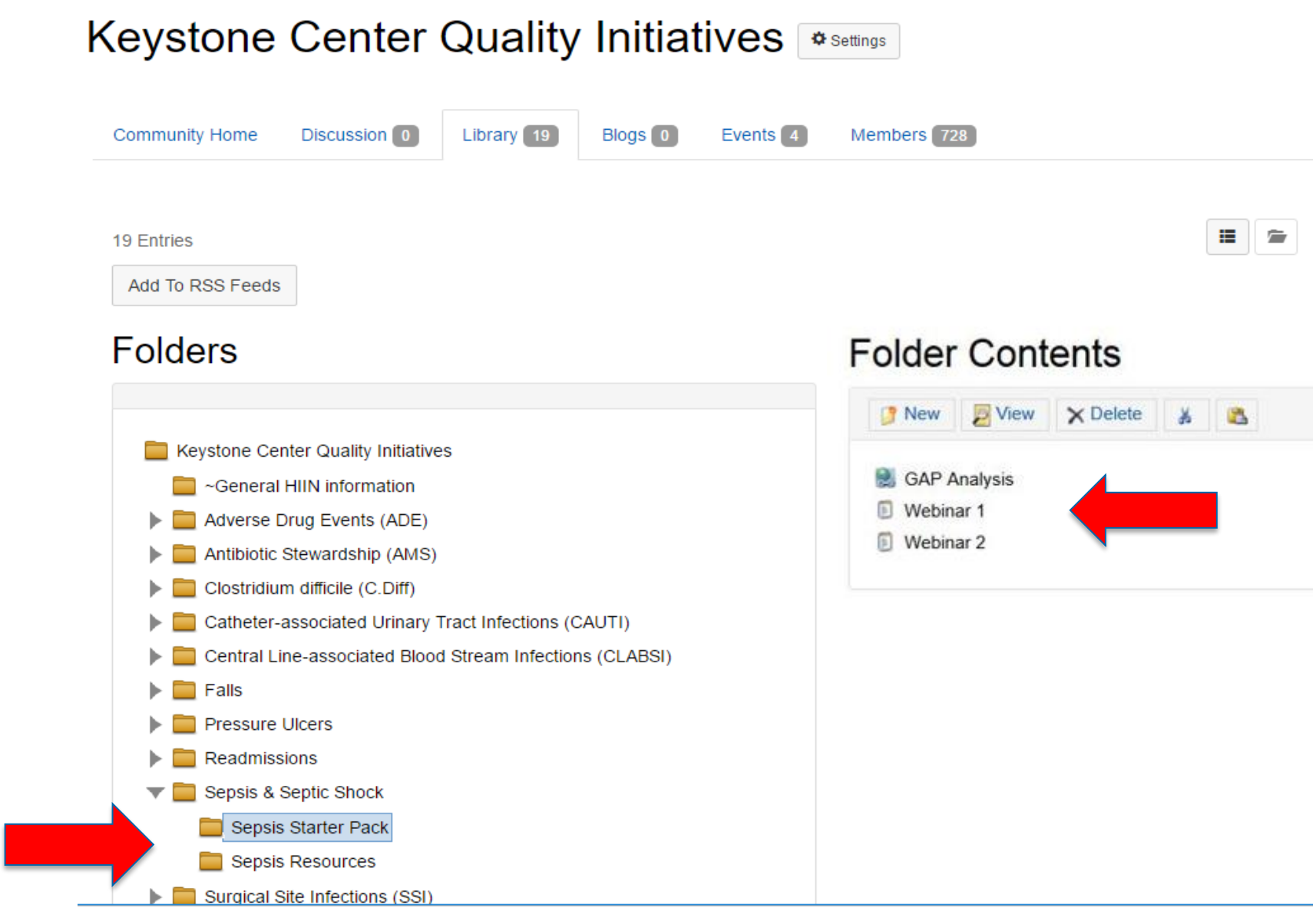
Measuring Progress

- HIIN Measures
  - Post-Operative Sepsis (PSI-13): Postoperative sepsis cases (secondary diagnosis) per 1,000 elective surgical discharges for patients ages 18 years and older.
    - *Numerator - Number of discharges with diagnostic code for sepsis in any secondary diagnosis field.*
    - *Denominator – Number of elective surgical discharges age 18 and older defined by administrative codes for an operating room procedure*
  - Sepsis Mortality Rate: Severe sepsis/septic shock mortality rate
    - *Numerator – Number of patients with discharge status of expired*
    - *Denominator – Total number of patients with principle or secondary diagnosis code of severe sepsis or septic shock*
- Data for above measures administrative claims, no manual entry
- Performance reports for above measures are available in KDS for all GLPP hospitals.

Resources

- AHRQ CUSP Toolkit
- Sepsis Alliance –Surviving Sepsis Campaign bundles
- Surviving Sepsis Campaign implementation kit
- AHRQ Innovations Exchange: Sepsis alert program leads to more timely diagnosis and treatment, reducing morbidity, mortality, and length of stay
- AHRQ Innovations Exchange: Nine-hospital collaborative uses patient screening criteria, fast-track diagnosis, and treatment protocols to reduce sepsis mortality by approximately 50 %

Where to find the Resources



Next Steps…

- Perform your Gap Analysis
- Access the resources provided - make notes and ask questions
- View Webinar #2
  - How to engage and involve stakeholders
  - Learn about PDSA and Small Tests of Change
- Keystone Calendar of Educational Events
  - Quality Essential Skills Training (QuEST)

[HTTP://WWW.GREATLAKESPFP.ORG/](http://www.greatlakespfp.org/)