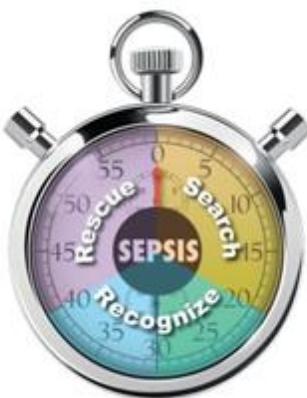


# Using Performance Measure Results for Data-Driven Quality Improvement

Sepsis Recognition and Care



Advocate Condell Medical Center

# Objectives

- This presentation will provide:
  - Historical perspective of the development of a systematic evidence based performance improvement process (Severe Sepsis)
  - Discuss the role of multidisciplinary teams in quality improvement
  - Identify the significance of support vertically as well as horizontally through the organization
  - A description of how data drove the improvement processes for the components of a comprehensive severe sepsis response
  - Discuss utilization and impact of electronic medical record solution
    - Screening
    - Documentation
    - Power Plans vs. Sepsis Advisor
  - Conversion from outcome measurements based on SCCM Surviving Sepsis Campaign to the CMS Sep-1 Core Measure
  - Describe the process of spreading success and opportunities for improvement in quality improvement projects



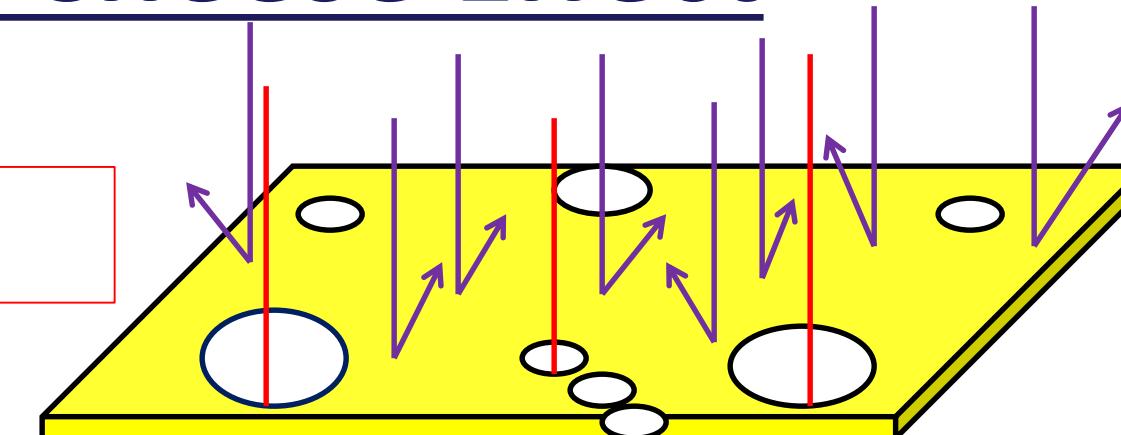
# Components to Success

- Leadership
- Tools
  - Process
  - Data Collection
- Communication
- Education
- Participation in “collaboratives”/outside opportunities
- Flexibility to scope (build from local to system)

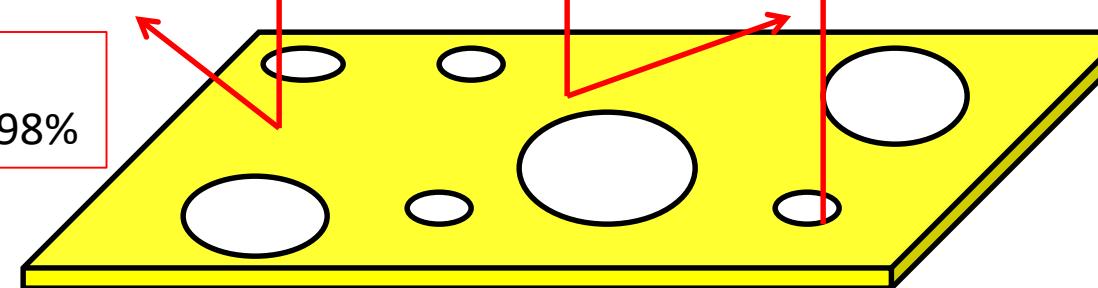


# Swiss Cheese Effect

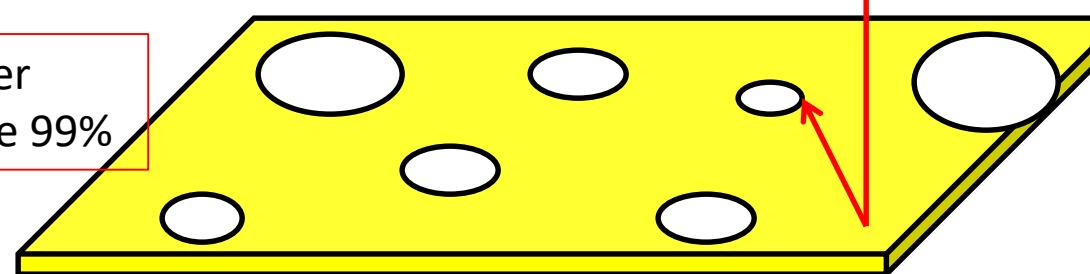
One person can only achieve 80%



Add one more layer  
People can achieve 98%

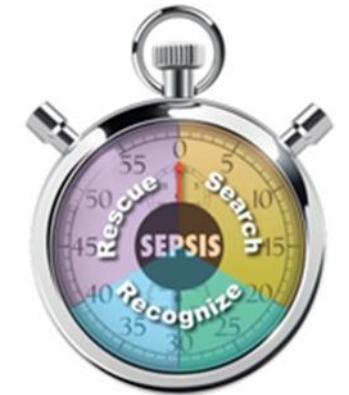


Add one more layer  
People can achieve 99%



# Starting Point

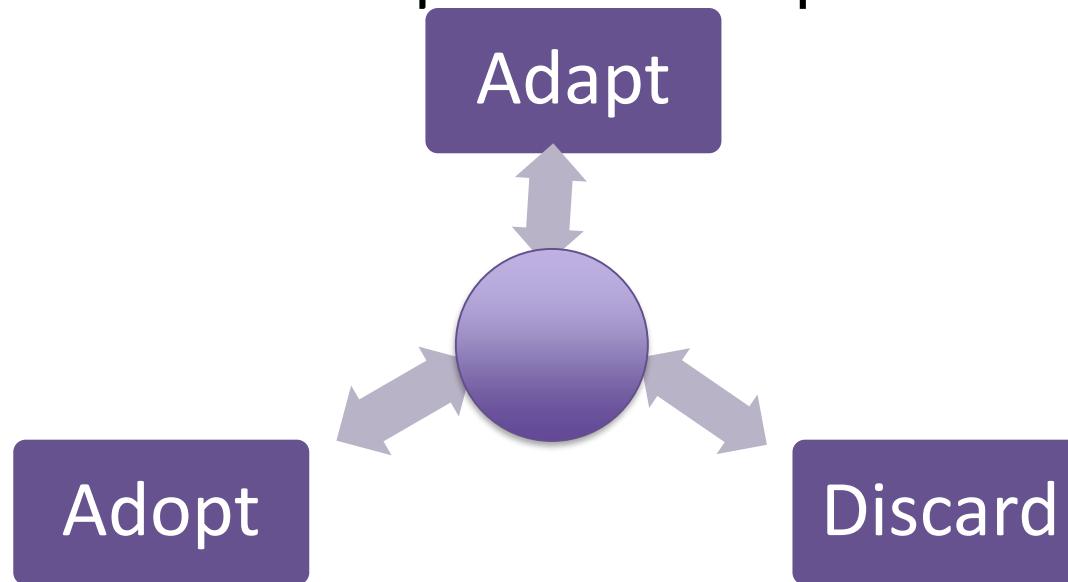
- Systematic approach to define and measure understood by the entire organization
  - Define – Measure – Analyze – Improve – Control (DMAIC)
  - Plan – Do – Act – Study (PDSA)
- Building the Team
  - Start with “Champions” who can demonstrate expert knowledge
    - ICU Intensivist
    - ICU Nurse Manager
    - System Resources – Clinical Effectiveness
  - Local senior organizational leaders to support process for success and reduction of barriers
    - Vice President of Medical Management
    - Vice President of Patient Care Services
    - Director of Quality Improvement



# PDSA Cycle

- **Start Small**
- **Build knowledge through sequential testing**
- The sequence
  - Test → Implement → Spread

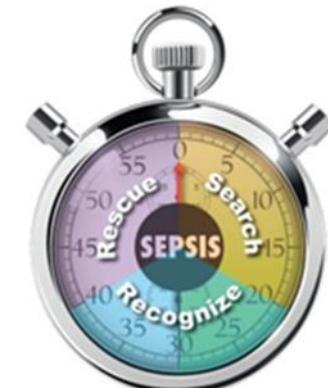
Fine tuning the change based on  
What you learned!



# Multidisciplinary Sepsis Taskforce

## Organizational Placement (Sub-committee of ICU Committee)

- Raeann Fuller, ICU Nurse Manager
- Elizabeth Wade, Performance Improvement Coordinator
- Director Medical Care Management
- ICU Intensivist
- Emergency Department Physician
- Hospitalist/Attending Physicians
- Director(s) of Nursing
- Medical Surgical Inpatient Nurse Manager (s)
- Director of Pharmacy
- Pharmacist
- Director/Manager of Laboratory Services
- Emergency Department Nurse(s) (Clinical Informatics Liaison)
- Critical Care Nurse (s)
- Medical Surgical Nurses
- Director/Manager Clinical Informatics



# Move from Local to System

## September – November, 2014

- Feedback from all ten Advocate hospitals
- Focused questions related to current sepsis processes and data collection
- Participation from:
  - Physicians
  - APNs
  - Nursing Directors and Managers
  - Staff RNs from ED, Critical Care, Med-Surg
  - Pharmacists
  - Quality specialists
  - Informatics Analysts



# What did we find?

- Sepsis awareness high, but variation in sepsis infrastructure at each site
- Nurses were very well versed in care interventions at many sites
- Nurses verbalized frustration with knowing the guidelines but unable to engage physicians to implement in timely manner
- Significant variation in screening processes in ED and in-house units
- Significant variation in Sepsis Alert process
- Physician practice varies greatly
- Fear of appropriate fluid resuscitation
- Documentation & coding issues continue
- Accountability & feedback are key
- Minimal data collection due to substantial resource intensity

**Bottom line: We fail to treat sepsis with the same urgency and consistency in practice that we employ with STEMI and stroke, yet all three are time sensitive conditions**

The site visit feedback supports our hypothesis that significant variation and lack of urgency needs to be addressed in order to improve care of our sepsis population within our system.

# Site Sepsis Programs

Hospital	Site Sepsis Team	Sepsis Screen in ED	Sepsis Protocol	Every patient, every shift, every day	Time Zero	Care Connection	Handoff ED to ICU	Sepsis Alert
1	X	X	X	X	X		Verbal over phone *RN takes pt to floor	RRT only
2	X		X			X	Verbal	RRT only
3	X	X	X	X	X	X	Verbal	Sepsis Response Team
4	X	ED screens every pt as of 10/1	X	X	X	X	SBAR	RRT only
5	X	X				X	Face to Face	RRT only
6	X	ED screens on paper				X	Verbal	RRT only
7	X	X	X			X	Telephone report *ICU RN comes to ED if patient is complex	RRT only
8	X		X				ICU RN comes to ED Verbal report to floor	RRT only
9	X		Archived			X	Verbal *ED RN brings ICU patient to unit	RRT Only *Had Sepsis Response Team few years ago, but no longer is implemented.
10	X		X			X	Verbal *ED RN brings ICU patient to unit	X *have Sepsis Response Team, but Staff usually call RRT

# “Tools” Process

- Bedside Tools
- EMR Integration
- Institutional Response – Sepsis Alert
- ALERT Nurse



# “Tools” – Screening

ORDER SET - SEPSIS ALERT: EARLY SEPSIS RECOGNITION TOOL CMC 2022 F/C 12/11

A SEPSIS ALERT is to be called when any non-ICU patient has (1) an identified or suspected infection and (2) screens positive for SIRS and (3) has one or more organ dysfunctions. The Sepsis Alert is initiated by calling the ICU Charge Nurse (ext. 27-2360).

In the Emergency Department, the RN is to notify the ED Physician with the results of this Recognition Tool and the initiation of the Sepsis Alert.

After assessment, if the patient does not meet the criteria for severe sepsis or septic shock and is to remain outside the ICU a reassessment is to be completed in 2 hours and a follow-notification to the ICU Charge Nurse.

The ICU Charge Nurse and/or the Intensivist will contact the Attending Physician for inpatients transferred to the ICU.

**SEPSIS** = Two or more of the following (SIRS) in a patient *with an identified or suspect infection*

Temperature greater than 38° C (100.4° F) or less than 36° C (96.8° F)  
 Heart rate greater than 100 (may have normal heart rate if patient is taking beta-blocker or other medications affecting heart rate)  
 Tachypnea (Respiratory Rate greater than 20 or  $\text{PaCO}_2$  less than 32 mmHg)  
 WBC less than 4000/mm<sup>3</sup> or greater than 12,000/mm<sup>3</sup> or 10% Bands  
 Serum Lactate greater than 2.0 mmol/L

AND

Organ failure exhibited by one of the following:

Altered Mental Status from baseline  
 Arterial Hypoxemia (ratio of  $\text{PaO}_2$ :  $\text{FiO}_2$  less than or equal to 250)  
 Systolic BP less than 90 mmHg or Mean Arterial Pressure less than 65 mmHg SBP decrease > 40 mm Hg from baseline  
 Ileus and/or Bilirubin greater than 2 mg/dl (34.2  $\mu\text{mol/L}$ )  
 Acute oliguria (urine output less than 0.5 ml/kg/hour for 2 hours)  
 Creatinine greater than 2.0 mg/dl or Creatinine increase of 0.5 mg/dl (if available)  
 Thrombocytopenia (Platelets less than 100,000/mm<sup>3</sup>)  
 Coagulopathy (INR greater than 1.5 or a PTT greater than 60 seconds)

Severe Sepsis is sepsis and at least one organ dysfunction/failure.

Septic Shock is severe sepsis resistant to fluid resuscitation and requiring vasopressors.

If patient meets the criteria for severe sepsis or septic shock and is admitted or transferred to the ICU, initiate the Severe Sepsis order.

**THIS IS A PERMANENT PART OF THE MEDICAL RECORD**

This patient is a candidate for the Severe Sepsis Order Set  
 This patient is NOT a candidate for the Severe Sepsis Order Set

RN's Signature: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Advocate Condell Medical Center  
Bringing medicine. Changing lives.

Advocate Condell Medical Center  
Sepsis Core Measure Worksheet

Patient Label

Date: \_\_\_\_\_ TIME ZERO SEVERE SEPSIS: \_\_\_\_\_

**SEVERE SEPSIS**

To Be Completed within 3-hours of SEVERE SEPSIS Time Zero

	Order Time	Completion Time	RN Signature
1. <input type="checkbox"/> Sepsis Alert Called/ICU Charge Nurse Notified			
2. <input type="checkbox"/> Lactate			
3. <input type="checkbox"/> Blood Cultures			
4. <input type="checkbox"/> IV Antibiotic			

To Be Completed within 6-hours of SEVERE SEPSIS Time Zero

	Order Time	Completion Time	RN Signature
5. <input type="checkbox"/> Repeat Lactate if initial Lactate > 2.0 **Please enter order to be completed 4-hours after Time Zero**			

**SEPTIC SHOCK**

Complete all of the items above (#1-#4) in addition to those below

Date: \_\_\_\_\_ TIME ZERO Septic Shock: \_\_\_\_\_

\*TIME ZERO = POSITIVE SCREEN FOR SEVERE SEPSIS + Lactate > 4.0 OR SBP < 90 or MAP < 65 after 30ml/kg fluid bolus

To Be Completed within 3-hours of SEPTIC SHOCK Time Zero

	Completion Time	RN Signature
6. <input type="checkbox"/> Fluid Bolus 30 ml/kg		

To Be Completed within 6-hours of SEPTIC SHOCK Time Zero

	Completion Time	RN Signature
7. <input type="checkbox"/> Vasopressors Started (Only if patient remains hypotensive after 30 ml/kg fluid bolus)		
8. <input type="checkbox"/> Focused Reassessment Completed by MD/PA/NP to include: <input checked="" type="checkbox"/> Vital Signs <input checked="" type="checkbox"/> Respiratory Exam <input checked="" type="checkbox"/> Capillary Refill Evaluation <input checked="" type="checkbox"/> Peripheral Pulse Evaluation <input checked="" type="checkbox"/> Skin Exam -OR- <input checked="" type="checkbox"/> Complete 2 of the following: <input checked="" type="checkbox"/> CVP <input checked="" type="checkbox"/> Central Venous Oxygen Measurement <input checked="" type="checkbox"/> Bedside Cardiovascular Ultrasound <input checked="" type="checkbox"/> Passive Leg Raise or Fluid Challenge		

Please return to the ICU/This is a PI Tool and is not part of the medical record.

Performed on: 12/07/2015 0501

**Sepsis Checklist**

Stage Date Time  
Performed on: 12/07/2015 16:42

Relevant Vital Signs and Lab Results

Heart Rate: 80 at 12/07/15 02:00  
 Respiratory Rate: 9 at 12/07/15 02:00  
 Temperature: 98.6 at 12/07/15 00:00  
 NIBP: 170/100 at 12/07/15 02:00  
 NIBP MAP: 140 at 12/07/15 02:00  
 SpO2: 100 at 12/07/15 02:00  
 Urine Output: 170 at 12/07/15 02:00  
 Lactate: 0.3 at 12/04/15 22:53  
 Bérbulin: 0.5 at 12/04/15 23:00  
 Creatinine: 0.5 at 12/04/15 05:50  
 Platelets: 163 at 12/06/15 13:30  
 INR: 1.1 at 12/06/15 16:50

Let SIRS/Sepsis Alert  
There has been no SIRS or Sepsis Alert during this encounter

Based on assessment, does the patient meet any of the following infection indicators?

- Yes  No
- Altered Mental status from baseline (especially for elderly)
- Productive cough or new infiltrate on CXR
- Presence of urinary catheter, cloudy urine, dysuria
- Open wound, drainage from any wound, acute redness/tenderness
- Acute abdominal pain, tenderness
- Documented infection and/or currently receiving antibiotics
- Recent invasive procedure
- Redness, pain, swelling, oozing at IV insertion site
- WBC >12,000 or <4,000 or >10% bands

**SIRS Criteria**

<input type="checkbox"/> None	<input type="checkbox"/> None
<input type="checkbox"/> Heart Rate > 90 bpm	<input type="checkbox"/> Hypotension: Increased Q2 Rate Requirement
<input type="checkbox"/> Respiratory Rate > 20 pm	<input type="checkbox"/> Cardiovascular: SBP < 90 or > 40 Drop From Baseline or MAP < 65
<input type="checkbox"/> Temp. > 38° C or < 36° C	<input type="checkbox"/> CNS: Altered Mental Status Unrelated to Primary Neuro Pathology
<input type="checkbox"/> White Blood Cells > 12,000 or < 4,000 or > 10% bands	<input type="checkbox"/> Renal: Urine Output < 0.5 L/kg/Hour or Creatinine > 2.0 or Increase > 0.5 from Baseline
	<input type="checkbox"/> Hematologic: Platelets < 100,000 or INR > 1.5
	<input type="checkbox"/> Hepatic: Serum Total Bilirubin > 2
	<input type="checkbox"/> Metabolic: Lactate > 2

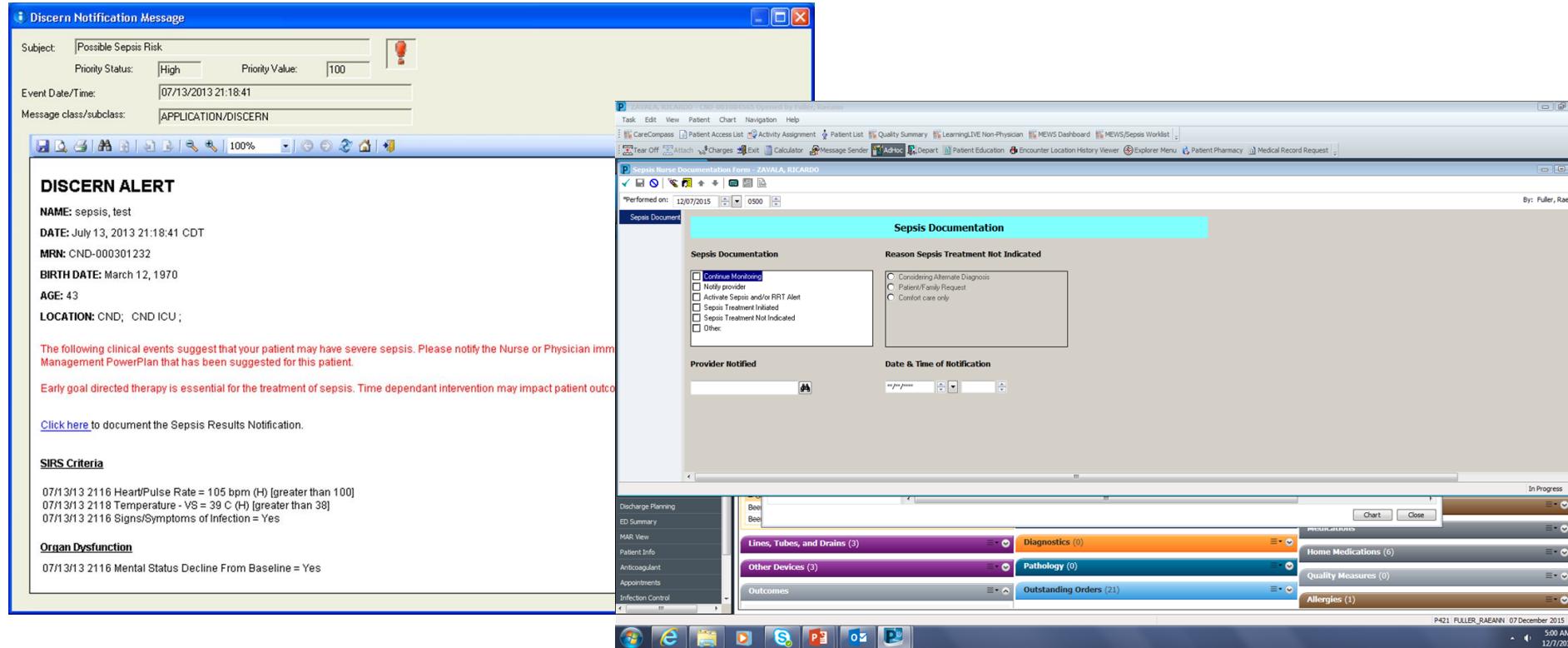
**Organ Dysfunction Criteria NOT Related to Chronic Condition**

If 2 SIRS + 1 Organ Dysfunction Criteria Met, Continue Through Form and Activate Sepsis Treatment  
If Not Met, Stop Form



Advocate Condell Medical Center

# “Tools” Documentation



...Sepsis physician note



Advocate Condell Medical Center

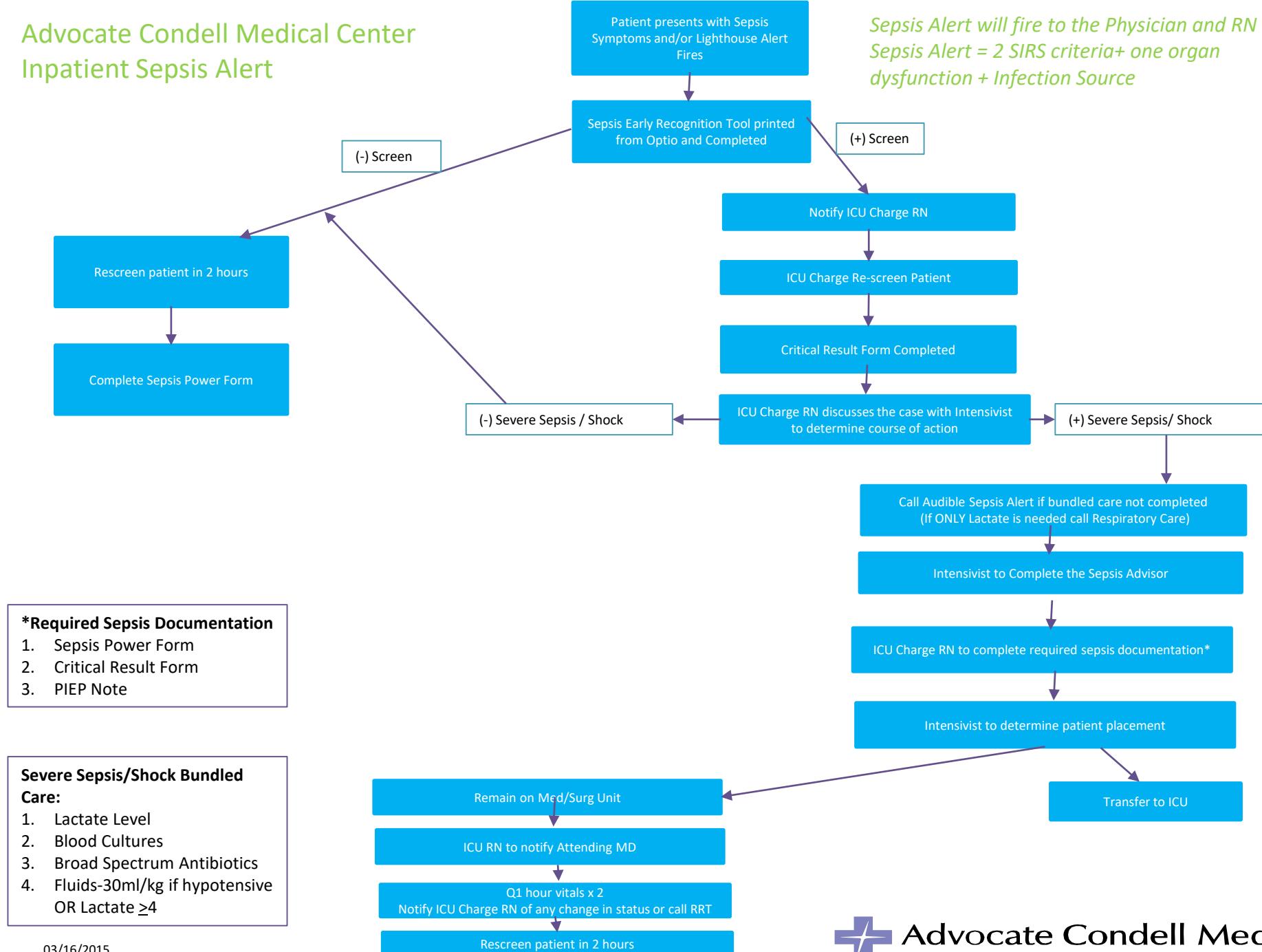
# Sepsis Alert Process

- Disease Specific RRT
  - House wide response (ED, Outpatient and Inpatient)
  - Call to the ICU Charge Nurse 27-2777)
  - Patient Assessment by ICU Charge Nurse
  - ICU Charge Nurse Collaboration with Intensivist
  - Orders if appropriate
  - Collaboration with appropriate physician based on patient location
  - Audible ALERT for Medical Surgical patients **IF** they need CCP and base labs
    - Laboratory
    - Pharmacy
    - Respiratory Therapy



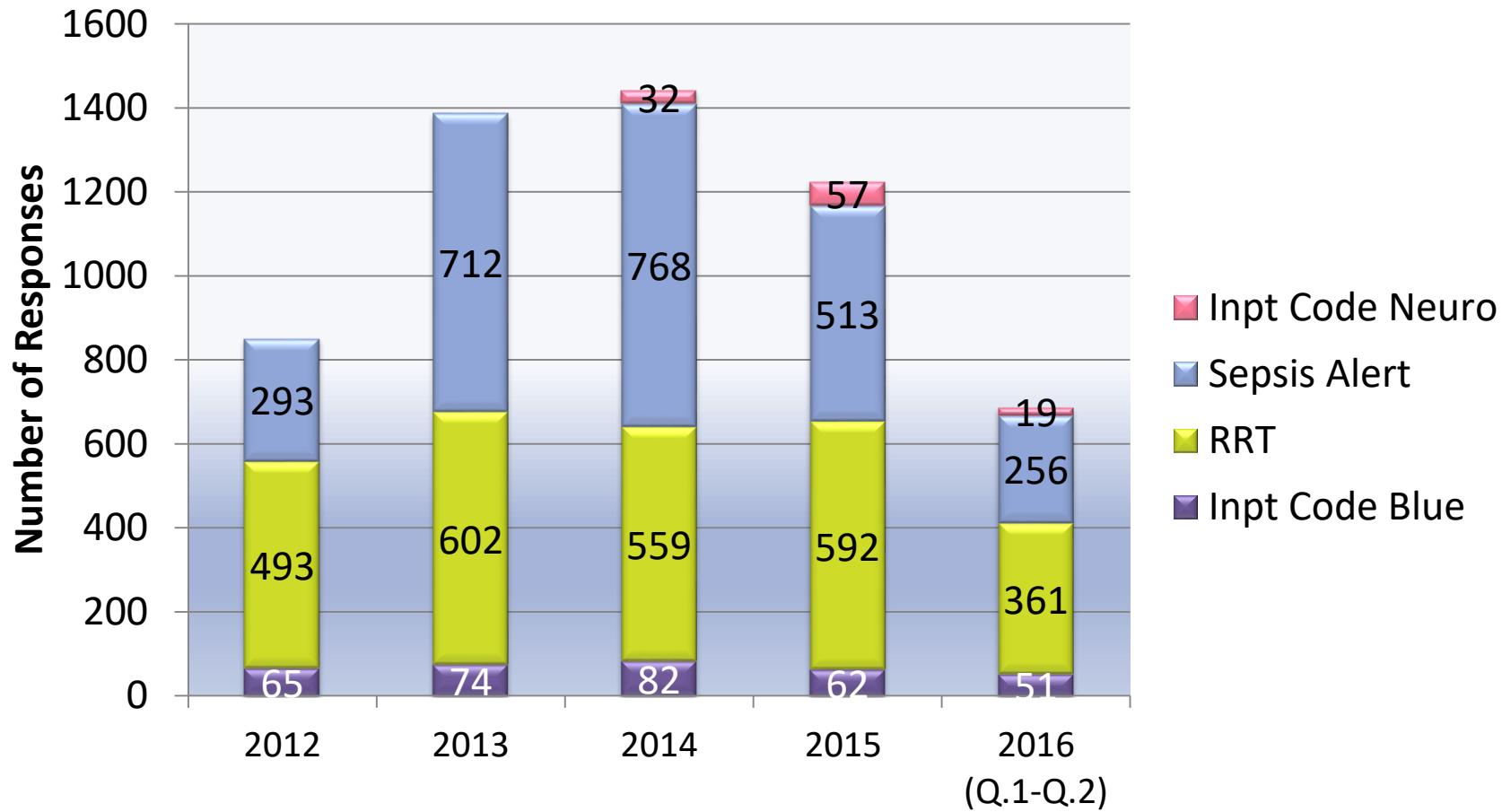
# Advocate Condell Medical Center

## Inpatient Sepsis Alert



Advocate Condell Medical Center

# ICU Emergency Response 2012-2016



Advocate Condell Medical Center

# ALERT Nurse for Condell

- Always
- Launch
- Early
- Rapid
- Treatment



*Goal: Development of Sepsis Coordinators for each Advocate Hospital Site*



Advocate Condell Medical Center

# Communication and Education

- Overall Multidisciplinary Teams
- Ad hoc for special situations i.e. Lactate process
- Results Every Where and Often
  - ICU Committee (nursing and medicine)
  - Emergency Department (nursing and medicine)
  - Quality Medical Oversight Council
  - System level
    - Sepsis collaborative
    - Critical Care
    - Key Result Area



Make it Real!!!!!!

## What do These People Have in Common?

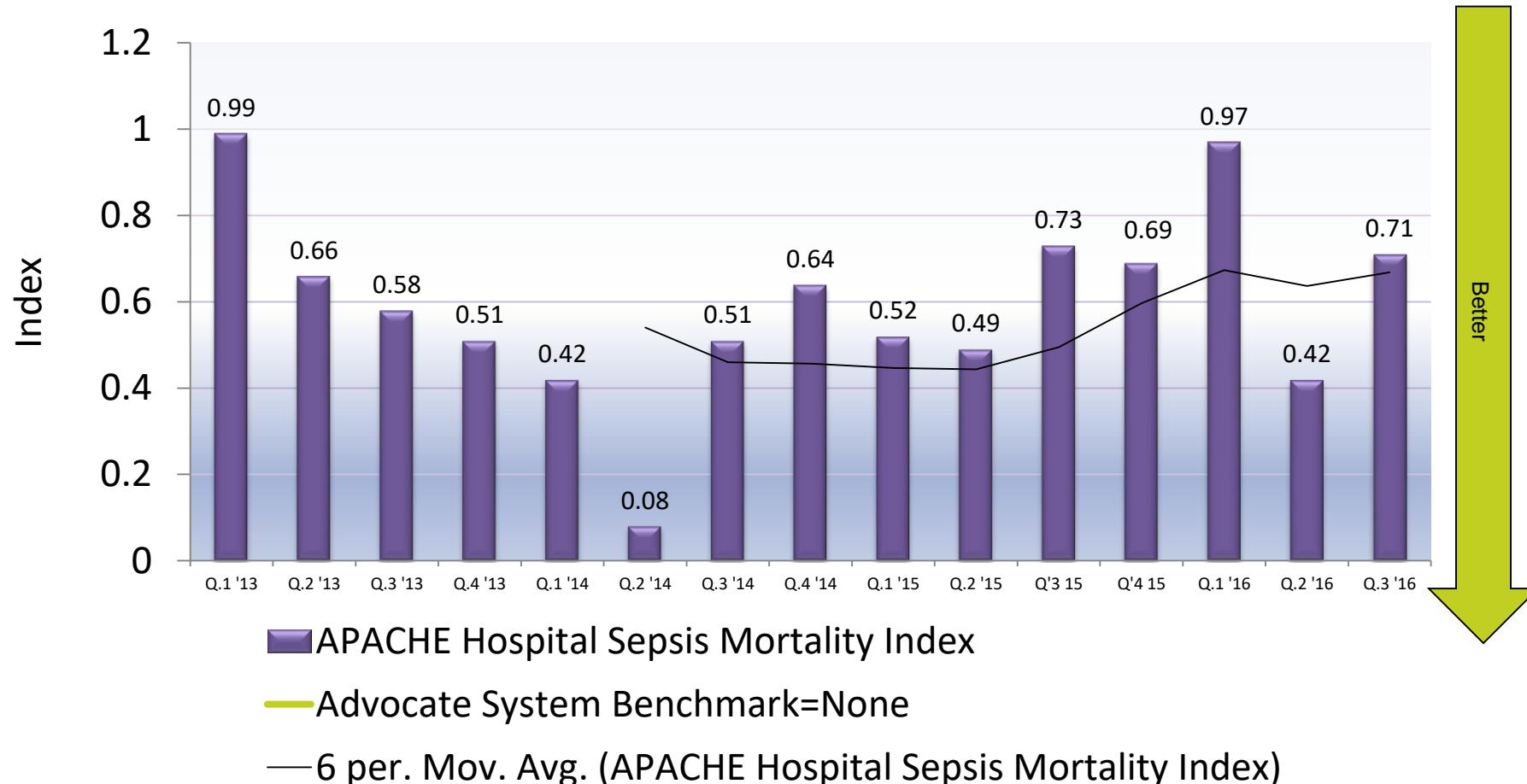


They all died  
from sepsis



Advocate Condell Medical Center

# Hospital Sepsis Mortality Index-APACHE



Source: APACHE Data eICU

 Advocate Condell Medical Center

# System Sepsis Dashboard

Condell

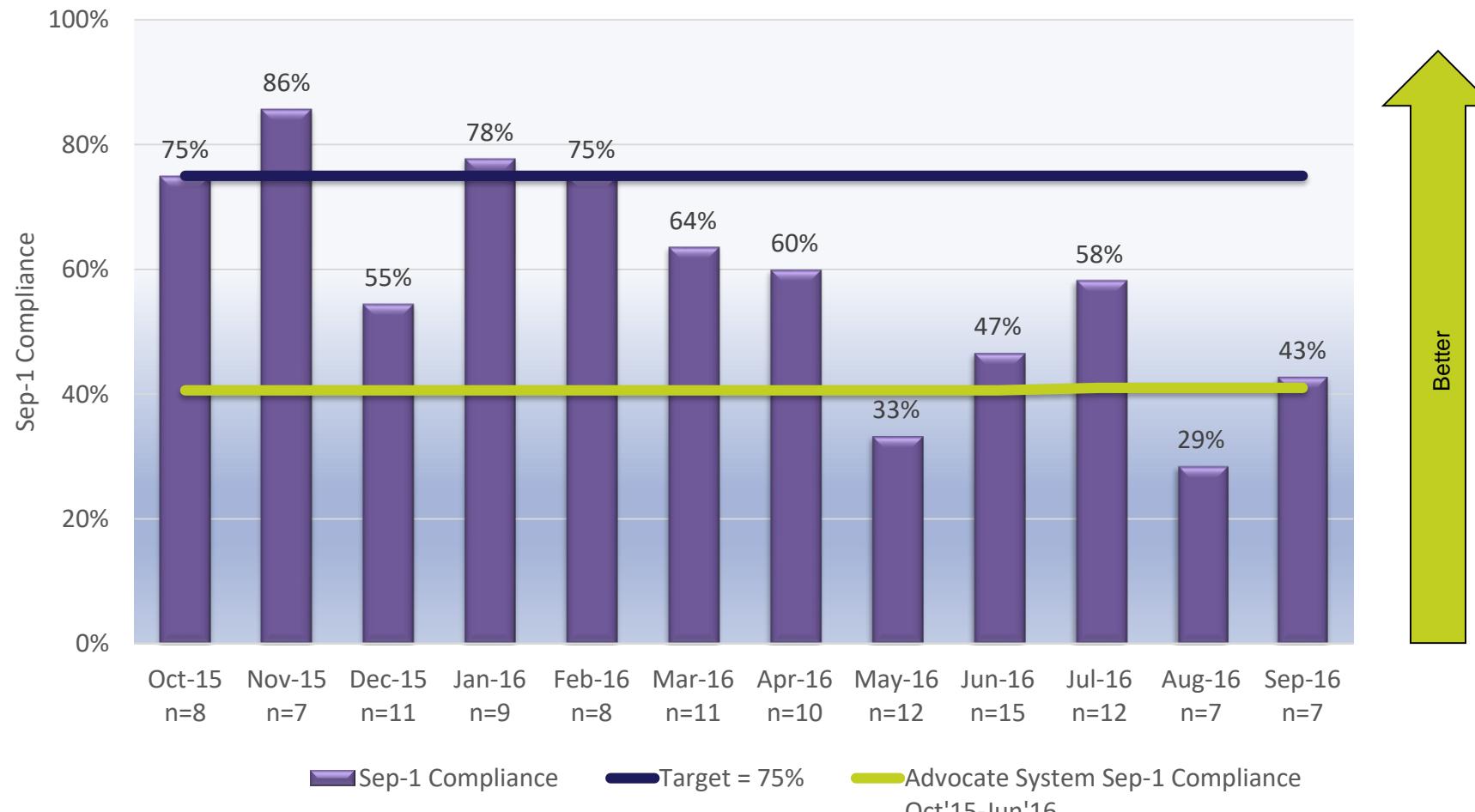
ALL SEPSIS														
	Target	Baseline	2016							Comparing YTD Timeframes				Desired Direction
			2014	Jan	Feb	Mar	Apr	May	Jun	Jul	2014	2015	2016	% △ (2015-2016)
COND														
Cases		949	82	102	125	82	76	95	96	545	634	658	3.8%	↗
Percentage of Septic Shock		24.6%	18.3%	12.7%	19.2%	13.4%	14.5%	22.1%	16.7%	28.6%	20.3%	16.9%	-17.1%	↗
Bundle Compliance			77.8%	75.0%	63.6%	60.0%	33.3%	46.7%	58.3%					↗
ALOS Index		0.86	0.92	0.93	0.83	0.84	1.00	0.86	0.80	0.86	0.89	0.88	-1.3%	↗
ALOS		7.15	7.57	6.99	6.96	7.04	8.76	7.65	6.38	7.48	7.35	7.27	-1.1%	↗
Mortality Index		0.97	1.11	0.27	1.20	2.12	1.02	1.41	0.88	0.89	1.05	1.12	6.7%	↗
Mortality Rate		17.6%	13.4%	12.7%	13.6%	22.0%	9.2%	16.8%	22.9%	16.7%	15.0%	15.8%	5.5%	↗
Readmission Index		0.71	0.54	0.36	1.05	0.49	0.82	1.27	0.41	0.67	0.90	0.72	-20.3%	↗
Readmission Rate		9.2%	6.6%	4.4%	11.0%	5.9%	8.9%	15.9%	4.7%	8.9%	11.7%	8.4%	-28.2%	↗



Advocate Condell Medical Center

# Sepsis Core Measure Compliance

## Sep-1



Advocate Condell Medical Center

# Summary of Outliers-All Patients

## September-2016

### Severe Sepsis Outlier

September 2016: Four Outliers

No Fluids (Clinical Decision/ED)-Two Cases

Both cases ESRD on HD.

One case with lactate=4.2 and no fluids after consulting with nephrology

One case with isolated entry of SBP=89 then WNL

No Initial Lactate (Inpatient/T4)

No Repeat Lactate (Shared by ED and ICU)

### Septic Shock Outliers

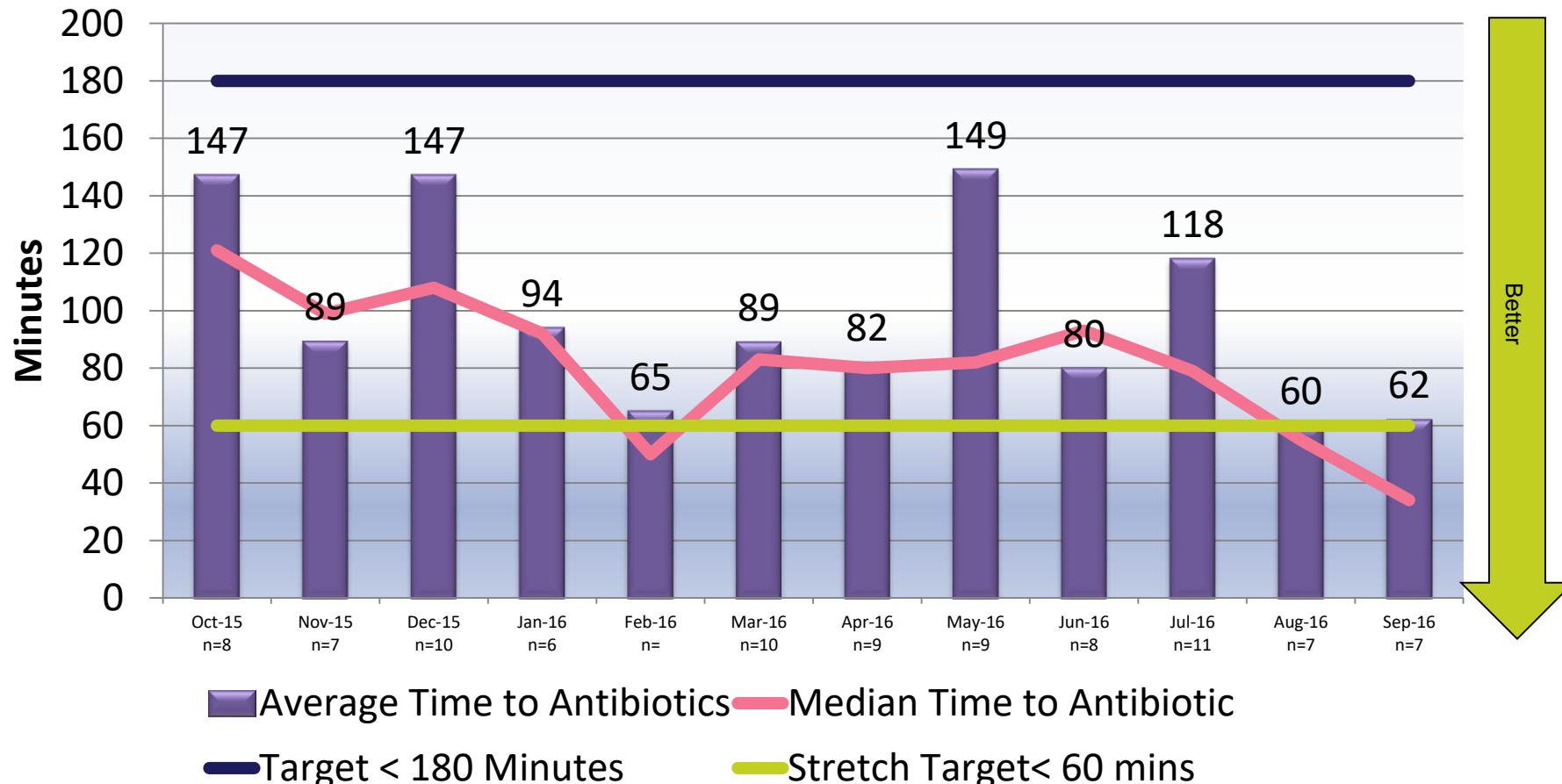
September 2016: No Cases Meeting Criteria



Advocate Condell Medical Center

# 3-Hour Bundle

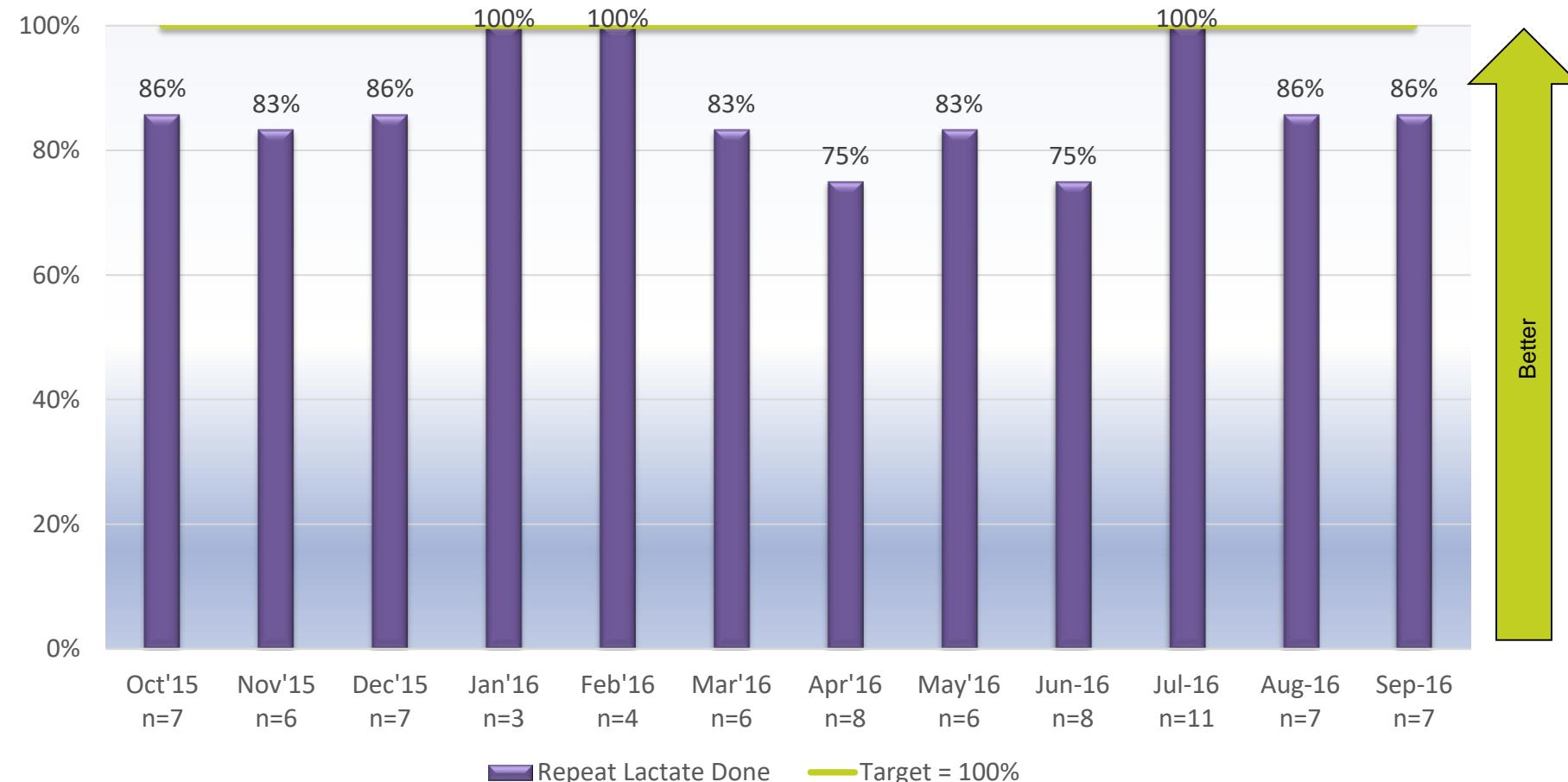
Average Time From Time Zero to Antibiotic-All Patients



Advocate Condell Medical Center

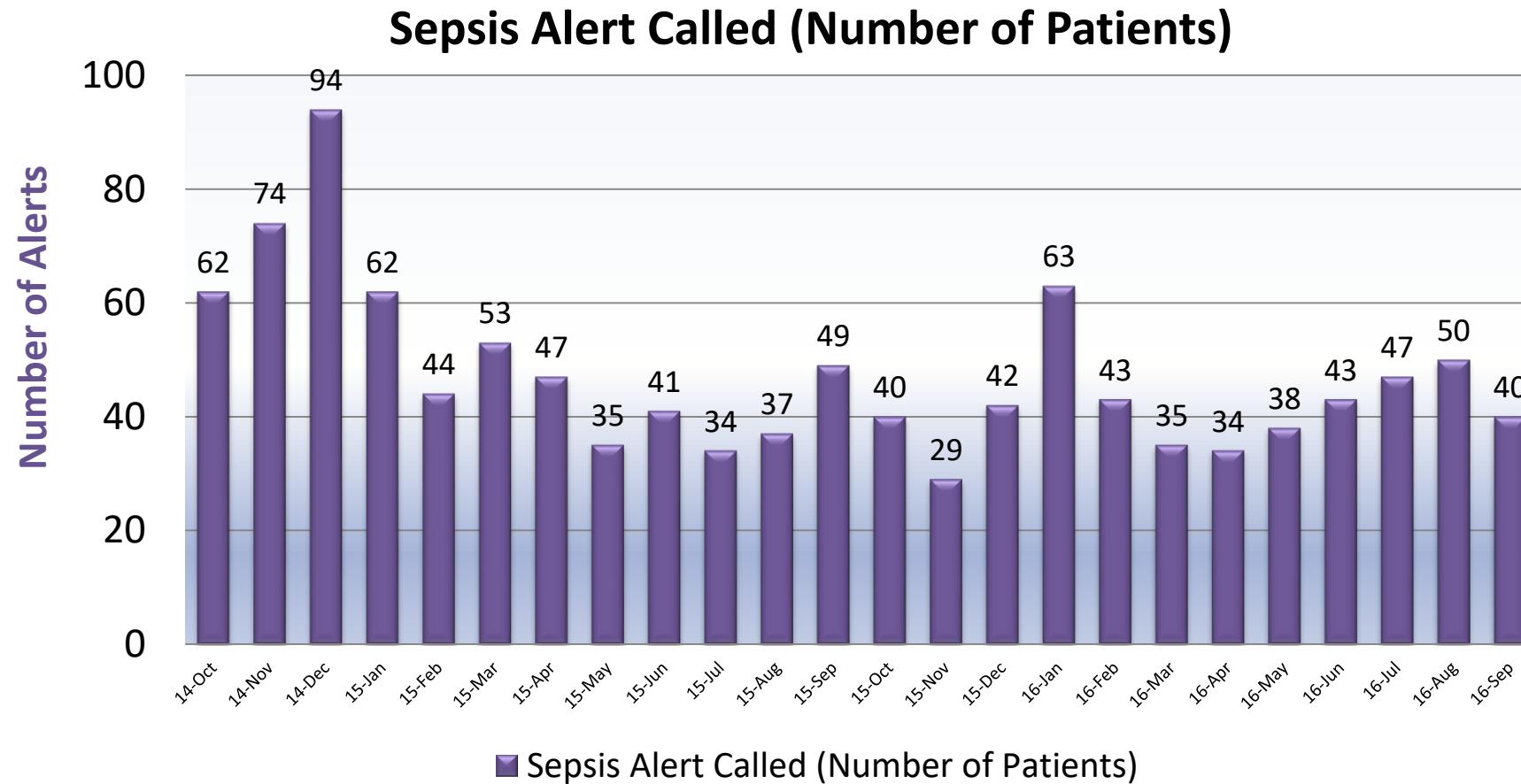
# Top 10 Safety Goal

## Repeat Lactate Done



Advocate Condell Medical Center

# Sepsis Alert



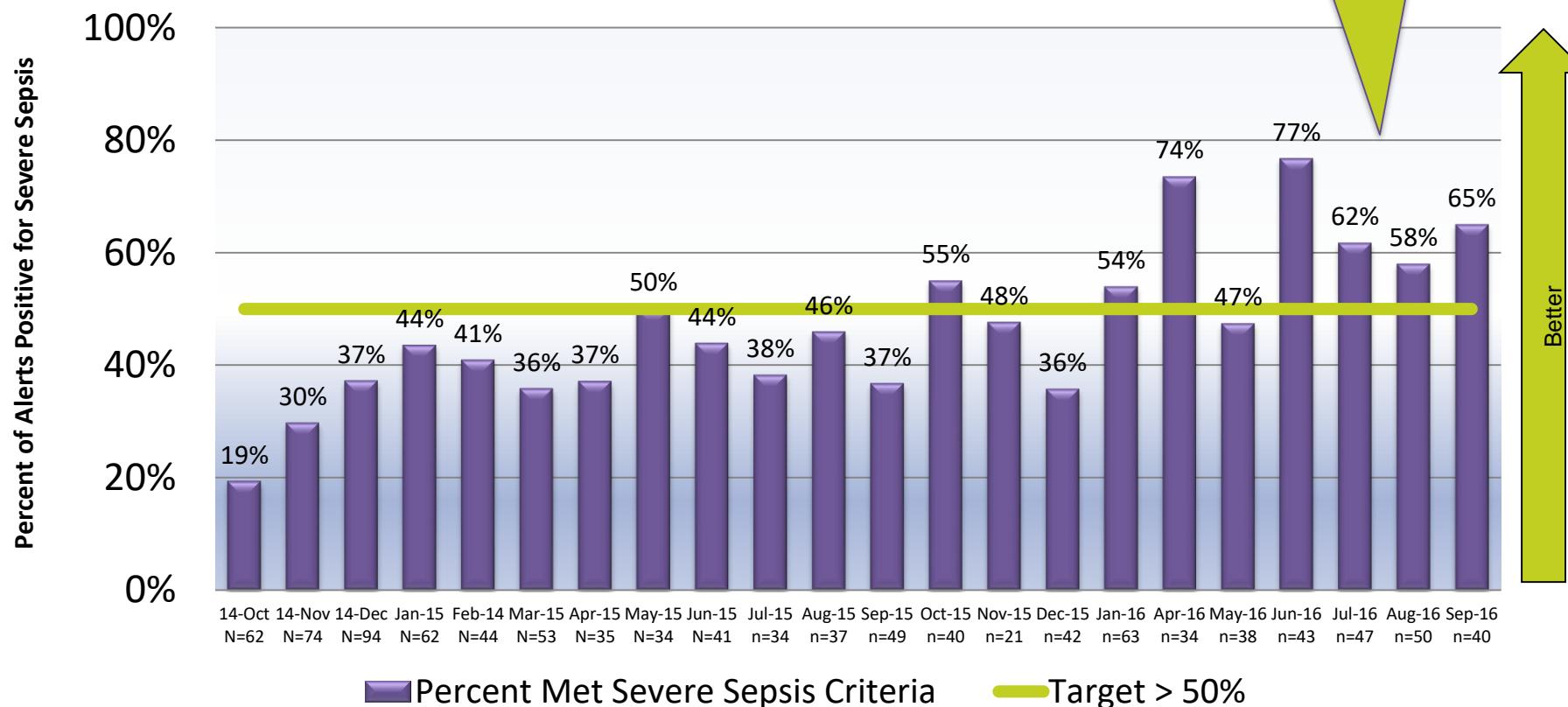
# Sepsis Alert

## Patient Met Severe Sepsis Criteria

### Sepsis Bundle Checklist Completion

July 2016: 31%

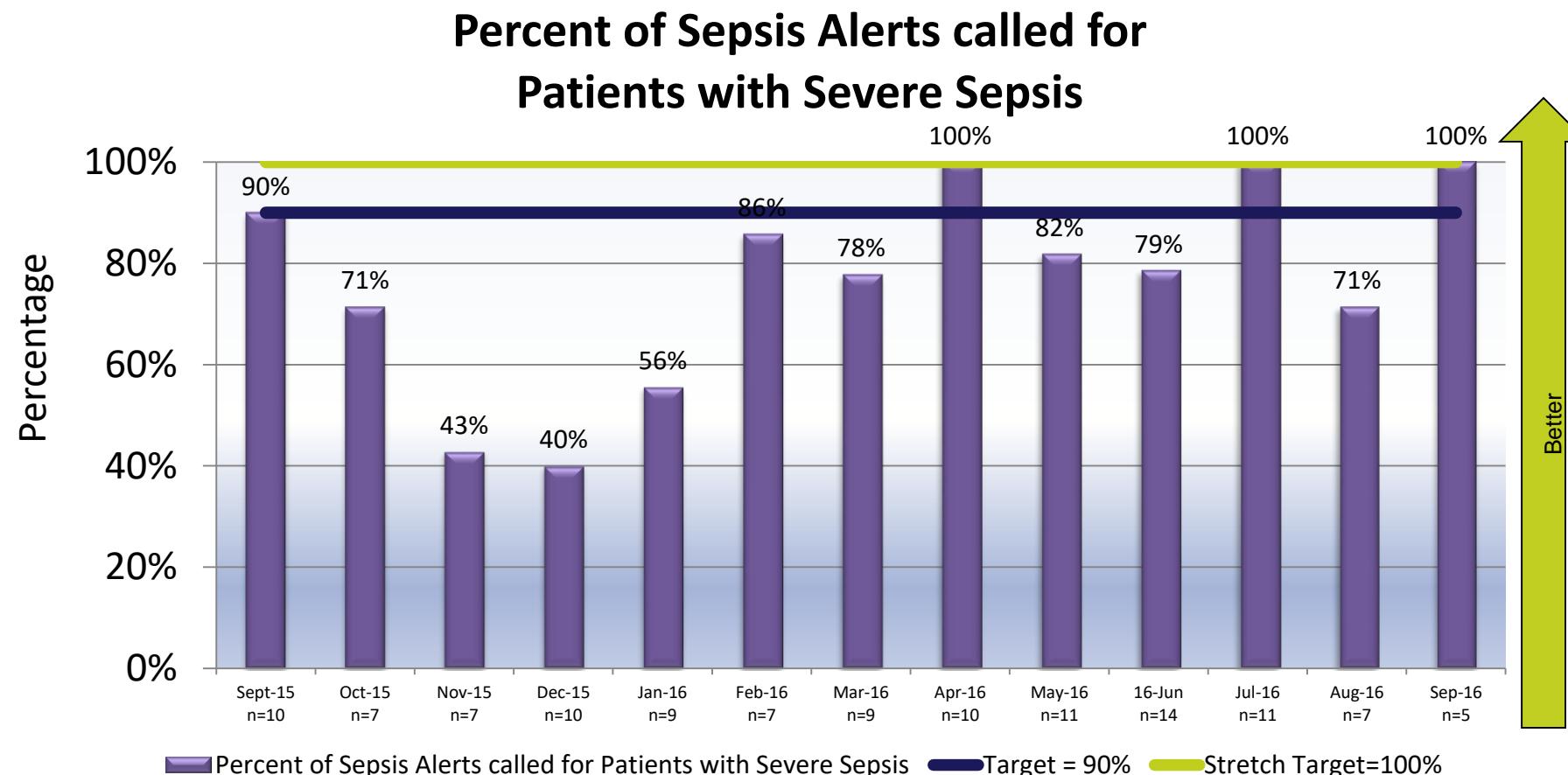
Aug 2016: 76%



Advocate Condell Medical Center

# Top 10 Safety Goal

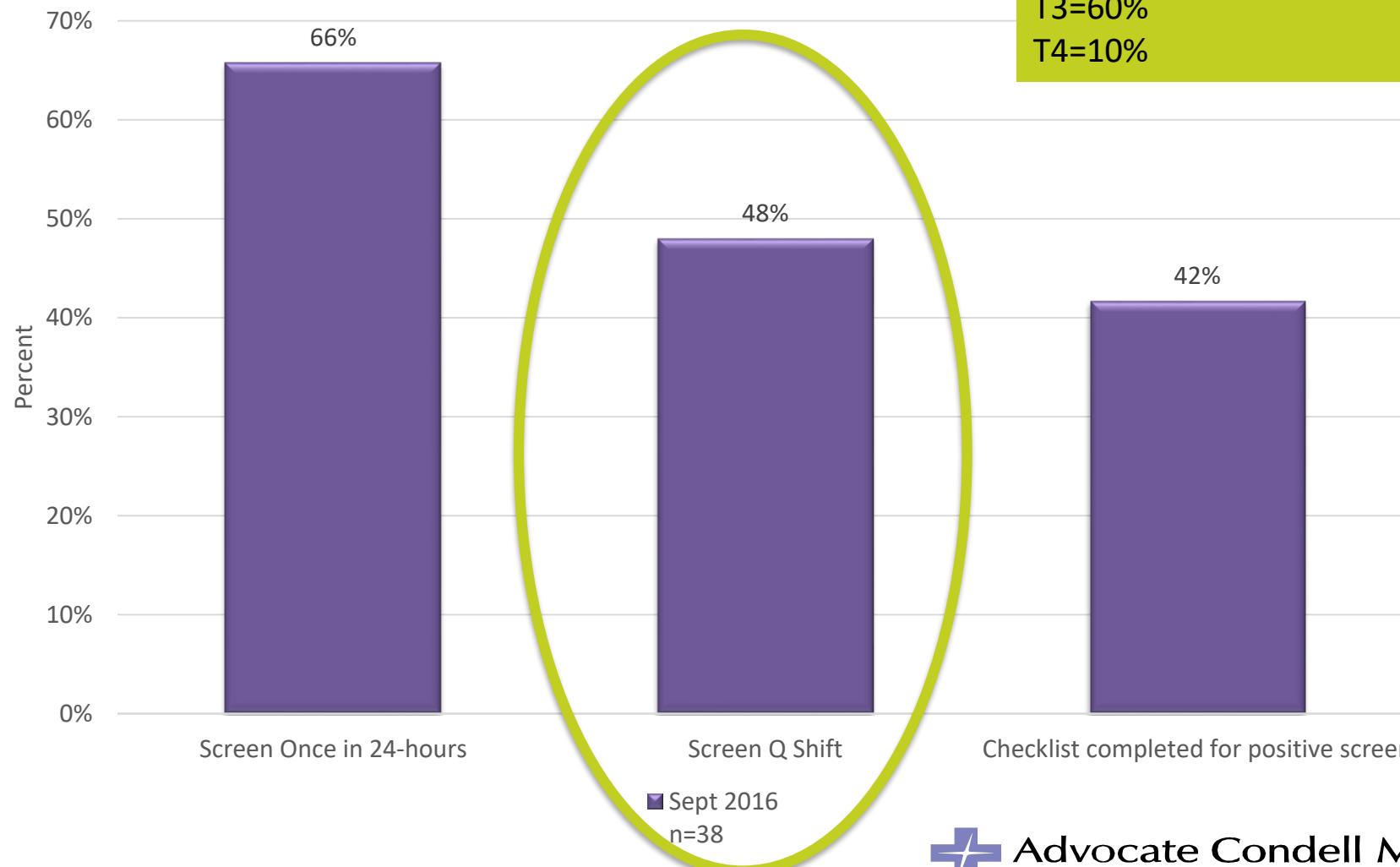
## Sepsis Alert Called



Advocate Condell Medical Center

# Sepsis Screening

Every Nurse...Every Day...Every Shift



Advocate Condell Medical Center



# Emergency Department Sepsis Powerplan Rollout Project

August 15, 2016

**System Kick Off Meeting**



# Agenda

- Review the reason for action
- Discuss key stakeholders and site teams
  - System versus site roles and responsibilities
  - Getting the word out
- Discuss high-value communication tools and go-live support
- Metrics to understand the impact
- Review timeline / milestones from today to go-live on October 16, 2016

# Participation in Collaboratives

- IMPACT Study – International sepsis prevalence
- SCCM Medical Surgical Sepsis Collaborative
- Michigan Health and Hospital Association

- Provides comparative process analysis
- Increased exposure to process solutions
- Pride in your accomplishments



# Changes we tested and implemented; barriers we have found

## **Screening**

- EMR screening process is not currently working BUT nurse screening continues on paper each shift.

## **Developing nursing protocols**

- We currently have power sets in the EMR.
- Power plans are not used consistently in med/surg.

**SCCM Collaborative**

# Changes we tested and implemented; barriers we have around

## Partnering with physicians for response

- Strong support of medical leadership
- Strong ED support
- Increased ICU support
- Need to improve collaboration with Hospitalists.

## Partnering with others like ED, Response Team, Pharmacy

- We have a strong collaboration with Lab, Pharmacy, Respiratory Care and the ED.
- We need to improve the collaboration with the Hospitalist groups.
- Strong collaboration between ED, Med/Surg and the ICU charge RN-the sepsis alert process works.

**SCCM Collaborative**

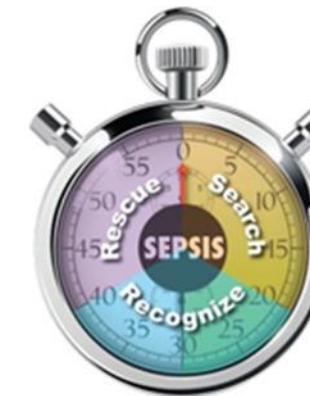
# We were surprised to learn . . .

- That all 4 cases of sepsis on the floor, the staff nurses recognized the sepsis and triggered the alert.
- Appropriate labs were obtained prior to the sepsis alert.
- In 3 of the 4 cases broad spectrum antibiotics were already on-board.

## **SCCM Collaborative**

# Advocate and Advocate Condell's Efforts

- 2006:
  - Early Sepsis Recognition Tool (paper)
  - Severe Sepsis Order Set
  - Implemented ScVO2 monitoring
  - **Nursing and Emergency Physician education**
- 2007
  - Sepsis Task Force and Education
  - **Nursing and Emergency Physician education**
  - **VHA Sepsis Initiative (2007 – 2010)**
- 2010 – 2011
  - Advocate Cerner Lighthouse Build meetings
  - **Nursing and Emergency Physician education**
  - **Right Care Right Now Orientation education**
  - Sepsis Alert with the ICU Charge Nurse
    - Disease specific RRT
    - To provide systematic response, evaluation and treatment of severe sepsis and septic shock.
    - House wide (Emergency Department, Outpatient, Inpatient)



# Advocate and Advocate Condell's Efforts

- 2013
  - Nursing and Emergency Physician education
  - **IMPACT International Sepsis Study**
  - Updated all materials and standards to the most recent SCCM Guidelines
  - Cerner Sepsis Lighthouse Solution beta testing began
    - Severe Sepsis Power Plan
    - Emergency Department
    - Intensive Care
    - Antibiotic Advisor/Vasopressor Advisor
- 2014
  - **SCCM Medical Surgical Sepsis Collaborative**
  - Nursing and Emergency Physician education
  - Revision of the Early Sepsis Recognition Tool (paper)
  - Reimplementation of Lighthouse
    - New Medical Surgical Power Plan
    - Desensitization of the triggers,
    - Medical Surgical audible sepsis alert,
    - Severe Sepsis report cards (ED, Inpatient, Composite)



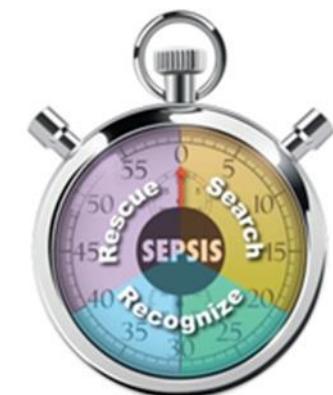
# Advocate and Advocate Condell's Efforts

- 2015
  - Advocate System Sepsis Collaborative and dashboard development
  - New Cerner Lighthouse Solution implemented system wide
  - Updated all materials and standards to the most recent SCCM Guidelines
  - SIRS and Severe Sepsis Algorithms
  - **Completion of SCCM Medical Surgical Collaborative**
  - December Nursing and Emergency Physician education
  - Development of the ALERT Nurse



# Advocate and Advocate Condell's Efforts

- 2016
  - **Michigan Health and Hospital Association Sepsis Collaborative**
  - Quarterly Nursing Education and Development of Lunch and Learns
  - Change in data collection to meet Sep – 1 Core Measure
  - Development of "...Sepsis" for ease of physician documentation
  - System and local assessment of lactate measure challenges/auto order
  - Development of Inpatient sepsis nursing ad hoc committee
  - Development of Advocate Pediatric sepsis teams through the Children's Hospitals
- Coming in 2017
  - Conversion of ALERT Nurse to Advanced Practice Nurse coverage
  - Compliance with Gabby's Law



# Advocate Condell Medical Center

## Lives Saved thru Evidenced Based Sepsis Care



Source: APACHE Hospital Sepsis Mortality Index



Advocate Condell Medical Center

# Thank You and Questions

What do These People Have in Common?



Sepsis truly is...



A search and rescue mission, with a stop watch

Advocate Health Care