
HALIFAX HEALTH
Live your life well.

Battle Sepsis with Prescriptive Alerts, Rapid Communication

HALIFAX HEALTH

Tom Stafford, Vice President & CIO

Education:

Bachelors of Science Aerospace Engineering

Masters of Science Mechanical Engineering

Career:

United States Navy

Medical Device Design and Manufacture

Healthcare IT

IT Accolades:

10th Best Place to work in IT 2015 – Computerworld

2nd Best Place to work in IT 2016 – Computerworld

5th Best Place to work in IT 2017 – Computerworld

5th Best Place to work in IT 2018 – Computerworld

10th Best Place to work in IT 2019 - Computerworld

Premier 100 Technology Leaders 2017 – Computerworld

Top 105 CIOs to watch in 2018/19 – Becker's Healthcare

Stephen Claypool, M.D.

Medical Director, Clinical Surveillance & Compliance, Wolters Kluwer, Health

Career

- 20 years of medical experience, having practiced internal medicine with Saint Paul Internists and was a hospitalist with St. Joseph's Hospital, HealthEast, in Minnesota.
- 25 years of medical informatics experience and is board certified by the ABPM in Clinical Informatics and by the ABIM in Internal Medicine.

Education

- Medical degree from the University of Minnesota School of Medicine
- Residency and chief residency in internal medicine at Hennepin County Medical Center in Minneapolis
- Undergraduate degree from The Colorado College in Colorado Springs

About Halifax Health

Halifax Health Medical Center, Daytona Beach

- Opened in 1928
- 600 beds
- “100 beds in intensive units”
- More than 500 physicians, representing
- 54 subspecialties

Halifax Health - Medical Center of Port Orange

- Opened in 2006
- 80-bed community hospital
- 20-bed emergency department
- 8-bed intensive care unit

More About Halifax Health

Emergency Department

- *Largest in Florida: 99,000 square feet, 102 treatment rooms*
- *Area's only Level II Trauma Center*
- *Area's only Pediatric Emergency Department*

Area's only Neonatal Intensive Care and Pediatric Intensive Care Unit

Center's for Neurosciences, Cardiology, Oncology, and Orthopedics

16 Provider Offices/Clinics with more opening soon

Halifax Health Hospice

- *Area's largest Hospice Program*
- *Four Inpatient Care Centers*

Behavioral Health Service: Adolescent and Adult – Inpatient and outpatient

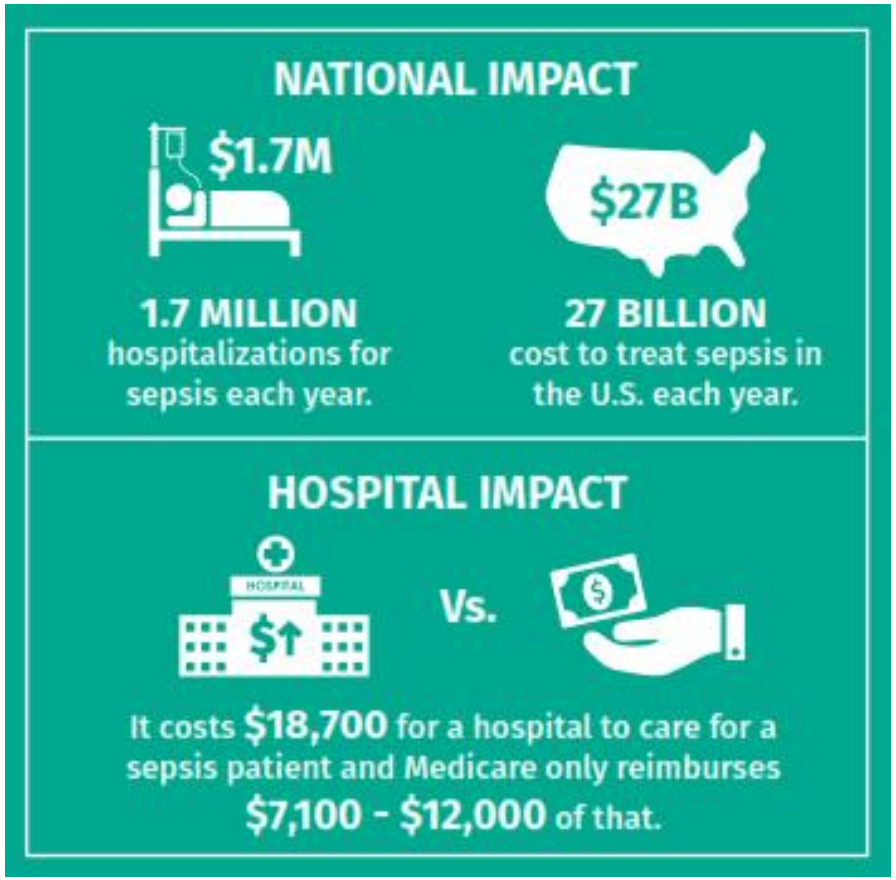
The Epidemic

"Sepsis is the body's overwhelming and life-threatening response to infection that can lead to tissue damage, organ failure, and death. In other words, it's your body's over-active and toxic response to an infection."

~ Sepsis Alliance, accessed August 28, 2019

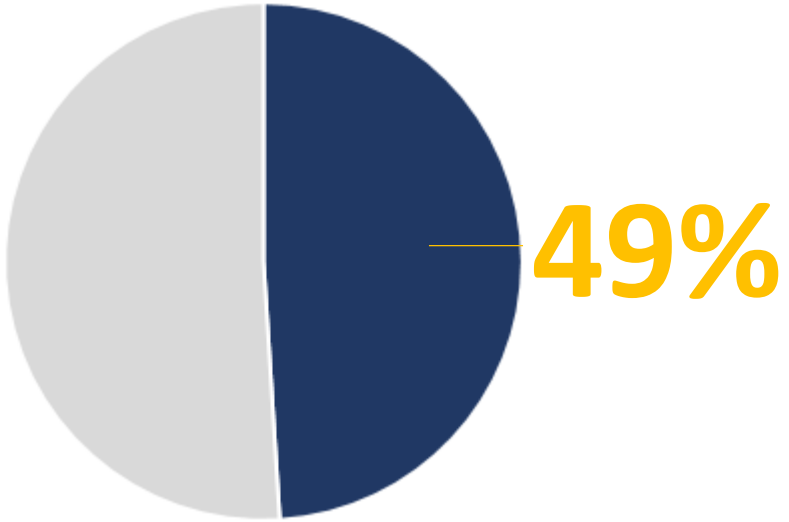
Sepsis Impact: Quality & Cost

COST



QUALITY

Only 49% of patients nationally receive APPRORIATE care for severe sepsis or septic shock



CMS Bottom 10 Performing States (2019)

Minnesota | Oregon | Missouri | Virginia | Arizona | Washington | Rhode Island | District of Columbia | Delaware | Puerto Rico

The State of Sepsis Care in the U.S.

Bundle compliance only

Poor

at “higher” adherence hospitals

Non-compliance 6hr. Bundle =

2x

mortality

Historically, usual care

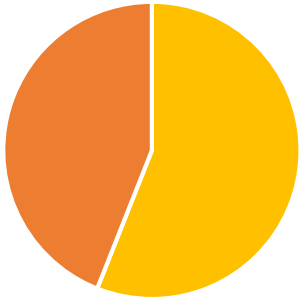
~ 33%

mortality

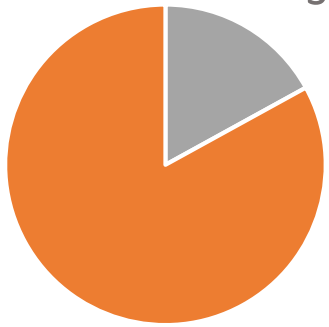
House officers correctly identify sepsis only

56%

of the time



Nurses **correctly identify** sepsis only

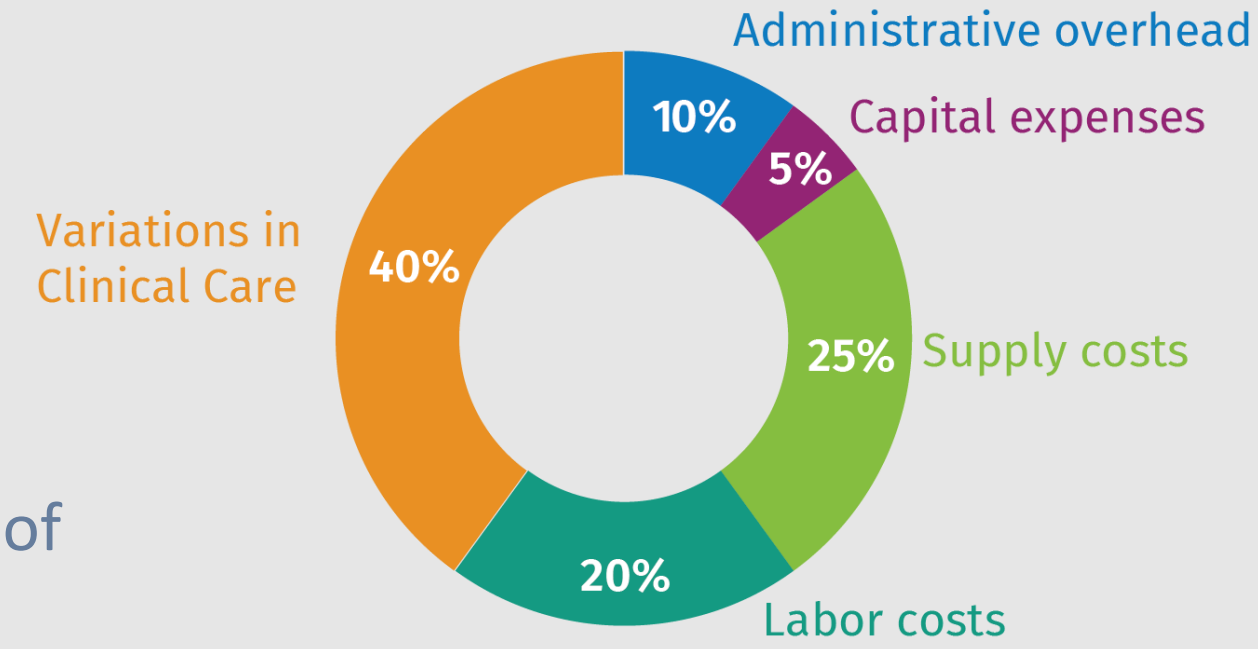


17%

of the time

Reduce Care Variation for Cost Savings

TRADITIONAL MARGIN LEVERS NO LONGER SUFFICIENT

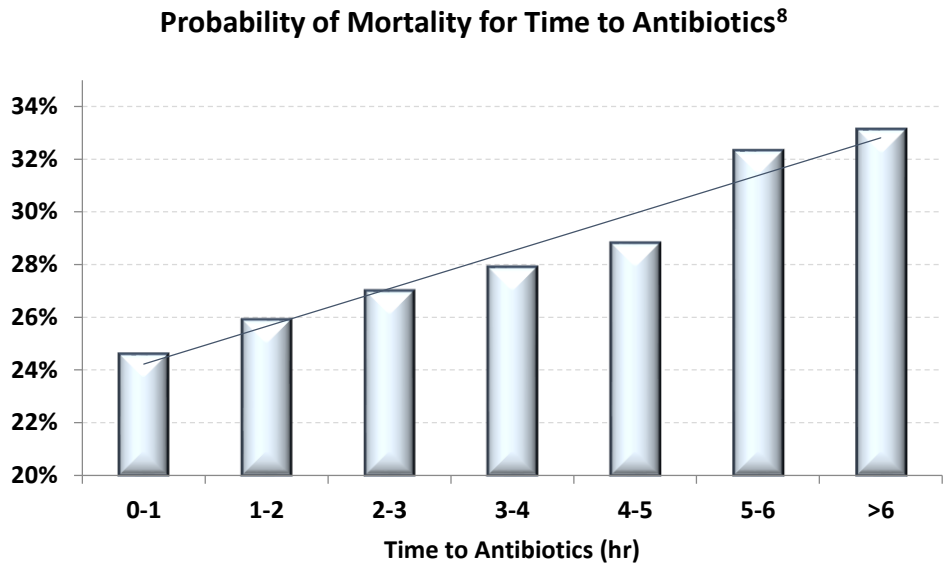


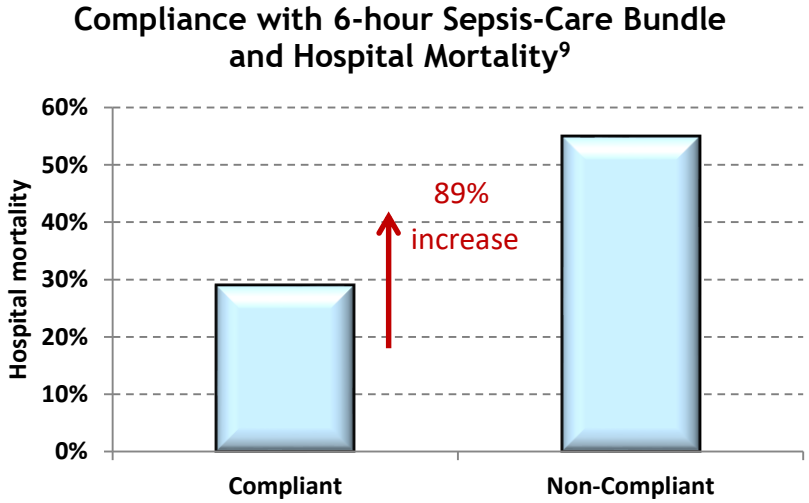
CFOs' Estimated Breakdown of Cost Savings Opportunities
(n=45)

Source: Bailey C, "The Cost Reduction Imperative," Becker's Hospital Review, http://www.beckershospitalreview.com/finance/the-cost-reduction-imperative.html; Hayford T, et al., "Projecting Hospitals' Profit Margins Under Several Illustrative Scenarios," Congressional Budget Office, September 2016, https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/workingpaper/51919-Hospital-Margins_WP.pdf; Physician Executive Council interviews and analysis.

Sepsis…Early Detection & Treatment Saves Lives

EVERY HOUR WITHOUT TREATMENT SIGNIFICANTLY RAISES THE RISK OF DEATH





8) *Ferrer, Ricard MD, PhD1; Martin-Loeches, Ignacio MD, et al. "Empiric Antibiotic Treatment Reduces Mortality in Severe Sepsis and Septic Shock From the First Hour: Results From a Guideline-Based Performance Improvement Program,"* Crit Care Med. 2014 Aug;42(8):1749-55.

9) *Gao F, Melody T, Daniels DF, Giles S, Fox S. The impact of compliance with 6-hour and 24-hour sepsis bundles on hospital mortality in patients with severe sepsis: a prospective observational study. Crit Care. 2005;9(6):R764-70.*

Institute for Healthcare Improvement (IHI) collaborated to create clinical guidance

Participating organizations

- European Society of Intensive Care Medicine
- Society of Critical Care Medicine
- International Sepsis Forum

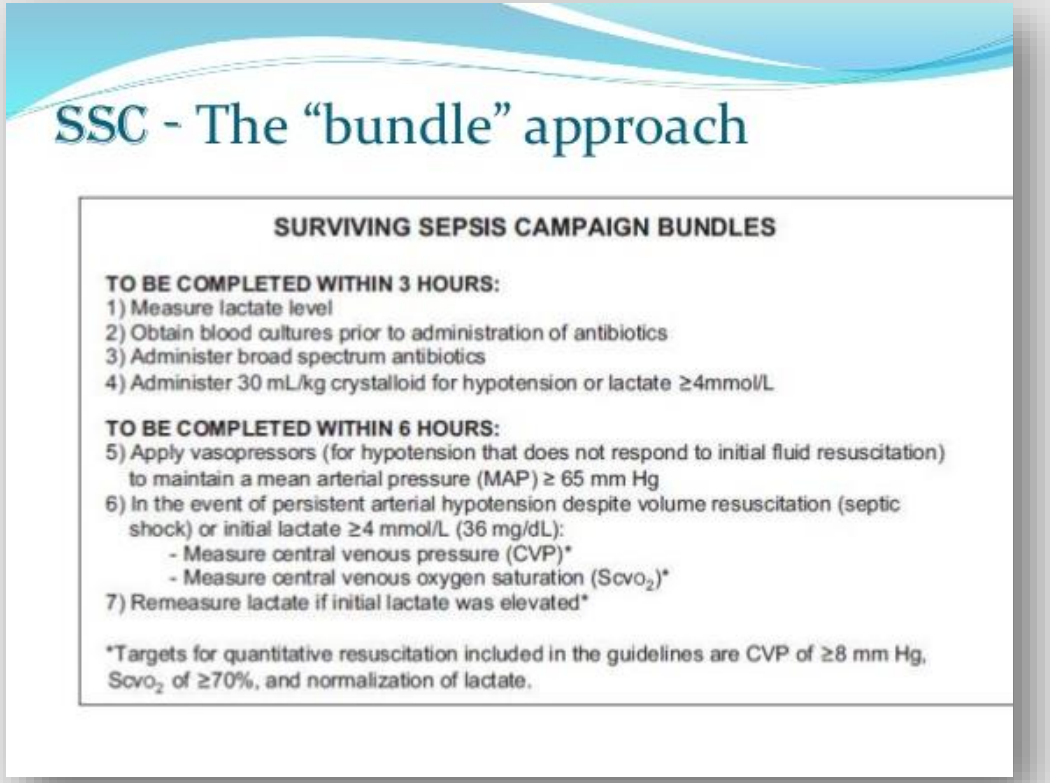
Surviving Sepsis Campaign

* Rhodes A, Evans L, Alhazzani W, Levy M, Antonelli M, Ferrer R, et al. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock: 2016. Int Care Med 2017;43:304–77.
* Dellinger R, Levy M, Rhodes A, Annane D, Gerlach H, Opal S, et al. Surviving sepsis campaign: international guidelines for management of severe sepsis and septic shock, 2012. Intensive Care Med 2013;39:165–228.
* Levy MM, Evans LE, Rhodes A. The Surviving Sepsis Campaign Bundle: 2018 update. Intensive Care Med. 2018 Apr 19;1–4.

Do the Sepsis Guidelines Work?

Following the SSC treatment bundles, which are mostly in sync with CMS, is associated with improved patient outcomes for sepsis.

- Meta-analysis of 50 observational studies: reduction in mortality [OR 0.66; 95% CI 0.61–0.72]*



** Damiani E, Donati A, Serafini G, Rinaldi L, Adrario E, Pelaia P, et al. Effect of performance improvement programs on compliance with sepsis bundles and mortality: a systematic review and meta-analysis of observational studies. PLoS One 2015;10:e0125827.*

Sepsis 1 Definition Components

FROM INFECTION

Systematic Inflammatory Response Syndrome (SIRS)

- HR>90
- RR>20
- Temp>38.3C
- Temp<35C
- WBC>12k or Bands>10
- WBC<3.5k
- SBP<90

Organ Dysfunction

- Creatinine>2
- Lactate>2
- Bili=>4
- PTT>60
- Platelet<100
- INR>1.5
- SBP<90

Applying CDS Alerting Analysis to Sepsis

A meta-analysis of 8 sepsis alerting studies from 2015 showed ***no improvement in mortality***.

Failure was primarily due to ***poor test specificity***, with PPV < 50%, resulting in alert fatigue.[3]

Makam, Anil N., Oanh K. Nguyen, and Andrew D. Auerbach. "Diagnostic accuracy and effectiveness of automated electronic sepsis alert systems: a systematic review." Journal of hospital medicine 10.6 (2015): 396-402.

Systematic Review of Sepsis Screening tools

Reviewed all studies of sepsis tools published 1990-2016

- Tools are inaccurate
- Tools don’t improve mortality (except POC Advisor)

Alberto L, Marshall AP, Walker R, Aitken LM. Screening for sepsis in general hospitalized patients: a systematic review. Journal of Hospital Infection. 2017 May 12

Alert Fatigue

Clinicians ignore EHR safety notifications **between 49 percent and 96 percent of the time!**[1]

Alert fatigue can contribute to clinician burnout, dissatisfaction, and turnover.[2]

1) Van Der Sijs, Heleen, et al. "Overriding of drug safety alerts in computerized physician order entry." Journal of the American Medical Informatics Association 13.2 (2006): 138-147.
2) Hysong, Spitzmuller, et al. "Electronic Alerts and Clinician Turnover: The Influence of User Acceptance," Am J Manag Care. 2014;20(11 Spec No. 17):SP520-SP530.

The Solution

POC Advisor Reduces Mortality

SURVEILLANCE TECHNOLOGY—PEER-REVIEWED, SCIENTIFICALLY PROVEN

PREDICTIVE ACCURACY

- Sensitivity (99%)
- Specificity (97%)
- Minimal Alert Fatigue: PPV is ~4x EHR SIRS based solution

VERY EARLY DETECTION

- 5.5 and 7.8 hours before SIRS-based alerting at large academic facility and top IDN respectively
- ABX administration ~6 hrs. earlier at both

PRESCRIPTIVE ALERTS

- Pushed to care team in real time
- Bundle compliance
- Timely execution of labs, fluids, ABX, & documentation with reminders and escalation

How POC Advisor Works to Improve Outcomes

IDENTIFYING PATIENTS AT RISK FASTER & ENSURING EVIDENCE BASED CARE

Monitor

Cloud-based solution that analyzes EHR patient data in real time using rules, algorithms and NLP to accurately identify patients at risk.

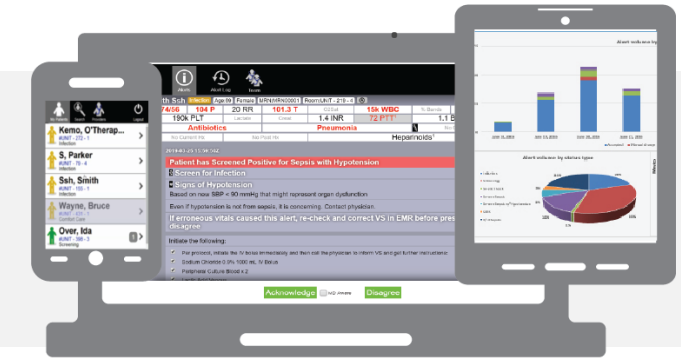
Respond

Delivers patient-specific, actionable alerts and evidence-based care advice to the front-line staff via their preferred clinical workflow.

Alerts sent to the EHR, Vocera, pagers, etc.

Measure

Real-time analytics that supports timely clinician education to reduce variability in care. Access intuitive dashboards providing a comprehensive view of performance.



The only surveillance solution that accurately identifies a patient with sepsis versus other abnormalities.

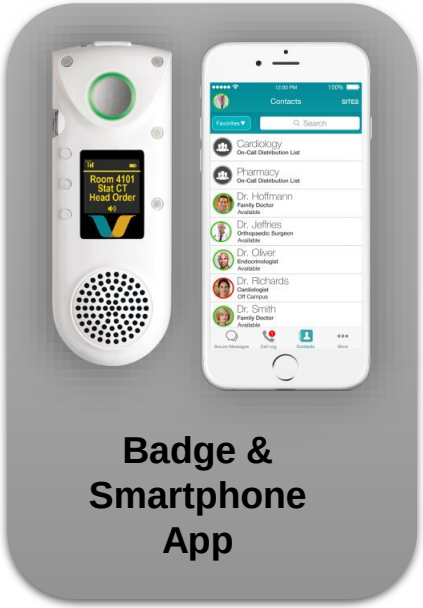
Sepsis Alerting

Healthcare Information System

250+ Clinical Data Points

Wolters Kluwer

POC Advisor™



API to API

Sepsis Alert Acknowledgement

Patient Sepsis Alert

API to API

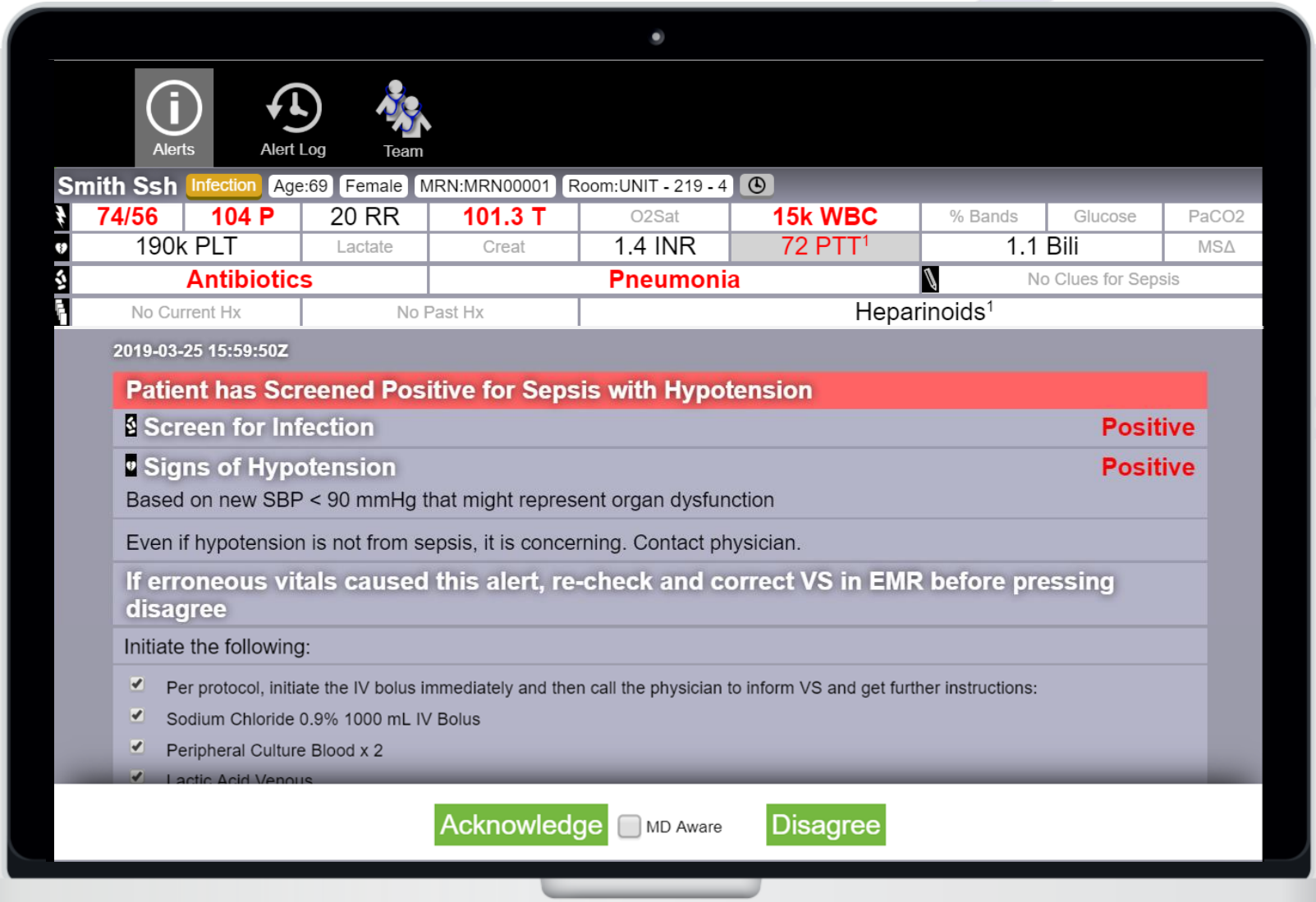
Patient Sepsis Alert

Sepsis Alert Acknowledgement

Integration Engine

Predictive Alerting

POC Advisor (Nurse View)



Prescriptive Alerting

POC Advisor Alerting and Guidance

- What worked?
- What didn't work? **Why?**

People

80%

Process

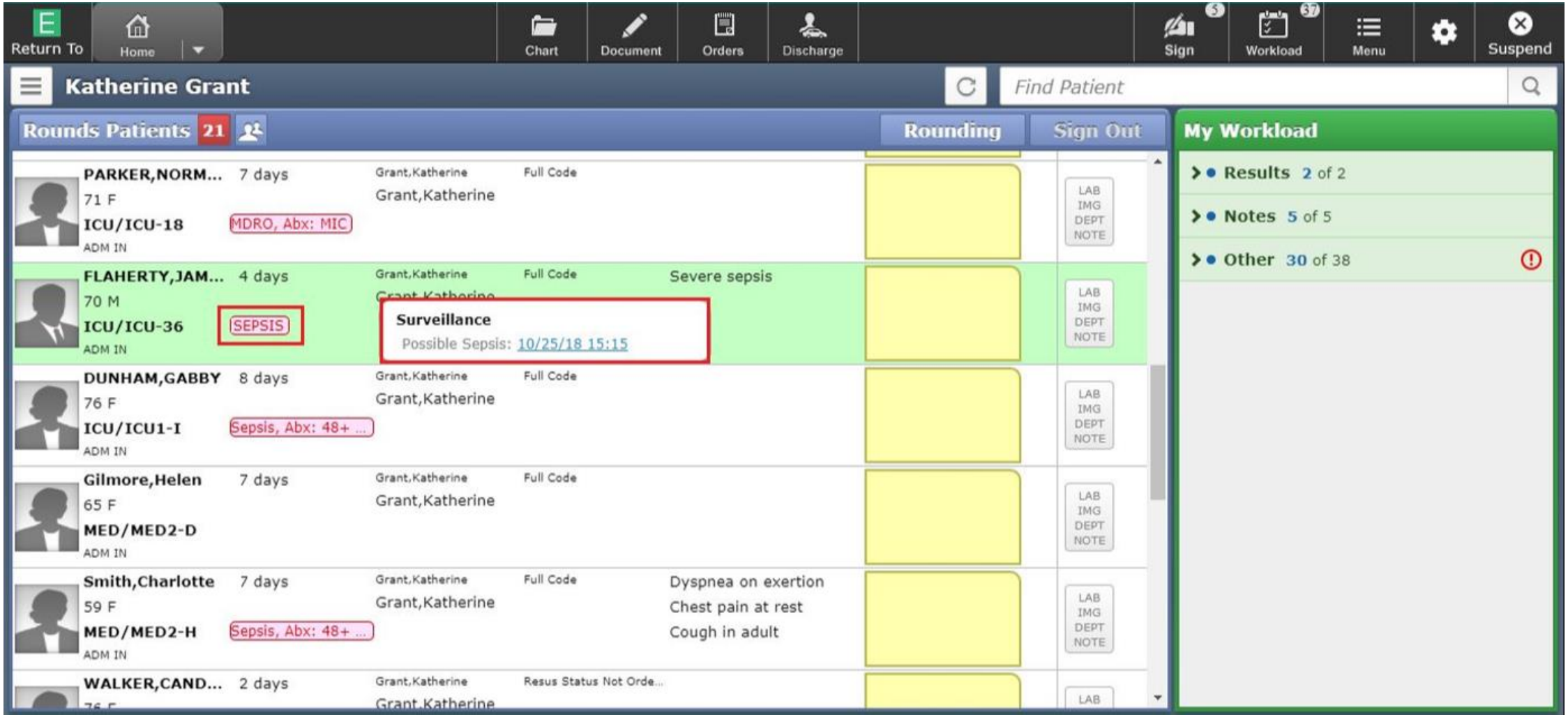
15%

Technology

5%

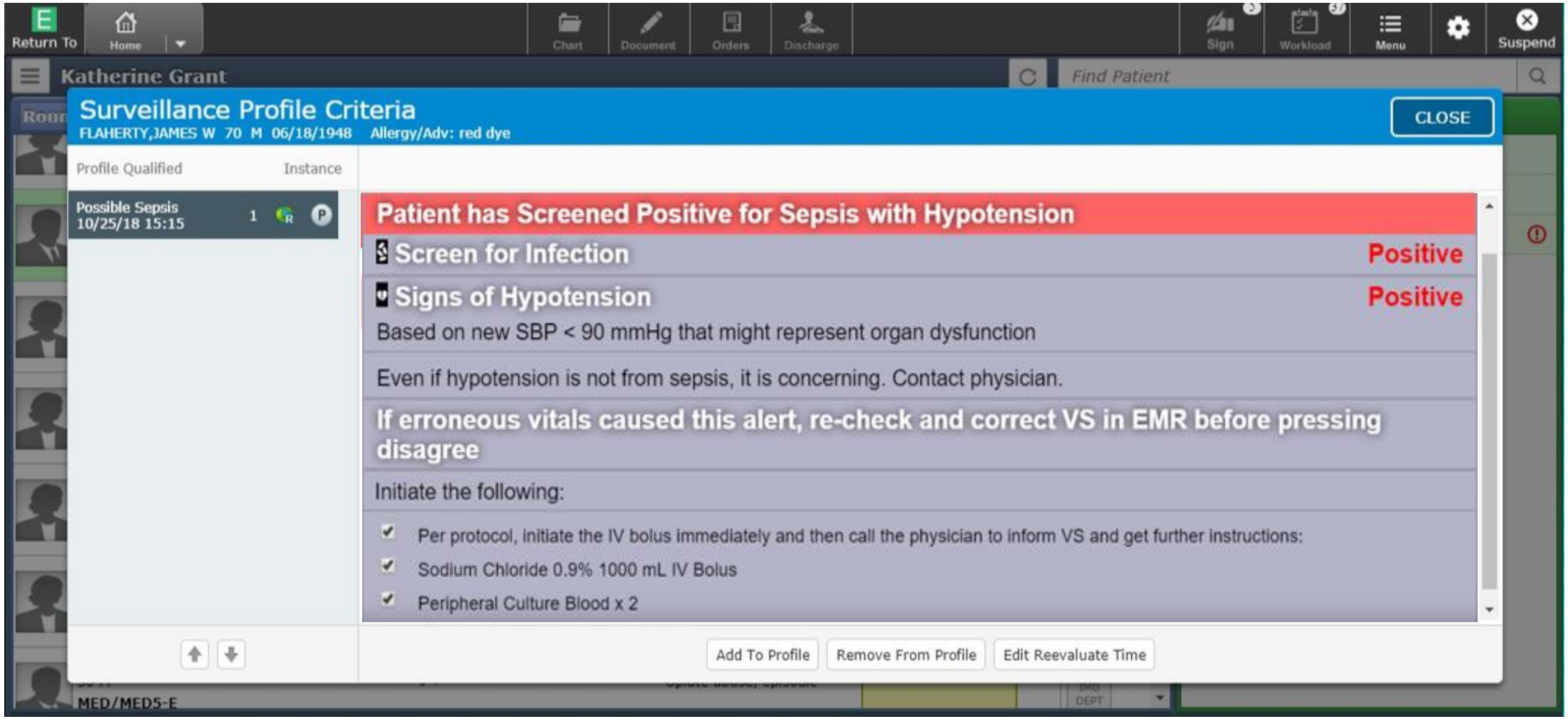
Wolters Kluwer

Concept: POC Advisor Integration with Meditech

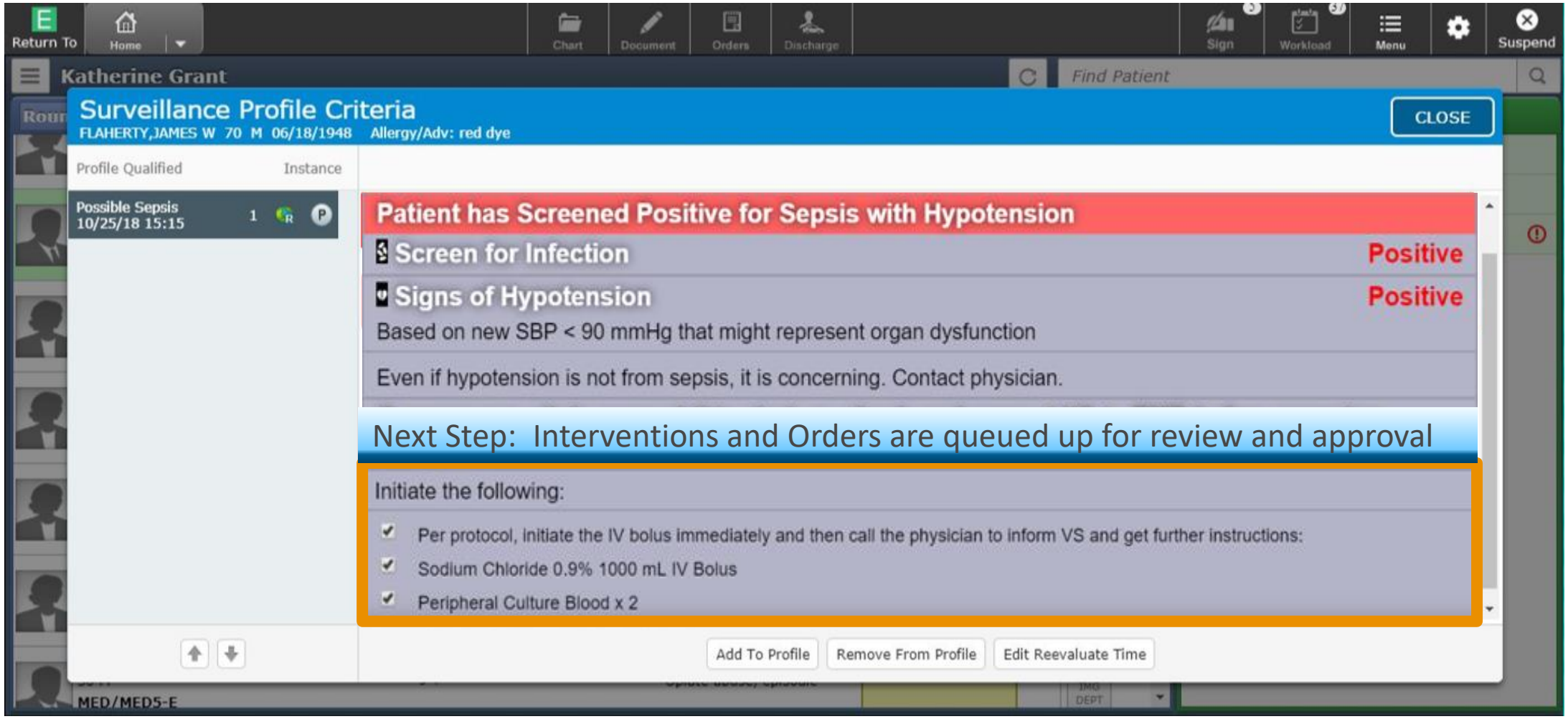


Wolters Kluwer

Concept: POC Advisor Integration with Meditech



Concept: POC Advisor Integration with Meditech



Wolters Kluwer

The Results

Halifax Bundle Compliance Analysis

Sepsis Bundle Compliance

- We know from other data that bundle compliance **improvement correlates with mortality & LOS improvements**, so it is a commonly used benchmark across sites for measuring sepsis care

JAMA | Original Investigation

Association Between State-Mandated Protocolized Sepsis Care and In-hospital Mortality Among Adults With Sepsis

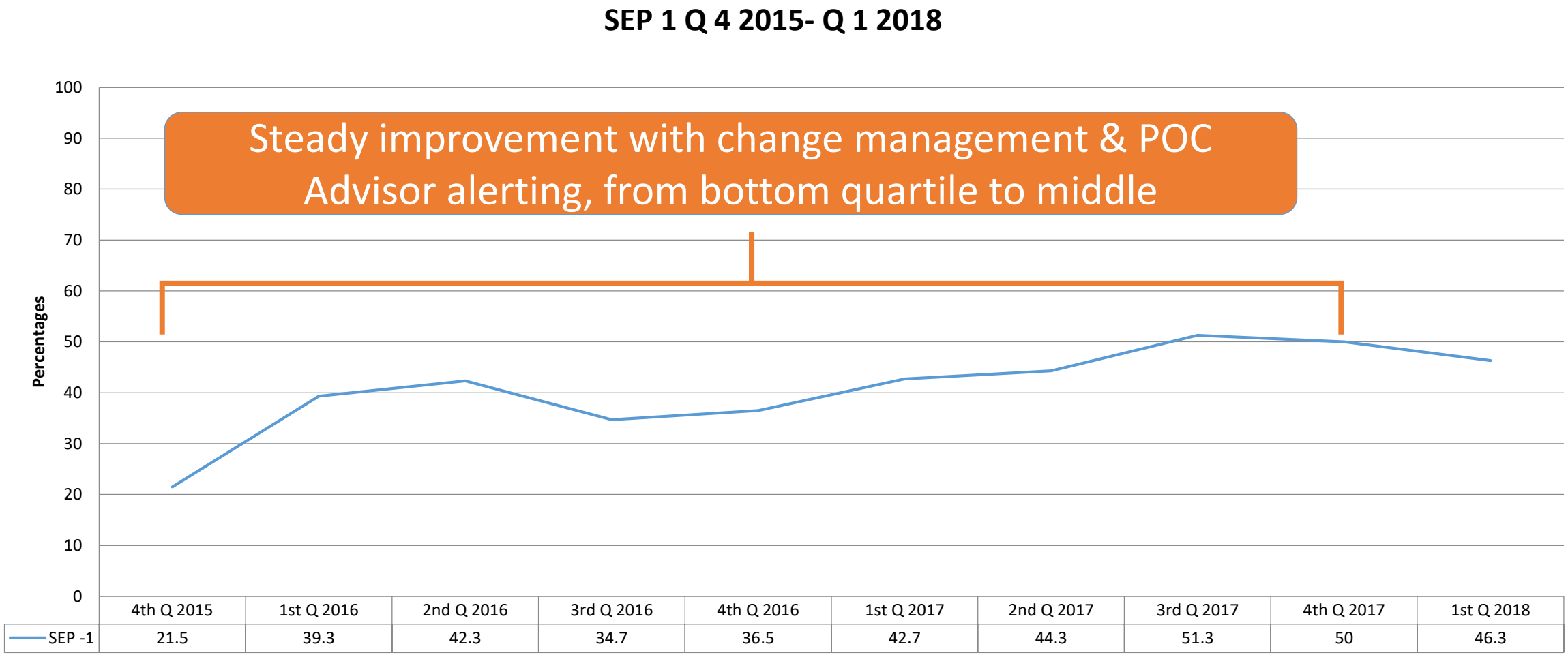
Jeremy M. Kahn, MD, MS; Billie S. Davis, PhD; Jonathan G. Yabes, PhD; Chung-Chou H. Chang, PhD; David H. Chong, MD; Tina Batra Hershey, JD, MPH; Grant R. Martsolf, PhD, MPH, RN; Derek C. Angus, MD, MPH

JAMA. 2019;322(3):240-250.
doi:10.1001/jama.2019.9021

Halifax Sepsis Results

- Halifax added a sepsis coordinator, a sepsis steering committee and change management focused on sepsis care
- Halifax started using alerting with POC Advisor
- Slow steady improvement in CMS bundle compliance from bottom quartile to roughly average
  - This is outstanding given that Halifax serves as the county hospital and has a very sick patient population

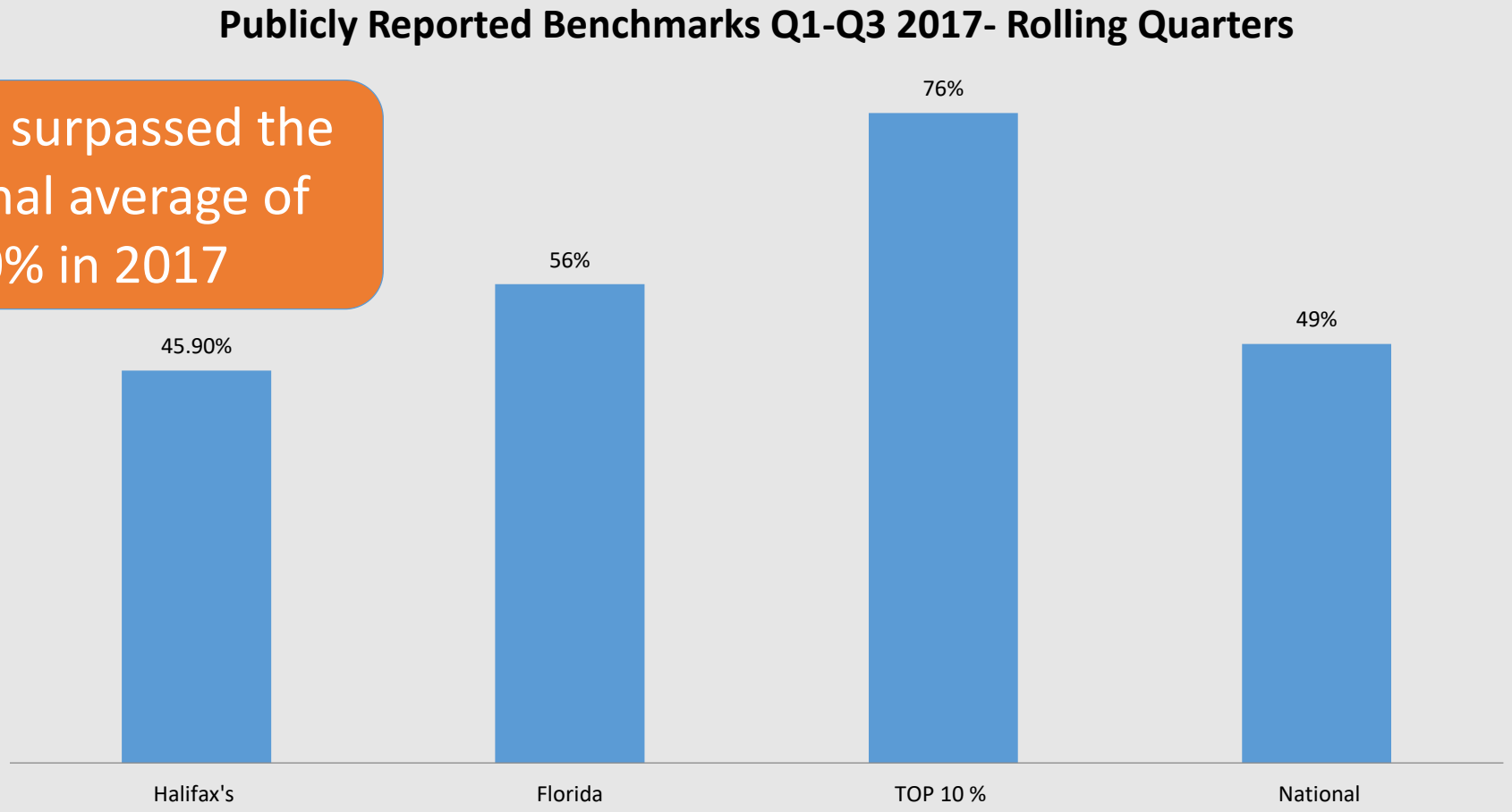
Halifax CMS SEP-1



	4th Q 2015	1st Q 2016	2nd Q 2016	3rd Q 2016	4th Q 2016	1st Q 2017	2nd Q 2017	3rd Q 2017	4th Q 2017	1st Q 2018
SEP -1	21.5	39.3	42.3	34.7	36.5	42.7	44.3	51.3	50	46.3

Halifax CMS SEP-1

Halifax surpassed the national average of 50% in 2017

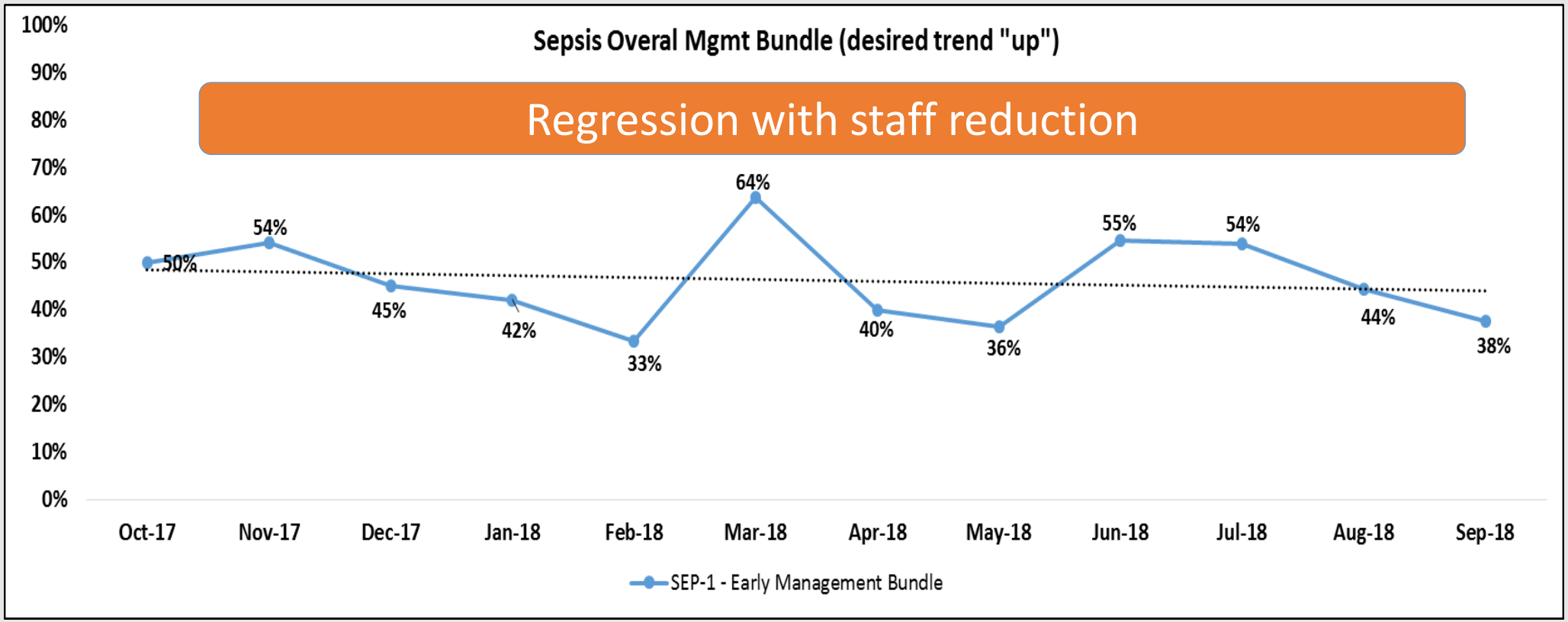


Halifax Sepsis Results

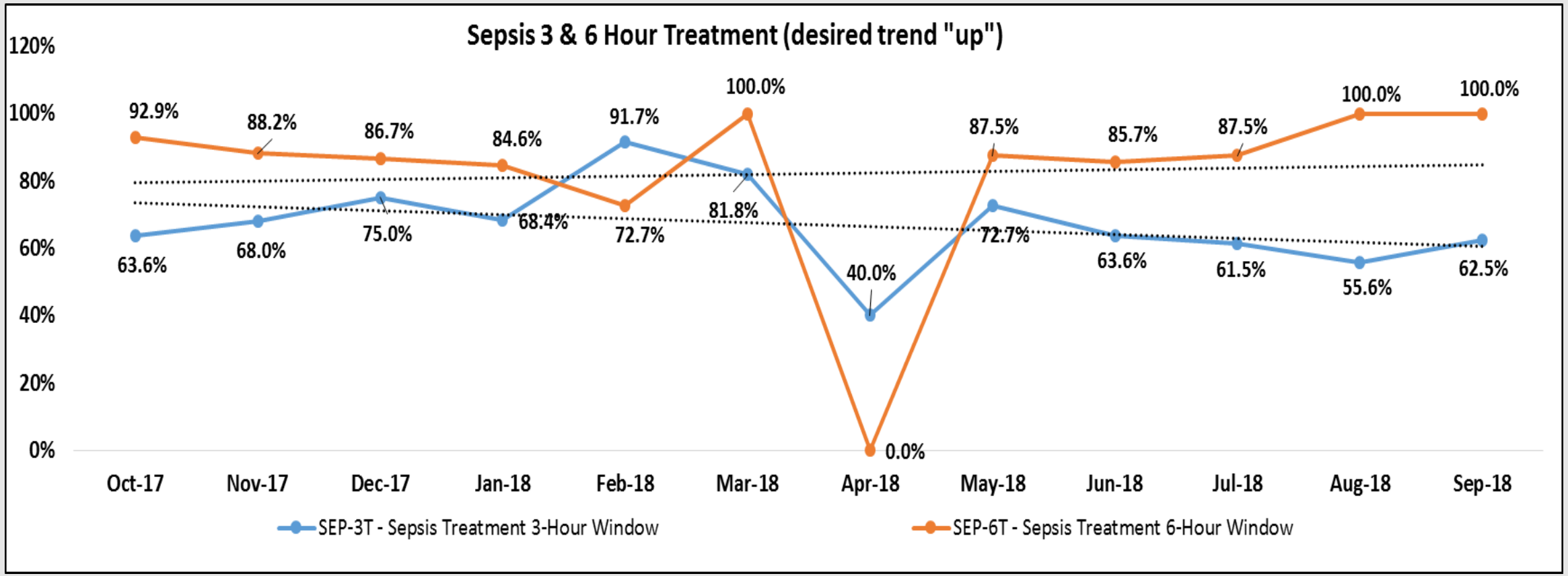
- Due to budget cuts, Halifax reduced sepsis staff

- WK focused on integration with other systems, e.g. Epic, Cerner, and didn’t (yet) finish integration with MEDITECH

Halifax CMS SEP-1



Halifax CMS SEP-1



Halifax – Alert Accuracy

Total study population: 541

Charts reviewed: 124
(chart reviewer physician was blinded to POC Advisor diagnosis)

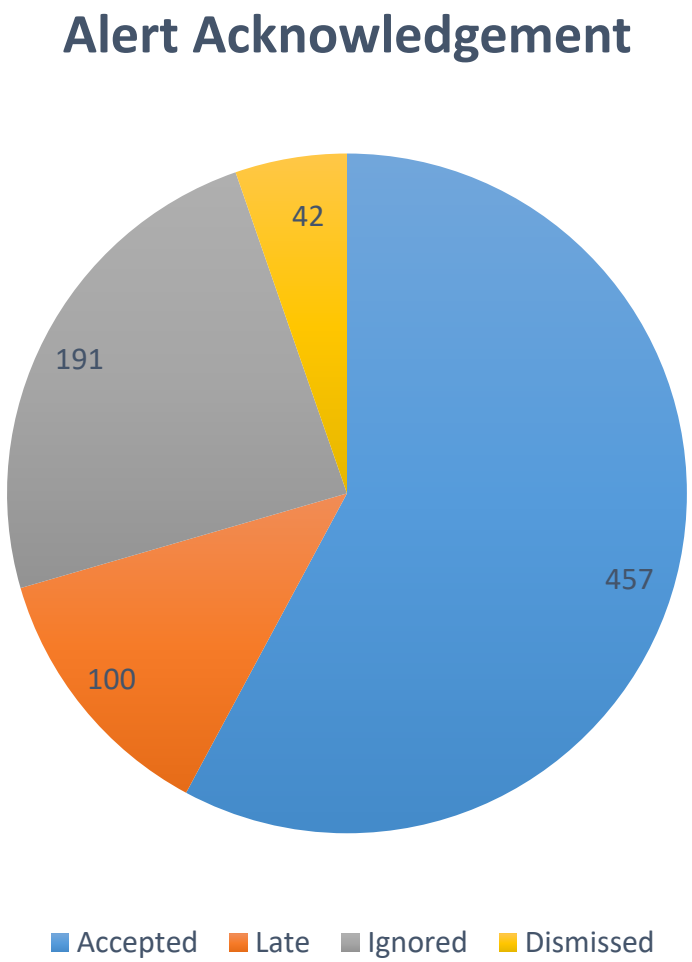
RESULTS
Sensitivity 100%
Specificity 98%

The problem wasn't that alerts weren't accurate…

Bundle Compliance Stats-Alert Acknowledgement

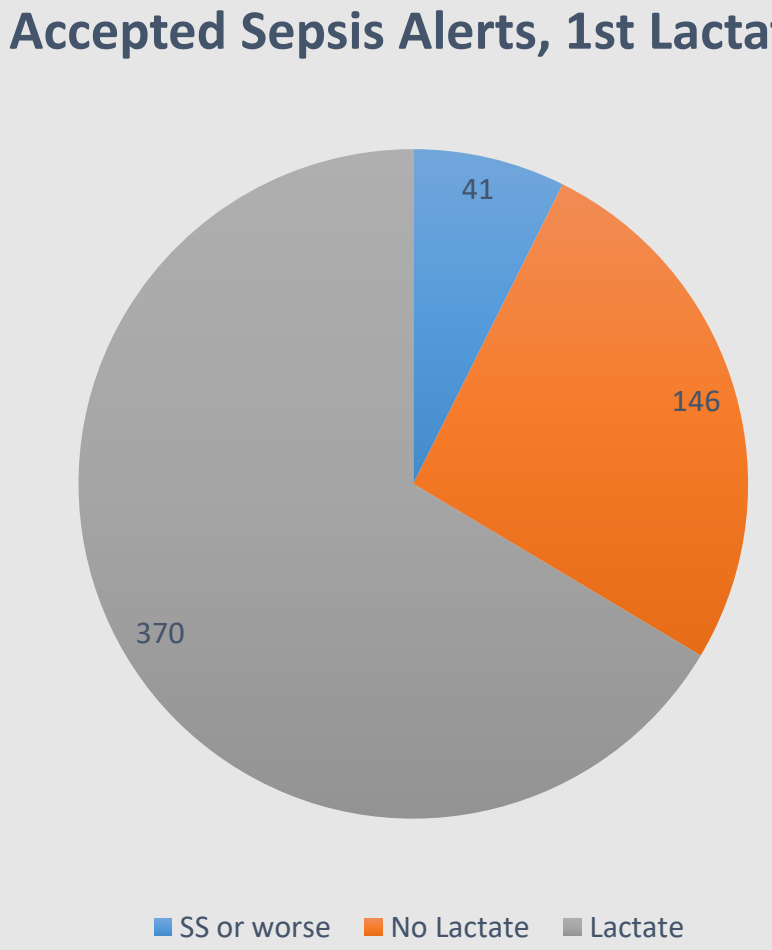
- 191/790 sepsis alerts were ignored since 10/1/18
- 100 were significantly delayed

The problem is that alerts were not followed and bundle components missed for patients with known sepsis



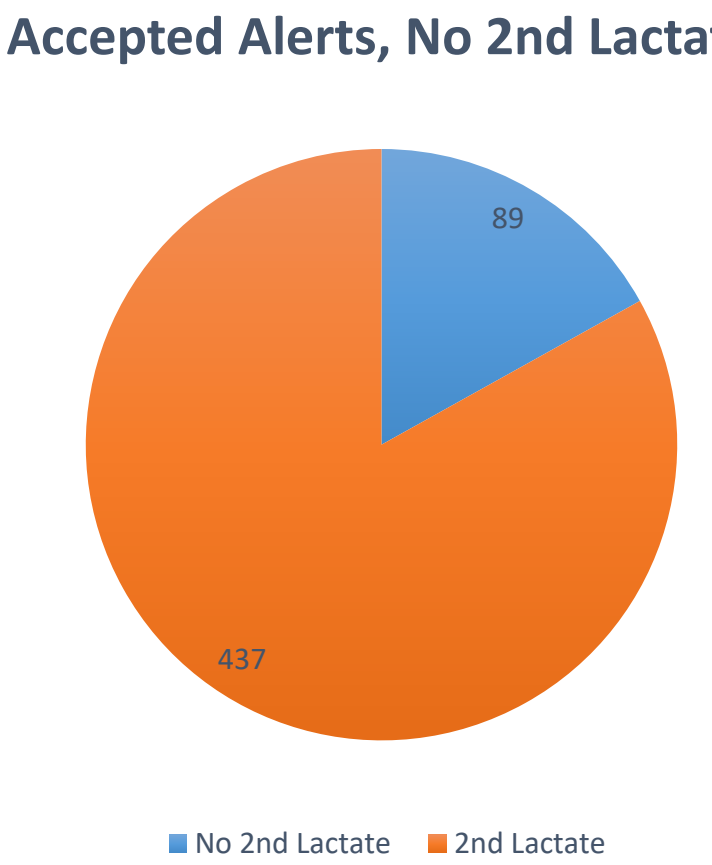
Bundle Compliance Stats-1st Lactate

- 187/557 accepted alerts for sepsis, no lactate ordered since 10/1/18
- 41 of these were Severe Sepsis or worse



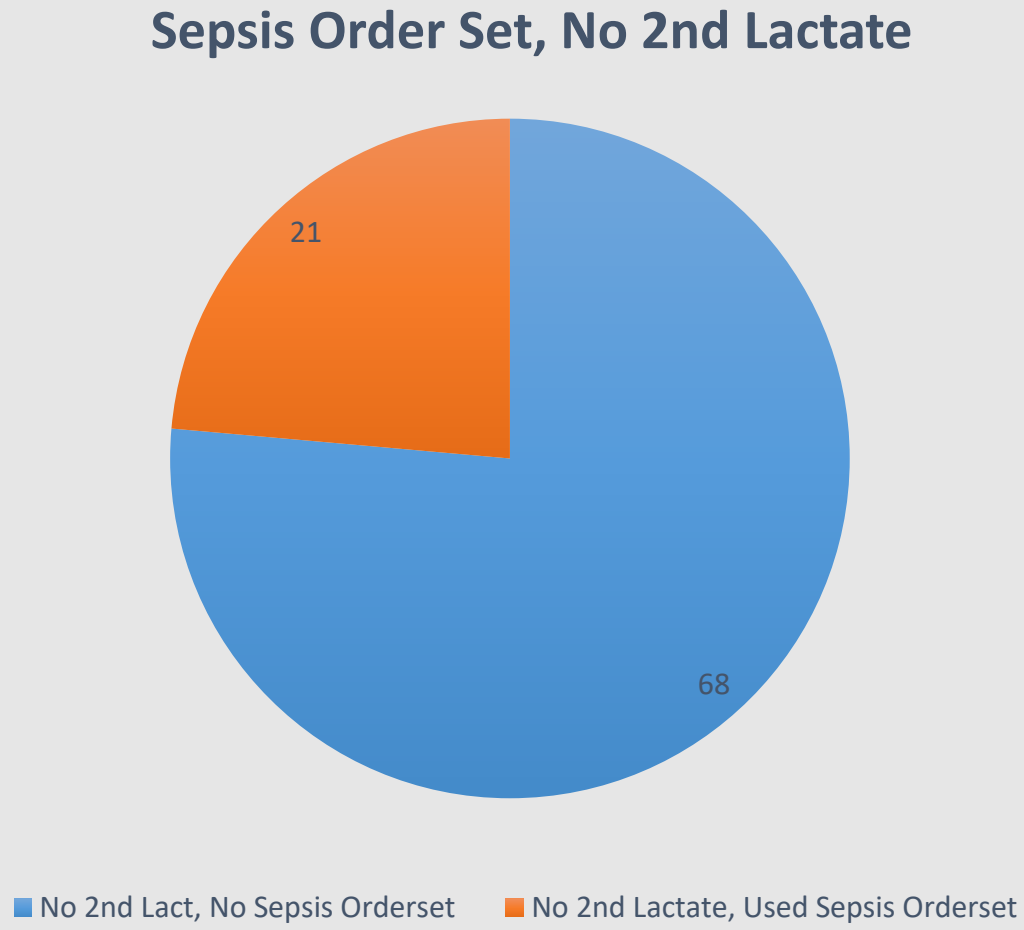
Bundle Compliance Stats-2nd Lactate Compliance

- 89/526 accepted sepsis alerts, 1st lactate >2, never ordered a 2nd lactate since 10/1



Bundle Compliance Stats-No 2nd Lactate

- 68/89 sepsis cases without a 2nd lactate since 10/1 did NOT use the Sepsis Order set, so no reflex order for 2nd Lactate draw.



Summary

The Journey:

- Sepsis care improved 2015-2017, but not in 2018
- POC Advisor alerts are accurate, but the actions weren't always documented correctly in the record
- Staff frequently do not use the sepsis order set

The Goal:

- Interface POC Advisor into Meditech

Questions?


THANK
YOU