

## Revolutionizing Sepsis Management: Ochsner's Early Detection, Intervention, and Digital Surveillance Approach

### Ochsner Health System

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## 1. Executive Summary

**Outcomes:** Using a collaborative approach paired with the Epic Sepsis Predictive Model and virtual nursing support:

In 2023, we reduced our primary sepsis RAMI by nearly 20%, saving 112 additional lives, when compared to 2022. Improvement occurred at 23 of our 28 tracked sites. We also reduced our hospital-acquired sepsis RAMI from 3.26 to 2.89, saving 40 additional lives when compared to 2022. Improvement occurred at 24 of our 28 tracked sites. More broadly, when looking at quarterly performance for the last two years, primary sepsis RAMI went from 1.12 in Q1 of 2022 to 0.81 in Q4 of 2023, a 28% reduction from start to latest cycle.

Longer term, looking by quarter, our health system had a primary sepsis RAMI of 1.15 at its highest and 0.81, at its lowest (our most recent quarter.)

We also improved across the board by about 3% in all system-level process measure goals that were set by the system sepsis collaborative, to include 3-hour sepsis perfect care, MD ordering of sepsis panels, timely antibiotics, and nursing lactate orders being placed.

We have piloted virtual nursing sepsis surveillance at two facilities, with a third facility going live soon. In this model, a dedicated virtual nurse screens risk-stratified patients using a sepsis list and adjudicates alerts fully and accurately. When compared to non-surveillance units, we see an almost seven-fold increase in screenings and four times better sepsis bundle performance.

**Disease State & Team Structure:** Sepsis, or the body's overwhelming response to infection, is associated with about half of the mortalities in our hospital system. It is the number one killer of hospitalized patients across the world. With this in mind, we knew there needed to be reinvigorated attention given to recognizing and treating sepsis. Efforts began in Nov 2020 to stand up a system sepsis collaborative, the likes of which had never been done before. This collaborative has grown to an interdisciplinary group of more than 140 regular participants across the system. It provides a bidirectional platform for sharing information and learnings about sepsis care. The collaborative is structured at the system and local level, with sponsorship from the Chief Quality Officer. Physician leadership has representation from the Emergency Department (ED) and Inpatient side, along with a nursing & rapid-response subject matter expert (SME). Change management is handled by a Director

of Performance Improvement (PI) from within System Quality. In the case of OHS, both MD leaders are also directly linked to IS through their Chief Information Officer (CIO) and Assistant Chief Information Officer (ACMIO) roles. At the local level, we expect that sepsis committees are facilitated by a member of Quality, and are attended by the Medical Affairs (VPMA), Chief Nursing Officer (CNO), front-line physician and nursing champions from both the ED and hospital medicine, plus other ad hoc attendees.

### **Technology, Tools, and Process Changes:**

We use a centralized list of the highest risk population, which is scalable to unit, hospital, or the entire hospital system in real time. This list shows risk scores, sepsis timer information, and an at-a-glance status of recommended treatment options, such as antibiotics and lactates. Users may add patients in need of additional monitoring. Virtual nursing teams may monitor this list and intervene.

We created an interactive sepsis sidebar checklist with timer, which includes recommended care elements, such as blood cultures and fluids. The entire care team sees the same information in real time. Order-related tasks may be auto-completed by using order sets/panels, etc. There is an interactive banner which provides the incentive to work within the tool rather than jump around the chart. Buttons will change color based on completion status.

Ochsner Health employs multi-level Best Practice Advisories (BPA) that fire to providers and/or nurses for patients at very-high, high, and sepsis WATCH risk levels. The predictive model runs every 15 minutes. BPAs are non-interruptive in the ED setting. Language is clear and concise to prompt quick action by the care team.

BPAs may now allow the care team to place patients on Sepsis WATCH, which can be used to keep a closer watch on patient's vitals if the provider is concerned that sepsis is not yet present but may develop. Choosing Sepsis WATCH will place brain tasks for vital signs every hour for four hours.

**Tripping Points & Lessons Learned:** We needed a floor and ceiling strategy, especially given that our campuses varied widely in size and resources. For smaller campuses with fewer providers, using a BPA and nurse-driven screenings & protocols fed by Artificial Intelligence (AI) can drive increased detections (the floor.) For large campuses with more centralized resources (e.g., remote monitoring, virtual nursing,

etc.), but more complex patients, lists and screens can provide efficient patient screening with AI as backup (the ceiling.)

For EDs, non-interruptive BPAs needed or used as narrator/triage screen provides high-sensitivity and drive time-dependent actions.

Interactive tools prompt a “pull” strategy where the providers want to engage with them rather than quickly click through.

Order sets/panels provide “quick buttons” to complete multiple actions.

Nursing written order guidelines empower nurses to flag patients as potentially septic and initiate lactate screens, along with activating a sepsis timer.

We are in the process of revamping our BPAs, beginning with very high-risk sepsis. We learned that we needed to add Smartlinks to show vitals and abnormal lab values to give clinicians more context as to why the patient met the very high-risk criteria.

We learned that we needed to make our BPA action language very clear and precise. For example, if a patient is deemed very high-risk for sepsis, the clinician is prompted with, “Per system protocol, lactate is required to be ordered.” The order button is defaulted, and a user must only click accept. Under the acknowledgement reason, if a clinician chooses not to order a lactate, they must select a button that states, “Cancelling order, disregard protocol.”

Virtual nursing is the future of better sepsis care. Dedicated nursing staff may screen for sepsis, conduct chart reviews, order treatment, and prompt provider communication, as needed.

# Significant Reduction in Sepsis Mortality Rates

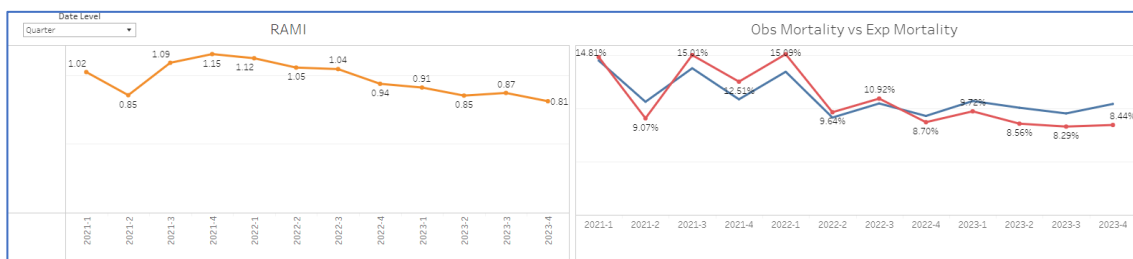
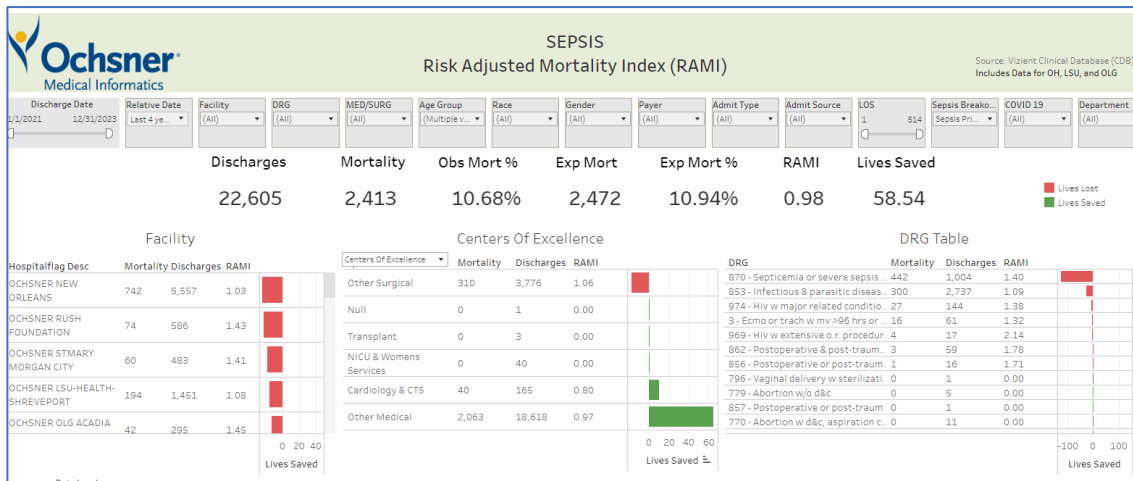
**Primary Sepsis RAMI:** Decreased from 1.04 (842 observed deaths) in 2022 to 0.87 (730 deaths) in 2023!

- Improved performance at 23 of our 28 sites.

**Hospital-Acquired Sepsis RAMI:** Reduced from 3.26 (271 observed deaths) in 2022 to 2.89 (231 deaths) in 2023.

- Improved performance at 24 of our 28 sites.

**Impact:** These improvements in RAMI scores represent not only a triumph in clinical excellence but also numerous lives saved and enhanced recovery for our patients.



# OHS: 2023 System Sepsis Goals

\*as of 12.31.23

Goal	2022 Baseline-ED	2023 OHS Performance-ED	2022 Baseline-IP	2023 OHS Performance-IP	2022 Baseline-All	2023 OHS Performance-All
MD: 3-hour sepsis perfect care quality bundle – provider incentive to reach 62% perfect care	55.2%	59% (+3.8%)	10.7%	13.3% (+2.6%)	45.4%	50% (+4.6%)
MD: MD using sepsis order panels minimum of 30% of the time	52%	55.8% (+3.8%)	28.8%	33.4% (+4.6%)	46.8%	51.4% (+4.6%)
MD: 50% abx within 60 mins of TZ	39.6%	42.5% (+2.9%)	73.4%	75.3% (+1.9%)	47.1%	48.9% (+1.8%)
Nursing: Nursing lactate orders being placed 30% of the time, within 90 mins	10.6%	14.5% (+3.9)	9.9%	14.3% (+ 4.4%)	10.6%	14.5% (+3.9%)

Patient Safety Work Product — Privileged and Confidential Under PSQA and Relevant State Peer Review Statutes

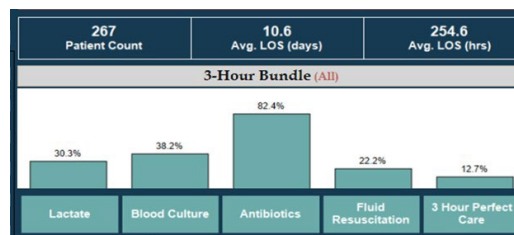
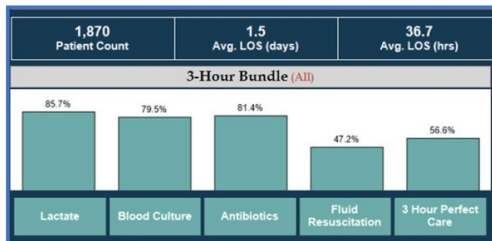
## 2023 OMC Sepsis Perfect Care Bundle Compliance

### Virtual Sepsis Surveillance Units

- (Monitored floor and ED)
- EMERGENCY DEPARTMENT
- MTSU - 8WT
- 14WT
- CSU - 3H
- GISSU - 10WT

### Non-Surveillance Units

- NOMH ICU 16WT
- NOMH MEDICAL SURGICAL UNIT
- NOMH NEUROSCIENCE PROGRESSIVE UNIT
- NOMH OBSERVATION 11H
- NOMH ONCOLOGY ACUTE
- NOMH POST OPERATIVE SURGICAL SERV
- NOMH TRANSPLANT STEPDOWN



## 2. Define the Clinical Problem and Pre-Implementation Performance

### Primary Sepsis Risk-Adjusted Mortality:

**Background:** Ochsner joined Vizient in 2018, which allowed our organization to benchmark our patient outcomes against other nationally recognized users, such as Cleveland Clinic and Mayo Clinic, for the first time. While we'd seen an uptick over the years in our sepsis Risk-Adjusted Mortality Index (RAMI), we discovered that our flagship academic medical center was approximately 80 lives lost away from

performing in the top decile for sepsis (using 2020-2021 data.) We saw similar data when examining the system performance at its baseline (Nov 2018-May 2022.) Using Q1 2021 as our pre-intervention baseline, please see mortality information below:

**Measure Definition: 1.02**

Primary Sepsis Risk-Adjusted Mortality via Vizient Clinical Database.

**Numerator: Observed Mortality: 14.81%, 232 observed mortalities**

Adult (18+) patients diagnosed with any sepsis ICD-10 as their principal diagnosis(A021,A227,A267,A327,A40,A400,A401,A403,A408,A409,A41,A410,A4101,A4102,A411,A412,A413,A414,A415,A4150,A4151,A4152,A4153,A4154,A4159,A418,A4181,A4189,A419,A427,A5486,B377,O0337,O0387,O0487,O0737,O0882,O85,O8604,P36,P360,P361,P3610,P3619,P362,P363,P3630,P3639,P364,P365,P368,P369,R652,R6520,R6521,T8144XA,T8144XD,T8144XS), percentage expired, of all patients with primary sepsis coding

**Denominator: Expected Mortality: 14.49%, 227 expected mortalities**

Adult (18+) patients diagnosed with any sepsis ICD-10 as their principal diagnosis(A021,A227,A267,A327,A40,A400,A401,A403,A408,A409,A41,A410,A4101,A4102,A411,A412,A413,A414,A415,A4150,A4151,A4152,A4153,A4154,A4159,A418,A4181,A4189,A419,A427,A5486,B377,O0337,O0387,O0487,O0737,O0882,O85,O8604,P36,P360,P361,P3610,P3619,P362,P363,P3630,P3639,P364,P365,P368,P369,R652,R6520,R6521,T8144XA,T8144XD,T8144XS), percentage expected to expire out of all primary sepsis patients, per Vizient calculator tool

**Exclusion Criteria:** Bad Data, per Vizient, nonviable neonates, normal newborns, pediatric aged patients, classified rehabilitation patients

**Goal:** In 2022 & 2023, we asked each individual facility to reduce their primary sepsis RAMI by 15%, when compared to the prior year's performance.

**Health Equity:** We did not examine health equity in the early years of our sepsis program.

**Center of Medicare & Medicaid Services (CMS) Sepsis Total Perfect Care/Sep-1 Bundle:**

**Background:** In 2024, CMS Sep-1 Core Measure performance became a part of value-based performance for the first time in history, meaning that hospitals will now have their CMS reimbursements affected by total sepsis bundle performance, outlined below.

**Measure Definition:**

Total Perfect Care Bundle Compliance includes 3-hour and 6-hour sepsis perfect care. The 3-hour bundle includes lactates, blood culture collection, broad spectrum

antibiotic administration, and fluids. The 6-hour bundle includes pressors, volume reassessments, and second lactates. This measure is sampled.

**Baseline: 2021 Annual Rate for the Ochsner System Roll-Up: 48.83% total perfect care compliance**

**Numerator: 398**

**Denominator: 815**

**\*Note that we have additional data with a quarterly view provided in later questions.**

**Specs & Exclusion Criteria:** <https://qualitynet.cms.gov/inpatient/specifications-manuals#tab2%20t>

**Goal:** Between 2022 & 2023, our goal was simply to improve each year. In 2024, we must increase our performance to 60% total perfect care for each participating campus.

**Health Equity:** We did not examine health equity in the early years of our sepsis program.

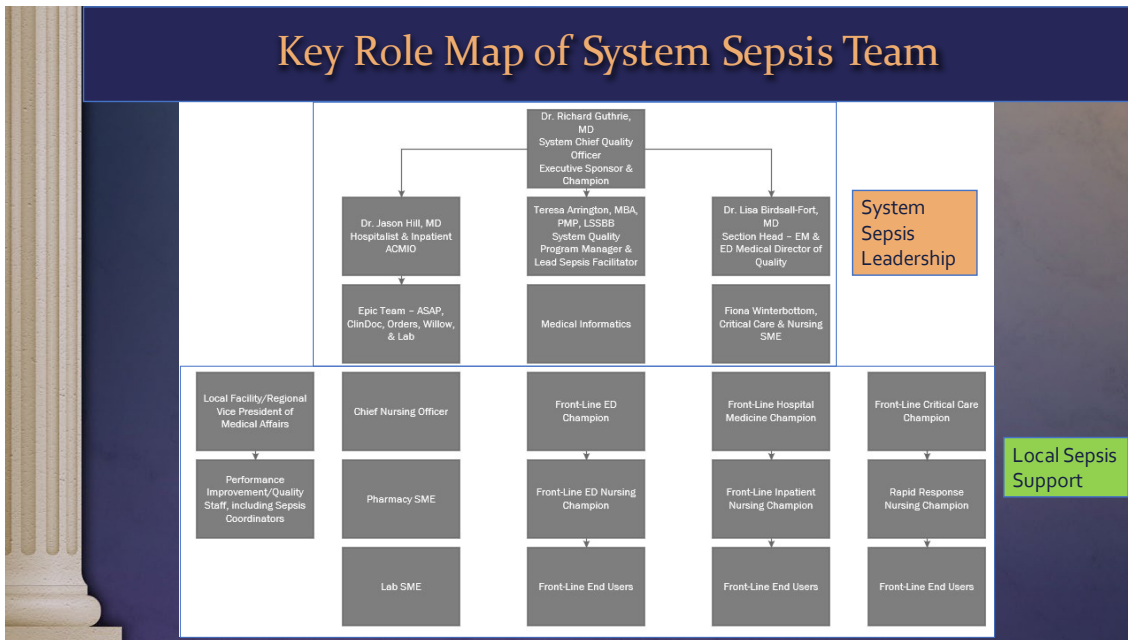
### ***3. Design and Implementation Model Practices and Governance***

**Key Roles & Responsibilities:** Please see key role map below of overall sepsis program. The system team was originally formed due to the championship and sponsorship of the system Chief Quality Officer. Sepsis was a known top driver of RAMI. A change management professional from the system Quality department was selected as change agent at the system level, and approximately 50% of her FTE was dedicated to sepsis in the first two years of standing up the program. Our initial clinical champion was a very strategically-minded anesthesiologist who had proven success with standing up clinical initiatives in difficult environments. He helped with crafting an approach for standing up the collaborative itself. However, within a year, we pivoted to a dyad model with an engaged ED & Hospital Medicine (HM) provider as project leads. This change was made out of deference to expertise and the clinical fields most likely to treat high volumes of sepsis patients. This was a critical change to get better oversight for the sepsis tools, which are most frequently interacted with by ED and HM providers. Finally, there is a critical care nurse who also serves on the Rapid Response team, who provides nursing insights. In addition to this system team, we also ask each local campus to stand up a supportive sepsis committee with the roles outlined below.

There is a sepsis analytics team, which is primarily facilitated by the ED/HM service line PI manager. Our ED and HM physician dyads are the sponsors for the work, with



both providers holding dual Information Services (IS)/Epic and practicing clinician roles. In addition, the sepsis collaborative change manager completes the IT support triage & strategy team. The group meets once per month to discuss overarching IT strategy, with biweekly meetings with a larger analytics team, including nursing education, nursing informatics, Epic, and Tableau. See analytics role clarity grid below for full details.



## Analytics Team- Role Clarity

**\*All members represented below review requests for tool and workflow creation and changes**

Role	Responsibilities	Designees
Idea submitters	Escalate broken workflows/tools Submit ideas for IT or workflow changes or innovation for review	Open to all of Ochsner Health System
Triage/Leads	Responsible for triaging all IT and workflow change requests & communicating approvals, etc. Final approval/denial authority for requested changes Champion changes	Elizabeth Estevez – ED & HM Quality Lisa Birdsall -Fort – ED/ACMIO Jason Hill – HM & CIO Teresa Arrington – Quality/Change Mgt
Clinician SMEs	Responsible for escalating clinician feedback and providing guidance on clinical implications of suggested changes Responsible for providing feedback on field testing	Haroon Jakher – HM Stephen Saenz – Sepsis APP Fiona Winterbottom – Critical Care Nursing/Rapid Response/Virtual Nursing
Nursing Education & Informatics	Responsible for communicating nursing workflow impacts & feedback, as well as creating & scaling nursing education on workflows Responsible for providing feedback on field testing from a nursing perspective	Melanie Kendrick – Nursing Education Paul Stevens – Epic Academy Connie Miller – Informatics
Epic	Responsible for Epic build testing and changes and barrier communication, based on their designated Epic assigned role	Kathi Graham – ASAP/ED Dave Dietz – ASAP/ED Khoi Nguyen – ClinDoc Shana Guidry – ClinDoc Chrystal Jacques - Orders
Tableau	Responsible for creating, testing, managing, and updating Tableau visualization of data, including RAMI & process measure dashboards	Tami Do JD Jeffreys Silpika Karampuri Isaac Kosel



April 25, 2024 7

**Workflow Design Process:**

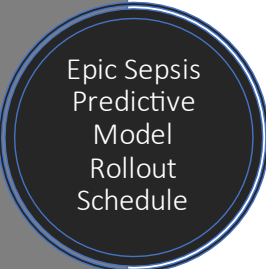
The Epic Sepsis Predictive Model algorithm was initially validated using set endpoints determined by Epic, most generally a sepsis diagnosis or problem in order to generate a matrix of sensitivity/specificity. We used this model to decide the cut points on varying levels of interventions. The model itself doesn't evolve, as it is fixed by Epic. They do, however, release updated versions. Ochsner is currently in the process of implementing version 2. The process is continual. To be successful, one must apply the model logic with clinical acumen. For example, we set our own BPA inclusions/exclusions to help make the model fit better in various scenarios, such as excluding hospice patients, Intensive Care Unit (ICU) patients, and patients already on antibiotics.

In response to the complexities of sepsis treatment and detection, our healthcare organization has implemented significant workflow and governance modifications to maximize the benefits of technological and data innovations. Central to these modifications is the standardization of sepsis treatment protocols, which includes the implementation of a checklist and timer system ensuring timely initiation of critical therapies—primarily antibiotics and fluids within a three-hour window. This system is supported by an Epic interface that uses color-coded actions to guide the care team effectively, enhancing both compliance and educational outcomes. Additionally, the interface's gamification elements have improved user engagement and experience. For sepsis detection, predictive analytics are employed to assess the risk based on patient data, tailored for use in both emergency and inpatient settings. This analytic approach is complemented by a virtual nurse screening protocol, which has significantly improved the detection rates by allowing extensive patient screening across our network. Governance improvements include the development of a universal sepsis dashboard to monitor treatment and screening actions system wide. These processes were refined through iterative testing and pilot programs, leading to a strategic deployment of resources tailored to the needs and capacities of individual hospitals within our system, thereby enhancing overall efficacy and resource utilization.

**Clinical Staff Training Approach:**

We made the decision to pilot our initial Epic Sepsis Predictive Model with supportive patient lists and interactive sidebar checklist at Ochsner's Kenner campus in June 2021, after approximately 15 months of running the model in the background to train it on our patient population. The Kenner location is a community level hospital, and

they were a highly engaged team. We partnered with their local ED & Hospital Medicine provider leads, as well as their CNO to gain commitment to trial the patient lists and sidebar checklist. The tools had been shared widely for at least 5 months in the System Sepsis Collaborative to build excitement and generate interest. We met frequently via Zoom and with onsite Epic Academy support to demo the tools for front-end users at the Kenner site. We also created supportive huddle helpers, which were shared during trainings and are also housed on the Ochsner HUB, which any user can sign into. All IT-related documents, FAQs, and recorded demos are searchable there. After initial trainings and prep with the pilot team, lasting about 2 months, we also had a daily 15 minute zoom every day for about 2 weeks to gain real-time feedback on adoption, questions, or barriers that needed to be addressed. We were able to reduce this feedback schedule gradually as we made tweaks and scaled to more areas. For the full scaling schedule of Ochsner Health’s owned and managed locations, see the grid below.



Location	ED Implementations	IP Implementations
Kenner	June 29, 2021	June 29, 2021
Baptist	October 5, 2021	November 16, 2021
West Bank/Marrero	October 12, 2021	November 18, 2021
Northshore	October 26, 2021	January 24, 2022
St. Bernard	December 7, 2021	January 11, 2022
Jeff Hwy	January 11, 2022	March 29, 2022 (Tiered unit -based roll-out; Complete as of 6/20/22)
Baton Rouge/Iberville	February 15, 2022	March 15, 2022
St. Charles	March 15, 2022	March 15, 2022
Chabert	March 15, 2022	March 15, 2022
St. Anne	March 15, 2022	March 15, 2022
Hancock	March 15, 2022	March 15, 2022
OLG	May 1, 2022	May 1, 2022
LSUS/LSUM	7/19/2022	7/19/2022
SMH	8/9/22	8/9/22
Rush & St. Mary	9/13/22	9/13/22
STPH	10/17/22	10/17/22
TGMC & Titus	11/15/22	11/15/22
Jennings	1/23/23	1/23/23

\*Subject to Change  
Patient Safety Work Product — Privileged and Confidential Under PSQIA and Relevant State Peer Review Statutes

## How do I escalate analytics agenda items? Ochsner System Sepsis Collaborative (sharepoint.com)

**why does sepsis matter :**

- ▼ Sepsis Month Resources
- ▼ Sepsis RAMI – Tableau
- ▼ Epic Sepsis Resources (Demo Videos, Huddle Helpers, etc.)
- ▼ System Sepsis – Rapid Cycle Improvement Projects
- ▼ Collaborative Decks & Recorded Meetings
- ▼ Sepsis FAQs
- ▲ Sepsis Toolkit or Analytics Error Escalation

Submit Your Sepsis Toolkit or Analytics Error Escalation

Ochsner

April 24, 2024 3

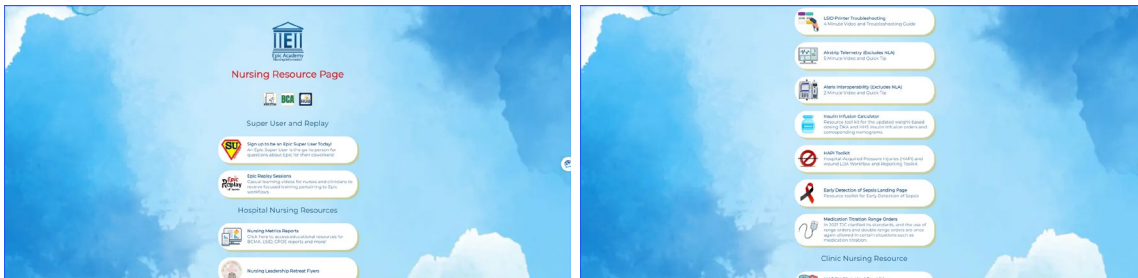
**Epic & IS Staff Training:** There are several ways Early Detection of Sepsis workflow information is disseminated to users across the system. There are different approaches to addressing education for new changes and for continuing education. There are also separate approaches for spreading information to directors and managers and for physicians and nurses that are daily end users. There are also several resources for rapid cycle feedback to address potential education opportunities.

### **New Changes**

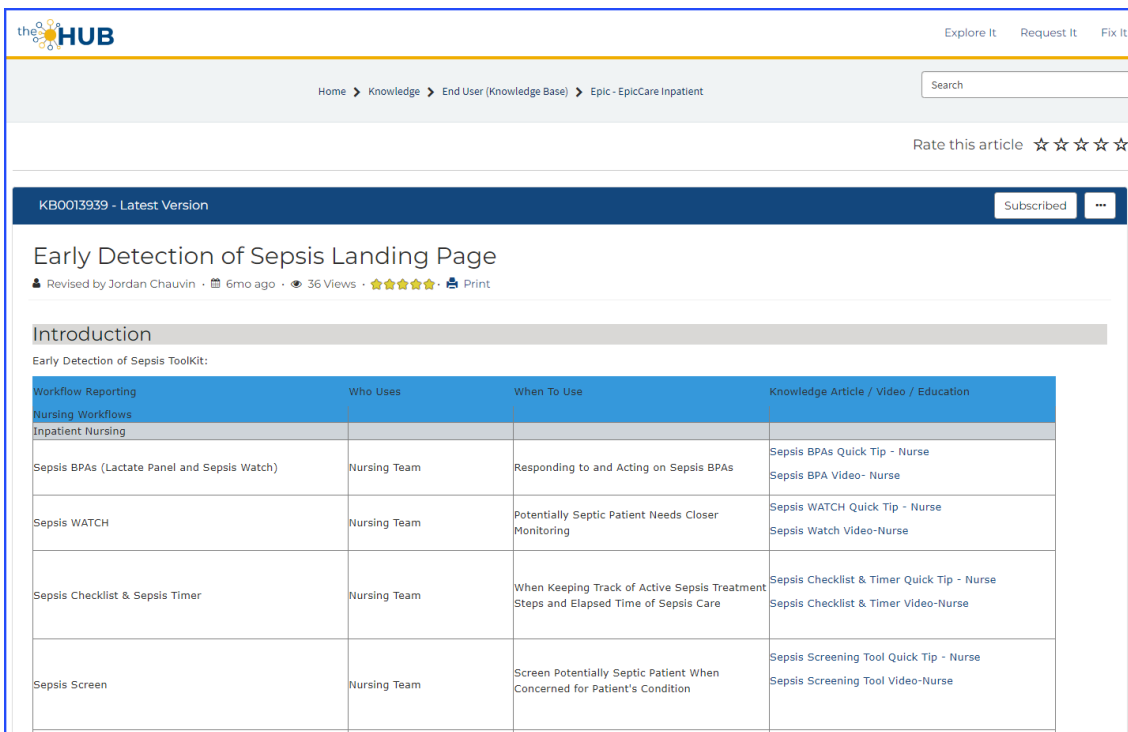
In person support for new major changes to current early detection of sepsis workflow is done with Epic Academy staff at each facility. Education sessions are held with the user groups and departments that will be affected by any new changes to the Early Detection of Sepsis workflows. Ochsner Learning Network (OLN) is utilized for online training courses on new workflows and is important for tracking how many users have been reached with the new information.



QR Code Fliers are passed out that have a scannable QR code that brings end users to educational materials on their cell phone.



Hub Landing Page. The HUB is a resource for all users that contains all educational materials created by the IS department. The Early Detection of Sepsis Landing Page houses all materials related to sepsis in one page within the HUB.

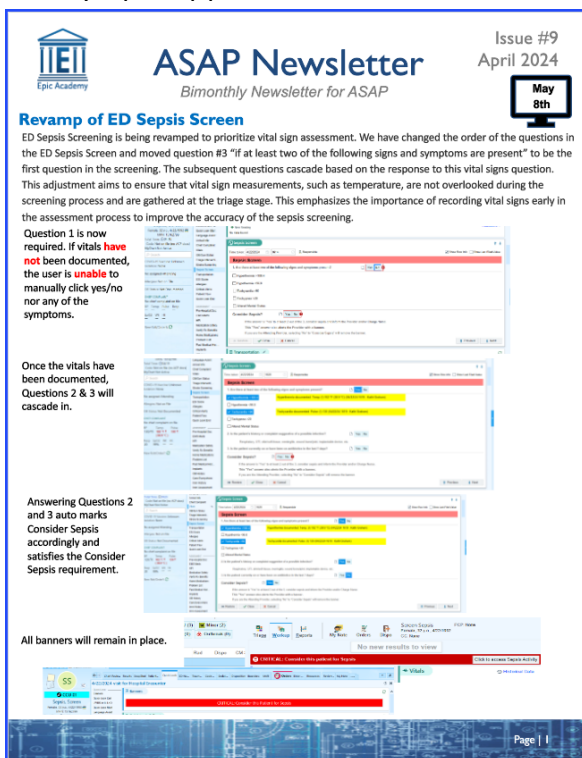


## Continuing Education

Hub Landing Page – Quick Tips, Workflow Videos and Reporting help are all located here for accessing at anytime a user may need it. Epic Academy places QR codes on

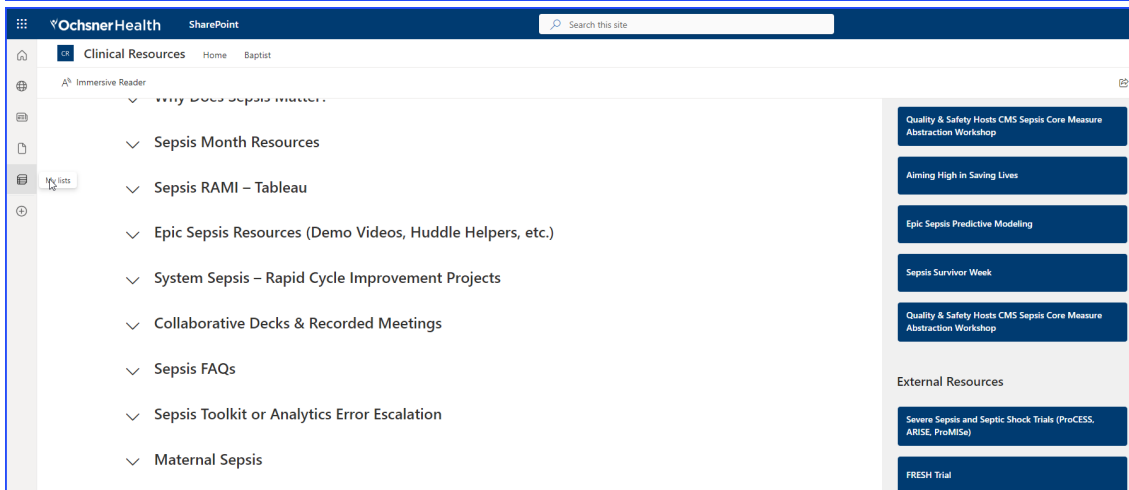
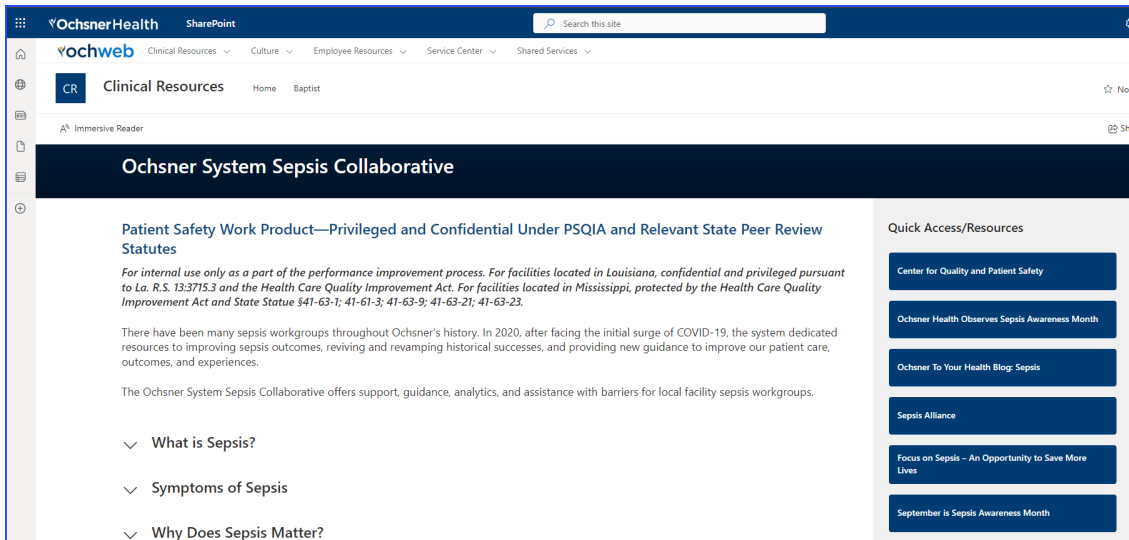
computers throughout our facilities that will direct users to a directory of education topics that includes Early Detection of Sepsis landing page.

Epic academy Newsletters are biweekly internal publications that are sent to all users. When new workflows or changes to existing workflows, the newsletters containing this information are sent to the appropriate users. Newsletter are broken out by Epic application.



Ochsner Learning Network (OLN) is used to provide users across the system with educational materials in an online course format. These courses can be self-assigned or assigned by leaders to their users where appropriate. There are several Sepsis related OLN modules available.

Epic Academy hosts “Super User Sessions” with users who have been identified as “Super Users”. These users are highly engaged and advanced users of Epic who are used a resource on their units. The sessions are hosted live quarterly and new or important information about Epic workflows is highlighted. The Super Users are expected to bring what they learn back to their unit to educate their teams. These sessions are recorded and live on OLN to be self-assigned at future dates if needed. The system Sepsis SharePoint site is also utilized as a source of continuing education. Reporting tools, news, newsletters and initiatives are housed here for reference.



## Managers/Directors vs Daily End User

Reaching the leaders in our system is just as important as reaching frontline users.

Early Detection of Sepsis workflow changes or additions are brought to several councils before implementation for feedback and approval. These councils include but are not limited to, ED / Inpatient / Obstetrics (OB) Education Collaboratives and ED / Inpatient / OB Quality Councils. Several other service lines have committees with Epic Academy representation and have standing agenda time for Epic news.

Many facilities have local unit-based committees that are attended by Epic Academy representatives where information on Epic is relayed.

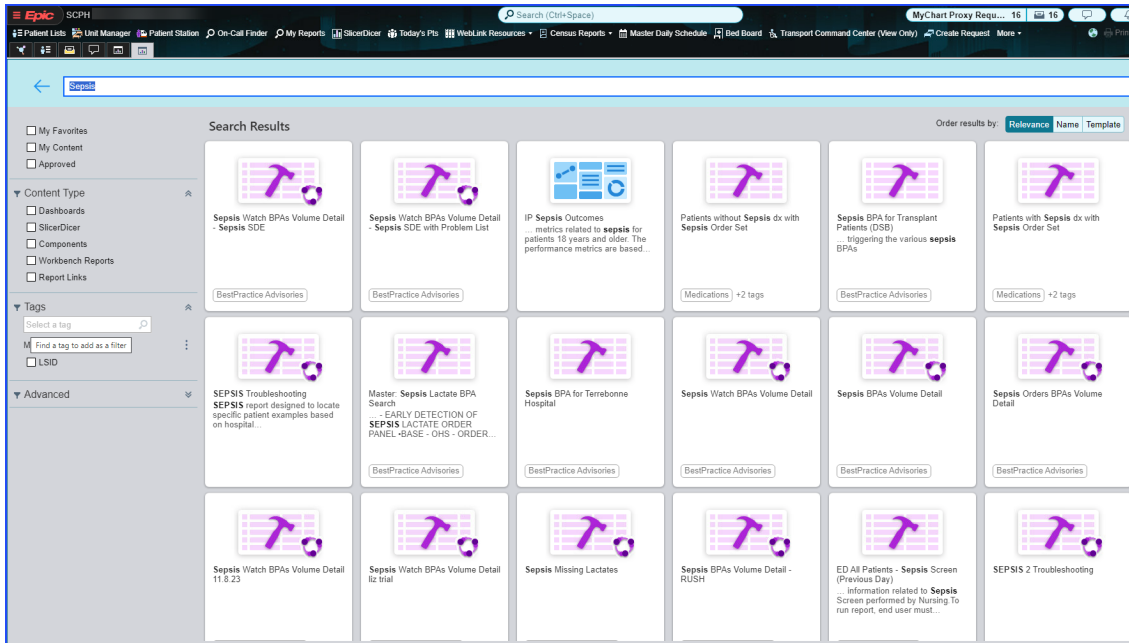
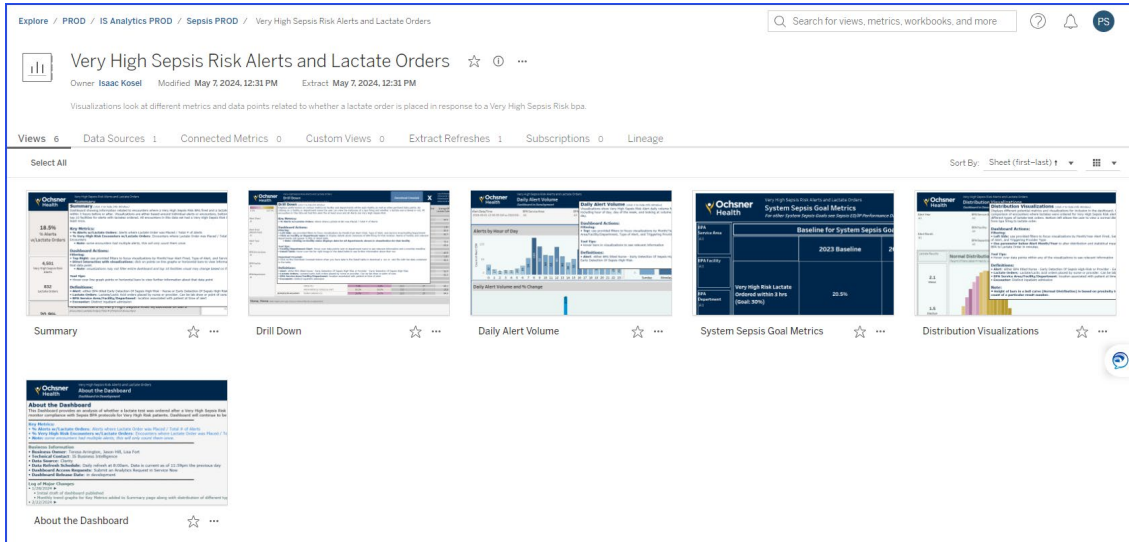
Facility level leadership meetings that are attended by all hospital leadership have standing agenda slots for Epic Academy representatives where new or changing workflow information is relayed.

Facility wide morning huddle calls are also utilized to spread information. These are daily calls with all leadership positions in attendance where high level announcements can be made about go-lives and education opportunities.



## Rapid Cycle Feedback

An important piece to education is being able to identify which users may need more education. These education opportunities can be identified with several reporting tools in Epic and Tableau. These include compliance reports in Epic and dashboards on Tableau.



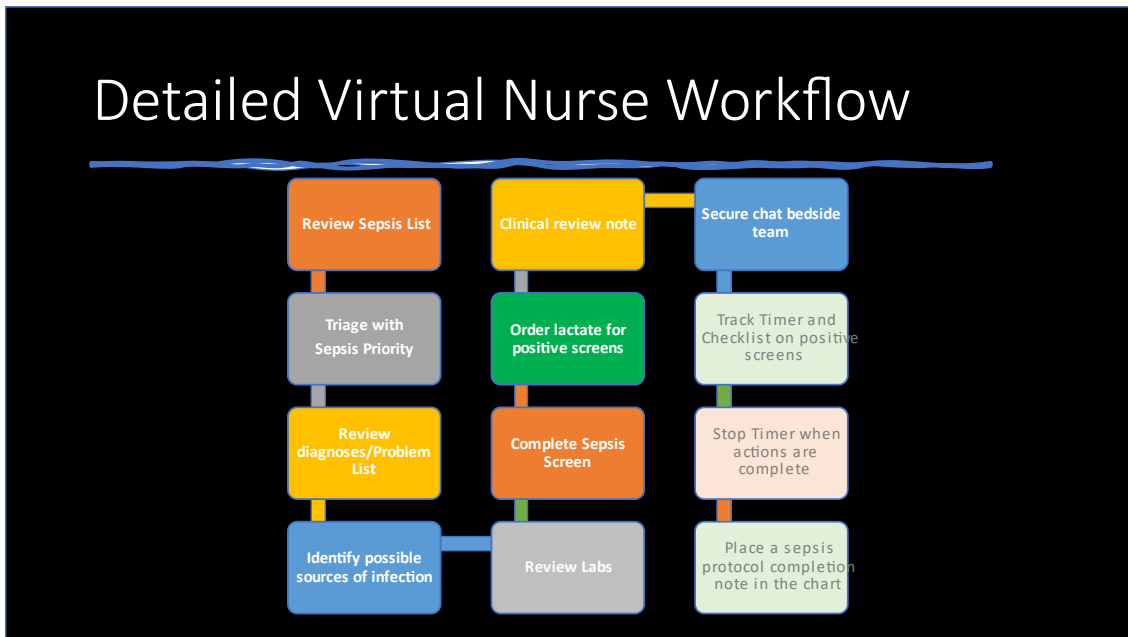
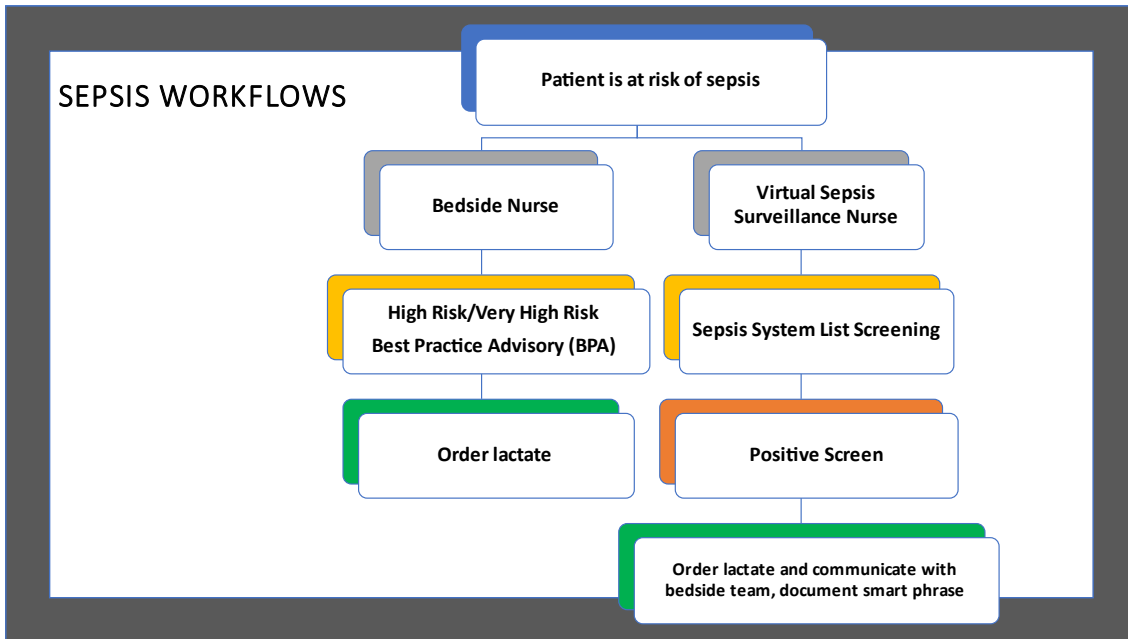
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## Clinical Transformation enabled through Information and Technology

The flow chart below depicts the workflow of both the bedside staff and the virtual sepsis nurse. A predictive algorithm within the medical record identifies patients at risk of sepsis. This prompts two workflows



The bedside nurses or Provider's may receive an alert that the patient is at risk for sepsis. They are prompted to place orders for a lactic acid level or sepsis order panel. The virtual sepsis nurse triages patients identified at risk for sepsis from a sepsis "risk" list. The virtual nurses then prompt a workflow to order a lactic acid level and communicate with bedside staff. This is displayed in the detailed algorithm below.



The Early Detection of Sepsis Predictive Model analyzes a patient's clinical data such as vitals, diagnoses, and lab results to aid in earlier diagnosis and proper documentation, which indirectly contributes to their inclusion in the sepsis quality measure population. Based on the analysis, the model assigns a score indicating a stratified level of high or very high risk of sepsis and triggers alerts reminding clinicians of best practices for sepsis management including prompting clinicians to order a lactate test, a crucial indicator of sepsis. These actions by the AI model can indirectly lead to sepsis diagnosis and patient inclusion in the quality measure cohort by increasing awareness and earlier diagnosis and improving documentation. By highlighting high risk patients and prompting lactate tests, the model encourages earlier evaluation for sepsis. Faster diagnosis allows for quicker treatment, potentially improving patient outcomes. Alerts triggered from the AI model encourage better documentation of sepsis evaluation in patient records. This ensures that diagnosed cases are accurately reflected in the medical records, leading to their inclusion in the sepsis quality measure cohort.

### **Early Sepsis Detection with Machine Learning**

This system utilizes a chronicles-based logistic regression model with 79 variables to predict the risk of sepsis in hospitalized patients.

#### **Key Features:**

- **Early Identification:** Identify patients at high risk of sepsis before their condition worsens, allowing for timely intervention.
- **Data Integration:** Combines various data sources including:
- **Diagnoses:** Chronic health conditions like chronic kidney disease, diabetes, etc.
- **SIRS Criteria:** Vital signs and white blood cell count to assess inflammatory response.
- **Lab Results:** Comprehensive blood analysis for further assessment.
- **Medications:** Current medications that may impact the immune system.
- **Lines and Devices:** Presence of medical devices that could increase infection risk.

#### **Benefits:**

- **Improved Accuracy:** The model goes beyond traditional SIRS criteria to potentially identify more sepsis cases and reduce false positives.
- **Enhanced Clinical Decision-Making:** Clinicians can leverage risk scores to prioritize care for patients most susceptible to sepsis.
- **Optimized Resource Allocation:** Early detection allows for focused interventions, potentially reducing unnecessary procedures and improving overall efficiency.

- This system empowers clinicians to proactively manage sepsis risk, potentially leading to improved patient outcomes.

### **General BPA information**

The Best Practice Advisories used in Ochsner's inpatient sepsis workflow can be passive or interruptive. The predictive model runs batch job every fifteen minutes that evaluates the patient's documentation and generates an acuity score. The possible scores are broken down into ranges that are assigned a high or very high-risk level. If the patient has already hit the AI generated model score threshold prior to the user accessing the patient chart, the BPA will appear passively in the various navigators in the workspaces the user regularly reviews patient data and documentation. The Best Practice Advisory section of the navigator will be highlighted either orange or red, depending on the risk level of the patient, to draw the user's eye. The BPA being passive at this point allows the user the opportunity to document the treatment of the patient and satisfy the BPA through normal workflow practices. When the user navigates to the highlighted area of the navigator, the appropriate sepsis risk level BPA will display. If the patient hits the AI generated model score threshold while the user is currently in the patient chart, documentation such as filing flowsheets data or accessing the orders activity will trigger an interruptive BPA window notifying the user of the change in risk level status and gives the user the opportunity to place the sepsis panel orders in addition to the other documentation in progress that perhaps would not have ordered otherwise. If the clinician attempts to exit the patient chart without addressing a BPA that has fired, a message will appear reminding them the BPA still needs to be addressed before they can exit.

The order panels used in each BPA are specific to the nurses and providers scope of practice. There is a phantom order included in each panel that allows analytics to identify when the orders placed are specific to the treatment of sepsis and helps determine the compliance rate at which users are taking the appropriate and desired action from the BPAs. It is also used to trigger the ED Active Sepsis event and simultaneously start the Sepsis Timer.

Patients that meet the high-risk level AI generated model score threshold can be stratified further by using SIRS to determine if the user should move forward with treatment. It also gives the clinician the flexibility to place the patient on Sepsis WATCH for additional monitoring before deciding to initiate sepsis a sepsis protocol. The next few paragraphs explain the Very High Risk, High Risk, and Sepsis WATCH BPAs and how they are used at Ochsner to drive the standard of care for sepsis treatment.

### **Very High Risk**

The Very High-Risk BPA is red in color for easy identification of the elevated risk level. The patient must have an AI generated predicted model score of greater than or equal to 20. Both the nurse and the provider have their own versions of the Very High-Risk BPA. This BPA displays the vitals and labs recently documented for the patient for both users, however the provider BPA also uses a smartlink to pull in antibiotics administered to the patient within the last 36 hours. Decision support is provided by explicitly directing the user to place lactate/sepsis treatment order panels when this BPA fires. Clinicians can take this action and queue up the orders directly from the BPA. If the clinician decides not to place the orders because what is ailing the patient is something other than sepsis, the acknowledgement reason can be selected indicating the patient is not being treated for sepsis at this point and removes the patient from the Early Detection of Sepsis system list. After 24 hours of documenting the acknowledgement reason, the patient is eligible for the Very High-Risk BPA to fire in the future, assuming the predictive model score threshold is met again.

When the Very High-Risk BPA fires, it automatically triggers a push notification to be sent to the mobile devices of the attending provider and a specific group of clinical users, usually specializing in deterioration of patients. The appropriate clinicians are aware of the change in status even when they may not be accessing the patient's chart at that moment, allowing them to redirect their attention to the patients with the higher acuity needs as necessary.

### **High Risk**

The High-Risk BPA is orange in color for easy identification of the elevated risk level. The patient must have an AI generated predicted model score of greater than or equal to 10 and less than 20. This BPA lists the criteria a patient must meet to be considered "high risk". It uses Epic's smartlink functionality to pull in the highest or lowest documented vitals taken over the last 6 hours and pertinent lab results for that specific patient. The abnormal values are displayed in red font. It uses Epic's smarttext functionality to display conditional text notifying the user of the number of SIRS criteria that have been met and provides decision support by explicitly directing the user to place lactate/sepsis treatment order panels if there are 2 or more SIRS criteria met or in the case where less than 2 SIRS criteria have been met, directing the user to select the acknowledgement reason in the BPA that is linked to a Smart Data Element which places the patient on Sepsis WATCH to be monitored further before deciding to initiate the sepsis protocol. Clinicians can take both actions, as applicable, directly in the BPA. Selecting the acknowledgement reason to place the

patient on Sepsis WATCH does not trigger the ED Active Sepsis event and it does not start the sepsis timer. The acknowledgement reason does trigger a background BPA that loads a nursing task to monitor vitals every hour for 4 hours on Epic's Brain activity. This task helps to ensure the nurse is aware additional vitals are needed as time passes and that vitals are in direct alignment with the patient being placed on Sepsis WATCH. In both scenarios, the patient is added to the Early Detection of Sepsis System list.

Both the nurse and the provider have their own versions of the High-Risk BPA. The provider versions of the SIRS 0-1 criteria met BPA and the SIRS 2+ criteria met BPA also use a smartlink to pull in antibiotics administered to the patient within the last 36 hours. Both the nurse and provider BPAs explain what placing a patient on Sepsis WATCH means clinically and they also contain a Sepsis Clinical User References hyperlink that opens a window to the Early Detection of Sepsis Hub Landing Page giving the user quick access to additional information workflow and functionality education documents. It is important to note logic is built in the rules to ensure a BPA that has been addressed by one user will not fire the same BPA on the same patient for a different user within a 24-hour window. This is to ensure orders are not placed on patients repetitively in error.

### **Sepsis WATCH BPA**

The Sepsis WATCH BPA also carries a high-risk level and has a lot of the same features as the High-Risk BPA. It is orange, the patient must have an AI generated predicted model score of greater than or equal to 10 and less than 20, and it uses the same smarttext and smartlist functionality and features to inform clinicians about the patient's SIRS criteria as well as provides decision support. The Sepsis WATCH BPA is an extension of the High Risk BPA for patients that require additional monitoring prior to determining the need for sepsis treatment. It is configured to fire 4 hours after the Smart Data Element that is linked to documenting the acknowledgement reason in the High Risk. The Sepsis WATCH BPA can fire prior to the 4-hour window if the patient deteriorates and the SIRS criteria the patient meets increases from 0-1 to 2 or greater. A smarttext displays conditional text notifying the user of the number of SIRS criteria that have been met and provides decision support by explicitly directing the user to place lactate/sepsis treatment order panels if there are 2 or more SIRS criteria met or in the case where less than 2 SIRS criteria have been met, directing the user to disregard the order and elect the acknowledgement reason. If not placing the orders, the acknowledgement reason selected is linked to SmartData Element indicating the patient is not being treated for sepsis at this point and removes the patient from the Early Detection of Sepsis system list. After 24 hours of documenting

the acknowledgement reason in the Sepsis WATCH BPA, the patient is eligible for the High-Risk BPA to fire in the future, assuming the predictive model score threshold is met again.

### **Early Detection of Sepsis System List**

The Early Detection of Sepsis system list was developed to furnish clinicians with a comprehensive overview of a patient's sepsis status within the inpatient setting. Customized lists have been generated for individual hospital locations, comprising patients identified as high risk, very high risk, or under sepsis observation. These lists offer more than 15 columns, facilitating thorough monitoring of patients' statuses. Additional information regarding the filters and columns are listed below for further clarity and utilization.

#### **Filter**

- High Risk – Has a predictive model score  $\geq 10$  and  $< 20$
- Very High Risk – Has a predictive model score  $\geq 20$
- Sepsis Watch – Clinicians have placed this patient on sepsis watch through the Sepsis Watch Best Practice Advisory (BPA)

#### **Columns**

- Patient Name – Displays age, name, and gender.
- MRN – Displays patient's medical record number (MRN) for the current admission.
- Patient Class – Displays the patient's class.
- Room/Bed – Displays the patient's room and bed.
- Early Detection of Sepsis Risk - This column shows the Early Detection of Sepsis predictive model's score category as High, Medium, or Low based on the following thresholds:
  - Low risk score threshold  $\geq 0$  and  $< 10$
  - Medium risk score threshold  $\geq 10$  and  $< 20$
  - High risk score threshold  $\geq 20$
- Last Sepsis Screen – Displays the date and time the last IP sepsis screen was completed.
- Sepsis Timer – This column will display “Timer Started”, “Timer Stopped” or “Timer Not Started” depending on the patient's status within the last 12 hours. The timer is located in the Sepsis Navigator.
- MEWS Score – Displays the Modified Early Warning (MEWS) Score for the patient.
- MSOFA Score – Displays the total Modified Sequential Organ Failure Assessment (MSOFA) score for patient.

- Antibiotic Ordered\Resulted – Displays a check mark if antibiotics have been ordered or resulted within the last 12 hours.
- Blood Culture Ordered\Resulted - Displays a check mark if blood culture has been ordered or resulted within the last 12 hours.
- Sepsis Fluid Ordered\Resulted – Displays a check mark if sepsis fluid has been ordered and\or resulted.
- Fluid Volume Documented – Will display a checkmark if a lactated ringers IV bolus or sodium chloride iv bolus has been placed.
- Repeat Lactate Ordered\Resulted - Displays a check mark if lactate has been ordered and\or resulted more than once within a 12-hour period.
- Perfusion Assessment Complete - Displays a check mark if the provider 6-hour note has been ordered and\or resulted more than once within a 12-hour period. Confirmation of documentation results to true if provider has manually attested to performing an assessment within the last 6 hours from the Sepsis Navigator Checklist or from the appropriate flowsheet template.
- Pressors Ordered - Displays a check mark if vasopressors have been ordered within a 12-hour period. Confirmation of vasopressor documentations returns true if identified norepinephrine infusion variable, epinephrine iv infusion, phenylephrine iv infusion or vasopressin infusion have been placed.

Ochsner is constantly working with our core values of Innovation and Excellence in mind while always keeping Patients First. We are continuously evaluating outcomes and reevaluating our build and user workflows to streamline the documentation and processes completed so they are as efficient and accurate with caring for their patients as possible. In the initial phases of the sepsis project, a best practice advisory fired on inpatients notifying the user that the patient was at a high or very high risk for sepsis, based on the AI generated predicative model score. The BPA prompted and jumped the user to the activity to complete documentation of the inpatient sepsis screening tool to determine if the sepsis protocol should be initiated. The sepsis screening tool is a smartform that pulls in previously documented vitals and lab results to automatically answer the questions for nurses and providers. If initiating the protocol was appropriate, verbiage would appear directing the user to places the appropriate orders. The challenge with that initial workflow was there were several steps/clicks needed before the clinician was informed of what the patient needed, and some nurses did not feel empowered to place the lactate orders the screen was recommending.

We decided to review the BPAs and discovered there was an opportunity to optimize them and streamline the workflow. Instead of the risk level BPA prompting the user to access the screen and reference the applicable vitals and lab results from within the screen to complete the documentation and ultimately be prompted to place the appropriate orders, enhancements were made to (1) pull in and display the vitals and lab results directly into the risk level BPA, (2) give the users the ability to place the orders from within the BPA. and (3) gave users the flexibility to incorporate enhanced monitoring prior to initiating the sepsis protocol through implementing the Sepsis WATCH workflow, again using the BPAs. This eliminated the need to complete the screen first in most cases. We continue to have it available for users who desire to proactively screen patients, which is primarily used in the virtual nursing workflow. We also used this opportunity to rewrite a more clearly defined standard of care written order guideline around sepsis for nurses that included the newly implemented Sepsis WATCH workflow. This document empowered the nurses to place the lactate orders because the guideline stated it was appropriate and the BPAs the order panels were displayed in explicitly directed them to do so based on the patient's status.

We prompt users to place lactate order panels in the BPAs because lactate testing is a valuable diagnostic tool to guide sepsis management. Lactate testing can identify elevated lactate levels which indicate cellular dysfunction due to tissue hypoperfusion (reduced blood flow to tissues). This can help assess sepsis severity and predict patient outcomes. Serial lactate measurements track how a patient responds to sepsis treatment. Ideally, lactate levels should trend downward as the underlying issue improves. Some septic patients might maintain blood pressure despite inadequate oxygen delivery to tissues. Lactate can help uncover this "occult shock" and prompt more aggressive treatment.

There are different alerts within the medical record that prompt staff to consider sepsis as a clinical problem.

This is an example of a very high-risk alert that prompts clinical staff to order a lactic acid panel.



Critical (1)

**Early Detection of Sepsis Risk**

**Early Detection of Sepsis Risk**

**Vitals:**

	01/17/23 0011	01/17/23 0015	01/17/23 0050	01/17/23 0849
BP:		119/72		(1) 165/96
BP Location:		Left arm		
Patient Position:		Sitting		
Pulse:	93		75	(1) 112
Resp:		20		(1) 22
Temp:		97.9 *F (36.6 *C)		(1) 101 *F (38.3 *C)
TempSrc:		Oral		
SpO2:		98%	97%	(1) 90%
Weight:				
Height:				

**Abnormal Lab Values:**

- No abnormal Creatinine Result
- No abnormal Bilirubin Result
- Last Platelet Result: 207
- No abnormal Lactate Result
- No abnormal INR Result
- No abnormal aPTT Result
- Last WBC Result: 5.23

This patient has been identified as very high risk for sepsis. Per system protocol, lactate is required to be ordered.

Order Do Not Order SEPSIS LACTATE PANEL

Acknowledge Reason

Canceling order, disregard protocol

Enter Comment

Accept

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This is an alert to place a patient on a "sepsis watch" to allow time to gather more information for clinical decision-making.

Early Detection of Sepsis Risk

**Early Detection of Sepsis Risk - SEPSIS WATCH**

Patient must meet 2 or more of the criteria to be High Risk:

- Temp < 36C (96.8F) or > 38C (100.4F)
- Heart rate > 90 BPM
- Respiratory rate > 20 BPM
- WBC count < 4000 or > 12,000 or > 10% bands

**Contributing factors:**

Tmax: 101 F (maximum value)  
 Heart Rate: 115 (maximum value)  
 Respiration Rate: 27 (maximum value)

**Indications of Organ Dysfunction:**

Patient has 3 SIRS criteria. Per system protocol, order lactate.

Order Do Not Order SEPSIS LACTATE PANEL

Acknowledge Reason

Canceling order, disregard protocol

Accept (1)

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Very Important (1)

**Early Detection of Sepsis Risk**

**Early Detection of Sepsis Risk**

Patient must meet 2 or more of the criteria to be High Risk:

- Temp < 36C (96.8F) or > 38C (100.4F)
- Heart rate > 90 BPM
- Respiratory rate > 20 BPM
- WBC count < 4000 or > 12,000 or > 10% bands

**Contributing factors:**

Tmax: 101 F (maximum value)

**Indications of Organ Dysfunction:**

Patient has 1 SIRS criteria. Per system protocol, place patient on Sepsis WATCH.

Sepsis WATCH indicates patient is at risk for sepsis but needs additional monitoring before diagnosis or treatment.

Order Do Not Order SEPSIS LACTATE PANEL

The following actions have been applied:

- Scheduled. A follow-up advisory has been scheduled.

Acknowledge Reason

Sepsis WATCH

Accept (1)

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This is an example of the virtual nurse patient screening for patients who are on the sepsis list. Sepsis List to identify the patient at risk of sepsis with a "sepsis priority" icon (column 1)

Sepsis Priority	Patient Name/Age/Gender	MRN	Room/Bed	Patient Class	Early Detection of Sepsis Risk	Last Sepsis Screen	Sepsis Timer	MEW Score	MSO Score	Antibiotics Ordered/Gh	Lactate Ordered/R	Blood Culture Ordered/C	Sepsis Fluid Ordered/F	Fluid Volume Documented	Repeat Lactate Ordered/Resulted	Perfusion Assessment Complete	Pressors Ordered
🔴			553/553 A	IP- Inpatient	High Risk	—	Timer Not Started	3	4	🚫	🚫	🚫	🚫	🚫	Ordered: Resulted: 🚫	🚫	🚫
🟡			ED 10/10	Emergency	High Risk	—	12:46	3	0	🚫	✓	✓	🚫	🚫	Ordered: Resulted: 🚫	🚫	🚫
🟡			6089/6089 A	IP- Inpatient	High Risk	12/6/2022 01:36 [No]	Timer Not Started	3	12	✓	🚫	🚫	🚫	🚫	Ordered: Resulted: 🚫	🚫	🚫
🟡			542/542 A	IP- Inpatient	High Risk	—	Timer Stopped	3	1	✓	🚫	🚫	🚫	🚫	Ordered: Resulted: 🚫	🚫	🚫

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The sepsis screen completed by the Virtual Nurse to verify data that contributes to sepsis risk.

**Sepsis Screen: If there is a suspicion of sepsis (YES to questions 1 and 2) AND signs of organ dysfunction (YES to question 3) are present, please activate the sepsis timer and place orders as indicated below.**

1. Are the patient's current symptoms suggestive of a possible infection?  Yes  No

Respiratory, UTI, skin/soft tissue, meningitis, wound bone/joint, implantable device, etc.

2. Are there at least two of the following signs and symptoms present?  Yes  No

- Hyperthermia >100.4 or Hypothermia < 96.8 Last Temperature: 100.4 [05/11/22 1413]
- Tachycardia >90 Last Pulse: 121 [05/11/22 1311]
- Tachypnea >20 Last Respirations: 16 [05/11/22 1311]
- WBC < 4,000 or WBC > 12,000 Last WBC Result: 13.21 5/11/2022 1:32 PM
- Altered Mental Status Last AVPU: alert [05/11/22 1311]

3. Are any of the following organ dysfunction criteria present and not considered to be due to a chronic condition?  Yes  No

- SBP < 90 or MAP < 65 Last BP: 120/71 [05/11/22 1311]
- Creatinine > 2.0 Last Creatinine Result: 1.3 5/11/2022 1:32 PM
- Total Bilirubin > 2.0 Platelet count < 100,000 Last Total Bilirubin Result: 0.4 5/11/2022 1:32 PM Last Platelet Result: 296 5/11/2022 1:32 PM
- Lactate > 2.0 Last Lactate Result: 2.9 5/11/2022 1:32 PM
- INR > 1.5 or aPTT > 60
- Respiratory compromise requiring Bipap, Cpap, or Intubation

**Initiate Sepsis Protocol:**  Yes  No

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This is the note that is generated from the virtual nurse screen that is filed in the notes section of the chart to remind clinicians, particularly physicians, that a positive sepsis screen has been identified. This allows physicians to consider changes in antibiotic therapy during their usual workflow.

**IP Sepsis Screen (most recent)**  
 Sepsis Screen - 05/16/22 1407

Is the patient's history or complaint suggestive of a possible infection?	Yes -AD
Are there at least two of the following signs and symptoms present?	Yes -AD
Sepsis signs/symptoms - Tachypnea	Tachypnea >20 -AD
Sepsis signs/symptoms - WBC	WBC < 4,000 or WBC > 12,000 -AD
Are any of the following organ dysfunction criteria present and not considered to be due to a chronic condition?	Yes -AD
Organ Dysfunction Criteria	Creatinine > 2.0 -AD
Initiate Sepsis Protocol	No -AD
Reason sepsis not considered	Pt. receiving appropriate management -AD

User Key (r) = Recorded By, (t) = Taken By, (c) = Cosigned By

Initials	Name
----------	------

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The sepsis checklist helps all teams keep track of interventions that are completed or pending at any stage in the patient's continuum of care.

**Sepsis Timer**

Select Refresh to Update Timer

- ✓ Complete - Blood Cultures Ordered
- ✓ Complete - Antibiotics Ordered
- ⚠ Lactate Not Ordered
- ⚠ Fluid Resuscitation Not Ordered
- ✓ Complete - First Antibiotics Administered
- ⚠ Fluid Resuscitation Not Administered
- ⚠ Fluid Resuscitation Volume Not Documented
- ⚠ Initial Lactate Not Resulted
- ⚠ Second Lactate Not Resulted
- ⚠ Provider 6 Hour Note Not Complete
- ⚠ Vasopressors Not Ordered

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#### 4. Improving Adherence to the Standard of Care

### ***CMS Sepsis Total Perfect Care/Sep-1 Bundle:***

**Background:** In 2024, CMS Sep-1 Core Measure performance became a part of value-based performance for the first time in history, meaning that hospitals will now have their CMS reimbursements affected by total sepsis bundle performance, outlined below.

#### **Measure Definition:**

Total Perfect Care Bundle Compliance includes 3-hour and 6-hour sepsis perfect care. The 3-hour bundle includes lactates, blood culture collection, broad spectrum antibiotic administration, and fluids. The 6-hour bundle includes pressors, volume reassessments, and second lactates. This measure is sampled and is gathered via Chart Abstraction driven by Medisolv & CMS.

**Baseline:** 2021 Annual Rate for the Ochsner System Roll-Up: **48.84% total perfect care compliance**

**Numerator: 398**

**Denominator: 815**

**Specs & Exclusion Criteria:** <https://qualitynet.cms.gov/inpatient/specifications-manuals#tab2%20t>

**Goal:** Between 2022 & 2023, our goal was simply to improve each year. In 2024, we must increase our performance to 60% total perfect care for each participating campus.

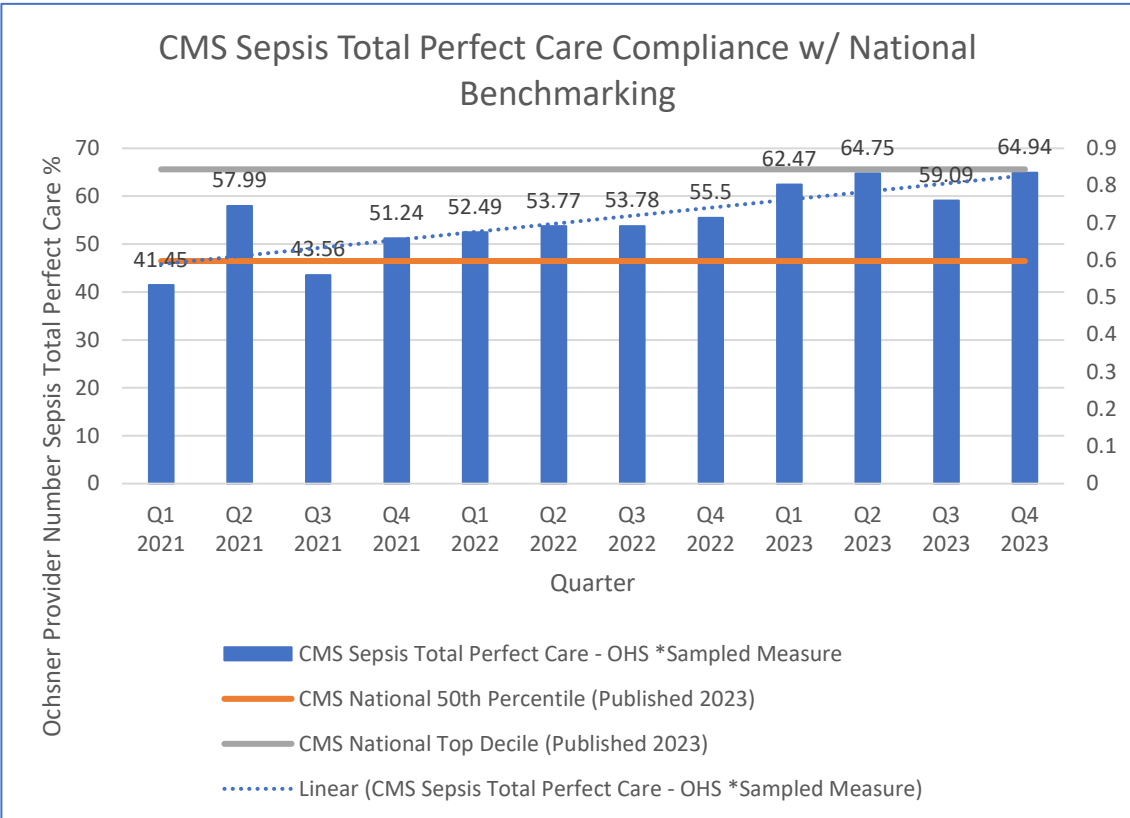
Presented quarterly, Q1 2021 showed a total perfect care of 41.45%. We were able to increase this to 64.94% by Q4 2023, which is a 56.67% improvement. Meanwhile, as described in Question 6, these process measures contributed to a 20.59% reduction in primary sepsis risk-adjusted mortality in the same timeframe. When taken from our worst-performing quarter for mortality (RAMI of 1.15), we saw a 29.57% decrease in mortality by the end of 2023.

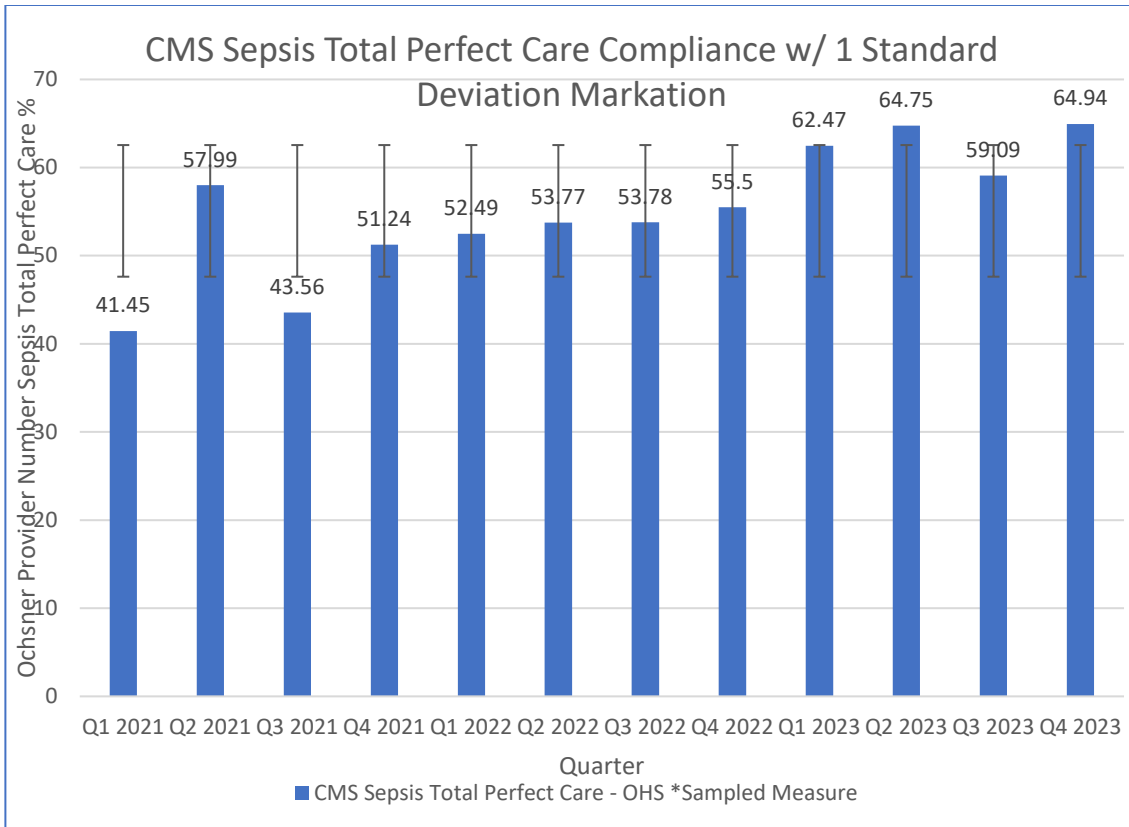
In late 2023, CMS shared that Sepsis Core Measure performance would be tied to Value-Based Performance payment to all participating hospitals in the nation. They provided an Achievement Threshold, seen below, that each hospital must meet. In addition, they provided directional guidance on top decile performance. The Achievement Threshold marks the fiftieth percentile of all hospitals' performance for each measure during the baseline period. The Benchmark represents the mean of the top decile of all hospitals' performance for each measure during the baseline period. In other words, Ochsner Health must perform at the 60th percentile in order to meet the measure.

Looking beyond the requirements for the 2024 calendar year threshold, Ochsner Health will continue to focus heavily on sepsis order panel usage, which includes many of the bundle components required for the 3-hour and 6-hour sepsis bundle, such as lactate and blood culture collection. In the ED setting, sepsis order panel usage is incentivized to a set threshold each year to help drive attention and compliance. However, it is always important to carefully consider incentive ties, as you never want to detract from clinical judgement in particular cases. In other words, one would not expect to see 100% compliance with sepsis total perfect care across the board.

Healthcare-Associated Infections				
Safety	Baseline Period		Performance Period	
	Jan. 1, 2022–Dec. 31, 2022		Jan. 1, 2024–Dec. 31, 2024	
	Measure ID	Measure Name	Achievement Threshold	Benchmark
	CAUTI	Catheter-Associated Urinary Tract Infection	0.615	0.000
	↓ CDI	Clostridium <i>difficile</i> Infection	0.423	0.000
	↓ CLABSI	Central Line-Associated Bloodstream Infection	0.760	0.000
	↓ MRSA	Methicillin-Resistant Staphylococcus <i>aureus</i>	0.793	0.000
	↓ SSI	Colon Surgery Abdominal Hysterectomy	0.747 0.763	0.000 0.000
	↑ Sepsis	Severe Sepsis & Septic Shock	0.597482	0.843620

25%





## 5. Improving Patient Outcomes

Ochsner Health System grew between the years of 2021 to 2023. We now have 28 tracked hospital sites for sepsis mortality performance. Our System Sepsis Collaborative kicked off in earnest in early 2021 and became a directional forum for sharing best practices and rolling out education on new clinical tools and workflows within Epic. Our goal was to drive a reduction in our primary sepsis risk-adjusted mortality index, while also improving our CMS Sepsis Total Perfect Care compliance percentage. The CMS Sepsis Bundle calls for septic patients to receive a lactate test, blood cultures prior to antibiotics, broad spectrum antibiotics, and fluids for elevated lactates – all within three hours of time zero, or the moment clinical suspicion for sepsis begins. Within six hours of that same time, the patient should receive pressors for blood pressure control, a tissue perfusion reassessment, and a second lactate if the first lactate was elevated. All these process measures, when taken together, will form the CMS Sepsis Total Perfect Care compliance rate. These actions are known to improve sepsis survival. To support the early recognition and timely interventions described above, we took the actions below.

We created a floor and ceiling strategy when monitoring patients, especially given that our campuses varied widely in size and resources. For smaller campuses with fewer providers, using a BPA and nurse-driven screenings & protocols fed by AI can drive increased detection (the floor.) For large campuses with more centralized resources (e.g., remote monitoring, virtual nursing, etc.), but more complex patients, patient lists and screens can provide efficient patient screening with AI as backup (the ceiling.)

For EDs, non-interruptive BPAs needed or used as narrator/triage screen provides high-sensitivity and drive time-dependent actions.

Interactive tools prompt a “pull” strategy where the providers want to engage with them rather than quickly click through.

Order sets/panels provide “quick buttons” to complete multiple actions.

Nursing written order guidelines empower nurses to flag patients as potentially septic and initiative lactate screens, along with activating a sepsis timer.

We are actively in the process of revamping our BPAs, beginning with very high-risk sepsis. We learned that we needed to add Smartlinks to show vitals and abnormal lab values to give clinicians more context as to why the patient met the very high-risk criteria.

We learned that we needed to make our BPA action language very clear and precise. For example, if a patient is deemed very high-risk for sepsis, the clinician is prompted with, “Per system protocol, lactate is required to be ordered.” The order button is defaulted, and a user must only click accept. Under the acknowledgement reason, if a clinician chooses not to order a lactate, they must select a button that states, “Cancelling order, disregard protocol.”

Virtual nursing is the future of better sepsis care. Dedicated nursing staff may screen for sepsis, conduct chart reviews, order treatment, and prompt provider communication, as needed.



**Ochsner Medical Informatics**

### SEPSIS Risk Adjusted Mortality Index (RAMI)

Source: Vizient Clinical Database (CDB)  
Includes Data for OH, LSU, and OLG

Discharge Date: 12/31/2023 | Relative Date: Last 4 ye... | Facility: (All) | DRG: (All) | MED/SURG: (All) | Age Group: (Multiple v...) | Race: (All) | Gender: (All) | Payer: (All) | Admit Type: (All) | Admit Source: (All) | LOS: 1 | S14 | Sepsis Breako...: Sepsis Pri... | COVID 19: (All) | Department: (All)

		Discharges	Mortality	Obs Mort %	Exp Mort	Exp Mort %	RAMI	Lives Saved
		22,605	2,413	10.68%	2,472	10.94%	0.98	58.54

**Facility**

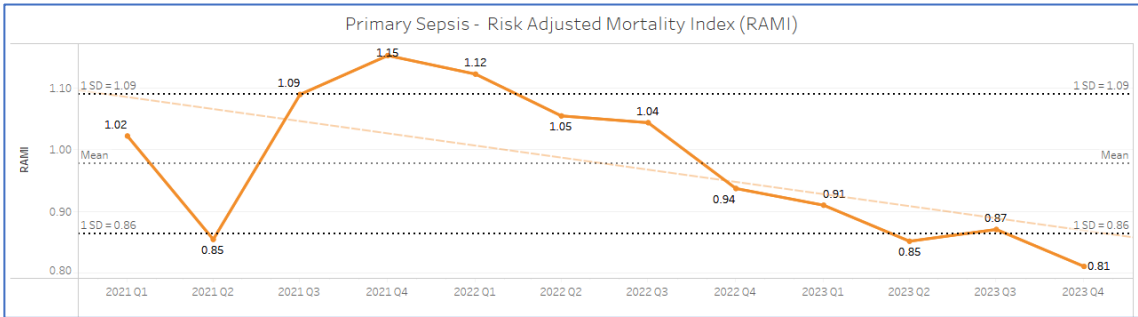
Hospital/Flag Desc	Mortality	Discharges	RAMI
OCHSNER NEW ORLEANS	742	5,557	1.03
OCHSNER RUSH FOUNDATION	74	586	1.43
OCHSNER STMARY MORGAN CITY	60	483	1.41
OCHSNER LSU-HEALTH-SHREVEPORT	194	1,451	1.08
OCHSNER OLG ACADIA	42	295	1.45

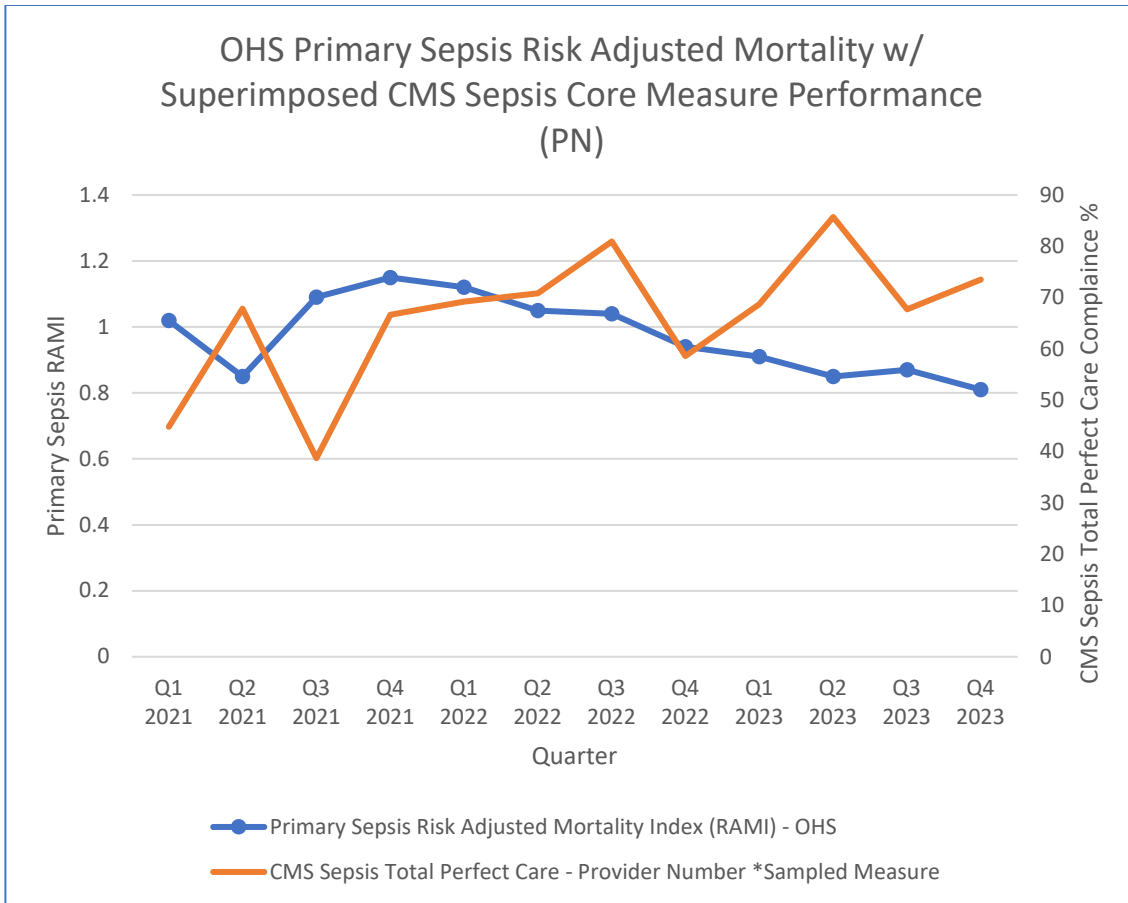
**Centers Of Excellence**

Centers Of Excellence	Mortality	Discharges	RAMI
Other Surgical	310	3,776	1.06
Null	0	1	0.00
Transplant	0	3	0.00
NICU & Womens Services	0	40	0.00
Cardiology & CTS	40	165	0.80
Other Medical	2,063	18,618	0.97

**DRG Table**

DRG	Mortality	Discharges	RAMI
870 - Septicemia or severe sepsis	442	1,004	1.40
853 - Infectious & parasitic diseas.	300	2,737	1.09
974 - HIV w/ major related conditio.	27	144	1.38
3 - Ecmo or trach w/ mv > 96 hrs or ...	16	61	1.32
969 - HIV w/ extensive o.r. procedur.	4	17	2.14
862 - Postoperative & post-traum...	3	59	1.78
856 - Postoperative & post-traum.	1	16	1.71
795 - Vaginal delivery w/ sterilizati.	0	1	0.00
779 - Abortion w/o d&c	0	5	0.00
857 - Postoperative & post-traum.	0	1	0.00
770 - Abortion w/ d&c, aspiration c.	0	11	0.00





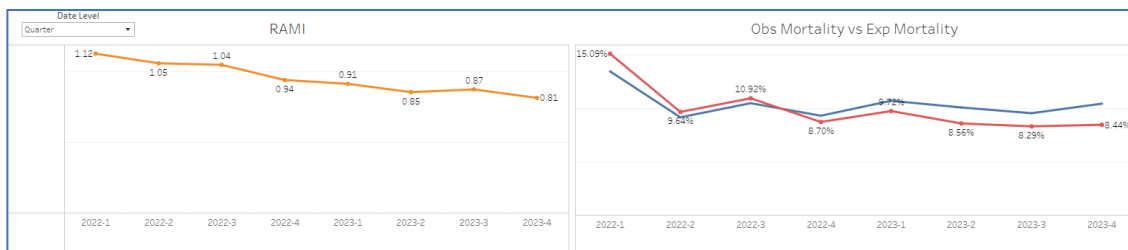
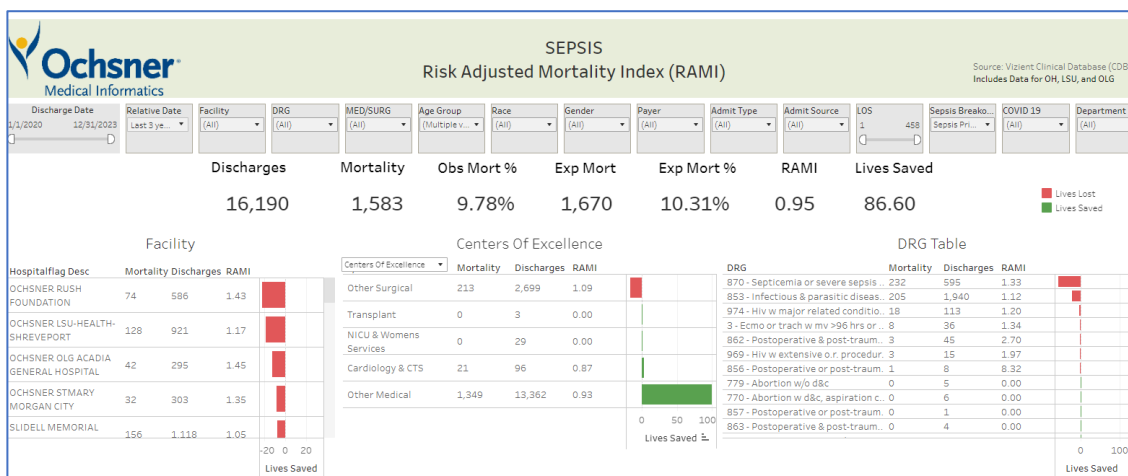
## 6. Accountability and Driving Resilient Care Redesign

### Describe real-time analytics tools to monitor performance:

Our providers have several dashboards available to them for performance monitoring. There is a Vizient Sepsis RAMI Dashboard to monitor overall mortality performance, but it is lagged by two months, so we will not focus our attention there. We have an ED & Inpatient Sepsis Performance Dashboard, which shows compliance with the 3- and 6-hour sepsis bundle. See CMS Sep-1 bundle requirement information in Section 2 above. This dashboard is filterable in several ways, such as by campus, date range, or patient race, etc. Compliance with bundle requirements is shown as a roll-up of filtered selections or by individual physician or patient. Trended performance over time is also available, along with length of stay data and time to antibiotics.

There is a view that shows overall system performance toward the 2024 System Sepsis Collaborative goals, along with the prior year's baseline. In 2024, these goals

include total perfect care of 60%, ED sepsis order panel usage of 68%, antibiotics given 90% of the time within +/- 3 hours of time zero, and an inpatient goal of any lactate being ordered +/- 3 hours of the predictive model 30% of the time. There is a new Very High-Risk Sepsis dashboard that was developed in early 2024. The key metrics in this dashboard include % alerts with lactate orders and % very high-risk encounters with lactate orders. Filters are available to define time frame, facility, service area, or BPA type, etc. The Top 10 highest performing facilities with alert to action rates are displayed. All 3 of the dashboards mentioned here have a 1-day lag.



**Describe reports & Data to facilitate tool & workflow monitoring:**

We have a BPA usage report that we monitor closely to determine staff actions. This information is also displayed on an alert to action dashboard, which informs the sepsis analytics leadership team about true adoption of the tools that are rolled out to clinicians. In 2023, we noticed a trend of lactate orders being placed but discontinued prior to collection. This reduced our ability to detect and confirm sepsis risk. In response to this, Sepsis WATCH was created, which allowed a pathway for clinicians to keep an eye on patients who were at risk of deteriorating yet were not yet confirmed to be septic. The Sepsis WATCH order would call for nursing to monitor vitals q1 hour for 4 hours and collect a lactate.

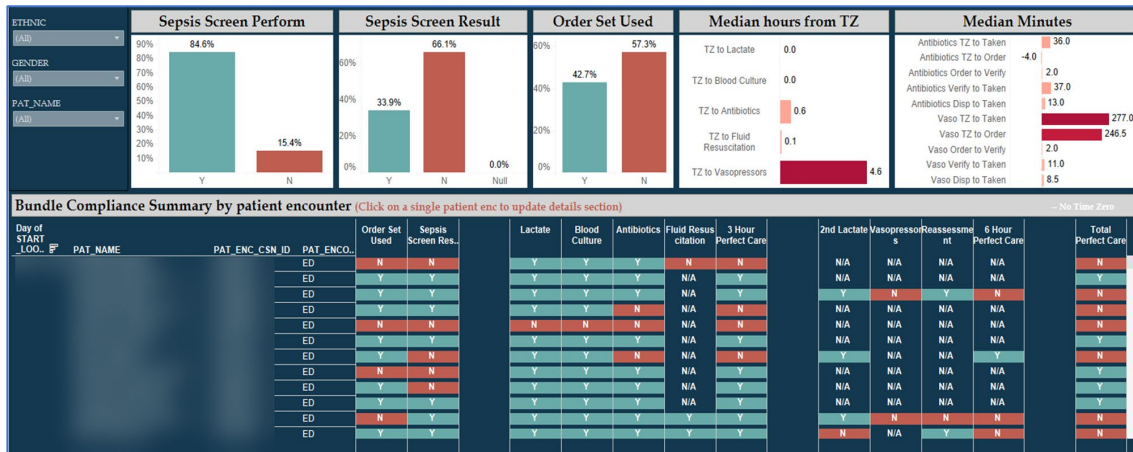
We use a daily alert volume report to determine whether alert thresholds are getting too high – in other words, are we likely contributing to alert fatigue, and thus, lack of action being taken.

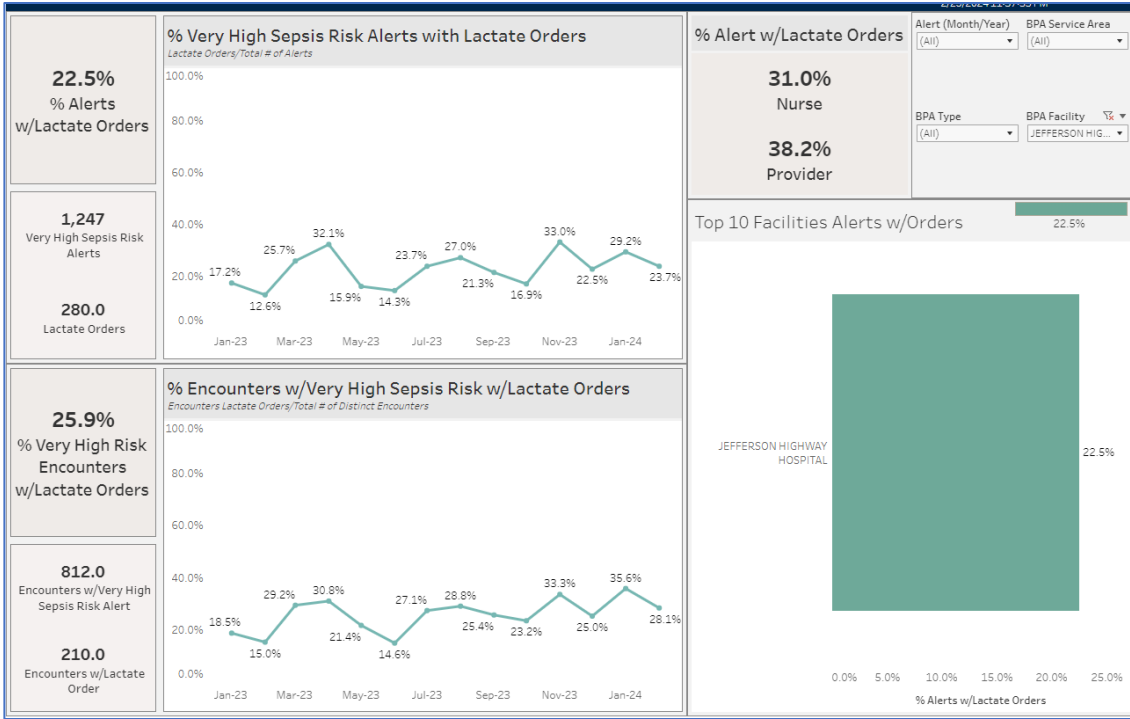
There is a sepsis scores report that is used to determine if a patient should have been included in the early detection of sepsis lists. The report is filterable by facility and will show every score listed for a given patient. This report is references if ever a clinician asks why a risk-defined BPA did not fire on a given patient.

We had a known opportunity with sepsis smartphrase usage compliance by our providers. We were able to use a smartphrase usage report to determine what phrases existed, make modifications, and drive improvements, especially with our tissue reperfusion statement.

Sepsis order set/order panel usage is an ED service-line goal for Ochsner’s system, and we are able to monitor compliance through a sepsis orderset usage compliance report.

Visualization tools related to sepsis bundle compliance (also discussed in detail in prior questions) are filterable to both the individual patient and provider level. This allows for specialty groups and service lines to identify their unique opportunities for improvement. This is often done through quality-led service line meetings. For example, a tool may identify that Hospital Medicine at Jefferson Highway may be consistently falling out with second lactate collection. This would allow corrective steps to be taken.



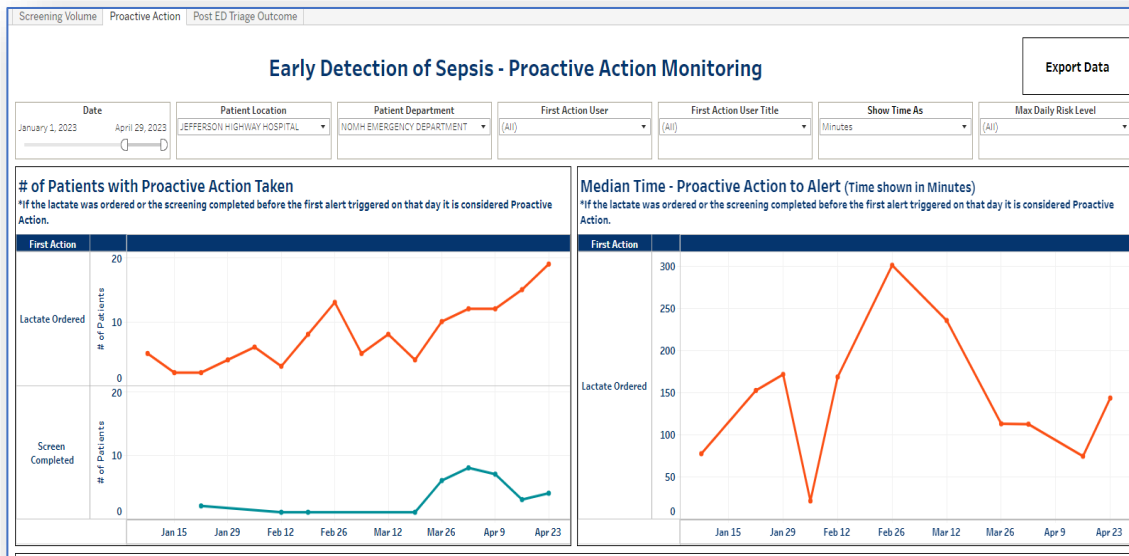


## ED System Sepsis Goal Metrics

### Baseline for System Sepsis Goals

	2023 Baseline	2024 YTD Performance
<b>Total Perfect Care %</b>	<b>46.6%</b>	<b>46.4%</b>
<b>Order Set Used %</b>	<b>55.8%</b>	<b>57.8%</b>
<b>Antibiotics %</b>	<b>81.8%</b>	<b>81.6%</b>

[Click here to navigate to dashboard with Very High Risk Lactate Orders metric](#)



OHS PERFORMANCE IMPROVEMENT - Production - CONNIE M

Search (Ctrl+Space)

Report Settings - Connie Sepsis BPA all locations [32957842]

Criteria | Display | Appearance | Summary | Print Layout | Toolbar | Override | General

Find BestPractice Advisories

Find Criteria: Enter a search term, or click the search icon to browse available criteria

Date Range: From: 1/1/2024 12:01 AM To: 1/31/2024 11:59 PM

BestPractice Advisory

- BASE - OHS - ASAP - SEPSIS TIMER 24 HOUR AUTO STOP [16002398]
- BASE - OHS - ED - SEPSIS PANEL ORDERED [1603641]
- BASE-OHS-IP-ADULT SEPSIS CARE PLAN [8178]
- BASE - OHS IP - NURSE-DRIVEN SEPSIS PROTOCOL FOR EARLY SEPSIS PREVENTION [3170]
- BASE - OHS - IP - SEPSIS ANTIBIOTIC REASSESSMENT/DISCONTINUATION [3887]
- BASE - OHS - ORDERS - SEPSIS FOLLOW-UP LACTATE PROTOCOL [4624]
- BASE - OHS PREDICTIVE ANALYTICS - EARLY DETECTION OF SEPSIS HIGH RISK DETERIORATION PUSH NOTIFICATION AGHH [304...
- BASE - OHS PREDICTIVE ANALYTICS - EARLY DETECTION OF SEPSIS HIGH RISK DETERIORATION PUSH NOTIFICATION AKMH [304...
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- BASE - OHS PREDICTIVE ANALYTICS - EARLY DETECTION OF SEPSIS HIGH RISK DETERIORATION PUSH NOTIFICATION HMSH [304...

Report Logic AND

Show search summary

Run Save Save As Restore Close

My Favorites  
My Content  
Approved

Content Type  
Dashboards  
Slider/Dicer  
Components  
Workbench Reports  
Report Links

Tags  
Select a tag  
My Tags  
BR ICU  
Code rapid det reports  
Diabetic reports  
Infection control buggy re  
Jeff Hwy  
Med titration  
Nursing informatics gene  
Sepsis reports  
Stroke  
TTM reports

Advanced  
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My Analytics Clear Filters

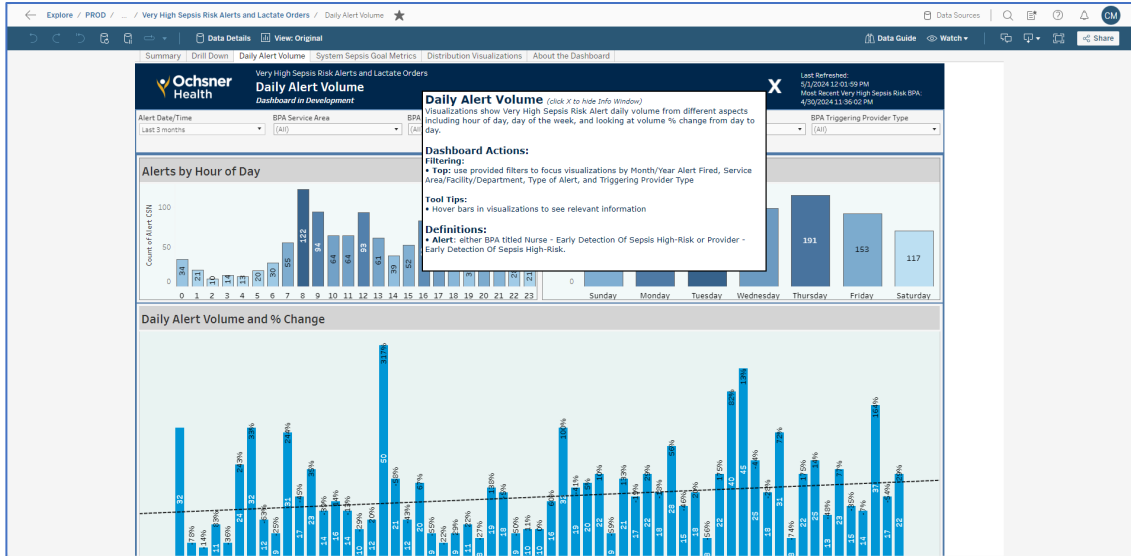
Import Data

Early Detection of Sepsis - Alert Volume  
Early Detection of Sepsis  
BestPractice Advisories

Connie Sepsis BPA Jan 2024  
BestPractice Advisories

Find IP Patients Generic Criteria  
Searches on currently admitted patients, recently discharged patients, patients on a leave of a.

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**Report Settings - Connie JHWY - Sepsis Scores April [33761040]**

Criteria | Display | Appearance | Summary | Print Layout | Qverride | General

Find flowsheet measurement ⓘ

Find Criteria:

Date Range: From: 1/1/2024 To: 1/7/2024

**Location**  
JEFFERSON HIGHWAY HOSPITAL

**Flowsheet Template**  
IP SEPSIS SCORE CALCULATION

**Flowsheet Row**  
R IP SEPSIS PREDICTIVE MODEL SCORE - FILED

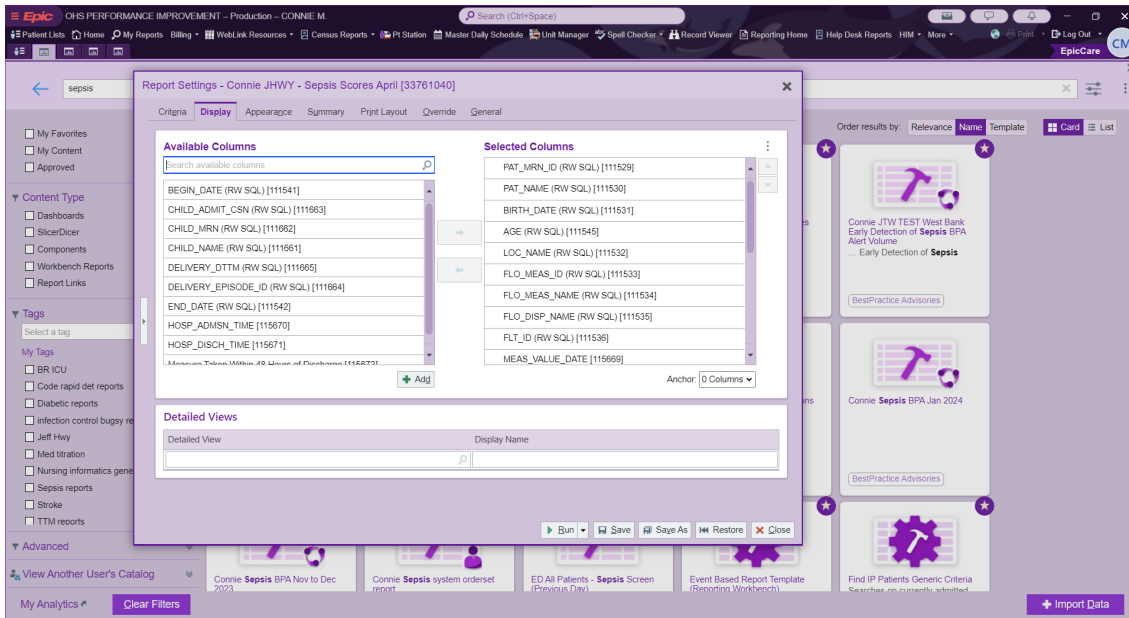
**SA Security**  
Values determined when report is run

Report Logic AND

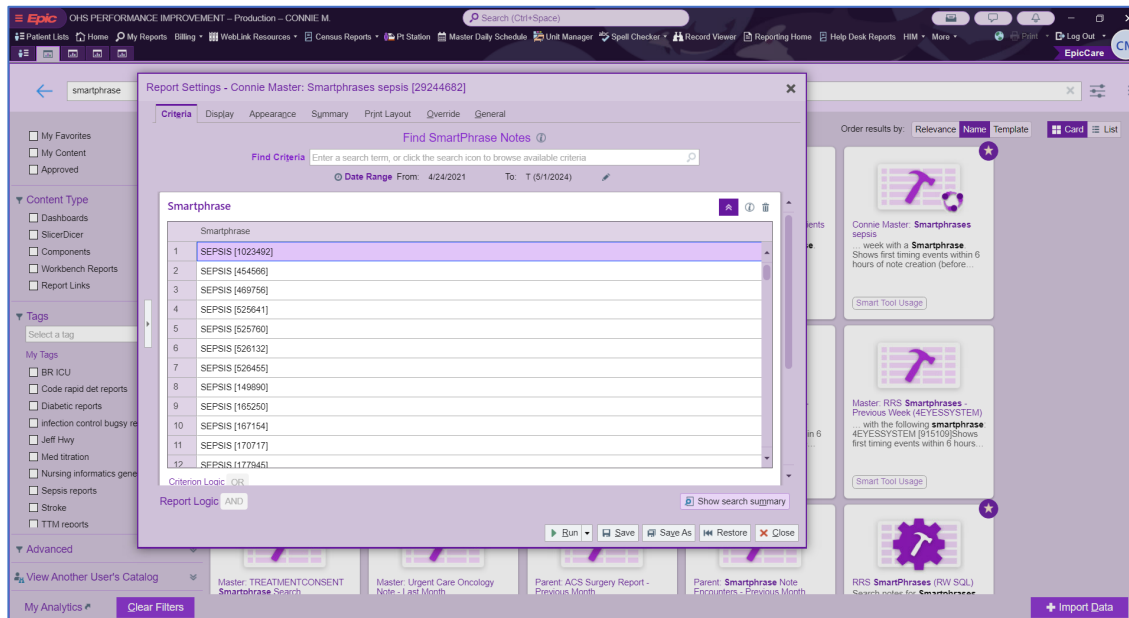
Show search summary

Run Save Save As Restore Close

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***HIMSS Global Conference Audience Guidance (This will not be published)***

Topic Guidance: Check three which apply to this case study

Clinical Informatics and Clinician Engagement	Healthy Aging and Technology
Clinically Integrated Supply Chain	Improving Quality Outcomes
Consumer/Patient Engagement and Digital/Connected Health	Innovation, Entrepreneurship, and Venture Investment
Consumerization of Health	Leadership, Governance, and Strategic Planning
Culture of Care and Care Coordination	Population Health Management and Public Health
Data Science/Analytics/Clinical and Business Intelligence	Precision Medicine and Genomics
Disruptive Care Models	Process Improvement, Workflow, and Change Management
Grand Societal Challenges	Social, and Behavioral Determinants of Health
Health Informatics Education	Telehealth
Health Information Exchange	User Experience (UX)
Interoperability	Usability
Data Integration, and Standards	User-Centered Design
Healthcare Applications and Technologies Enabling Care Delivery	