EJGH

Sepsis care improvement through an automated clinical decision support solution at East Jefferson General Hospital

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BACKGROUND

Sepsis is a potentially life-threatening complication of an infection. There are as many as 3 million cases of severe sepsis and 750,000 resulting deaths in the United States annually. Early recognition and management, including administration of antibiotics and intravenous fluids, are critical to improve sepsis outcomes.

3 MILLION
cases of severe sepsis are reported in the United States annually
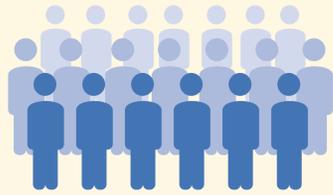
East Jefferson General Hospital (EJGH) is a general medical and surgical hospital in Metairie, LA, with 424 beds. Improvement of sepsis care has been prioritized within the hospital, and in early 2015 EJGH partnered with ILÚM Health Solutions and medCPU to implement an automated clinical decision support solution (CDSS) to support management of sepsis. The CDSS applies the current clinical practice for the management of sepsis and uses information from the electronic health record –including laboratory, vital sign, and free-text data–to improve adherence to guideline-based care. When practice deviates from guideline-based care, the solution sends electronic notifications to physicians, nurses, and other healthcare providers to evaluate and intervene as appropriate.
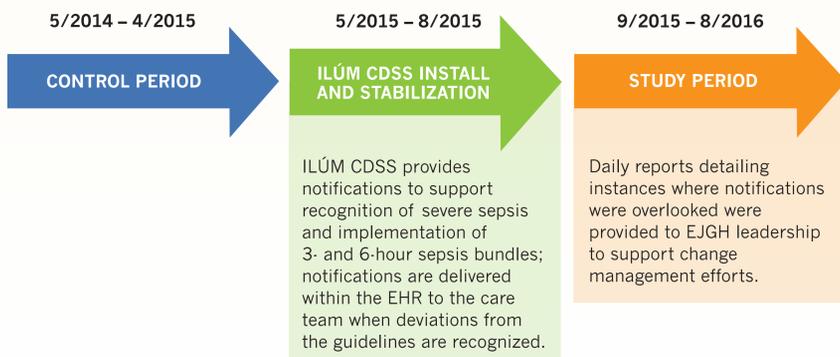
PROJECT AIM

Improve adherence to guideline-based care and outcomes through an automated clinical decision support solution.

ACTIONS TAKEN

EJGH's hospital-wide initiative targeting sepsis quality improvement includes multi-disciplinary departmental collaboration and sponsorship from administration and leadership.

Approach: improving adherence to hospital sepsis guidelines by utilizing a CDSS from ILÚM Health Solutions, powered by medCPU, which automated EJGH's sepsis guidelines and was customized to EJGH's clinical workflows.

EJGH's guidelines are based on the Surviving Sepsis Campaign (SSC) international guidelines, and include screening for severe sepsis, timely administration of broad-spectrum antibiotics, and administration of IV fluids for hypotension or to normalize lactate.

5/2014 – 4/2015	5/2015 – 8/2015	9/2015 – 8/2016
CONTROL PERIOD	ILÚM CDSS INSTALL AND STABILIZATION	STUDY PERIOD
	ILÚM CDSS provides notifications to support recognition of severe sepsis and implementation of 3- and 6-hour sepsis bundles; notifications are delivered within the EHR to the care team when deviations from the guidelines are recognized.	Daily reports detailing instances where notifications were overlooked were provided to EJGH leadership to support change management efforts.

The hypothesis was that the CDSS would improve adherence to EJGH's sepsis guidelines, which will result in improved clinical outcomes including improved recognition of severe sepsis and decreased progression to shock.

RESULTS

Implementation of the automated CDSS resulted in high adherence to guideline-based care, including measurement of serum lactate level and administration of IV fluids. The adherence rate of key measures reached above 80% after 2 months of CDSS implementation and was maintained through the following 10 months.

Legend: ● ABx within 90 min   ■ Serum lactate within 1 hr   ▲ IV fluids within 90 min
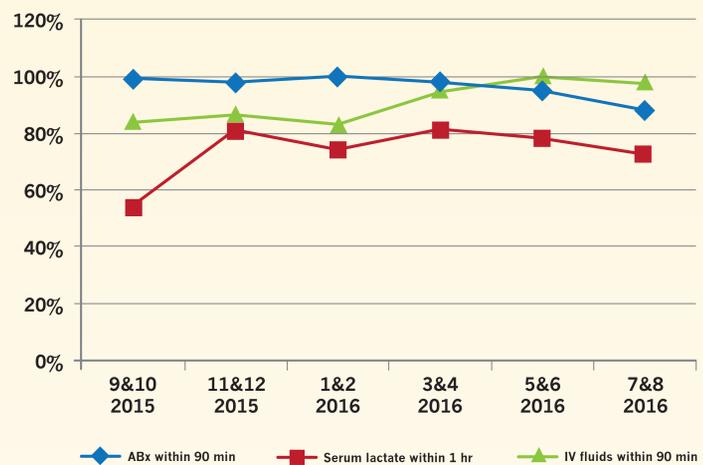
Comparing billing data 12 months before to 12 months after the CDSS implementation, there were significantly improved clinical outcomes and reduced utilization of healthcare resources, including improved severe sepsis recognition, and reduced sepsis-associated length of stay and ventilator utilization.

	Control group (N=1268)	Study group (N=1547)	P value
Sepsis type, n (%)			0.03
Sepsis, unspecified organism	995 (78.5)	1124 (72.7)	
Severe sepsis without shock	56 (4.4)	151 (9.8)	
Septic shock	217 (17.1)	272 (17.6)	
Hospital length of stay, mean (s.d.)	7.11 (6.04)	6.81 (6.23)	0.05
Patients on ventilator, n (%)	154 (12)	5 (0.3)	<0.0001

Among patients with severe sepsis, significantly fewer patients developed hospital-onset shock in the study group compared to the control group.

	Control group (n=86)	Study group (n=186)	Odds ratio (95% CI*)	P value†
Severe sepsis	56 (65%)	151 (81%)	0.43 (0.24, 0.77)	0.0057
Hospital-onset septic shock	30 (35%)	35 (19%)		

*Confidence interval.
†Fisher's exact test.

LESSONS LEARNED…

- Coupled with a hospital-wide and leadership-endorsed effort to improve management of sepsis, automation of EJGH's guidelines via CDSS supported improved adherence, with aggregate adherence rates achieving and maintained around 80% for measures of interest to EJGH.

- In the period after implementation of the CDSS, a significant improvement in the recognition of severe sepsis, a reduced risk for progression to septic shock, and a reduction in sepsis-associated length of stay and ventilator utilization were observed when compared to the control period.

- **Next steps:** (1) education and change management to continue to improve adherence rates; (2) broaden the CDSS to include infection-specific guidelines to support optimal antibiotic prescribing.

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