


UTILIZING A “CODE SEPSIS” TEAM TO IMPROVE OUTCOMES AND REDUCE MORTALITY

JANUARY 31, 2012



SEPSIS


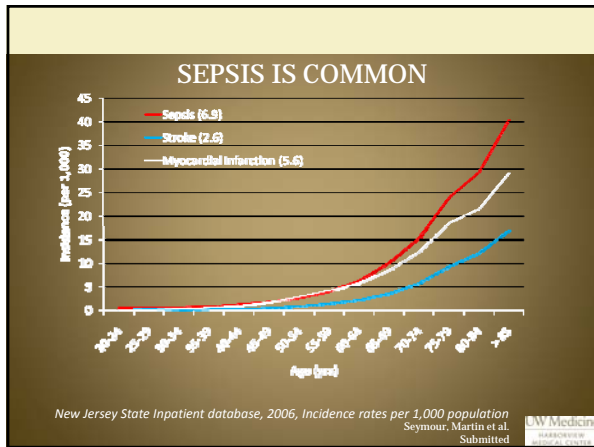
10th leading cause of death in the US

Incidence: 751,000 cases in the U.S. annually with 500,000 cases of severe sepsis in the ED annually

Mortality: 30-50% for Severe Sepsis and 50-60% for Septic Shock

Cost: 16.7 billion per year in the U.S.

1. CDC [www.cdc.gov](#), accessed 02/2011
2. Surviving Sepsis Campaign [www.survivingsepsiscampaign.org](#), accessed 01/2011
3. Angus D.C. et al. Epidemiology of severe sepsis in the United States: Analysis of incidence, outcome, and associated cost of care. *Critical care medicine*. 2001, 29 (7), 1303-1310


TIME MATTERS

Antibiotics

- 1 hour delay = 7.6% increased mortality

Critical Care Team

- 1 hour delay = 2.1% increased mortality




SEPSIS IDENTIFICATION

SIRS + infection = Sepsis

Systemic **I**nflammatory **R**esponse **S**yndrome

SIRS: 2 of the following:

- Temperature > 38°C or < 36°C
- Heart rate > 90 bpm
- RR > 20 bpm or PaCO₂ < 32 mm Hg or resp. fail
- WBC > 12 or < 4 or > 10% band forms




LACTATE

In sepsis, lactate should be viewed as a marker of perfusion

Elevated lactate portends increased mortality

Group	28-Day Mortality %
Low	~10
High	~32
Sepsis	~48

Mikkelsen Crit Care Med 2009

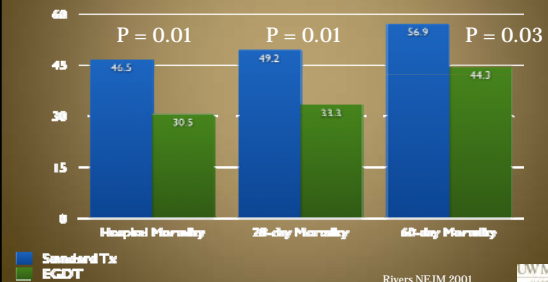


EARLY GOAL DIRECTED THERAPY IN SEPSIS

- Formal process to screen and resuscitate patients at risk for sepsis and septic shock
- Initiated in the ED during the first 6 hours
- Patients who present with SIRS and Infection
- Fluid resuscitation, blood cultures, lactate, CBC
- Antibiotics



EGDT IMPROVES MORTALITY



THE FORMALIZATION OF “ CODE SEPSIS”

- Prior to June 2009, HMC had no formal process to identify and manage patients with sepsis.
- Disorganized approach in managing the septic patient.
- Variability in antibiotics and lactate levels.
- A formal sepsis program was established.



“CODE SEPSIS”

- Multi-disciplinary group was formed
- ED Sepsis protocol and order set developed.
- For patients who did not respond to initial therapy, “Code Sepsis” activation occurred.
- “Code Sepsis” would bring a team of critical care providers to the bedside.



REVIEW OF CODE SEPSIS ACTIVATIONS

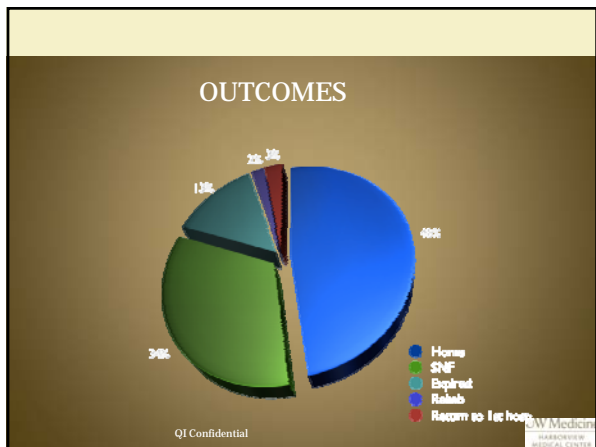
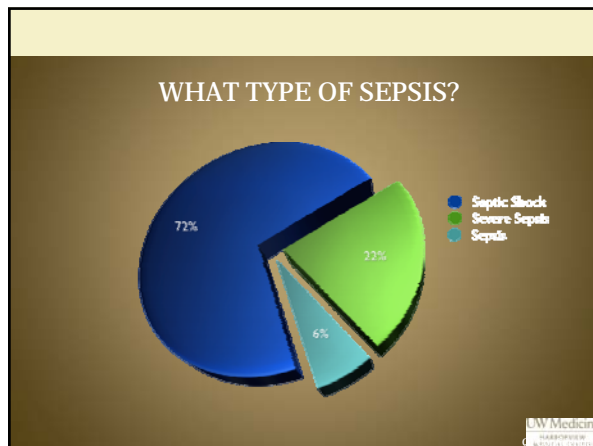
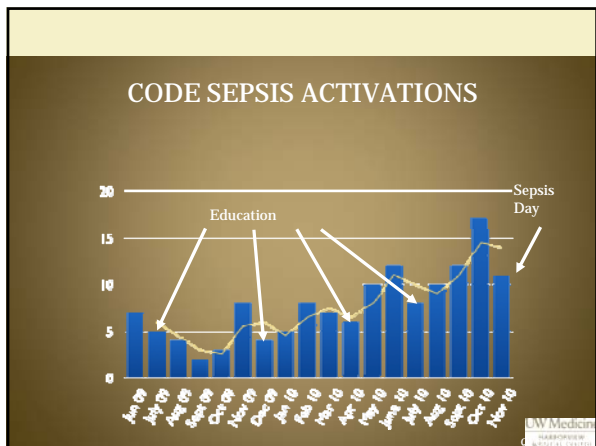
- Each “Code Sepsis” activation reviewed using time sensitive metrics
- Time zero (ED arrival) to lactate & labs, blood cultures, fluids, antibiotics, repeat lactate, CVP & SCVO2 placement.
- Clinical analyst produced quarterly reports showing progress with program.



EMERGENCY DEPARTMENT EDUCATION

- ED staff and education are essential to compliance
- First Tuesday of the month is “Sepsis Day”
- Case reviews with ongoing sepsis education
- Regular education & feedback increased activations of “Code Sepsis”





HOW DO WE COMPARE?

	# Patients	Mortality	NNT
Henry Ford Hospital	133	30%	5
Otero (meta: 12 centers)	627	24.5%	7
Seymour (NJ data)		22%	
Harborview	103	13%	

Harborview ranking by UHC 2010: 3 out of 113 medical centers
3rd Quarter 2010: #1

POTENTIAL SAVINGS

- Estimated 2.4 bed-days per case
- Estimated \$8,100 cost avoidance per case
- Hypothetical 350 code sepsis patients/year
- *Save 840 bed-days
- *\$2.8 million in cost avoidance

LESSONS LEARNED

- Education takes time
- Culture change needs buy-in & champions
- Skeptics can help make a system robust
- Change in outcome begins immediately
- Lot of work remains

CONCLUSIONS

- Early identification and evidence-based management of patients presenting with sepsis to the Emergency Department:
 - Reduces ICU and hospital LOS
 - Decreases ventilator days and mortality
 - Sepsis guidelines provide an organized approach
 - Appropriate antibiotics need to be given early
 - Use lactate to trend response to treatment



SEPSIS RESUSCITATION YES WE CAN

Thank you to the dedicated staff who tackle any task to improve the care of our patients

- David Carlom MD
- Diane Fuller Switzer MN ARNP
- Todd Ray RN BSN
- Valerie Calogero RN
- Rich Utarnarchitt MD
- Paula Minton-Foltz MSN RN
- Deb Gross MN RN
- Nicole Kupchik MN RN CCNS

