Sepsis Wave II

New recommendations from the Surviving Sepsis Campaign and what do they mean for the ED

How to use the E-QUAL Portal and submit Activity 2

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COI Disclosures

- No financial conflicts to disclose

Outline

- Review key elements of 2016 Surviving Sepsis Guidelines

- Focus on:
    - Early identification
    - Initial management

Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016

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Sepsis-3 Definitions

- *Sepsis*: Life-threatening organ dysfunction caused by dysregulated host response to infection

- *Septic Shock*: Subset of sepsis with circulatory and cellular/metabolic dysfunction associated with higher risk of mortality

SSC Guidelines and Sepsis-3 Definitions

- *"Sepsis"* in place of *"Severe Sepsis"*

- Sepsis-3 clinical criteria (i.e. qSOFA) were not used in studies that informed the recommendations in this revision

  – Could not comment on use of Sepsis-3 clinical criteria

SSC Guideline Process

- PICO Question Review and Development
- Literature searches
  - Minimum of 2 major databases
  - Assistance from professional librarians
- Generation of evidence profiles
- Grading of recommendations
  - GRADE
- Voting
  - 80% agreement required
- Reformulation and re-voting as needed

Best Practice Statements

- Strong but ungraded statements
- Use defined criteria

Criteria for Best Practice Statements
Is the statement clear and actionable?
Is the message necessary?
Is the net benefit (or harm) unequivocal?
Is the evidence difficult to collect and summarize?
Is the rationale explicit?
Is the statement better if formally GRADEd?

Guyatt GH, Schünemann HJ, Djulbegovic B, et al: *Clin Epidemiol* 2015; 68:597–600

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Prose GRADE descriptions

	2016 Descriptor	2012 Descriptor
Strength	Strong Weak	1 2
Quality	High Moderate Low Very Low	A B C D
Ungraded Strong Recommendation	Best Practice Statement	Ungraded Strong Recommendation

Implications of the strength of a recommendation

	Strong Recommendation	Weak Recommendation
For patients	Most individuals would want the recommended course of action. A small proportion would not.	The majority of individuals would want the suggested course of action but many would not.
For clinicians	Most individuals should receive the recommended course of action.	Different choices are likely to be appropriate for different patients and therapy should be tailored to the individual patient's circumstances.
For policy makers	The recommendation can be adapted as policy in most situations, including use as performance indicators	Policy-making will require substantial debates and involvement of many stakeholders.

Recommendations

- 93 Recommendations
  - 32 **Strong** recommendations: ***"We recommend"***
  - 39 **Weak** recommendations: ***"We suggest"***
  - 18 Best Practice Statements
  - No recommendation provided for 4 PICO questions

Screening For Sepsis And Performance Improvement

We recommend that hospitals and hospital systems have a performance improvement program for sepsis including sepsis screening for acutely ill, high-risk patients. (Best Practice Statement)

Sepsis Performance Improvement

- Performance improvement efforts for sepsis are associated with improved patient outcomes

- A recent meta-analysis of 50 observational studies:

  - Performance improvement programs associated with a significant increase in compliance with the SSC bundles and a reduction in mortality (OR 0.66; 95% CI 0.61-0.72)
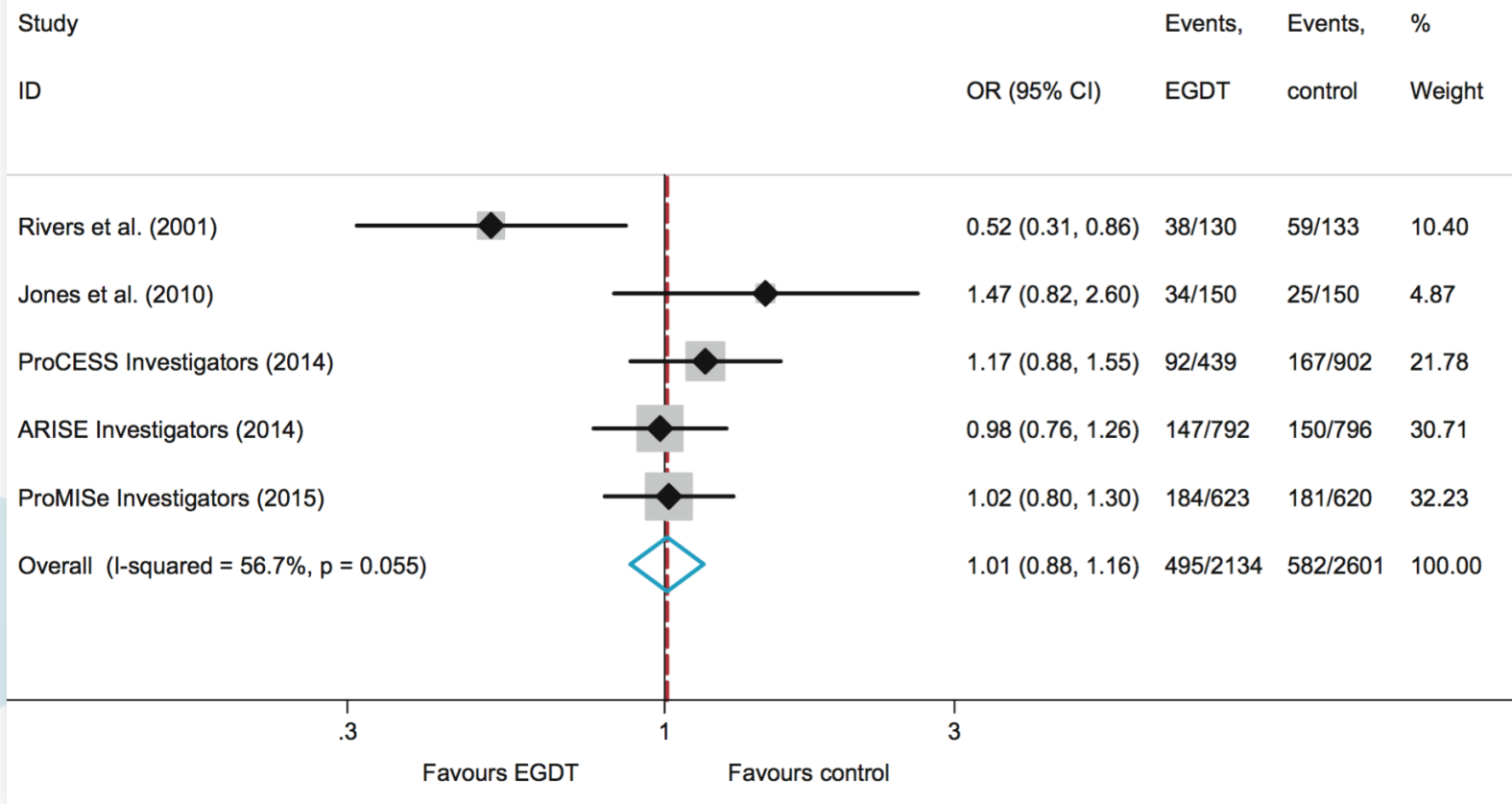
2012 Recommendation for Initial Resuscitation.

We recommend the **protocolized**, quantitative resuscitation of patients with sepsis- induced tissue hypoperfusion. During the first 6 hours of resuscitation, the **goals of initial resuscitation should include all** of the following as a part of a treatment protocol:

a) CVP 8–12 mm Hg
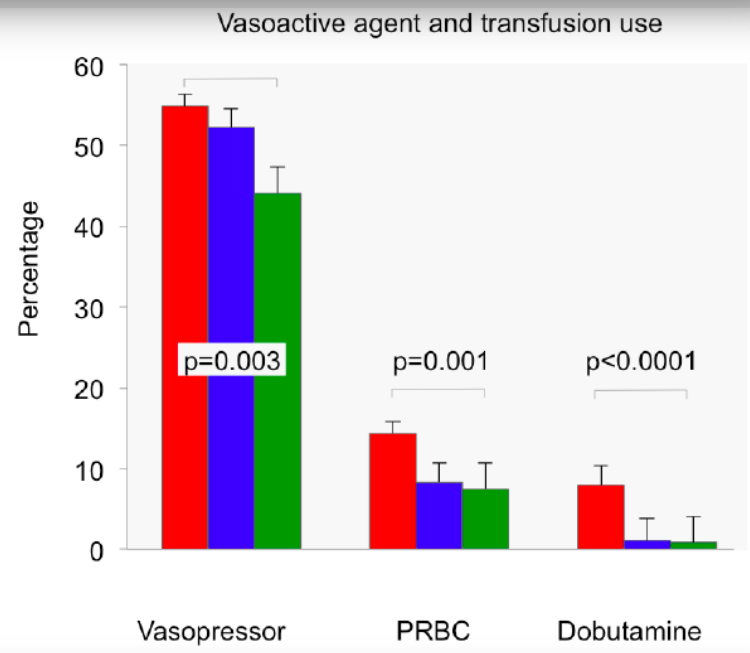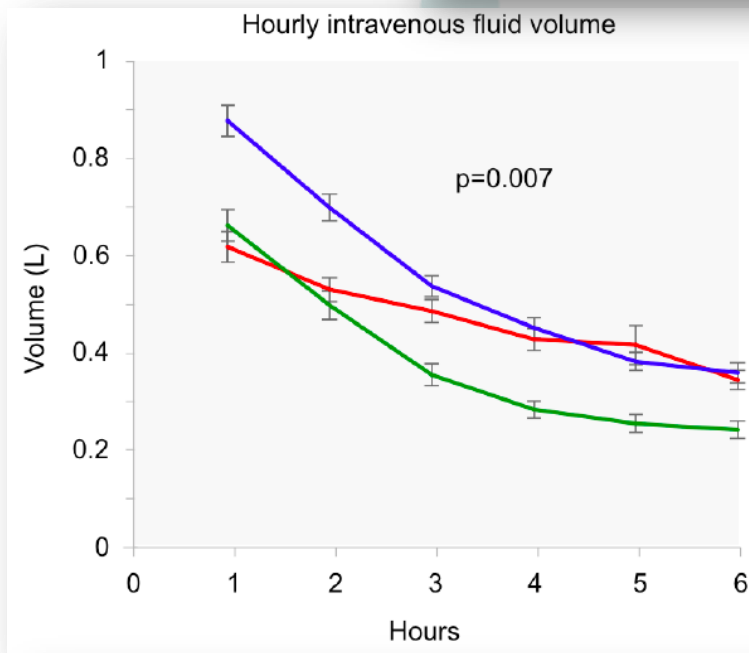b) MAP ≥ 65 mm Hg
c) Urine output ≥ 0.5 mL/kg/hr
d) Scvo2 ≥ 70%.

A systematic review and meta-analysis of early goal-directed therapy for septic shock: the ARISE, ProCESS and ProMISe Investigators

Surviving Sepsis Campaign

A Primary mortality outcome of each study

Study ID	OR (95% CI)	Events, EGDT	Events, control	% Weight
Rivers et al. (2001)	0.52 (0.31, 0.86)	38/130	59/133	10.40
Jones et al. (2010)	1.47 (0.82, 2.60)	34/150	25/150	4.87
ProCESS Investigators (2014)	1.17 (0.88, 1.55)	92/439	167/902	21.78
ARISE Investigators (2014)	0.98 (0.76, 1.26)	147/792	150/796	30.71
ProMISe Investigators (2015)	1.02 (0.80, 1.30)	184/623	181/620	32.23
Overall (I-squared = 56.7%, p = 0.055)	1.01 (0.88, 1.16)	495/2134	582/2601	100.00

.3   1   3

Favours EGDT   Favours control

A Randomized Trial of Protocol-Based Care for Early Septic Shock

The ProCESS Investigators*

Intravenous Fluids	
EGDT	2.8 L
Usual Care	2.3 L

Intravenous Antibiotics	
EGDT	97.5%
Usual Care	96.9%

Caveats / Limitations of ProCESS, ARISE & Promise

- The overall management of sepsis has changed…

  – In all three studies patients had early antibiotics, and approximately 30ml/kg of intravenous fluid prior to randomization.

- We need therefore to be very careful about over interpreting the results in areas where this paradgim is not valid.

The River's work was useful….

- Provided us a construct on how to understand resuscitation:
  - Start early- (give antibiotics)
  - Correct hypovolemia
  - Restore perfusion pressure
  - And in some cases a little more may be required..!

- These concepts are as important today as they ever were.

Sepsis and septic shock are medical emergencies and we recommend that treatment and resuscitation begin immediately.

Best Practice Statement

Diagnosis

- **We recommend that appropriate routine microbiologic cultures (including blood) be obtained before starting antimicrobial therapy in patients with suspected sepsis and septic shock if doing so results in no substantial delay in the start of antimicrobials.** (Best Practice Statement)

  - **Remarks: Appropriate routine microbiologic cultures always include at least two sets of blood cultures (aerobic and anaerobic).**

Antibiotics

- **We recommend that administration of IV antimicrobials be initiated as soon as possible after recognition and within 1 h for both sepsis and septic shock.**

(Strong recommendation, moderate quality of evidence).

- **We recommend empiric broad-spectrum therapy with one or more antimicrobials to cover all likely pathogens.**

(Strong recommendation, moderate quality of evidence).

Source Control

- **We recommend that a specific anatomic diagnosis of infection requiring emergent source control be identified or excluded as rapidly as possible in patients with sepsis or septic shock, and that any required source control intervention be implemented as soon as medically and logistically practical after the diagnosis is made.**

(Best Practice Statement).

Initial Resuscitation

- **We recommend that in the resuscitation from sepsis-induced hypoperfusion, at least 30ml/kg of intravenous crystalloid fluid be given within the first 3 hours.**

(Strong recommendation, low quality of evidence)

- **We recommend that following initial fluid resuscitation, additional fluids be guided by frequent reassessment of hemodynamic status.**

(Best Practice Statement)

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Fluid Therapy

- **We recommend crystalloids as the fluid of choice for initial resuscitation and subsequent intravascular volume replacement in patients with sepsis and septic shock**

(Strong recommendation, moderate quality of evidence).

- **We suggest using albumin in addition to crystalloids when patients require substantial amounts of crystalloids**

(Weak recommendation, low quality of evidence).

Vasoactive agents

- **We recommend norepinephrine as the first choice vasopressor**

(Strong recommendation, moderate quality of evidence).

- **We suggest adding either vasopressin (up to 0.03 U/min) or epinephrine to norepinephrine with the intent of raising MAP to target, or adding vasopressin (up to 0.03 U/min) to decrease norepinephrine dosage.**

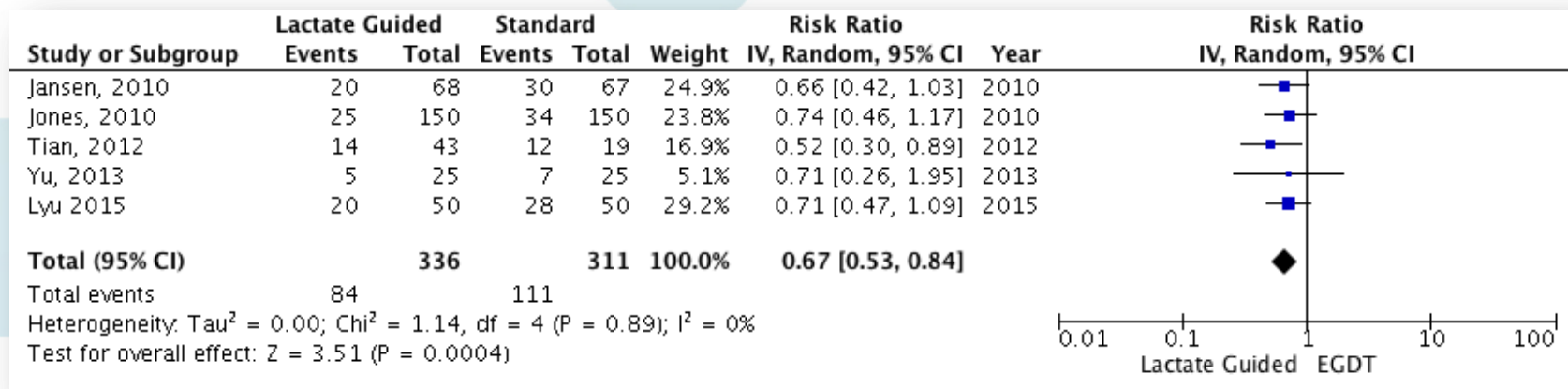(Weak recommendation, low quality of evidence)

If shock is not resolving quickly…..

- **We recommend further hemodynamic assessment (such as assessing cardiac function) to determine the type of shock if the clinical examination does not lead to a clear diagnosis.**
(Best Practice Statement)

- **We suggest that dynamic over static variables be used to predict fluid responsiveness, where available.**
(Weak recommendation, low quality of evidence)

Lactate can help guide resuscitation

- **We suggest guiding resuscitation to normalize lactate in patients with elevated lactate levels as a marker of tissue hypoperfusion.**
(Weak recommendation; low quality of evidence)

Study or Subgroup	Lactate Guided Events	Total	Standard Events	Total	Weight	Risk Ratio IV, Random, 95% CI	Year
Jansen, 2010	20	68	30	67	24.9%	0.66 [0.42, 1.03]	2010
Jones, 2010	25	150	34	150	23.8%	0.74 [0.46, 1.17]	2010
Tian, 2012	14	43	12	19	16.9%	0.52 [0.30, 0.89]	2012
Yu, 2013	5	25	7	25	5.1%	0.71 [0.26, 1.95]	2013
Lyu 2015	20	50	28	50	29.2%	0.71 [0.47, 1.09]	2015
Total (95% CI)		**336**		**311**	**100.0%**	**0.67 [0.53, 0.84]**	
Total events	84		111				

Heterogeneity: Tau² = 0.00; Chi² = 1.14, df = 4 (P = 0.89); I² = 0%
Test for overall effect: Z = 3.51 (P = 0.0004)

Summary

- Screen patients for sepsis

- Start resuscitation early with source control, intravenous fluids and antibiotics.

- Frequent assessment of the patients' volume status is crucial throughout the resuscitation period.

- We suggest guiding resuscitation to normalize lactate in patients with elevated lactate levels as a marker of tissue hypoperfusion.

Thank You!

Medium Value Activities (10 points each) Participation in EQUAL should satisfy

Adopt a formal model for quality improvement and create a culture in which all staff actively participates in improvement activities that could include one or more of the following: Train all staff in quality improvement methods; Integrate practice change/quality improvement into staff duties; Engage all staff in identifying and testing practices changes; Designate regular team meetings to review data and plan improvement cycles; Promote transparency and accelerate improvement by sharing practice level and panel level quality of care, patient experience and utilization data with staff; and/or Promote transparency and engage patients and families by sharing practice level quality of care, patient experience and utilization data with patients and families.	As part of EQUAL, participating EDs can adopt a formal model of quality improvement and create a culture in which all staff actively participate in quality improvement.	IA_PSPA _19
Use decision support and standardized treatment protocols to manage workflow in the team to meet patient needs.	EQUAL Activities measure implementation of clinical decision support.	IA_PSPA _16
Measure and improve quality at the practice and panel level that could include one or more of the following: Regularly review measures of quality, utilization, patient satisfaction and other measures that may be useful at the practice level and at the level of the care team or MIPS eligible clinician or group(panel); and/or Use relevant data sources to create benchmarks and goals for performance at the practice level and panel level.	Participants in EQUAL will measure and compare their practice.	IA_PSPA _18

Medium Value Activities (10 points each)
Additional Work Needed to satisfy

Engage patients and families to guide improvement in the system of care.	EQUAL participants will set up a patient family engagement committee for their ED and engage the committee on one learning collaborative topic: sepsis, imaging, or chest pain.	IA_BE_14
Build the analytic capability required to manage total cost of care for the practice population that could include one or more of the following: Train appropriate staff on interpretation of cost and utilization information; and/or Use available data regularly to analyze opportunities to reduce cost through improved care.	EQUAL participant EDs will do one or more of the following : provide staff training of all clinicians on imaging costs, electronic distribution of imaging utilization benchmarking reports from EQUAL.	IA_PSPA_17
Ensure full engagement of clinical and administrative leadership in practice improvement that could include one or more of the following: Make responsibility for guidance of practice change a component of clinical and administrative leadership roles; Allocate time for clinical and administrative leadership for practice improvement efforts, including participation in regular team meetings; and/or Incorporate population health, quality and patient experience metrics in regular reviews of practice performance.	EQUAL EDs that allocate administrative time for QI efforts such as EQUAL and have established QI programs used to satisfy EQUAL aims.	IA_PSPA_20
Ensure full engagement of clinical and administrative leadership in practice improvement that could include one or more of the following: Make responsibility for guidance of practice change a component of clinical and administrative leadership roles; Allocate time for clinical and administrative leadership for practice improvement efforts, including participation in regular team meetings; and/or Incorporate population health, quality and patient experience metrics in regular reviews of practice performance.	As part of all learning collaborative ED clinical and administrative leaders will be engaged in practice improvement.	IA_PSPA_20

High Value Activities (20 points each) Additional Work Needed to satisfy

Participation in the CMS Transforming Clinical Practice Initiative.	EQUAL participants will join a CMS TCPI Practice Transformation Network (PTN) and complete all EQUAL activities as well as additional surveys and projects identified locally by the PTN	IA_CC_4
Build the analytic capability required to manage total cost of care for the practice population that could include one or more of the following: Train appropriate staff on interpretation of cost and utilization information; and/or Use available data regularly to analyze opportunities to reduce cost through improved care.	EQUAL participant EDs will do one or more of the following : provide staff training of all clinicians on imaging costs, electronic distribution of imaging utilization benchmarking reports from EQUAL.	IA_PSPA_17
Ensure full engagement of clinical and administrative leadership in practice improvement that could include one or more of the following: Make responsibility for guidance of practice change a component of clinical and administrative leadership roles; Allocate time for clinical and administrative leadership for practice improvement efforts, including participation in regular team meetings; and/or Incorporate population health, quality and patient experience metrics in regular reviews of practice performance.	As part of all learning collaborative ED clinical and administrative leaders will be engaged in practice improvement.	IA_PSPA_20