

Sveženj ukrepov pri bolnikih s sepso

Matjaž Jereb

Klinika za infekcijske bolezni in vročinska stanja

UKC Ljubljana

- **ZAKAJ POTREBUJEMO PRAVILA?**
- **ZAKAJ POTREBUJEMO SMERNICE?**
- **ZAKAJ POTREBUJEMO SVEŽNJE UKREPOV?**
- **ZAKAJ POTREBUJEMO NADZORNE LISTE („CHECKLISTS“)?**

Zakaj potrebujemo pravila?

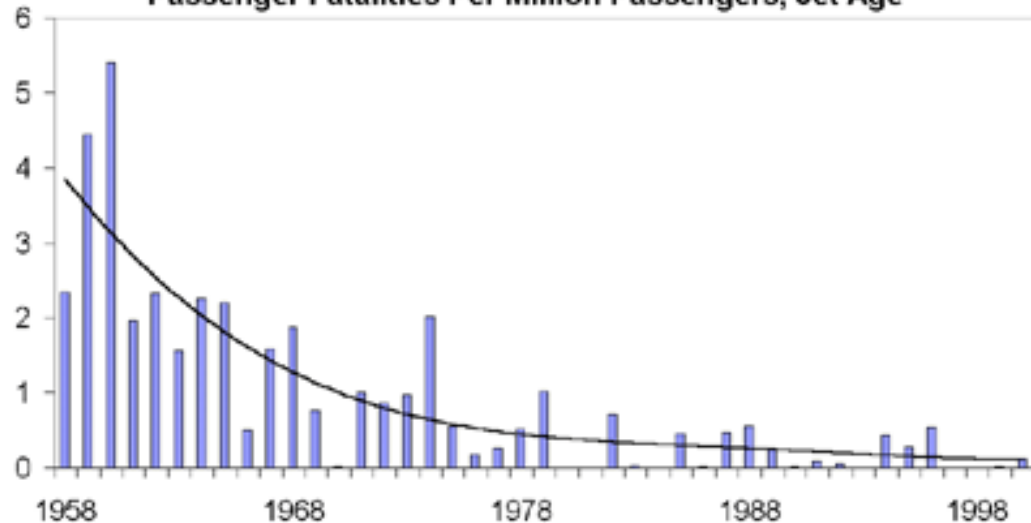
Funtoosh.com



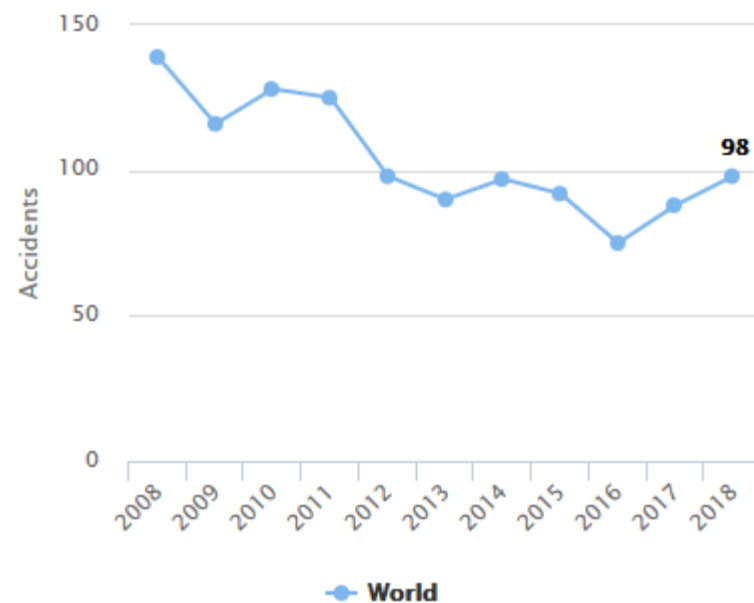


Accidents

Passenger Fatalities Per Million Passengers, Jet Age



Scheduled Commercial flights on airplanes above 5.7t only



SPECIAL ARTICLE

A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population

Alex B. Haynes, M.D., M.P.H., Thomas G. Weiser, M.D., M.P.H.,
 William R. Berry, M.D., M.P.H., Stuart R. Lipsitz, Sc.D.,
 Abdel-Hadi S. Breizat, M.D., Ph.D., E. Patchen Dellinger, M.D.,
 Teodoro Herbosa, M.D., Sudhir Joseph, M.S., Pascience L. Kibatala, M.D.,
 Marie Carmela M. Lapitan, M.D., Alan F. Merry, M.B., Ch.B., F.A.N.Z.C.A., F.R.C.A.,
 Krishna Moorthy, M.D., F.R.C.S., Richard K. Reznick, M.D., M.Ed., Bryce Taylor, M.D.,
 and Atul A. Gawande, M.D., M.P.H., for the Safe Surgery Saves Lives Study Group*

Table 5. Outcomes before and after Checklist Implementation, According to Site.*

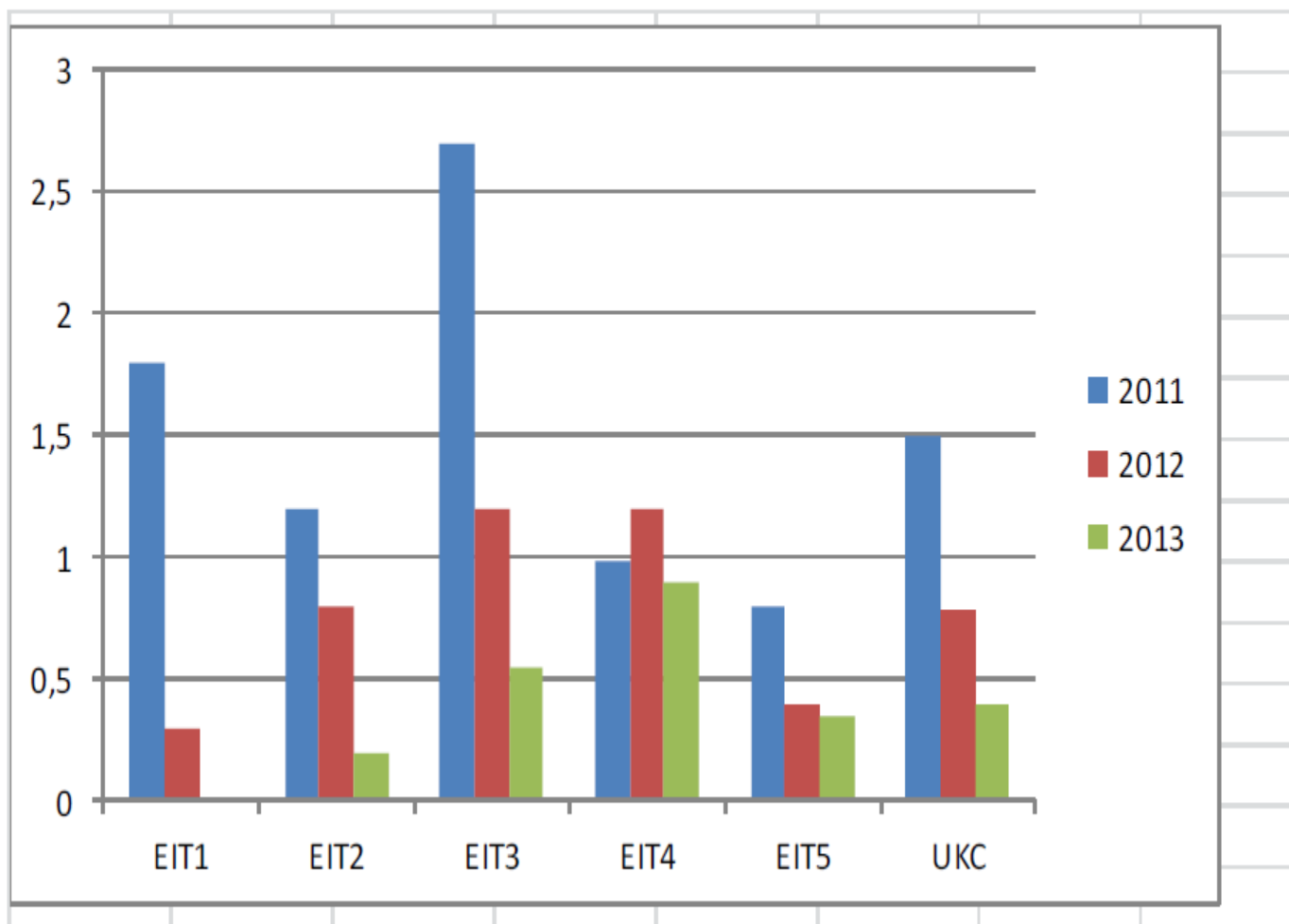
Site No.	No. of Patients Enrolled		Surgical-Site Infection		Unplanned Return to the Operating Room		Pneumonia		Death		Any Complication	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
							<i>percent</i>					
1	524	598	4.0	2.0	4.6	1.8	0.8	1.2	1.0	0.0	11.6	7.0
2	357	351	2.0	1.7	0.6	1.1	3.6	3.7	1.1	0.3	7.8	6.3
3	497	486	5.8	4.3	4.6	2.7	1.6	1.7	0.8	1.4	13.5	9.7
4	520	545	3.1	2.6	2.5	2.2	0.6	0.9	1.0	0.6	7.5	5.5
5	370	330	20.5	3.6	1.4	1.8	0.3	0.0	1.4	0.0	21.4	5.5
6	496	476	4.0	4.0	3.0	3.2	2.0	1.9	3.6	1.7	10.1	9.7
7	525	585	9.5	5.8	1.3	0.2	1.0	1.7	2.1	1.7	12.4	8.0
8	444	584	4.1	2.4	0.5	1.2	0.0	0.0	1.4	0.3	6.1	3.6
Total	3733	3955	6.2	3.4	2.4	1.8	1.1	1.3	1.5	0.8	11.0	7.0
P value			<0.001		0.047		0.46		0.003		<0.001	

Use of bundled interventions, including a checklist to promote compliance with aseptic technique, to reduce catheter-related bloodstream infections in the intensive care unit

[C David Simpson](#), MD,^{1,2} [Judith Hawes](#), NP,³ [Andrew G James](#), MBChB,^{3,4} and [Kyong-Soon Lee](#), MD^{3,4} [Paediatr Child Health](#). 2014 Apr; 19(4): e20–e23.

Avtor	EIT	Intervencija n	Kontrola n	Okužbe OŽK/1000KD Intervencija	Okužbe OŽK/1000KD Kontrola
Bernholtz 2004	odrasli	19 905	17 383	0,0	1,6
Berriel 2006	odrasli	NR	NR	3,0	9,6
Bonello	odrasli	NR	NR	2,7	5,2
Burrell 2011	Odrasli + otroci	NR	NR	1,2	3,0
Costello 2008	otroci	3675	2951	2,3	7,8
Harrigan 2006	odrasli	NR	NR	1,1	3,8
Longmate 2011	odrasli	2138	2660	0,0	3,4
McKee 2008	otroci	2200	3000	3,0	5,2
Miller 2010	odrasli	3283	4116	3,4	8,5
Peredo 2010	odrasli	3296	3572	2,4	6,7
Schulman 2011	NICU	55 137	61 096	2,1	3,5
Venketram 2010	odrasli	1670	4797	1,7	10,8

Katetrške seapse v UKC Ljubljana



- **Sepsa je ena najdražjih bolezni, ki jih zdravimo v bolnišnici in stroški naraščajo.**
- **V ZDA v letu 2011 preko 20 milijard \$ v letu (6.2% vseh bolnišničnih stroškov)**
- **> kot 30 M bolnikov s sepso / dan**
- **6 M bolnikov umre**



Bolnikova „zgodba“ se ne konča z odpustom

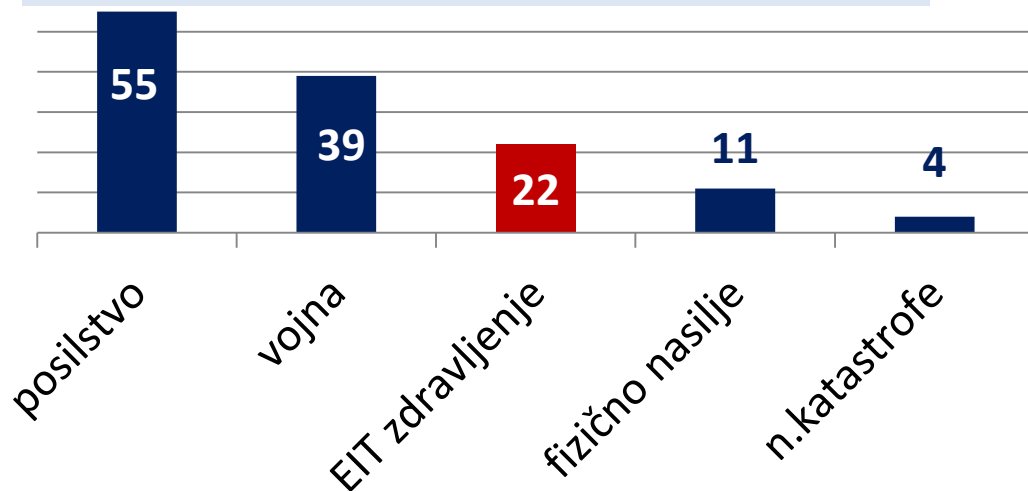
„Post sepsa sindrom“

- živčno mišična oslabeledost
- kronične bolečine
- post-travmatski stres
- kognitivne motnje
- depresija

Drugi simptomi:

- motnje spanja
- huda utrujenost
- motnje koncentracije
- pomanjkanje samozavesti, druge psihične motnje...

Post travmatski stres v %



Proгноza sepse

- **Smrtnost sepse 20 do 50%**

Martin GS. N Engl J Med 2003;348:1546-54.

Finfer S. Intensive Care Med 2004;30:589-96.

Brun-Buisson C. Intensive Care Med 2004;30:580-8.

Kaukonen KM. JAMA 2014;311:1308-16.

Esteban A. Crit Care Med 2007;35:1284-9.

De La Rica AS. Ann Transl Med 2016;4:325.

- **Smrtnost septičnega šoka > 50%**

Vincent JL. Crit Care Med 2006;34:344-53.

Anname

De La Rica AS. Ann Transl Med 2016;4:325.

D. Am J Respir Crit Care Med 2003;168:165-72.

Smernice za obravnavo bolnikov s sepso



Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock

R. Phillip Dellinger, MD; Jean M. Carlet, MD; Thierry Calandra, MD; Jonathan Cohen, MD; John C. Marshall, MD; Margaret M. Parker, MD; Jean-Louis Vincent, MD, PhD; Mitchell M. Levy, MD, PhD; for the International Surviving Sepsis Campaign Guidelines Committee

Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2008

R. Phillip Dellinger, MD; Mitchell M. Levy, MD; Jean M. Carlet, MD; Julian Bion, MD; Margaret M. Parker, MD; Roman J. Konrad Reinhart, MD; Derek C. Angus, MD, MPH; Christian Brun-Buisson, MD; Richard Beale, MD; Thierry Calandra, MD, PhD; Jean-Francois Dhainaut, MD; Herwig Gerlach, MD; Maureen Harvey, RN; John J. Marini, MD; John Marshall, MD; Marco Ranieri, MD; Graham Ramsay, MD; Jonathan Sevransky, MD; B. Taylor Thompson, MD; Sean Townsend, MD; Jeffrey S. Vender, MD; Janice L. Zimmerman, MD; Jean-Louis Vincent, MD, PhD; for the International Surviving Sepsis Campaign Guidelines Committee

Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock: 2012

R. Phillip Dellinger, MD¹; Mitchell M. Levy, MD²; Andrew Rhodes, MD, PhD³; Herwig Gerlach, MD, PhD⁵; Steven M. Opal, MD⁶; Jonathan E. Sevransky, MD⁷; Ivor S. Douglas, MD⁹; Roman Jaeschke, MD¹⁰; Tiffany M. Osborn, MD¹¹; Sean R. Townsend, MD¹³; Konrad Reinhart, MD¹⁴; Ruth M. Kleinman, MD¹⁵; Derek C. Angus, MD, MPH¹⁶; Clifford S. Deutschman, MD, MS¹⁷; Gordon D. Rubenfeld, MD¹⁹; Steven A. Webb, MD, MS, PhD²⁰; Richard J. Beale, MD²¹; Jean-Louis Vincent, MD, PhD²²; Rui Moreno, MD, PhD²³; and the Surviving Sepsis Campaign Guidelines Committee including the Pediatric Subgroup*

CONFERENCE REPORTS AND EXPERT PANEL

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



Andrew Rhodes^{1*}, Laura E. Evans², Waleed Alhazzani³, Mitchell M. Levy⁴, Massimo Antonelli⁵, Ricard Ferrer⁶, Thomas R. Kohn⁷, John A. Kahn⁸, Douglas G. Finkel⁹, Charles L. Sprung⁹, Mark E. Nunnally², Bram Rochwergh³, Iqbal Anjum¹², Richard J. Beale¹³, Geoffrey J. Bellomo¹⁴, Craig Coopersmith⁸, Daniel P. De Backer¹⁷, Craig J. French¹⁸, Luis Hidalgo²¹, Steven M. Hollenberg²², Alan E. Jones²³, Thomas R. Kohn²⁶, Thiago Costa Lisboa²⁷, Flavia R. Machado²⁸, Pawel Mazuski³¹, Lauralyn A. McIntyre³², Anthony S. McLean³³, John A. Marshall³⁶, Paolo Navasoli³⁷, Osamu Nishida³⁸, Tiffany M. Osborn³¹, Marco Ranieri⁴⁰, Christa A. Schorr²², Maureen A. Seckel⁴¹, David A. Shukri⁴⁴, Steven Q. Simpson⁴⁵, Mervyn Singer⁴⁶, Thomas Van der Poll⁴⁹, Jean-Louis Vincent⁵⁰, W. Joost Wiersinga⁴⁹, and the Surviving Sepsis Campaign International Guidelines Committee

The Surviving Sepsis Campaign Bundle: 2018 Update

Mitchell M. Levy, MD, MCCM¹; Laura E. Evans, MD, MSc, FCCM²; Andrew Rhodes, MBBS, FRCA, FRCP, FFICM, MD (res)³



Sepsa in zdravljenje

- Sveženj ukrepanja -3h

- določitev laktat
- odvzem HK
- antibiotik širokega spektra
- 30ml tekočine / kg TT
- ob hipotenziji ali laktatu > 4



- Sveženj ukrepanja -6h

- vazopresorji ob vztrajanju hipotenzije (MAP $\geq$ 65mmHg)
- ponovno merjenje laktata ob povišani vrednosti



Sepsa in zdravljenje

The Surviving Sepsis Campaign Bundle: 2018 Update

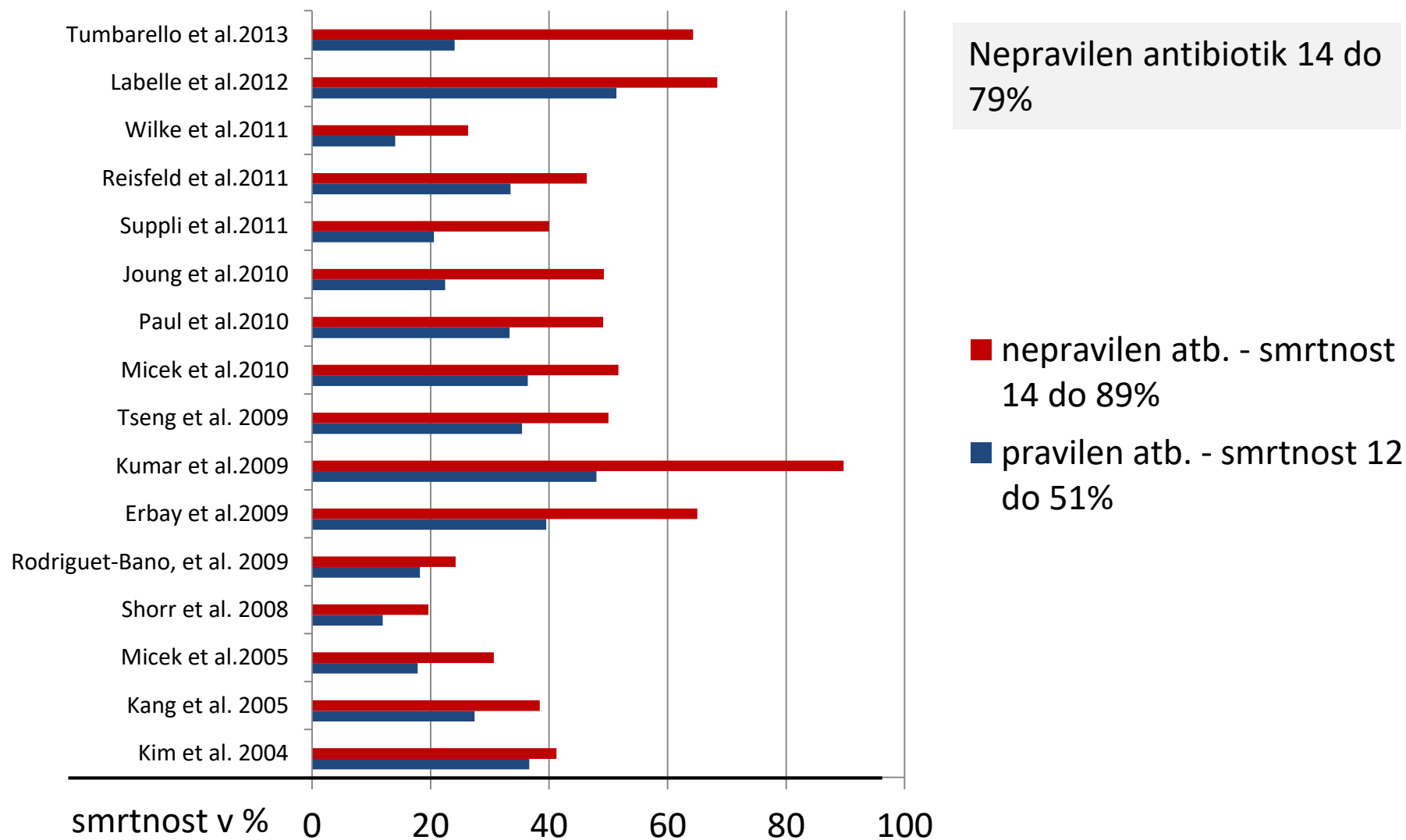
Mitchell M. Levy, MD, MCCM¹; Laura E. Evans, MD, MSc, FCCM²;
Andrew Rhodes, MBBS, FRCA, FRCP, FFICM, MD (res)³

- **Sveženj ukrepanja -1h**
 - določitev laktat
 - odvzem HK
 - antibiotik širokega spektra
 - 30ml tekočine / kg TT
ob hipotenziji ali laktatu > 4
 - vazopresorji ob vztrajanju hipotenzije ($MAP \geq 65 \text{ mmHg}$)

bolezen	smrtnost pred antibiotiki (%)	smrtnost po antibiotikih (%)	razlika v preživetju (%)
pljučnica od doma	~35	~10	~25
bolnišnična pljučnica	~60	~30	~30
infekcijski endokarditis	~100	~25	~75
okužbe kože in mehkih tkiv	~11	~0,5	~10

Clin Infect Dis 2008;47: S249-65; Springfield IL: Charles C. Thomas, 1955 & Lancet 1935;226:383-4; Lancet 1938;231:733-4.; Am J Med 1948;5:402-18; Clin Infect Dis 2009;49:383-91.

Antibiotik in sepsa



Antibiotik in sepsa

Avtor	N	Mesto raziskave	Čas do atb v h (mediana)	Razmerje obetov za smrt
Gaieski CCM 2010; 38;1045-53	261	urgenca, ZDA (šok)	119	0.30 (v 1h: po 1h)
Daniels Emerg Med J 2010; doi:10.1136	567	bolnica, Anglija	121	0.62 (v 1h: po 1h)
Kumar CCM 2006; 34(6): 1589-1596	2154	urgenca, Kanada (šok)	360	0.59 (v 1h: po 3h)
Appelboam CCM 2010; 14(Suppl 1):50	375	bolnica, Anglija	240	0.74 (v 1h: po 3h)
Levy CCM 2010; 38(2): 1-8	15022	multi-centrična		0.86 (v 1h: po 3h)

D. ANTIMICROBIAL THERAPY

1. We recommend that administration of IV antimicrobials be initiated as soon as possible after recognition and within one hour for both sepsis and septic shock (strong recommendation, moderate quality of evidence; grade applies to both conditions).

March 2017 • Volume 45 • Number 3

Rhodes A, et al. Surviving Sepsis Campaign: international guidelines for management of sepsis and septic shock: 2016. Crit Care Med 2017;45:1–67.

Sepsa in zdravljenje

The New England Journal of Medicine

EARLY GOAL-DIRECTED THERAPY IN THE TREATMENT OF SEVERE SEPSIS AND SEPTIC SHOCK

EMANUEL RIVERS, M.D., M.P.H., BRYANT NGUYEN, M.D., SUZANNE HAVSTAD, M.A., JULIE RESSLER, B.S.,
ALEXANDRIA MUZZIN, B.S., BERNHARD KNOBLICH, M.D., EDWARD PETERSON, PH.D., AND MICHAEL TOMLANOVICH, M.D.,
FOR THE EARLY GOAL-DIRECTED THERAPY COLLABORATIVE GROUP*

Merjenje	Intervencija	EGDT
CVP 8-12	tekočina	CVP 8-12
MAP > 65	Vazopresorji	MAP > 65
	Transfuzija k. eri. Dobutamine	ScvO ₂ > 70%
49% mortality		33% mortality

Rivers E, et al. (2001). *New England Journal of Medicine*, 345(19), 1368–1377.

**ORIGINAL ARTICLE**

Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock

Emanuel Rivers, M.D., M.P.H., Bryant Nguyen, M.D., Suzanne Havstad, M.A., Julie Ressler, B.S., Alexandria Muzzin, B.S., Bernhard Knoblich, M.D., Edward Peterson, Ph.D., and Michael Tomlanovich, M.D., for the Early Goal-Directed Therapy Collaborative Group*

N Engl J Med 2001; 345:1368-1377 | [November 8, 2001](#) | DOI: 10.1056/NEJMoa010307

Avtor	Leto	Smrtnost - pred (%)	Smrtnost - po (%)
EGDT	1997-2000	46.5	30.5
Ani et al (Severe)	1999-2008	40.0	27.8
Kumar (Severe)	2003-2009	39.6	27.3
Kumar (Shock)	2000-2007	47.1	36.4
Mult Observational	2001-2016	40.3	27.6
ProCESS	2008-2013	18.9	19-20
ProMISE	2011-2014	25.6	24.6
ARISE	2008-2014	18.8	18.6

ORIGINAL ARTICLE

Goal-Directed Resuscitation for Patients with Early Septic Shock

The ARISE Investigators and the ANZICS Clinical Trials Group*

ABSTRACT

ORIGINAL ARTICLE

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

The ProCESS Investigators*

ABSTRACT

BACKGROUND

In a single-center study published more than a decade ago involving patients presenting to the emergency department with severe sepsis and septic shock, mortality

The members of the
(Donald M. Yealy, M.D., David T. Ho,

ORIGINAL ARTICLE

Trial of Early, Goal-Directed Resuscitation for Septic Shock

Paul R. Mouncey, M.Sc., Tiffany M. Osborn, M.D., G. Sarah Power, M.Sc., David A. Harrison, Ph.D., M. Zia Sadique, Ph.D., Richard D. Grieve, Ph.D., Rahi Jahan, B.A., Sheila E. Harvey, Ph.D., Derek Bell, M.D., Julian F. Bion, M.D., Timothy J. Coats, M.D., Mervyn Singer, M.D., J. Duncan Young, D.M., and Kathryn M. Rowan, Ph.D., for the ProMISe Trial Investigators*

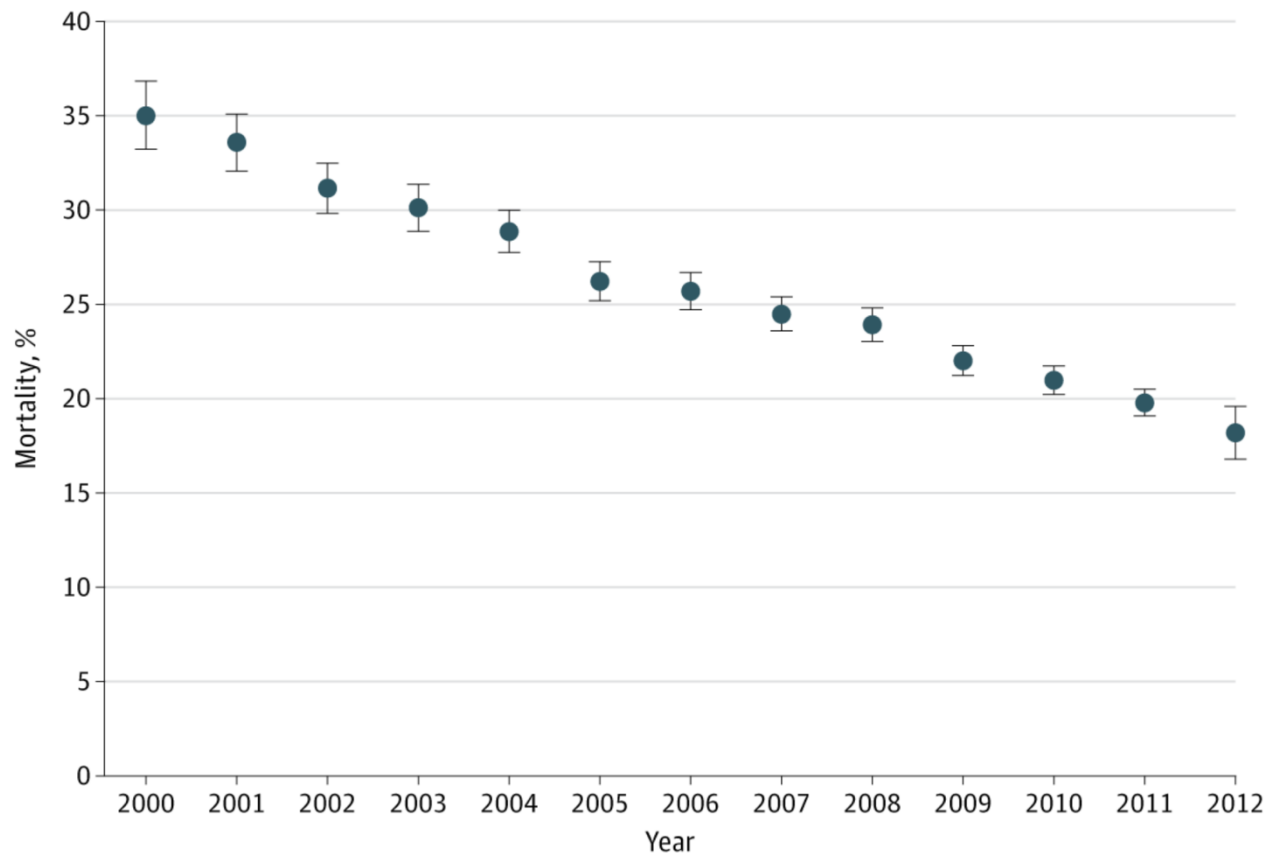
ABSTRACT

Bolniki randomizirani po tekočinskem oživljanju in uvedbi antibiotika !

Mortality Related to Severe Sepsis and Septic Shock Among Critically Ill Patients in Australia and New Zealand, 2000-2012

Kirsi-Maija Kaukonen, MD, PhD, EDIC; Michael Bailey, PhD; Satoshi Suzuki, MD; David Pilcher, FCICM;
Rinaldo Bellomo, MD, PhD

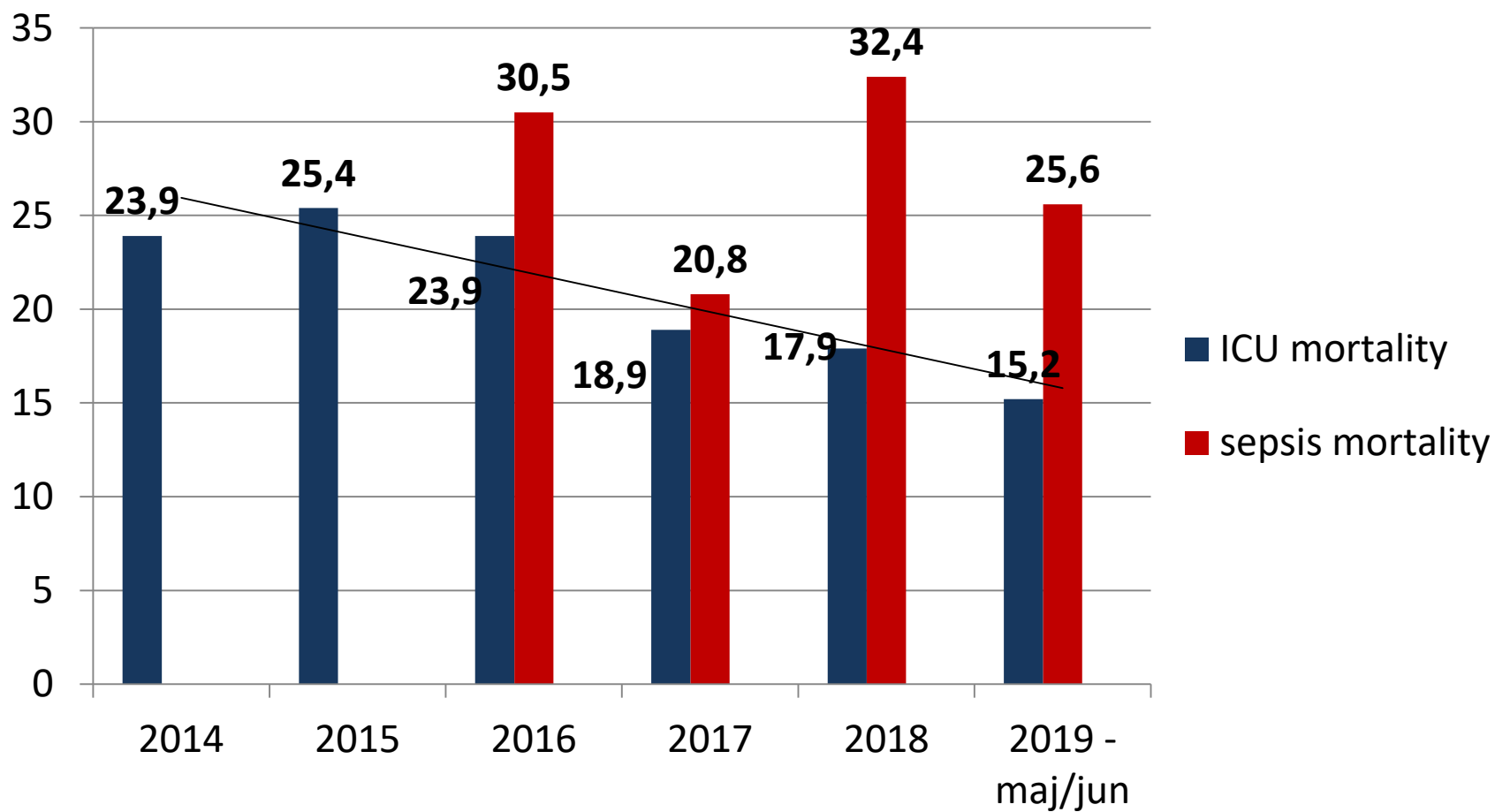
JAMA April 2, 2014 Volume 311, Number 13



No. of patients 2708 3783 4668 5221 6375 6987 7627 8529 8797 10277 11367 12213 12512

Proгноза sepse

- ZDA smrtnost 2004 : 2009 / 35,2% : 25,6%
Gaieski DF. Crit Care Med 2013;41:1167-74.
- ZDA smrtnost 2005 : 2010 / 21,1% : 14,8%
Banta JE. Crit Care Med 2012;40:2960-6.
- ZDA smrtnost 2010 : 2015 / 24% : 14%
Meyer N. Crit Care Med 2018;46:354-60.
- Francija smrtnost 1993 : 2001 / 56% : 35%
Brun-Buisson C. Intensive Care Med 2004;30:580-8.
- Španija smrtnost 2000 : 2013 / 19,1% : 17,9%
Alvaro-Meca A, et al. Popul Health Metr 2018; 16: 4.



Surviving Sepsis Campaign: Association Between Performance Metrics and Outcomes in a 7.5-Year Study



Mitchell M. Levy, MD, FCCM¹; Andrew Rhodes, MB BS, MD (Res)²; Gary S. Phillips, MAS³; Sean R. Townsend, MD⁴; Christa A. Schorr, RN, MSN⁵; Richard Beale, MB BS⁶; Tiffany Osborn, MD, MPH⁷; Stanley Lemeshow, PhD⁸; Jean-Daniel Chiche, MD⁹; Antonio Artigas MD, PhD¹⁰; R. Phillip Dellinger, MD, FCCM¹¹

January 2015 • Volume 43 • Number 1

Characteristic	Low resuscitation compliance			High resuscitation compliance			Total			p ^a
	Total, n	Died, n	%	Total, n	Died, n	%	Total, n	Died, n	%	
Overall	11,609	4,475	38.6	17,861	5,185	29.0	29,470	9,660	32.8	< 0.001
Location of severe sepsis										< 0.001

10% višja kompliansa = 3 do 5% nižja smrtnost

Site duration										< 0.001
< 2 years	4,960	1,896	38.2	3,352	992	29.6	8,312	2,888	34.7	
2 to < 3 years	1,611	600	37.2	6,557	1,895	28.9	8,168	2,495	30.5	
≥ 3 years	5,038	1,979	39.3	7,952	2,298	28.9	12,990	4,277	32.9	



Sepsa in zdravljenje

The Surviving Sepsis Campaign Bundle: 2018 Update

Mitchell M. Levy, MD, MCCM¹; Laura E. Evans, MD, MSc, FCCM²;
Andrew Rhodes, MBBS, FRCA, FRCP, FFICM, MD (res)³

- **Sveženj ukrepanja -1h**
 - določitev laktat
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 - antibiotik širokega spektra
 - 30ml tekočine / kg TT
ob hipotenziji ali laktatu > 4
 - vazopresorji ob vztrajanju hipotenzije ($MAP \geq 65 \text{ mmHg}$)

Anamneza = 83% diagnoze

[Br Med J.](#) 1975 May 31; 2(5969): 486–489. PMID: [PMC1673456](#)

PMID: [1148666](#)

Relative contributions of history-taking,
physical examination, and laboratory
investigation to diagnosis and management of
medical outpatients.

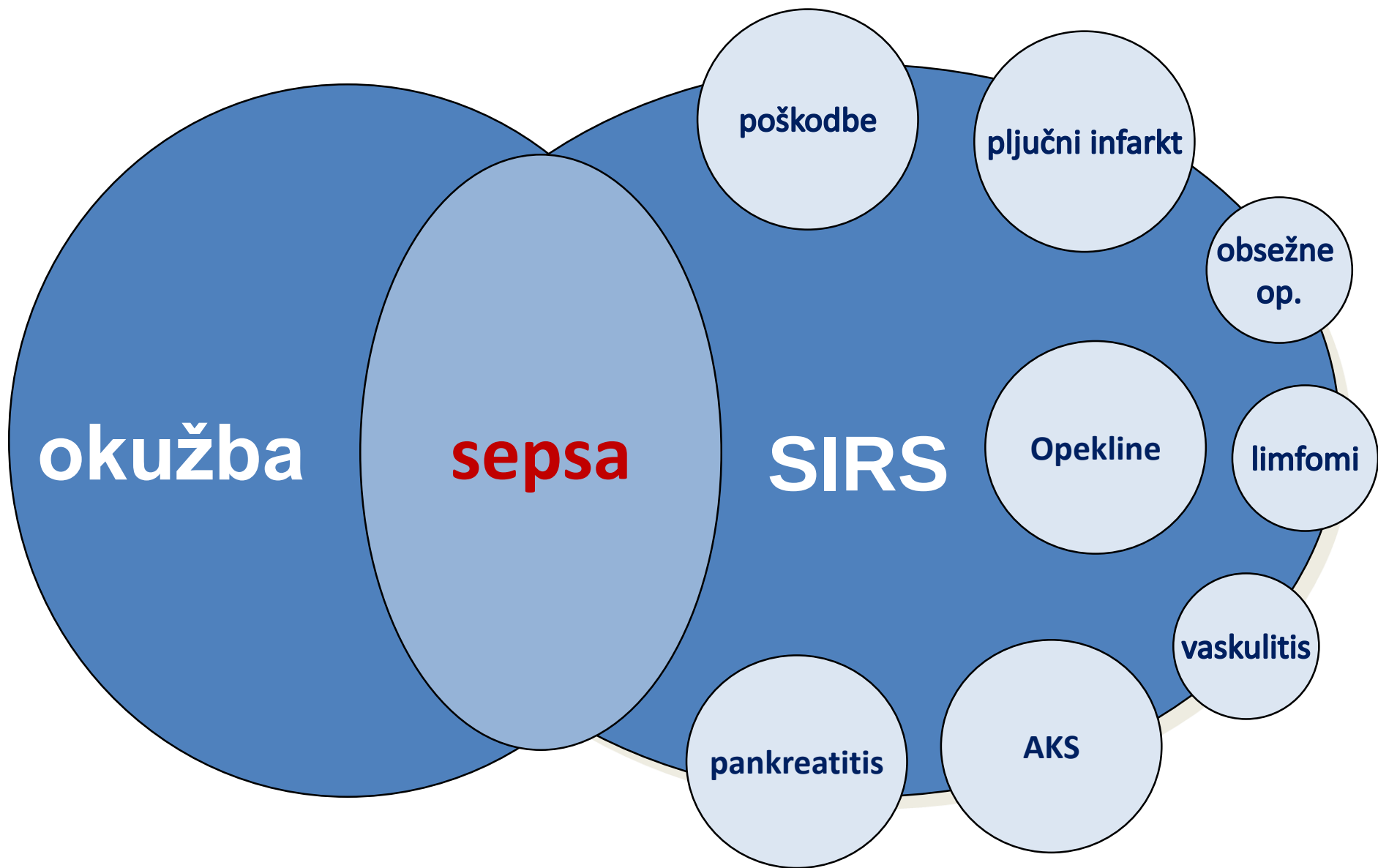
[J R Hampton](#), [M J Harrison](#), [J R Mitchell](#), [J S Prichard](#), and [C Seymour](#)

klinični znaki sepse (vročina, tahikardija,...)

vir okužbe (pljuča, sečila,...)

	0	1	2	3	4
Dihala PaO2 /FiO2 mmHg (kPa)	≥400 (53,3)	<400 (53,3)	<300 (40)	<200 (26,7)*	<100(13,3)
Koagulacija Trombociti x10 ³ /μl	≥150	<150	<100	<50	<20
Jetra Bilirubin mg/dl (μmol/l)	<1,2 (20)	1,2-1,9 (20-32)	2,0-5,9 (33-101)	6,0-11,9 (102-204)	>12 (204)
Srčno žilni sistem	MAP ≥ 70 mmHg	MAP ≤ 70 mmHg	Dopamine<5 dobutamin (vsak odmerek)**	Dopamin 5,1-15 Noradrenalin≤0,1 Adrenalin ≤ 0,1	Dopamin > 15 Noradrenalin>0,1 Adrenalin > 0,1
Osrednje živčevje GCS	15	13 -14	10 - 12	6 - 9	< 6
Ledvica Kreatinin mg/dl (μmol/l) količina urina ml/dan	<1,2 (110)	1,2 - 1,9 (110 – 170)	2,0 – 3,4 (171 – 299)	3,5 – 4,9 (300 – 440) < 500	>5,0 (440) < 200

Sepsa in specifičnost kliničnih znakov



Laboratorijski označevalci sepse - CRP

● diagnostična vrednost CRP za sepso

Ref.	CRP mg/l	občutljivost %	specifičnost %
Povoa P. <i>Intensive Care Med</i> 1998; 24	50	98,5	75
Ugarte H <i>Crit Care Med</i> 1999; 27	79	71,8	66,6
Suprin E <i>Intensive Care Med</i> 2000; 26	100	74	74
Cunha J. <i>Intensive Care Med</i> 1997; 23	40	100	85,4
Muller B. <i>Crit Care Med</i> 2000; 28	100	71	78
Cheval C. <i>Intensive Casre Med</i> 2000; 26	100	93	40
Chan L. <i>Critical Care</i> 2004; 8	60	69	90,5
Pradhan S. <i>Indian J Crit Care Med</i> 2016	61	84,3	46,2
Li HX, et al. <i>J Int Med Res</i> 2014	51	90	68

Laboratorijski označevalci sepse - PCT

Year	Population	Admission category	Setting	Procalcitonin assay	Cutoff (ng/mL)	n	Prevalence (%)	Severity	TP	FP	TN	FN	Sensitivity (95% CI)	Specificity (95% CI)	
(Continued from previous page)															
Naeini ⁴²	2006	Adult	Medical and surgical	..	PCT-Q	0.5	50	50%	Sepsis, severe sepsis, and septic shock	22	1	24	3	0.88 (0.69-0.97)	0.96 (0.80-1.00)
Oshita ⁴³	2010	Adult	..	..	PCT-Q	0.5	168	67%	No information	76	11	45	36	0.68 (0.58-0.76)	0.80 (0.68-0.90)
Pavcnik-Arnol ⁴⁴	2007	Paediatric	Medical and surgical	PICU	PCT-Kryptor	5.79	49	61%	Sepsis, severe sepsis, and septic shock	17	2	17	13	0.57 (0.37-0.75)	0.89 (0.67-0.99)
Ruiz-Alvarez ⁴⁵	2009	Adult	Medical and surgical	ICU	PCT-Kryptor	0.32	103	76%	Sepsis, severe sepsis, and septic shock	65	9	16	13	0.83 (0.73-0.91)	0.64 (0.43-0.82)
Sakr ⁴⁶	2008	Adult	Medical and surgical	ICU	PCT-LIA	2	327	36%	Sepsis, severe sepsis, and septic shock	82	92	116	37	0.69 (0.61-0.77)	0.56 (0.49-0.63)
Selberg ⁴⁷	2000	Adult	Medical	ICU	PCT-LIA	3.3	33	67%	Sepsis and severe sepsis	19	6	6	3	0.86 (0.65-0.97)	0.55 (0.23-0.83)
Simon ⁴⁸	2008	Paediatric	Medical and surgical	PICU	PCT-LIA	2.5	64	39%	No information	17	10	29	8	0.68 (0.46-0.85)	0.74 (0.58-0.87)
Suprin ⁴⁹	2000	Adult	Medical	ICU	PCT-LIA	2	95	70%	Sepsis, severe sepsis, and septic shock	49	6	14	26	0.65 (0.53-0.76)	0.70 (0.46-0.88)
Tsalik ⁵⁰	2011	Adult	..	ED	PCT-Kryptor	0.1	146	54%	Sepsis, severe sepsis, and septic shock	168	33	56	79	0.68 (0.62-0.74)	0.63 (0.52-0.73)
Tsangaris ⁵¹	2009	Adult	Medical and surgical	ICU	PCT-Kryptor	1	50	54%	Sepsis, severe sepsis, and septic shock	19	2	21	8	0.70 (0.50-0.86)	0.91 (0.72-0.99)
Tugrul ⁵²	2002	Adult	Medical and surgical	ICU	PCT-LIA	1.31	133	58%	Sepsis, severe sepsis, and septic shock	55	2	8	20	0.73 (0.62-0.83)	0.80 (0.44-0.97)
Wanner ⁵³	2000	Adult	Surgical	ED and ICU	PCT-LIA	1.5	133	34%	No information	34	20	68	11	0.76 (0.60-0.87)	0.77 (0.67-0.86)

All assays made by BRAHMSGmbH (Hennigsdorf, Germany). TP=true positive. FP=false positive. TN=true negative. FN=false negative. ED=emergency department. ICU=intensive care unit. PICU=paediatric intensive care unit. HW=hospital ward.

Obcutljivost = 76%
Specifičnost = 78%

DIAGNOZA

Table: Study characteristics

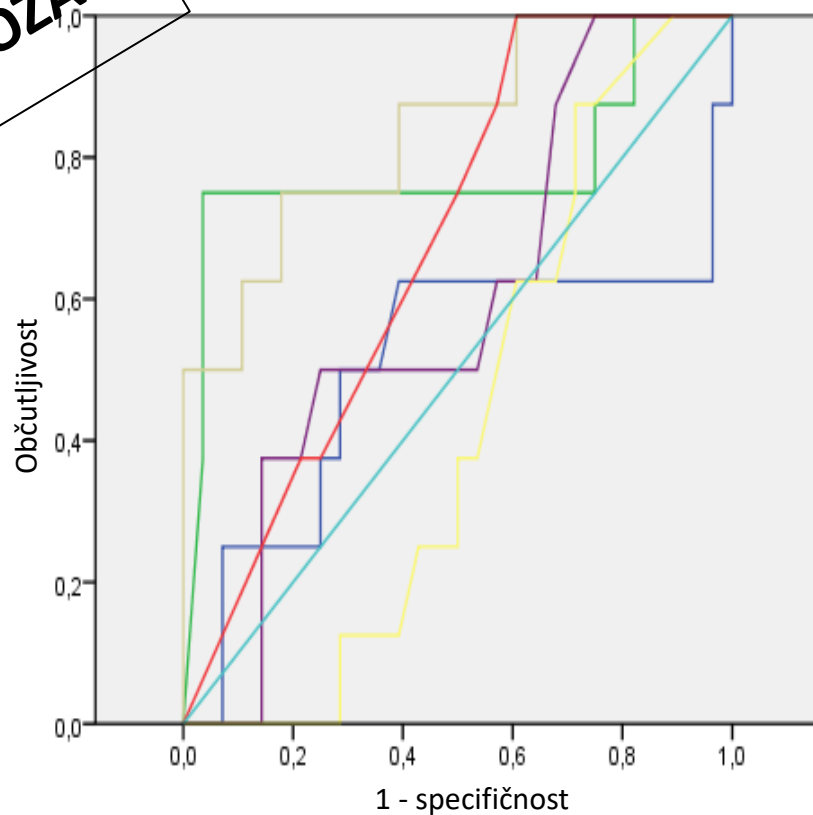
Laboratorijski označevalci sepse – CD 14 (presepsin)

Avtor	Mejna vrednost pg/ml	AUC	Občutljivost	Specifičnost
Shozushima T. 2011	415	0,85	0,80	0,81
Endo S. 2012	600	0,91	0,88	0,81
Liu B. 2013	317	0,82	0,71	0,86
Ulla M. 2013	600	0,70	0,79	0,62
Vodnik T. 2013	630	0,90	1	0,98
Behnes M. 2014	700	0,84	0,90	0,60
Godnič M. 2015	413	0,71	0,85	0,63
Sargentini V. 2015	600	0,89	0,86	0,72
Klousche K. 2016	466	0,75	0,90	0,55
Romualdo G. 2016	849	0,78	0,67	0,81

Občutljivost = 84%
Specifičnost = 77%

Biokemični marker sepse – CD 14 (presepsin)

DIAGNOZA



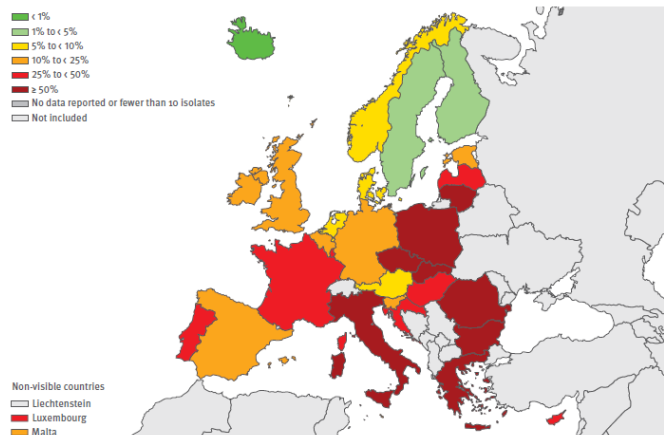
Higher Fluid Balance Increases the Risk of Death From Sepsis: Results From a Large International Audit*

Yasser Sakr, MD, PhD¹; Paolo Nahuel Rubatto Birri, MD¹; Katarzyna Kotfis, MD, PhD²; Rahul Nanchal, MD³; Bhagyesh Shah, MBBS, DA, IDCCM⁴; Stefan Kluge, MD⁵; Mary E. Schroeder, MD⁶;

TABLE 2. Fluid Balance, Severity of Illness, and Outcome According to Quartiles of Fluid Balance at 72 Hours After Admission to the ICU

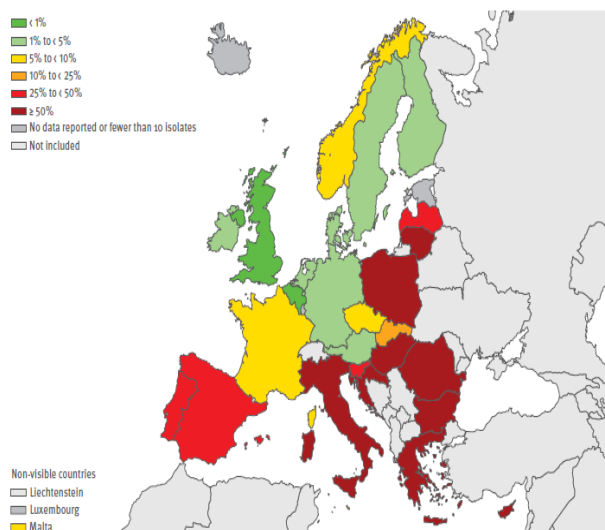
Variable	First Quartile, n = 452	Second Quartile, n = 452	Third Quartile, n = 452	Fourth Quartile, n = 452	p
Fluid balance (mL), median (IQR)					
First 24 hr	2,252 (1,250 to 3,325)	2,444 (1,404 to 3,632)	3,709 (2,602 to 4,894)	5,398 (3,910 to 7,111)	< 0.001
Cumulative 3 d	-3,714 (-6,536 to -2,301)	456 (-137 to 1,110)	3,241 (2,556 to 4,059)	7,904 (6,293 to 10,744)	< 0.001
Cumulative 7 d	-5,360 (-9,849 to -2,686)	286 (-554 to 1,153)	3,339 (2,164 to 4,495)	8,781 (6,209 to 12,951)	< 0.001
ICU cumulative	-5,375 (-11,949 to -2,358)	187 (-532 to 1,168)	3,050 (1,977 to 4,291)	8,307 (5,616 to 14,498)	< 0.001
Mortality rates (%) ^b					
ICU mortality	68 (15.3)	98 (21.1)	146 (32.6)	179 (40.2)	< 0.001
In-hospital mortality	111 (25.8)	138 (30.5)	179 (40.8)	218 (50.6)	< 0.001

Figure 3.7. *Klebsiella pneumoniae*. Percentage (%) of invasive isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2015



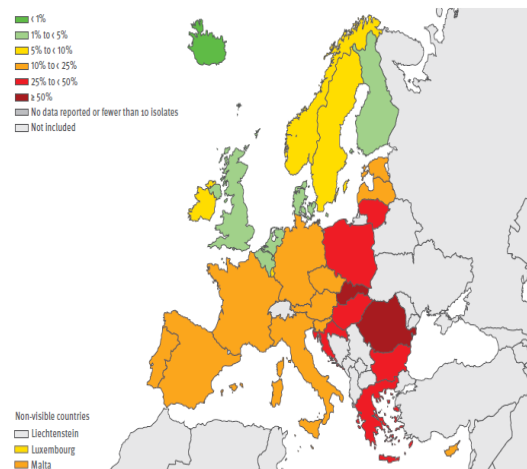
K. pneumoniae ESBL = 23,7%
K. pneumoniae karbap. R = <1%
E.coli ESBL = 12,5%

Figure 3.20. *Acinetobacter* spp. Percentage (%) of invasive isolates with combined resistance to fluoroquinolones, aminoglycosides and carbapenems, by country, EU/EEA countries, 2015



Acinetobacter spp. - (R na flurokinoloni , aminoglikozidi , karbapenemi)
R = 41,7%

Figure 3.15. *Pseudomonas aeruginosa*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2015



Ps. aeruginosa – (R na pip/ tazo, ceftazidim, fluorokinolone, aminoglikozide, karbapeneme)
R= 10,5%

The Surviving Sepsis Campaign Bundle: 2018 Update

Mitchell M. Levy, MD, MCCM¹; Laura E. Evans, MD, MSc, FCCM²;
Andrew Rhodes, MBBS, FRCA, FRCP, FFICM, MD (res)³

?

- **Razvoj svežnjev tekom let**
 - **6 ur in 24 ur v 8 korakih**
 - **3 ur in 6 ur v 6-7 korakih**
 - **1 ura v 5 korakih?**

Surviving Sepsis 2018: 1-hr Bundle

The [Society of Critical Care Medicine](#) (SCCM) and the [American College of Emergency Physicians](#) (ACEP) acknowledge concerns expressed about the recently released Surviving Sepsis Campaign (SSC) Hour-1 bundle.

SCCM and ACEP along with other involved international experts are organizing a meeting ASAP to carefully review the recommendations, and provide guidance on bundle implementation and care of potentially septic patients who present to emergency departments in the United States.

We recommend that hospitals not implement the Hour-1 bundle in its present form in the United States at this time.

The Surviving Sepsis Campaign Bundle: 2018 Update

Mitchell M. Levy, MD, MCCM¹; Laura E. Evans, MD, MSc, FCCM²;
Andrew Rhodes, MBBS, FRCA, FRCP, FFICM, MD (res)³

Critical Care Medicine

Surviving Sepsis Campaign one-hour bundle.

Bundle element	Grade of recommendation and level of evidence
Measure lactate. Re-measure if initial lactate > 2 mmol/L.	Weak recommendation. Low quality of evidence.
Obtain blood cultures prior to administration of antibiotics.	Best practice statement.
Administer broad-spectrum antibiotics.	Strong recommendation. Moderate quality of evidence.
Rapidly administer 30 ml/kg crystalloid for hypotension or lactate ≥ 4 mmol/L.	Strong recommendation. Low quality of evidence.
Apply vasopressors if patient is hypotensive during or after fluid resuscitation to maintain MAP ≥ 65 mm Hg.	Strong recommendation. Moderate quality of evidence.

mmol/L, millimoles per liter; *ml/kg*, milliliters per kilogram; *mmHg*, millimeters of mercury; *MAP*, mean arterial pressure.

Zaključki

- **Klinični znaki sepse niso zelo specifični**
- **V zgodnjem poteku sepse so laboratorijski znaki sepse premalo občutljivi**
- **Vprašanje specifičnosti kazalcev vnetja za dg. sepse**
- **Pred vsesplošno implementacijo „1 Hour bundle“ je potrebno natančneje definirati skupine bolnikov s sepso, ki bodo od tega imeli koristi**