

Overview on sepsis in low- and middle-income countries

FLAVIA MACHADO

Latin American
Sepsis
Institute



Global
Sepsis
Alliance



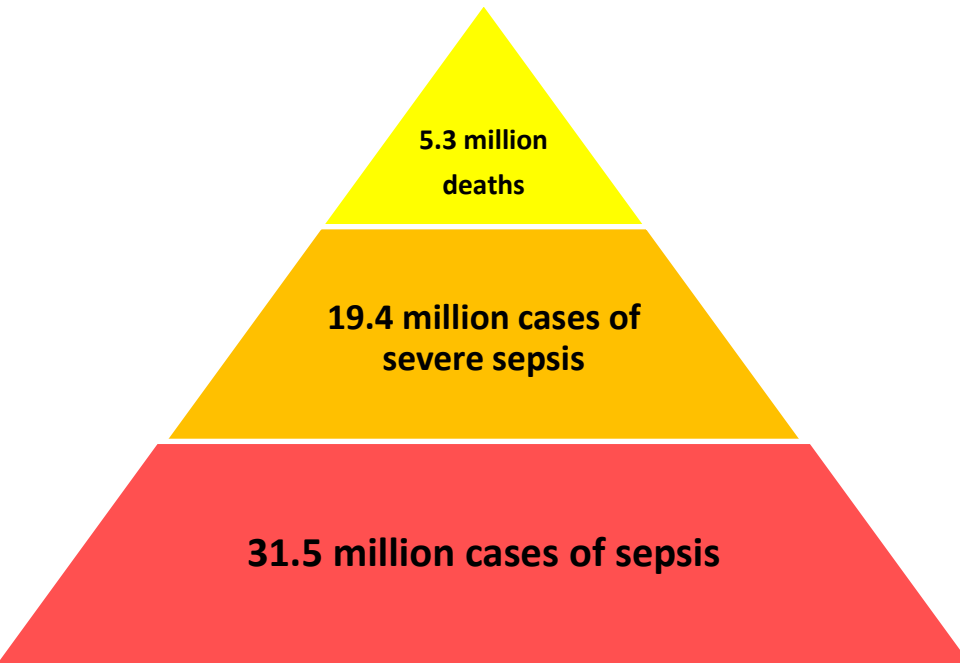
A large, white, serif-style number '1' is centered on a dark, textured wooden surface. The wood grain is visible, running vertically. The number is slightly shadowed, giving it a three-dimensional appearance.

*We don't
know the
numbers*



*Getting
data*

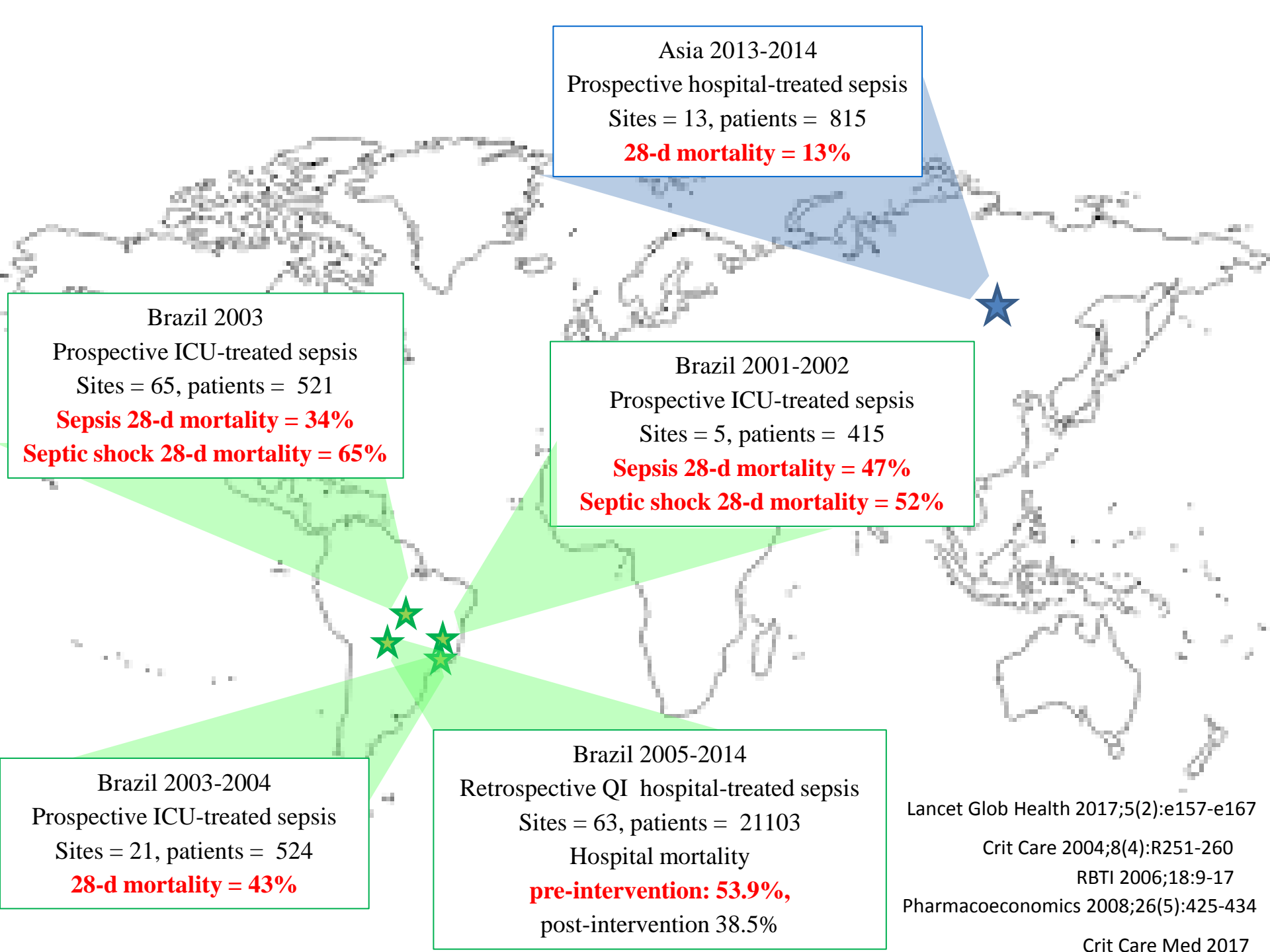
World numbers are extrapolating from HICs



Mapa mundial mostrando estudo em sepse e sepse grave que permitem o cálculo de taxas de incidência no nível da população. (EUA, Alemanha, Austrália, Taiwan, Noruega, Espanha, Suécia)

N = 27 studies
7 high-income countries

Incidence:
437 sepsis cases per 100000 person-years
270 severe sepsis cases per 100000 person-years
Mortality for severe sepsis : 26%



Asia 2013-2014
Prospective hospital-treated sepsis
Sites = 13, patients = 815
28-d mortality = 13%

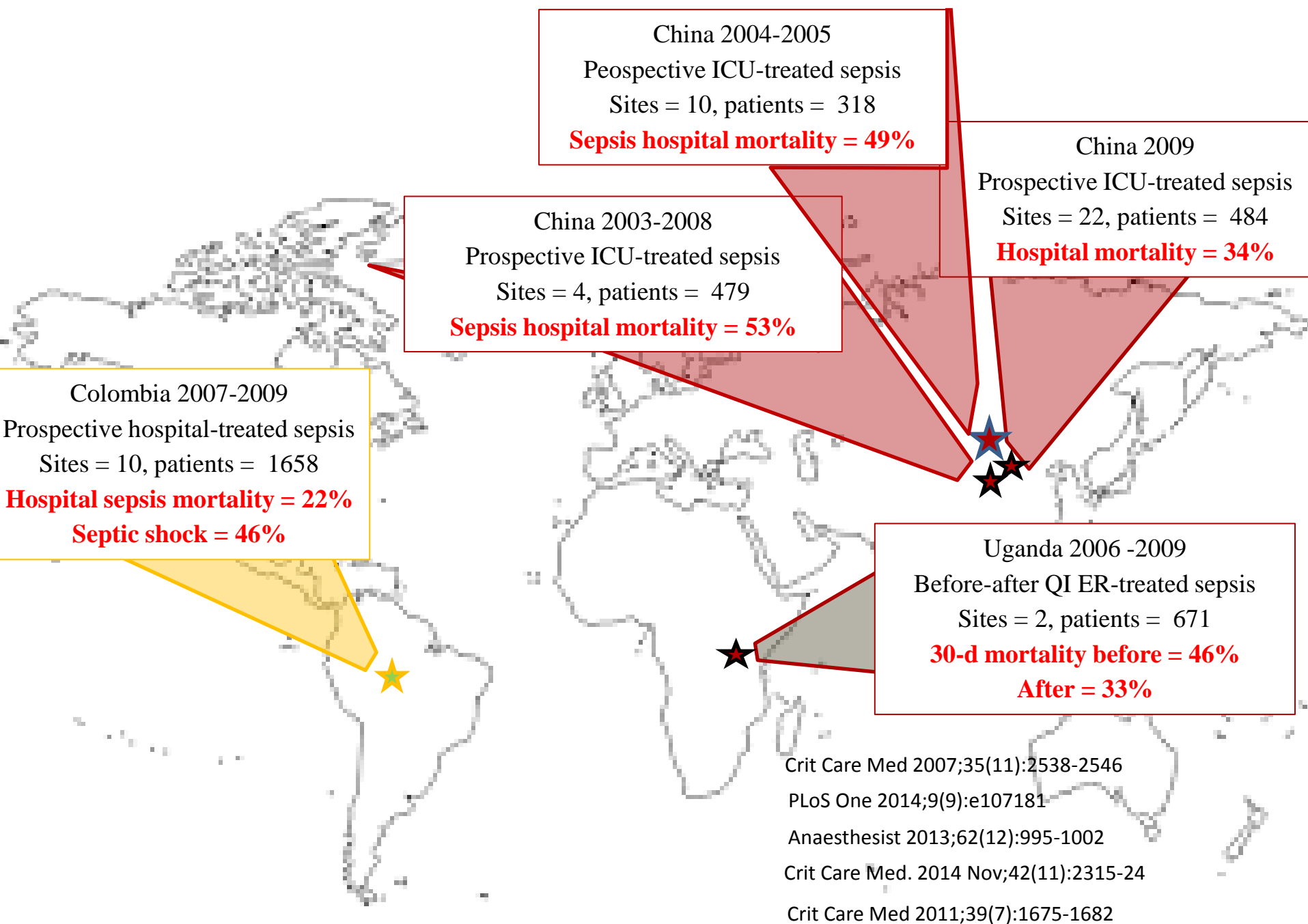
Brazil 2003
Prospective ICU-treated sepsis
Sites = 65, patients = 521
Sepsis 28-d mortality = 34%
Septic shock 28-d mortality = 65%

Brazil 2001-2002
Prospective ICU-treated sepsis
Sites = 5, patients = 415
Sepsis 28-d mortality = 47%
Septic shock 28-d mortality = 52%

Brazil 2003-2004
Prospective ICU-treated sepsis
Sites = 21, patients = 524
28-d mortality = 43%

Brazil 2005-2014
Retrospective QI hospital-treated sepsis
Sites = 63, patients = 21103
Hospital mortality
pre-intervention: 53.9%,
post-intervention 38.5%

Lancet Glob Health 2017;5(2):e157-e167
Crit Care 2004;8(4):R251-260
RBTI 2006;18:9-17
Pharmacoeconomics 2008;26(5):425-434



High quality data from LIMCs

Population-Based Epidemiology of Sepsis in a Subdistrict of Beijing

CCM 2017

Jianfang Zhou, MD¹; Hongcheng Tian, MD²; Xueping Du, MD³; Xiuming Xi, MD⁴;
Youzhong An, MD⁵; Meili Duan, MD⁶; Li Weng, MD¹; Bin Du, MD¹; for China Critical
Care Clinical Trials Group (CCCCTG)

Incidence:

Sepsis: 461 cases per 100,000 population
Severe sepsis 68 cases per 100,000 population
Septic shock: 52 cases per 100,000 population

Mortality rate:

All: 20%
Severe sepsis: 26.0%
Septic shock: 84.5% } **53.5%**

SPREAD study

The epidemiology of sepsis in Brazilian intensive care units
(the Sepsis PREvalence Assessment Database, SPREAD):
an observational study

Flávia R. Machado, Alexandre Biasi Cavalcanti, Fernando Augusto Buzza, Elaine M. Ferreira, Fernanda Sousa Angotti Camara, Juliana Liberman Sousa, Noemi Calvete, Reinaldo Salomão, Derek C. Angus, Luciano Cesar Pontes Azevedo, on behalf of the SPREAD investigators and the Latin American Sepsis Intensive Network*



Lancet Infect Dis 2017

**Incidence rate of ICU-treated sepsis
(severe):
290 per 100 000 population**

**Mortality rate: 55%
Severe sepsis - 50%
Septic shock - 60%**

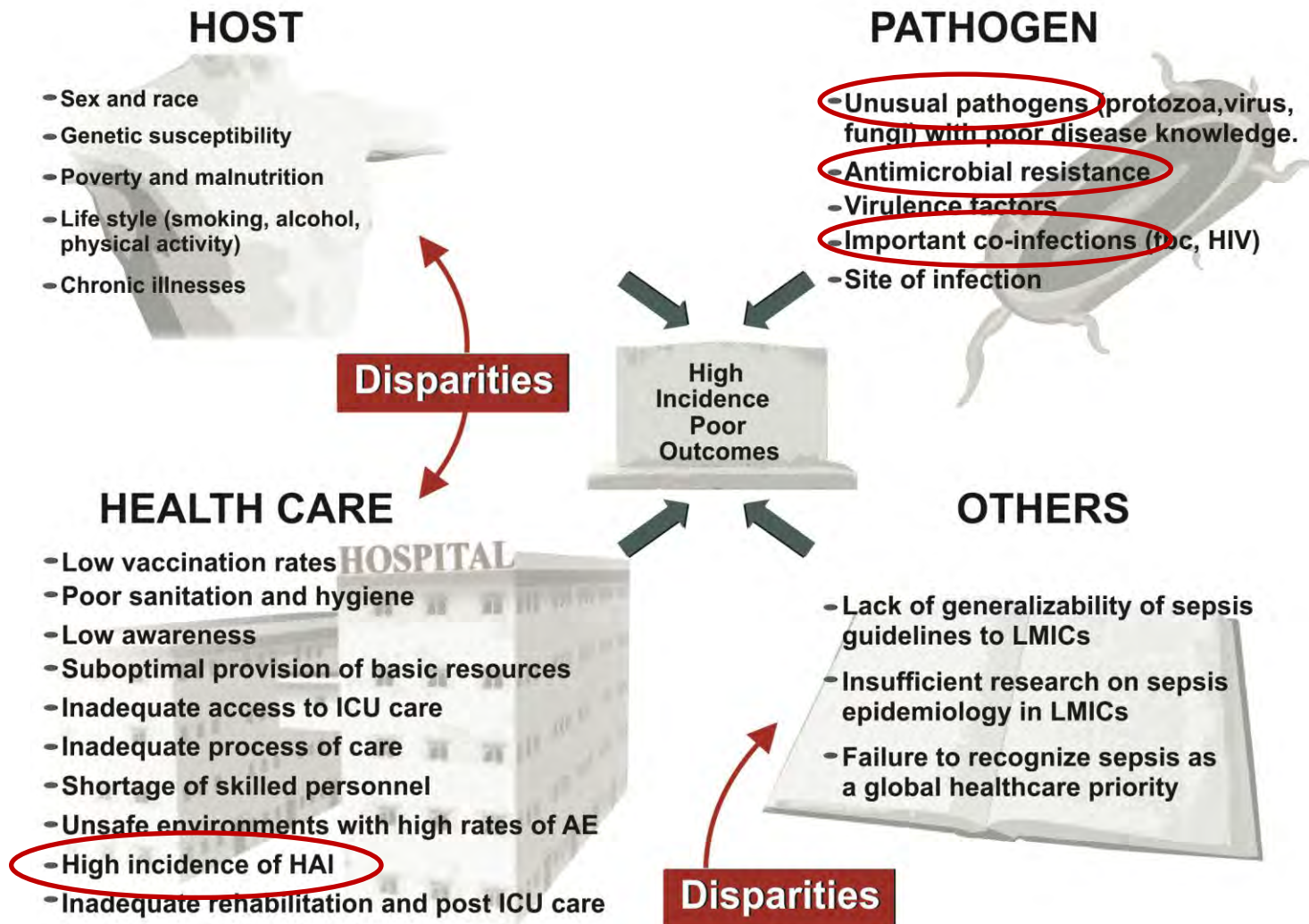


Total number of ICUs

- 1 to 2
- 3 to 8
- 9 to 17
- 17 to 29



Why it is not possible???



*We don't
have the
resources*



*Prioritizing
the
resources*



Severe infrastructure limitation

Access to emergency and surgical care in sub-Saharan Africa: the infrastructure gap

Renee Y Hsia,^{1*} Naboth A Mbembati,² Sarah Macfarlane³ and Margaret E Kruk⁴

Health Policy and Planning 2012;27:234–244

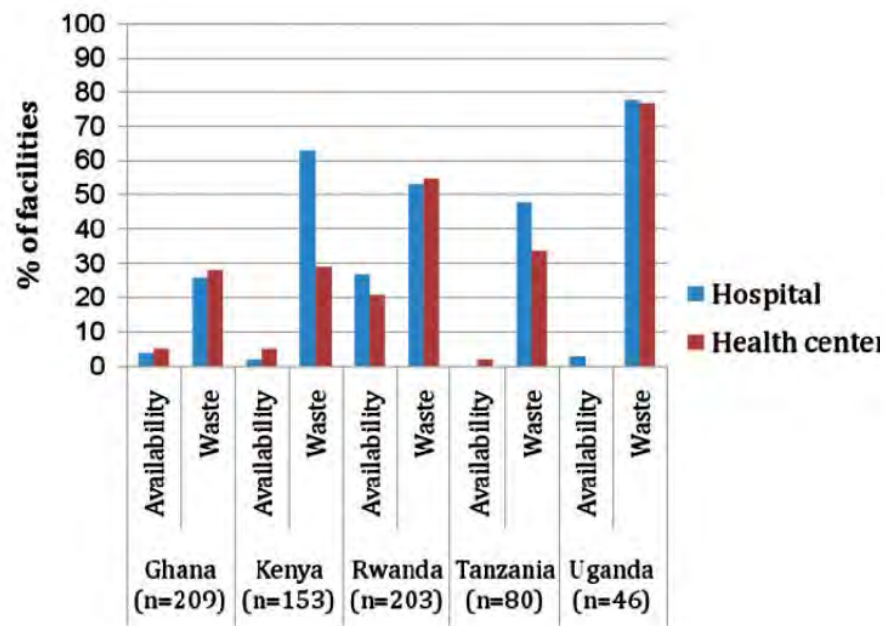


Figure 4. Availability of infection control materials and disposal of infectious waste across health facilities.

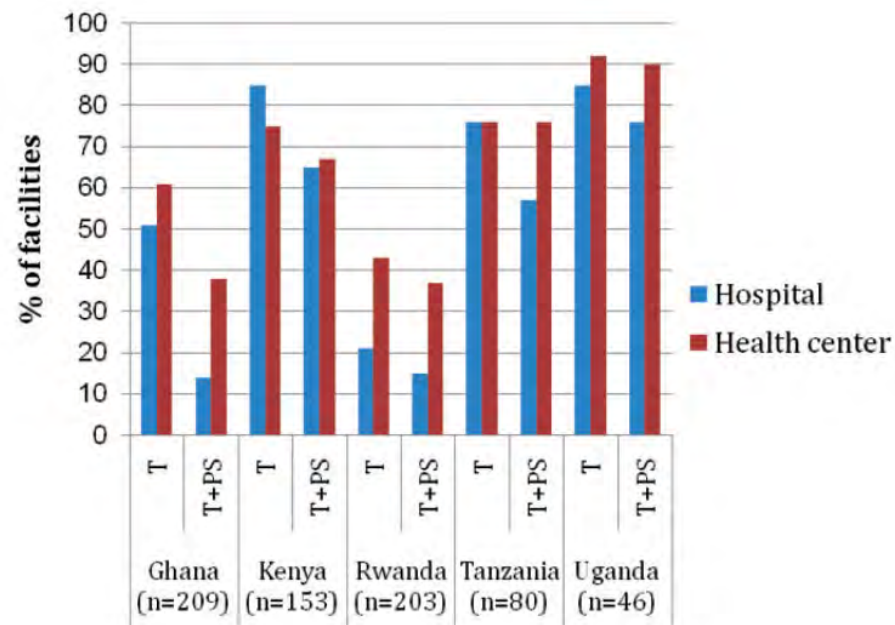


Figure 6 Education (training and supervision) programmes existing across health facilities

Resource limitation - lactate availability



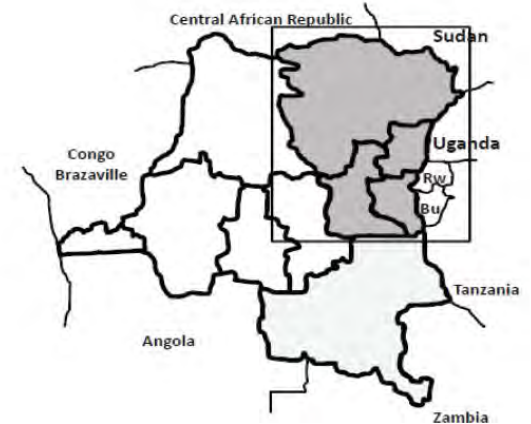
Always	25.7%
Some times	24.1%
Never	36.9%

Baelani et al CC 2011



Always	13.2%
Some times	13.2%
Never	60.5%

Baatar et al Bull WHO 2010



Always	0%
Some times	8,1%
Never	88.7%

Baelani et al MED Anest 2012

Resource limitation -

Accepted Manuscript

Healthcare infrastructure capacity to respond to severe acute respiratory infection (SARI) and sepsis in Vietnam: A low-middle income country

Dat Vu Quoc, Long Nguyen Thanh, Kim Bao Giang, Pham Bich Diep, Ta Hoang Giang, Janet V. Diaz



CLINICAL ARTICLE
Obstetrics

WILEY



Resource availability for the management of maternal sepsis in Malawi, other low-income countries, and lower-middle-income countries

Mohammed Abdu¹ | Amie Wilson² | Chisale Mhango³ | Fatima Taki¹ |
Arri Coomarasamy¹ | David Lissauer^{1,*}

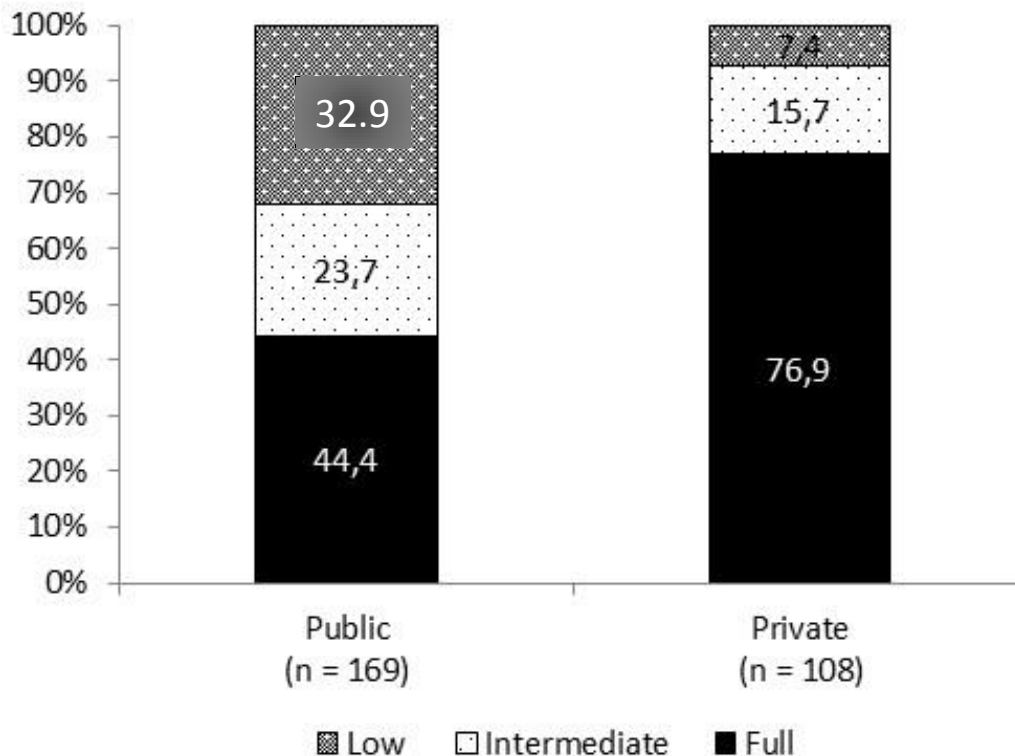
How about Brazil?

The epidemiology of sepsis in Brazilian intensive care units (the Sepsis PREvalence Assessment Database, SPREAD): an observational study



Lancet Infect Dis 2017

Flavia R Machado, Alexandre Blas Cavalcanti, Fernando Augusto Bazzo, Elaine M Ferreira, Fernando Sousa Angotti Camargo, Juliana Libacino Sousa, Noemi Cabetto, Reinaldo Salomão, Derek C Angus, Luciano Cesar Pontes Azavedo, on behalf of the SPREAD Investigators and the Latin American Sepsis Intensive Network*



Items:

- Blood gas analysis within 3 hours
- Lactate results within 3 hours
- Basic cultures
- Basic antibiotics
- Crystalloids
- Noradrenaline
- Central venous catheter
- Central venous pressure measurement

Resources scores according to type of hospital – main source of funding

SPREAD study - risk factors for mortality

The epidemiology of sepsis in Brazilian intensive care units (the Sepsis PREvalence Assessment Database, SPREAD): an observational study



Flávia R. Machado, Alexandre Blasí Cavalcanti, Fernando Augusto Bozza, Elaine M. Ferreira, Fernanda Sousa Aragatti Camara, Juliana Liberman Sousa, Noemi Cavetta, Reinaldo Salomão, Derek C. Angus, Luciano Cesar Pontes Azevedo, on behalf of the SPREAD Investigators and the Latin American Sepsis Intensive Care Network*

	OR (95% CI)	p value
SAPS 3	1.03 (1.02–1.04)	<0.0001
Resource availability*
High	1.00	..
Intermediate	1.20 (0.72–1.98)	0.484
Low	1.67 (1.02–2.75)	0.045
Health-care-associated infection	1.55 (1.13–2.12)	0.0069
Septic shock	1.71 (1.24–2.37)	0.0013
Compliance with bundles
Non-compliance with antibiotics	1.00	..
Compliance at least with antibiotics	0.63 (0.44–0.89)	0.0090
Compliance with 6-h bundle	0.56 (0.37–0.84)	0.0059

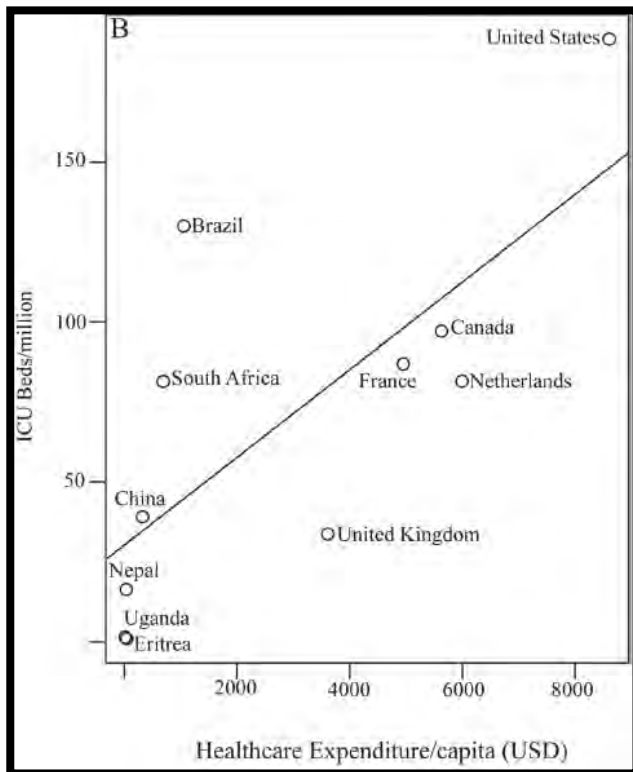
Table 2: Multivariate analysis of factor associated with mortality

Almost no access...

Intensive Care Unit Capacity in Low-Income Countries: A Systematic Review

Srinivas Murthy^{1*}, Aleksandra Leligdowicz², Neill K. J. Adhikari^{2,3}

PLOS ONE |
January 24, 2015



Nepal - 1,67 beds/100.000

Uganda - 0,1 beds/100.000

Zambia: 0.077 beds/100,000

Andrews JAMA 2017

Sri Lanka 2.5 beds

Malasia 2.4 beds

China 3.9 beds

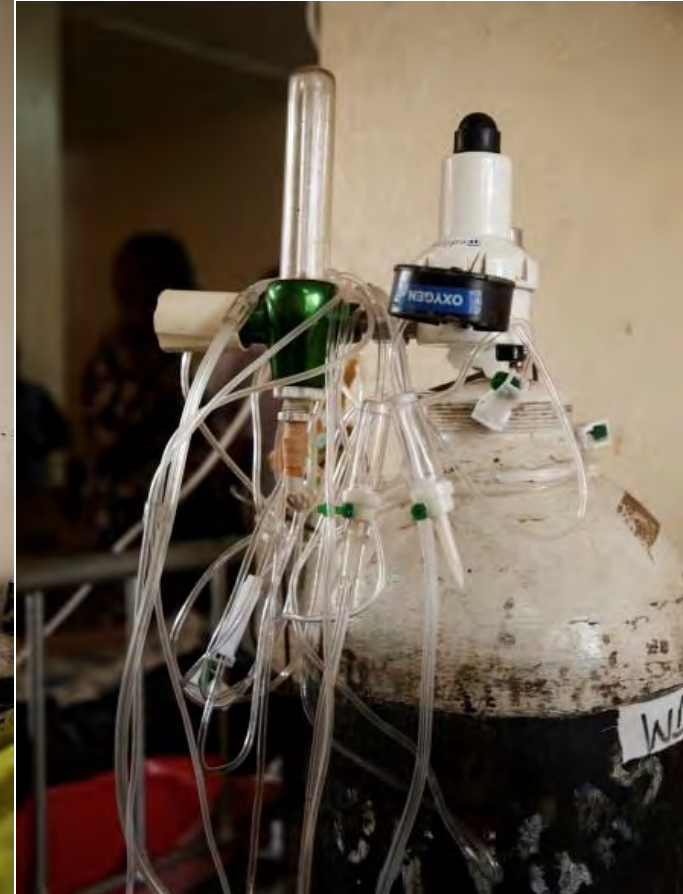
Bangladesh 7.9 beds

Per 100,000 habs

Hanniffa JCC 2014

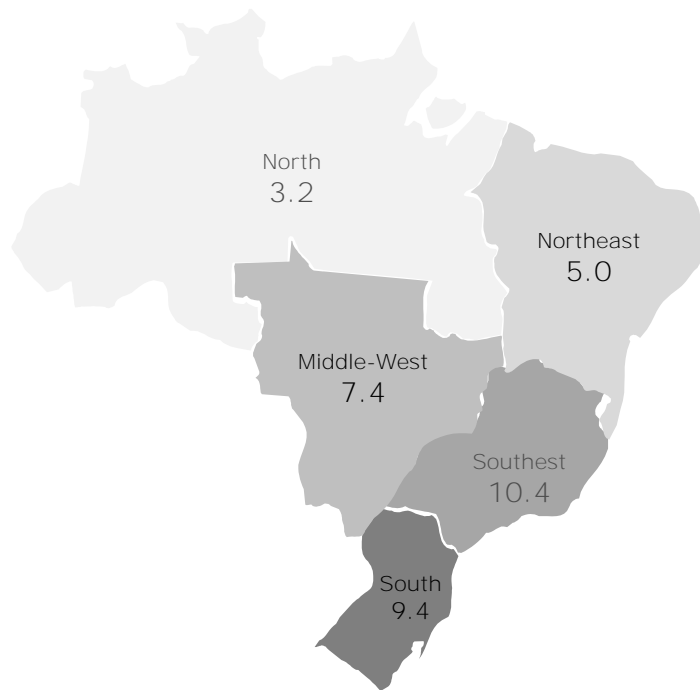
Most critically ill patients are managed outside of ICUs in resource-limited settings

Courtesy from Shevin Jacob, Uganda

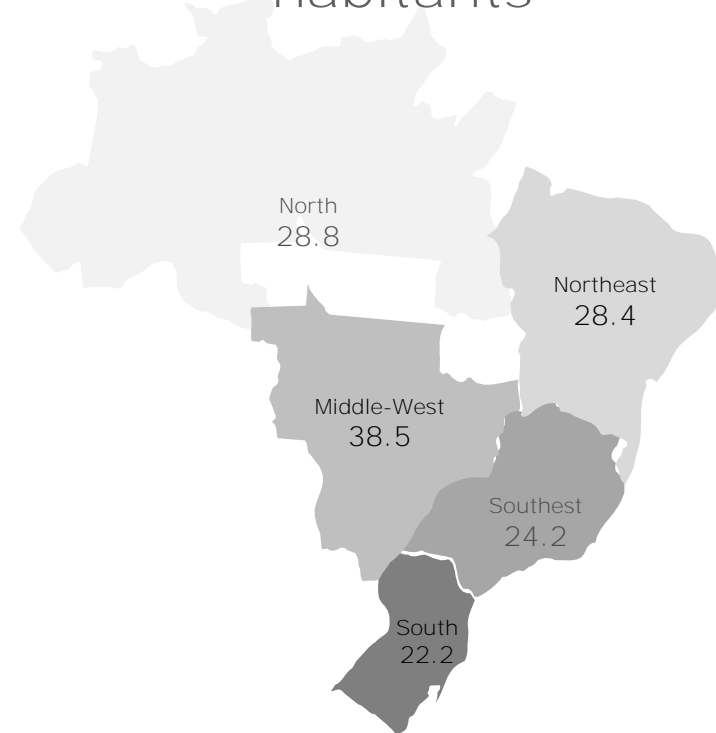


Access to whom?

7.6 public ICU
beds for 100,000
habitants



25.5 private ICU
beds for 100,000
habitants





*Low awareness
among lay
people =
delay in
searching for
care*



Making noise!

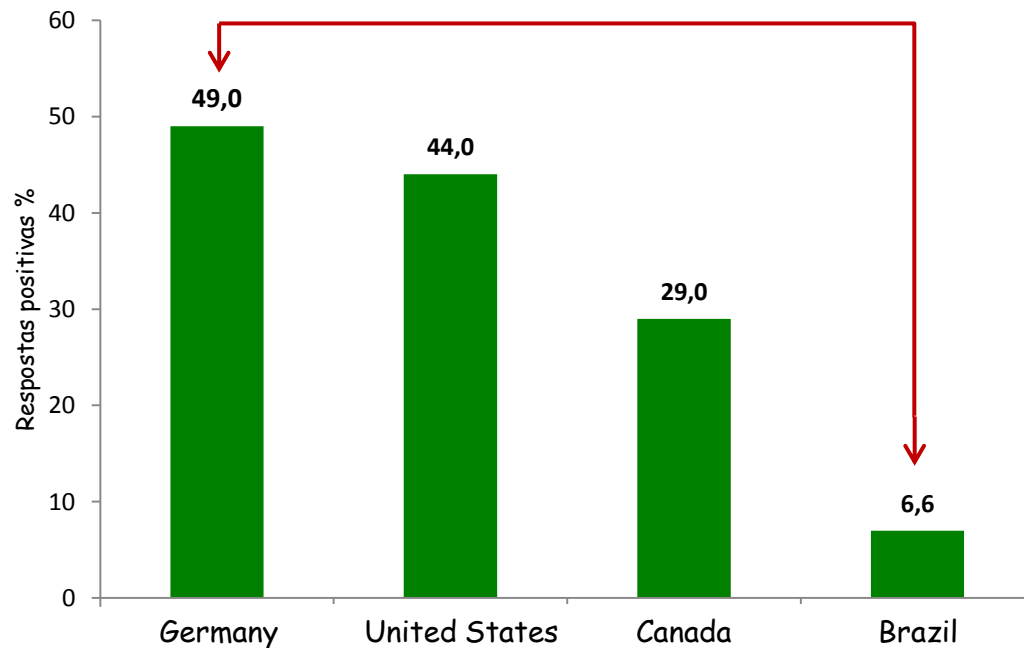
Low awareness among lay people

Brazil

2.126 people

134 cities

June 2014



Percentage of positive answers to the question: "Have you ever heard the word sepsis?"



dia mundial da sepse



Flavia



Tudo

Publicações

Pessoas

Fotos

Videos

Loja

Páginas

Locais

Filtrar resultados

PUBLICAÇÕES DE

- Qualquer pessoa
- Você



Páginas

Ver tudo

13
Setembro
Dia Mundial
da Sepse

Dia Mundial da Sepse

São Paulo
Comunidade
53.549 curtiram isso

✓ Curtiu

Instituto
Latino Americano de
Sepse

13 DE SETEMBRO
DIA MUNDIAL
DA SEPSE

**VOCÊ JÁ PLANEJOU A
CAMPAHA DESSE ANO?**

O ILAS disponibiliza materiais impressos além do KIT ILAS



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GRATUITO**

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Mais informações: secretaria@ilas.org.br

*A Solicitação dos materiais e kits devem ser feitas até dia 07/08

PROMOÇÃO

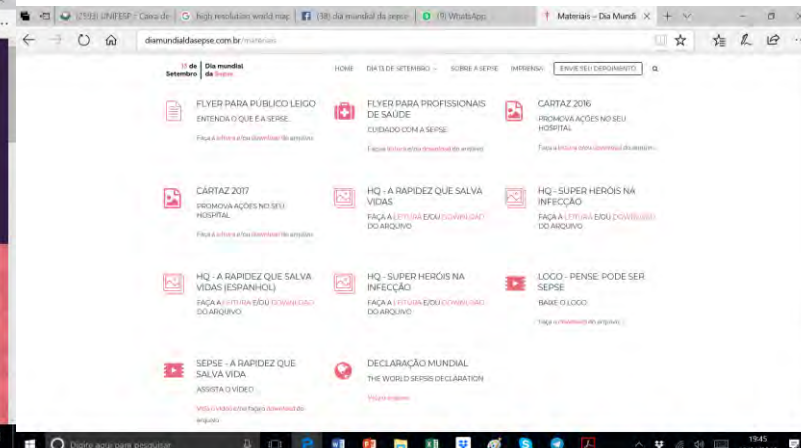
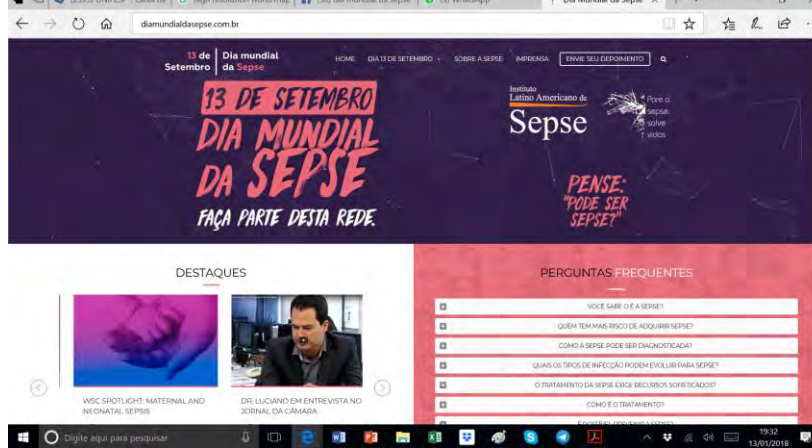
Pare a Sepse. Salve Vidas 2016!

Curta e Compartilhe essa imagem em sua
linha do tempo e **marque três amigos nos
comentários dessa postagem** e concorra!



O primeiro sorteado ganhará o livro "Superar é Viver", de Pedro Pimenta, e o segundo e terceiro receberão um Kit Dia Mundial da Sepse: 2 camisetas, 2 canetas, 1 carregador portátil e bôtons!

Válida até 12 de agosto



A sepsis se não tratar ela mata

14 mil visualizações •



A sepsis mata de montão

14 mil visualizações •
Há 4 meses



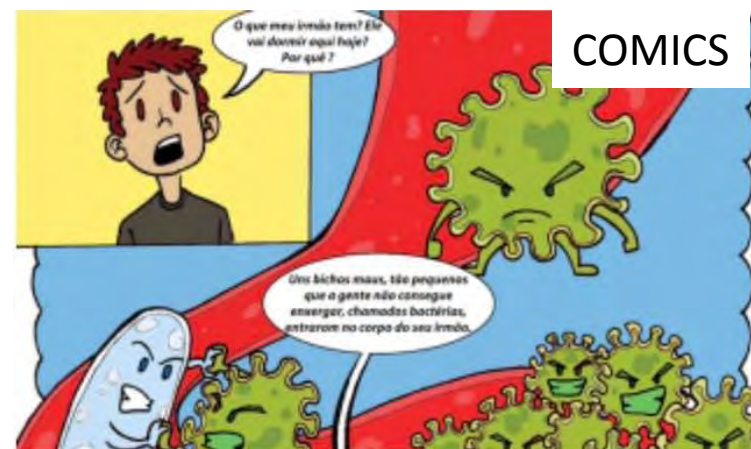
Sepsis - A rapidez que salva vidas

18 mil visualizações • Há 1 ano



!!A rapidez que salva vidas!!

1,1 mil visualizações • Há 1 ano



COMICS





Raising awareness - the World Sepsis Day

Brazil 2014

N = 2.126

134 cities

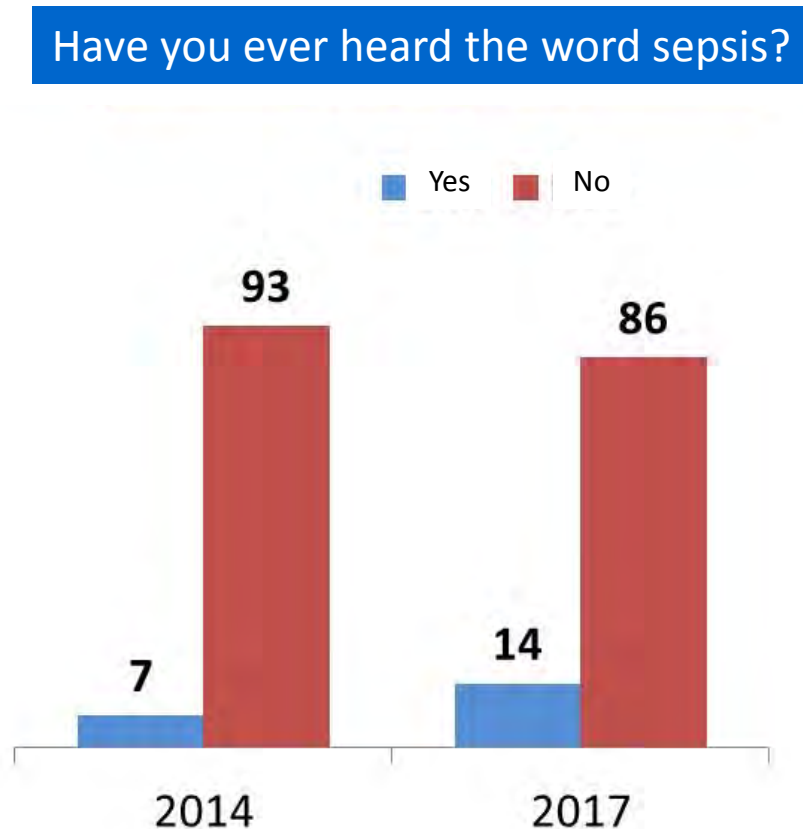
June 2014

Brazil 2017

N = 2.100

130 cities

March 2017



A photograph of a green, textured wall. A white number '4' is painted on the wall. Below the number, there is a yellow, rectangular reflective marker with two circular holes. The wall shows signs of wear and peeling paint.

*Healthcare
professionals
Limited awareness
+ shortage and
high turnover +
inadequate
training*



*Train!
Campaign!
Motivate!*

The Knowledge of the Physicians about Sepsis Bundles is Suboptimal: A Multicenter Survey

Journal of Clinical and Diagnostic Research. 2015 Jul, Vol-9(7): OC13-OC16

ZELIHA KOC AK TUFAN¹, FATMA GIVELEK ESER², EMRE YUDALI³, AYSE BATIREL⁴, BIRCAN KAYAASLAN⁵, ALIYE TANRICI BASTUG⁶,
DENIZ ERAY⁷, VEDAT TURHAN⁸, FAZILET DUYGU⁹, DURAN TOK¹⁰, SERIFE ALTUN¹¹, CEMAL BULUT¹², MEHMET A. TASYARAN¹³

Bundle element	Residents (n=153) n, %	Specialists (n=70) n, %
Blood lactate measurement (need for measurement within 3 hours)	113; 74%	54; %77
Threshold of blood lactate level in sepsis (>4mmol/L)	45; 30%	27; 39%
Blood culture, within 3 hours prior to antibiotic use	135; 88%	63; 90%
Target mean arterial blood pressure (>65mmHg) (severe sepsis)	89; 58%	41; 59%
Target central venous pressure (8-12mmHg) (septic shock or lactate>4mmol/L)	97; 63%	44; 63%
Target central venous oxygen saturation (>70%) (severe sepsis)	18; 12%	11; 16%
Fluid resuscitation, 30ml/kg within 3 hours, (hypotension or lactate >4mmol/L)	53; 35%	37; 53%

[Table/Fig-6]: Knowledge of sepsis bundles: residents versus specialists

A Multicenter Survey of House Staff Knowledge About Sepsis and the “Surviving Sepsis Campaign Guidelines for Management of Severe Sepsis and Septic Shock”

Richard R. Watkins, MD, MS^{1,2}, Nairmeen Haller, PhD³,
Melinda Wayde, MD⁴, and Keith B. Armitage, MD⁵

Journal of Intensive Care Medicine

1-4

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DOI: 10.1177/0885066617737304

journals.sagepub.com/home/jic



Journal of Critical Care (2010) 25, 545–552



ELSEVIER

Journal of
Critical Care

Sepsis

Survey on physicians' knowledge of sepsis: Do they recognize it promptly? ☆,☆☆

Murillo Assunção MD^{a,b,*}, Nelson Akamine MD^b, Guttemberg S. Cardoso MD^a,
Patricia V.C. Mello MD^c, José Mário M. Teles MD^{b,d}, André Luís B. Nunes MD^e,
Marcelo Oliveira Maia MD^f, Álvaro Rea-Neto MD^{b,g}, Flavia Ribeiro Machado MD^{a,b}
for the SEPSES study group

RESEARCH

Open Access



A complex intervention to improve implementation of World Health Organization guidelines for diagnosis of severe illness in low-income settings: a quasi-experimental study from Uganda

Matthew J. Cummings^{1†}, Elijah Goldberg^{2,3†}, Savio Mwaka³, Olive Kabajaasi³, Eric Vittinghoff⁴, Adithya Cattamanchi⁵, Achilles Katamba⁶, Nathan Kenya-Mugisha³, Shevin T. Jacob^{3,7*} and J. Lucian Davis^{8,9}

Courtesy from Shevin Jacob, Uganda

Fort Portal Regional Referral Hospital (Fort Portal, Uganda): Medical and Nursing Officers participating in a mock patient scenario as part of the WHO IMAI QuickCheck+ training course



Courtesy from Halima Salisu Kabara, Nigeria

[Training course of the National Association Of Nurse Intensivists Of Nigeria](#)





Contents lists available at ScienceDirect

Journal of Critical Care

journal homepage: www.elsevier.com



Sepsis 3 from the perspective of clinicians and quality improvement initiatives

Flavia R. Machado^{a, b, *}, Emmanuel Nsutebu^b, Salman AbDulaziz^b, Ron Daniels^a, Simon Finfer^a, Niranjan Kissoon^{a, b}, Harvey Lander^b, Imrana Malik^b, Elizabeth Papathanassoglou^b, Konrad Reinhart^{a, b}, Kevin Rooney^b, Hendrik Rüddel^b, Giulio Toccafondi^b, GiOrgio Tulli^b, Vida Hamilton^b

^a Global Sepsis Alliance Executive Committee, Paul-Schneider-Str. 2, 07747 Jena, Germany

^b Global Sepsis Alliance Quality Improvement Committee, Paul-Schneider-Str. 2, 07747 Jena, Germany



GSA
GLOBAL SEPSIS ALLIANCE

*Low quality of
care*



Finding a way



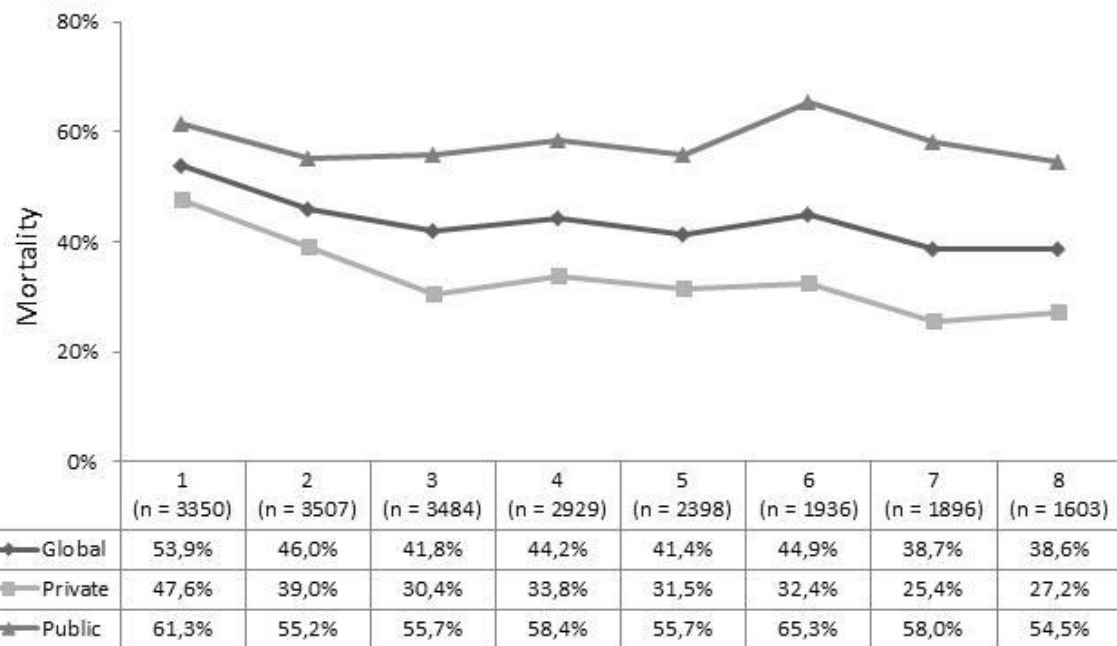
QUALITY IMPROVEMENT

**DOES IT
WORK?**

Inadequate process of care

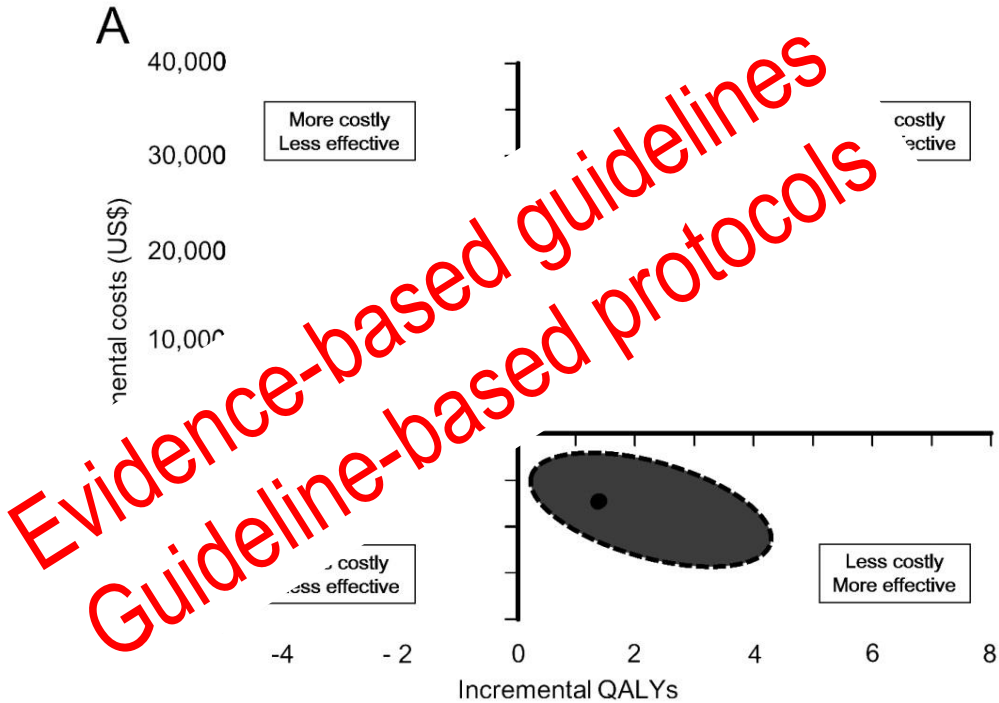
Quality Improvement Initiatives in Sepsis in an Emerging Country: Does the Institution's Main Source of Income Influence the Results? An Analysis of 21,103 Patients

Flavia R. Machado, MD, PhD; Elaine M. Ferreira, MSc, RN; Juliana Lubarino Sousa, RN; Carla Silva, RN; Pierre Schippers, MD; Adriano Pereira, MD, PhD; Ilusca M. Cardoso, MD, MSc; Reinaldo Salomão, MD, PhD; Andre Japiassu, MD, PhD; Nelson Akamine, MD, MSc; Bruno F. Mazza, MD, MSc; Murillo S. C. Assunção, MD, MSc; Haggeas S. Fernandes, MD; Aline Bossa, MSc; Mariana B. Monteiro, RN; Noemi Caixeita; Luciano C. P. Azevedo, MD, PhD; Eliezer Silva, MD, PhD; on behalf of the Latin American Sepsis Institute Network



Danilo Teixeira Noritomi
Otavio T. Ranzani
Mariana Barbosa Monteiro
Elaine Maria Ferreira
Sergio Ricardo Santos
Fernando Leibel
Flavia Ribeiro Machado

Implementation of a multifaceted sepsis education program in an emerging country setting: clinical outcomes and cost-effectiveness in a long-term follow-up study



Total cost per patient:
Baseline: 29.3 (95 %CI 23.9–35.4)
Last 3 months: 17.5 (95 % CI 14.3–21.1) thousand US
(mean difference -11,815; 95 % CI -18,604 to -5,338)

Building research capacity

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812

JUNE 30, 2011

VOL. 364 NO. 26

Mortality after Fluid Bolus in African Children with Severe Infection

Kathryn Maitland, M.B., B.S., Ph.D., Sarah Kiguli, M.B., Ch.B., M.Med., Robert O. Opoka, M.B., Ch.B., M.Med., Charles Engoru, M.B., Ch.B., M.Med., Peter Olupot-Olupot, M.B., Ch.B., Samuel O. Akech, M.B., Ch.B., Richard Nyeko, M.B., Ch.B., M.Med., George Mtove, M.D., Hugh Reyburn, M.B., B.S., Trudie Lang, Ph.D., Bernadette Brent, M.B., B.S., Jennifer A. Evans, M.B., B.S., James K. Tibenderana, M.B., Ch.B., Ph.D., Jane Crawley, M.B., B.S., M.D., Elizabeth C. Russell, M.Sc., Michael Levin, F.Med.Sci., Ph.D., Abdel G. Babiker, Ph.D., and Diana M. Gibb, M.B., Ch.B., M.D., for the FEAST Trial Group*

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Effect of an Early Resuscitation Protocol on In-hospital Mortality Among Adults With Sepsis and Hypotension A Randomized Clinical Trial

Ben Andrews, MD; Matthew W. Semler, MD, MSc; Levy Muchemwa, MBChB; Paul Kelly, MD, FRCP; Shabir Lakhri, MBChB; Douglas C. Heimbarger, MD, MS; Chileshe Mabula, MBChB; Mwangi Bwalya, MBChB; Gordon R. Bernard, MD



Health Care for Women International, 35:758–770, 2014
Published with license by Taylor & Francis
ISSN: 0739-9332 print / 1096-4665 online
DOI: 10.1080/07399332.2014.915843

Women's Health in Women's Hands: A Pilot Study Assessing the Feasibility of Providing Women With Medications to Reduce Postpartum Hemorrhage and Sepsis in Rural Tanzania

GAIL C. WEBBER

Department of Family Medicine, University of Ottawa, Ottawa, Ontario, Canada

BWIRE CHIRANGI

Shirati District Hospital, Shirati, Tanzania



*Sepsis is
(was?) a
neglected
disease*



Join efforts!



Global
Sepsis
Alliance



Fundación
Sepsis
México

Latin American
Sepsis
Institute



African
Sepsis
Alliance



SUDAN SEPSIS ALLIANCE
RECOGNISE SEPSIS ENHANCE SURVIVAL



The solutions: increase partnership



Apoios



The biggest step forward

SEVENTIETH WORLD HEALTH ASSEMBLY

Agenda item 12.2

WHA70.7

29 May 2017

Improving the prevention, diagnosis and clinical management of sepsis

The Seventieth World Health Assembly,

Having considered the report on improving the prevention, diagnosis and clinical management of sepsis;¹



The NEW ENGLAND JOURNAL *of* MEDICINE

Perspective



Global
Sepsis
Alliance

Recognizing Sepsis as a Global Health Priority — A WHO Resolution

Konrad Reinhart, M.D., Ron Daniels, M.D., Niranjana Kissoon, M.D., Flavia R. Machado, M.D., Ph.D.,
Raymond D. Schachter, L.L.B., and Simon Finfer, M.D.