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### Improving sepsis outcomes in Brazil



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Flávia Machado is Professor of Intensive Care and Head of the Intensive Care Section of the Anesthesiology, Pain and Intensive Care Department at the Federal University of São Paulo in São Paulo, Brazil. She is one of the founders of the Latin America Sepsis Institute (LASI), which is devoted to quality improvement process in Brazilian hospitals as well as to the coordination of multicentre studies in the field of sepsis. Dr. Machado joined the Editorial Board of *ICU Management & Practice* in 2016. Dr. Machado was president of LASI between 2008-2011 and vice president between 2012-2015. She is currently its CEO. She is on the executive board of the Global Sepsis Alliance and the executive committee for the World Sepsis Day and she served on the 2012 and 2016 Surviving Sepsis Campaign International Guidelines committee. She integrates the International Sepsis Forum (ISF) council since 2014, and is a member of the Executive Committee and the Scientific Committee of the Brazilian Research in Intensive Care Network (BRICNET). She tweets as [@FlaviaSepsis](#)

### **The recently published study on sepsis epidemiology in Brazilian ICUs is a landmark achievement (Machado et al. 2017). Please explain the key findings and significance.**

Most importantly we did something that to my knowledge wasn't done before. We random sampled all Brazilian ICUs. We divided Brazil into strata, then sampled 15% of each stratum, so we had a representative sample of what's happening in Brazilian ICUs. We included 227 ICUs in this one-day prevalence study. Because of this random sampling, even though it's a one-day study, it's very strong in telling us what's going on. We showed that 30 percent of Brazilian ICU beds were occupied by patients with organ dysfunction, with sepsis, not by patients recovering from sepsis. The burden of sepsis in Brazilian ICUs is huge, and the mortality rate of these patients was 55%, very high.

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### **Please describe your role and work with the Latin America Sepsis Institute (LASI).**

I'm the CEO of LASI, working with the Board. LASI has three branches—the quality improvement programme, research, and the awareness programme where we do our World Sepsis Day activities and run an annual scientific meeting, which had 700 delegates last year. The meeting includes basic and clinical science, a multiprofessional approach, paediatrics and neonatal medicine.

In our quality improvement programmes, we train hospitals to implement sepsis protocols, we develop educational and screening tools and we have a data collections system where they can input their data. We send them quarterly reports with their performance and benchmarking with other institutions in the network. We do this for free for any hospital.

LASI at the beginning was funded from unrestricted grants from the industry. Since 2009/10 we have no direct industry grants, but they help with our scientific meeting. Now, LASI also offers consulting services to private hospitals.

## How do you make sure that low- and middle-income country (LMIC) voices on sepsis are heard?

It's a challenge, but it's becoming better and the main stakeholders finally understand that we need to be heard. The most important critical care societies recognize that they need to give place and voice to LMICs. We see increased attention, such as presentations in congresses and insertion in guidelines. For example, the Surviving Sepsis Guidelines include representatives from LMICs ([survivingsepsis.org/Guidelines/Pages/default.aspx](https://survivingsepsis.org/Guidelines/Pages/default.aspx)). The World Health Organization (WHO) resolution on sepsis is a huge step, as resource-poor settings will be equally represented ([apps.who.int/gb/ebwha/pdf\\_files/WHA70/A70\\_R7-en.pdf](https://apps.who.int/gb/ebwha/pdf_files/WHA70/A70_R7-en.pdf)). There are groups in the European Society of Intensive Care Medicine (ESICM) that are working with LMICs and there are already some published guidelines on sepsis and other specific diseases.

## What are the priorities following the WHO resolution on sepsis?

The key step is that WHO urged the member states to have their national plans. If WHO also develops a global action plan, as with vaccination programmes and antimicrobial resistance programmes, this will be a huge step. If a country signs this, then that country is committed to developing its own national plan. My feeling is that if it's not mandatory then the odds are that it won't happen. In the resolution there are many other important items. For example, WHO is focused also in measuring the burden of sepsis properly. They are aware we don't know the numbers and explicitly mentioned that we need better measurements. In the Global Burden of Disease report for example, sepsis is a garbage code. People die from pneumonia, diarrhoea, but they don't die from sepsis, because infectious diseases are coded individually. The causes of death need to be coded separately but also together as sepsis.

## What are the major challenges in tackling sepsis in Brazil?

We don't have government policies, except for some cities and states that are now developing sepsis programmes. In the absence of government support it is too hard. Compare this with dengue that has a national programme. Every day, in newspapers, on TV, in the airport, you will see something about dengue. Because of this lack of awareness about sepsis we are struggling with all the other problems. We need to raise awareness amongst lay people. Other issues are the low awareness among healthcare professionals, lack of basic resources and ICU beds, inadequate processes of care, shortage and high turnover of staffing.

## Quality improvement (QI) programmes are the focus for improving sepsis outcomes in Brazil. What are the main achievements?

We have seen lots of examples of hospitals that have achieved great mortality reduction. Many lives have been saved by these QI initiatives. Outside the LASI network, we are also seeing lots of hospitals that are implementing their own programmes. We are seeing a movement towards recognizing the relevance of sepsis and having sepsis as a QI programme—hospitals are doing this regardless of what the government is doing. Many hospitals, even public hospitals, have their own protocols. This will make things easier when Brazil has its own national action plan.

## What are the issues intensivists from LMICs have with Sepsis 3 and qSOFA?

I don't think there are issues with the broad Sepsis 3 definition. Having sepsis defined by life-threatening organ dysfunction associated with dysregulated response to infection is perfect. The problem is with the clinical criteria to define what is a life-threatening organ dysfunction. Using the variation in SOFA score is not adequate, because it's difficult to use, people outside the ICU hardly have heard of it, and sepsis is a major problem for the wards and EDs, for internal medicine and emergency doctors. It's just inadequate to use a score that is for the ICU. Another point is that the validation process of the SOFA score was against SIRS. We didn't use SIRS as a criterion for severe sepsis before sepsis 3. Comparing the SOFA score with SIRS makes little sense as we use organ dysfunction, not SIRS, to define sepsis. The SOFA score will also increase specificity and decrease sensitivity. Hypotensive patients and patients with reduced level of consciousness will not be considered septic per the definition. Lactate will no longer define sepsis and we think these are important issues. For us in LMICs, having definitions that are broader is important. The issue with the Sepsis 3 definition of septic shock is that many low-income countries and some institutions in middle-income countries don't have lactate. A worldwide definition needs to be usable by everyone, so we think it should have been vasopressors OR lactate, not vasopressors AND lactate. The problem is not with qSOFA as a severity score. Our problem with qSOFA was the suggestion that it could be used as a screening tool. The JAMA figure stated that if the patient had a qSOFA score  $\geq 2$  you should screen for organ dysfunction (Singer et al. 2016). That suggestion caused a lot of confusion and people started to use qSOFA as a screening tool. As qSOFA has a low sensitivity we think it shouldn't be used as a screening tool.

## Following the CHECKLIST-ICU study what further research is BRICNet doing?

The CHECKLIST-ICU study was a QI intervention (Writing Group for the CHECKLIST-ICU Investigators and the Brazilian Research in Intensive Care Network (BRICNet) 2016). The first author is Alexandre Cavalcanti from the Research Institute - Hospital do Coracao, São Paulo. This is a philanthropic private hospital in Brazil which has a spectacular research profile. They have a programme with the Brazilian government called PROADI and they can use part of their taxes in projects that are relevant for public hospitals. This study was done with BRICNet, the Brazilian Research in Intensive Care network. Currently we are doing together the BaSICS, which is a randomised trial comparing saline with a balanced crystalloid solution (Zampieri et al. 2017). We are also doing with Hospital Moinhos de Vento, also a philanthropic hospital, another QI study called DONORS, which is a cluster randomised trial aiming to reduce cardiac arrest in potential donors to increase organ donation. BRICNet also works with LASI in the sepsis epidemiological studies.

**“Without ICU beds, who should the doctors save?” was the headline of an article in a Brazilian newspaper, and you have written very eloquently in the NEJM about the impossible choices you have to make every day**

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**and the need to promote equity in healthcare (Machado 2016). Please comment.**

This is a huge problem in Brazil and certainly in many other LMICs and also in high-income countries. In Brazil, only 25% of the population is covered by the private healthcare system. However, those who are covered by the private systems have access to 41.4 ICU beds per 100,000 population, while those covered by the public system have only 9.9 beds per 100,000 habitants. One of the key steps is to have clear rules of ICU admission. In Brazil, recently the Federal Council of Medicine published a resolution clearly stating the priorities for ICU admission, including the issues of palliative care. This will help doctors all around the country to solve the ethical dilemma. However, the issues with judicialisation will still exist. Judges order ICUs to admit patients that are not necessarily the ones we would admit if solely the priority rules would be considered. Another important issue is the absence of a clear policy for palliative care. Many times, we admit patients that we should have kept outside the ICU because end-of-life was not adequately discussed with families. Likewise, patients are kept alive in the ICU because end-of-life decisions are not discussed with the families and unjustified long periods of ICU stay precludes new admission for patients that really need ICU care.

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