An urban perspective on sepsis in developing countries

In a recent issue of *The Lancet Infectious Diseases*, Joseph U Becker and colleagues[1] addressed a most relevant and timely issue of sepsis in low-income and middle-income countries (LMICs). The surviving sepsis campaign (SSC) is an international initiative supported by prominent medical societies that aims to reduce sepsis-associated mortality by providing evidence-based recommendations for clinical management of patients with sepsis.[2] This initiative was widely accepted but has also been a source of intense controversy.[3] Although the authors elegantly present their ideas on the effect and future directions of the SSC in LMICs, we believe there are several limitations regarding this issue. Our major concerns are related to intrinsic limitations in the SSC guidelines and the authors' focus on less developed and rural countries.[1]

Sepsis is a relevant public health issue. However, the interventions proposed by the SSC guidelines have an excessive focus on individual health. As a worldwide campaign, it should recognise the inequities of different health-care systems and provide the scientific rationale and recommendations for the prevention of sepsis. The prevention of both community-acquired and nosocomial sepsis is largely neglected by the SSC. Community-acquired pneumonia is a major cause of sepsis that might be prevented by vaccines against *Streptococcus pneumoniae* and influenza virus. Nosocomial sepsis is a major source of morbidity and mortality, and simple and cost-effective interventions have been proposed to decrease its frequency. Rates in developing countries are very high.[4,5] This issue is particularly relevant for patients infected with HIV admitted to hospital, because nosocomial infection and sepsis are major causes of morbidity.[6] Recent studies showed that direct interventions might almost eradicate catheter-associated infections and decrease the rates of ventilator-associated pneumonia.[7] Taken together, these measures should have a major effect on public health.

Castel/Andia/Still Pictures

Mortality from sepsis is much higher in Brazil than in European countries

Another issue is that the populations of LMICs are mainly urban. Since 2008 most people live in urban centres, and by 2030 more than 4·6 billion people will be urbanites.[8] Urbanisation is showing a swift trend in developing countries,[8] resulting in new challenges in health care illustrated by the increasing incidence of dengue, tuberculosis, and nosocomial sepsis. Therefore the approach of the SSC in LMICs proposed by Becker and colleagues[1] should focus both on rural and urban settings.

Our main concerns are related to the provision of easy access to health care and implementation of good clinical practice protocols for the early care of severe infections. Late referral to the intensive-care unit is a major concern and the shortage of critical-care beds, difficulties in the recognition of sepsis, and its severity contributes to its high mortality rates.[9,10] This is particularly pertinent for early goal-directed therapy (EGDT). One has to consider that late referral might result in starting EGDT in patients that were diagnosed with sepsis more than 24 h earlier.[9] Late correction of hypotension coupled with positive fluid balance are associated with increased mortality in patients with sepsis.[11] These aspects might explain the disproportionately high mortality from sepsis in countries like Brazil or Malaysia than in European countries.[12] Therefore basic measures such as access to emergency departments and intensive-care units are crucial. Additionally, training emergency and primary-care physicians in early diagnosis and treatment of sepsis is needed. Educational efforts have recently been associated with improved outcomes in sepsis.[13] Moreover, recent data show that an accurate and early assessment, associated with general measures

such as hydration, blood cultures, and antimicrobial drugs might obviate the need for more complex and expensive interventions like EGDT, while still achieving similar results.[14]

In conclusion, an urban perspective aimed at optimising the access to health care of patients with sepsis is needed in LMICs to face the current challenge. In this setting the prevention of both nosocomial and community-acquired infections should be incorporated into the SSC guidelines as a cost-effective measure for LMICs. Additionally regional variations might lead to substantial differences in the effect of therapies such as EGDT in patients with sepsis.[15] Thus the EGDT concept is currently being validated in three simultaneous, multicentre, randomised clinical trials involving different high-income countries. A similar approach should be used in LMICs before the widespread incorporation of complex and costly interventions.

Fernando A Bozza, Jorge I F Salluh
Intensive Care Unit, Instituto de Pesquisa Evandro Chagas, Fundação Oswaldo Cruz, Rio de Janeiro, Brazil (FAB); and Intensive Care Unit , Instituto Nacional de Câncer, Rio de Janeiro, Brazil (JIFS)
bozza.fernando@gmail.com

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Malaria elimination on Hispaniola

Recently there was a call for malaria elimination on the island of Hispaniola,[1] the last island in the Caribbean with endemic transmission of *Plasmodium falciparum*, the most lethal species of the parasite. We strongly support this bold call to action and suggest that recent studies in Haiti be considered in developing an elimination strategy.[2–5]

Elimination of malaria on Hispaniola is timely and important for two reasons: it would provide proof of principle that malaria elimination can be achieved in complex environments, and there is now in-vitro molecular evidence for chloroquine resistance in Haiti.[3] Therefore, a rigorous malaria elimination effort is desperately needed before the island is forced to switch from chloroquine to a more costly combination therapy. An additional rationale for elimination is the protection of immunologically naive individuals internally displaced as a result of the recent earthquake in Haiti, many of whom are either moving into malarious areas to seek shelter or are sleeping in poorly constructed shelters with minimum protection from mosquitoes.

Lessons learned from the malaria elimination effort in Hispaniola would provide valuable information to other countries considering malaria elimination. If malaria elimination cannot be accomplished on Hispaniola, there is little reason to think it could be achieved in sub-Saharan Africa, where the malaria burden is higher and control challenges greater.[6]

Hispaniola is an appropriate initial candidate for malaria elimination because of various factors: low transmission concentrated almost entirely between