

## Commentary

# Implementation of an evidence-based sepsis program in the intensive care unit: evident or not?

Dominique M Vandijck<sup>1,2</sup>, Stijn I Blot<sup>1,3,4</sup> and Dirk P Vogelaers<sup>1,3,4</sup>

<sup>1</sup>Department of General Internal Medicine and Infectious Diseases, Ghent University Hospital, De Pintelaan 185, 9000 Ghent, Belgium

<sup>2</sup>Department of Public Health and Health Economics, Ghent University, De Pintelaan 185, 9000 Ghent, Belgium

<sup>3</sup>Department of Internal Medicine, Ghent University, De Pintelaan 185, 9000 Ghent, Belgium

<sup>4</sup>Department of Healthcare, University College Ghent, Keramiekstraat 85, 9000 Ghent, Belgium

Corresponding author: Dominique M Vandijck, [dominique.vandijck@ugent.be](mailto:dominique.vandijck@ugent.be)

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## Abstract

Severe sepsis and septic shock are among the most serious health conditions and are associated with unwelcome clinical, social, and economic outcomes. With the introduction of the Surviving Sepsis Campaign guidelines, the campaign leaders aimed to reduce mortality from severe sepsis by at least one quarter by 2009 by means of a six-point action plan, namely, building awareness among health care professionals, improving early and accurate disease recognition and diagnosis, increasing the use of appropriate treatments and interventions, education, getting better post-intensive care unit access, and developing standard processes of care. However, adherence to these recommendations is a first but crucial step in obtaining these goals. A comprehensive evaluation of both, adherence to a sepsis program and whether this results in better outcomes for patients, is therefore essential to guide informed decision-making regarding the implementation of such an evidence-based protocol.

In the present issue of *Critical Care*, Girardis and colleagues [1] provide a comprehensive analysis evaluating the effects on management and outcome of patients admitted to the intensive care unit (ICU) with severe sepsis or septic shock after the implementation of a sepsis program. Severe sepsis, namely, septic shock, heralds a major health threat. About 18 million cases of severe sepsis occur worldwide each year and one third of these are fatal [2-4]. Also, severe sepsis places a significant burden on health care resources, accounting for approximately 40% of ICU expenditures, and its incidence is expected to rise further [3,5]. As physicians realized that such dismal outcomes were no longer acceptable, experts came together under the auspices of the Surviving Sepsis Campaign (SSC) to develop a set of evidence-based management strategies for severe sepsis and septic shock which would be of practical use for the bedside physician [6].

Since the release of the SSC recommendations in 2004, the consensus is that, although identifying patients with severe sepsis is a major challenge, it can now be addressed by strict application of evidence-based clinical practices [3,4]. The evidence-based therapies for patients meeting the clinical definition of severe sepsis and septic shock include initiation of appropriate antibiotics within the first hours after onset of severe systemic infection, early fluid resuscitation, corticosteroids, drotrecogin alfa (activated), strict glycaemia control, and lung-protective ventilation [6,7]. Although there are controversies regarding the available evidence for some of these strategies, existing recommendations for the management of patients with severe sepsis or septic shock support their use in daily practice [8].

Whereas the use of the above-mentioned strategies has been shown to positively impact on patients' outcome, the wide adoption of them in daily practice has been less than ideal. Barriers to implementation are numerous, such as lack of knowledge, acceptance, and subsequent adherence among ICU staff members; lack of special equipment; the fact that implementation is too time-consuming; and lack of resources [9-16]. Despite the difficulties in translating the SSC recommendations into daily practice, research following this approach was able to demonstrate substantial survival benefits. With the quality improvement efforts by the SSC and the Institute for Healthcare Improvement (Cambridge, MA, USA), many centres are currently developing sepsis programs based on the evidence-based sepsis bundles.

In this regard, Girardis and colleagues [1] also introduced an in-hospital evidence-based sepsis program and evaluated its

ICU = intensive care unit; SSC = Surviving Sepsis Campaign.

effect on management and outcome. Adherence to this sepsis program by staff members and in-hospital mortality were measured after an educational intervention on sepsis, including an early consultation of a skilled 'sepsis team', had been followed. Additionally, the authors assessed whether such a specific program was able to improve the outcome, defined as hospital survival, of these patients. Girardis and colleagues are to be commended for their careful efforts in introducing in their centre the severe sepsis resuscitation (6 hours) and management (24 hours) bundles, both critical elements in achieving more successful outcomes. As the results of such an evaluation are very sensitive to the type of educational interventions provided and the choice of variables considered, the source of the estimates should be clearly stated, as has been done for this investigation.

The authors chose a prospective observational design in which all patients who were admitted to the ICU and who met a comprehensive list of inclusion criteria were enrolled [1]. Key issues of the present investigation were the development and other surrounding aspects of their educational intervention. The latter included basic, advanced, and refresher courses consisting of conference lectures and practical training sessions for all staff members. Also, a specific protocol was promoted by means of specially organized meetings, hospital intranet, and poster displays. A 'sepsis team' (mentioned above) consisting of an ICU physician and an infectiologist, who were available 24 hours a day, was introduced to support the ICU staff and provide them with the interventions required for each individual patient with severe sepsis or septic shock. Overall, the authors concluded that the introduction of a program dedicated to sepsis not only improved adherence to evidence-based recommendations, but also was accompanied by a simultaneous significant decrease of in-hospital mortality. Even after multivariate regression analysis, bundle implementation was found to be independently associated with better outcome.

However, the findings of Girardis and colleagues [1] should be interpreted in the context of the limitations of the findings. The authors assumed that the favourable outcome observed was attributable mainly to the improved bundle adherence, which (though significantly increased) was completed in only 35% to 40% of patients in the last period of investigation. However, severity of organ failure as expressed by Sequential Organ Failure Assessment (SOFA) score ( $12.3 \pm 4.0$  versus  $8.4 \pm 2.9$ ), the percentage of patients with septic shock (82% versus 66%), and the age of admitted patients ( $69 \pm 13$  versus  $58 \pm 17$  years) were all significantly lower compared with the beginning period of their investigation, which may provide another reasonable explanation for the observed survival benefits among the investigated patient cohort [17].

As very few data are available on this topic in an ICU patient population, Girardis and colleagues add to the growing body

of literature in sepsis program implementation that incorporates assessments of management and outcome evaluation to guide future decision-making on this widely discussed issue. Their findings indicate that, in such a setting, an increase in guideline adherence contributes to the improvement of outcome of patients admitted because of severe sepsis or septic shock. As such, the present investigation may provide a framework that other centres may use to prepare for similar programs. However, the main challenge will be to motivate and convince all staff members about the importance of adhering to these evidence-based recommendations.

## Competing interests

The authors declare that they have no competing interests.

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