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## Editorial

## Healthcare-associated sepsis and the role of clean hands: When we do not see the trees for the forest



As of this past year, sepsis has been redefined as a “life threatening organ dysfunction caused by a deregulated host response to infection”, which often leads to high rates of morbidity and mortality (Singer et al., 2016). Although the real burden of this challenging condition is unknown, a systematic review estimated that there are around 30 million cases and 6 million deaths attributed to sepsis per year (Fleischmann et al., 2016). There is a distinct possibility that this estimate, although immense, is low, as the condition disproportionately affects the developing world. In areas where information gathering is often limited, the real incidence of sepsis is difficult to quantify. (“Recognizing Sepsis as a Global Health Priority – A WHO Resolution | NEJM,” n.d.). “The burden of sepsis in the developing world is enormous, outcomes are often poor, and socioeconomic consequences are dire” (Shrestha et al., 2017). In the Global Burden of Disease statistics, its burden is not accurately represented, as deaths due to sepsis are classified according to the underlying infection (“Recognizing Sepsis as a Global Health Priority – A WHO Resolution | NEJM,” n.d.).

But sepsis is far from being a neglected tropical disease that only affects the developing world. Even in high-income countries, with modern hospitals and state-of-the-art equipment, it remains a major cause of death in children (Dellinger et al., 2008). Furthermore, its burden is increasing rapidly. In the developed world, sepsis is increasing at a rate of 8%–13% annually, with attributed hospitalizations more than doubling between 2000 and 2008 (Reinhart et al., 2013), (Hall et al., 2011). One study in the U.S. found it to be a contributing factor in between 33%–50% of all hospital deaths (“Hospital Deaths in Patients With Sepsis | Critical Care Medicine | JAMA | The JAMA Network,” n.d.).

Although familiar to academics and clinicians, the condition has remained largely ignored by governing bodies and international healthcare systems (“Recognizing Sepsis as a Global Health Priority – A WHO Resolution | NEJM,” n.d.). As a result of the recent renewed interest in sepsis, and due to advances in understanding its pathophysiology, management, and epidemiology, there were reasons to re-examine the condition, update the guidelines and redefine the term itself (Singer et al., 2016). In 2017, the World Health Assembly (WHA) adopted a resolution focusing on preventing, diagnosing and managing sepsis (“WHA Adopts Resolution on Sepsis,” n.d.).

Because most of the cases are of community origin, current literature tends to focus on how to recognize, prevent and treat

sepsis in the community. For example, among patients with sepsis in critical care, 60% already developed the condition prior to their admission (Vincent et al., 2014). We tend to strive to see the big picture in this epidemic; after all, most of these patients already have sepsis when they are admitted. The instances when sepsis is a direct consequence of healthcare itself, as a complication of healthcare-associated infection (HAI), are largely ignored. Little attention has been focused on how to prevent the episodes of sepsis that are caused by care, in both inpatient and outpatient settings. This might be in part due to the lack of more precise epidemiological studies, which would help clarify the extent of the issue. It could also be influenced by the comparatively low number of healthcare-associated sepsis compared to the total number of sepsis cases globally. This means that campaigns targeting healthcare-associated sepsis would likely have less of a measurable impact when compared to the larger-scale campaigns, which are already known to be effective. For example, pneumococcal vaccines were shown to drastically reduce the numbers of sepsis in the community (Thorrington et al., 2018). In order to reduce healthcare-associated sepsis, the focus must be on changing healthcare worker (HCW) behaviour regarding infection prevention and control (IPC) measures. It comes as no surprise that modifying human behaviour is more difficult than vaccinating people and needs to incorporate elements from behavioural and implementation science. We tend to want to concentrate our resources in the major areas (such as vaccinations to prevent sepsis in the community), essentially making sure that we do not fall into the trap of “not seeing the forest for the trees”. But what this adage does not take into account is the relative influence that can be exerted directly by HCWs on the comparatively minor issue of reducing healthcare-associated sepsis.

Although the total number of sepsis cases due to HAI is much lower than the number of community-onset sepsis, they are significant additional and preventable infections. If HCW behavior cannot reduce the occurrence of sepsis in the community, it makes sense to focus our efforts on where it can. Sepsis in healthcare can be linked to exogenous cross-transmission, and this transmission could be reduced by HCW adherence to IPC measures, especially hand hygiene. HCWs’ hands are considered the most important vehicle for microbial cross-transmission to patients; 50–70% of HAIs are linked to poor hand hygiene. It is logical that increasing hand hygiene compliance could play a pivotal role in preventing healthcare-associated sepsis in both developing

and developed countries. In low and middle income countries (LMICs), 38% of healthcare facilities do not have an adequate source of clean water, which compromises their ability to prevent and control infections by hand washing (World Health Organization and United Nations' Children's Fund, 2015). This lack of clean water increases the risk for HAI and sepsis. The use of alcohol-based hand rub (ABHR) for hand hygiene greatly reduces the need for clean water in providing a hygienic standard of care.

Because improved compliance with hand hygiene has been shown to drastically reduce HAI (Pittet et al., 2000), it could ostensibly also reduce the threat of sepsis. A reduced number of infections also means that there is less need for prescribing antibiotics, which in turn can lower antibiotic consumption and help reduce the spread of resistant organisms. There is a clear correlation between infections and sepsis caused by multidrug resistant organisms and the ability to successfully treat them. For example, methicillin resistant *Staphylococcus aureus* (MRSA) infections are associated with a 50% higher mortality than infections caused by *Staphylococcus aureus* susceptible strains (Hanberger et al., 2011).

The 5 May 2018 WHO "SAVE LIVES: Clean Your Hands" campaign (World Health Organization, n.d.) targets sepsis in health care; it is especially timely considering the increased global awareness of HAI and the concern towards the increasing number of multidrug resistant organisms worldwide. The "SAVE LIVES: Clean Your Hands" campaign was launched in 2009, and is celebrated annually on 5

May to promote hand hygiene in healthcare around the world. Each year there is a different focus and call to action specific to hand hygiene, and this year it focuses on healthcare-associated sepsis. "It's in your hands; prevent sepsis in health care" (see Figure 1). Calls to action highlight concrete strategies that individual HCWs and their institutions can implement in order to increase compliance and reduce the burden of HAI (see Table 1). The campaign endeavors to gather every possible actor among healthcare professionals, hospital administrators, politicians, patients and patient groups, as well as all stakeholders in order to promote a global advocacy effort for the critical role of hand hygiene in healthcare. Tools for campaigning and participation are available at <http://www.who.int/gpsc/5may/en/>. Health facilities that would like to be a part of this international effort can register through the WHO dedicated website: <http://www.who.int/gpsc/5may/register/en/>. Join the over 20'000 facilities around the world that participate!

A HCW cannot control much of what happens in the community before a patient arrives in a hospital, with the exception of community and nurse practitioners and emergency and ambulance departments' staff. However, HCWs do have control over what happens as soon as the patient is seeking care. It is key that we engage in an effort to combat healthcare-associated sepsis – not just for the health of the patients, but also for the faith that they have in the healthcare system.

Improving hand hygiene, and thus reducing HAI in general, is a straightforward, cost-effective, and proven strategy that hospitals and



**Figure 1.** "It's in your hands; prevent sepsis in health care".

5 May 2018 World Health Organization SAVE LIVES: Clean Your Hands campaign slogan and main promotional image (2018 hashtags: #HandHygiene #Sepsis). Campaign participants are invited to submit photos/selfies of them holding a board with the slogan and hashtags at [www.CleanHandsSaveLives.org](http://www.CleanHandsSaveLives.org).

**Table 1**5 May 2018 World Health Organization *SAVE LIVES: Clean Your Hands* campaign calls to actions.

Health workers	“Take 5 Moments <sup>a</sup> ” to clean your hands to prevent sepsis in health care”
IPC <sup>b</sup> leaders	“Be a champion in promoting hand hygiene to prevent sepsis in health care”
Health facility leaders	“Prevent sepsis in health care, make hand hygiene a quality indicator in your hospital”
Ministries of health	“Implement the 2017 WHA <sup>c</sup> sepsis resolution. Make hand hygiene a national marker of health care quality”
Patient advocacy groups	“Ask for 5 Moments <sup>a</sup> of clean hands to prevent sepsis in health care”

<sup>a</sup> Refers to the “My 5 Moments for Hand Hygiene” as published in the WHO Guidelines on Hand Hygiene in Health Care” (World Health Organization, 2009).

<sup>b</sup> IPC: Infection prevention and control.

<sup>c</sup> WHA: World Health Assembly.

healthcare institutions can implement to improve patient outcomes. The evidence suggests that implementing such measures could also drastically reduce the rates of healthcare-associated sepsis. Although sepsis remains one of the worst possible outcomes for a routine hospitalization, it is also one that HCW have a large degree of direct control over. Please join the campaign, and help make sure that we do not miss seeing the trees for the forest.

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