

**REPORT TO THE 28TH  
STATE OF HAWAII LEGISLATURE  
2015**

**PURSUANT TO HOUSE CONCURRENT RESOLUTION 202 SD 1: *Requesting that the Director of Health convene a task force “to recommend ways to reduce incidents of sepsis and sepsis deaths in the State” and other related outcomes.***

**Prepared by**

**State of Hawaii Sepsis Task Force  
Established by Department of Health  
with assistance from the Healthcare Association of Hawaii  
JANUARY 2015**

## **Background**

Sepsis is a systemic inflammatory response to a severe infection that can quickly progress to multisystem organ failure and death. Sepsis can have numerous causes; in a recent review,<sup>1</sup> pneumonia, intra-abdominal infections, and urinary tract infections were the most commonly identified etiologies.

Sepsis is defined in the following categories (adapted from Levy et al):<sup>2</sup>

- Sepsis: abnormalities in vital signs or laboratory values that suggest systemic inflammation (e.g., fever, elevated heart rate or respiratory rate, or abnormal white-blood cell [WBC] count) in the context of a suspected or confirmed infection
- Severe Sepsis: sepsis complicated by acute organ dysfunction
- Septic Shock: severe sepsis with persistently low blood pressures despite adequate fluid resuscitation.

Patients hospitalized for sepsis or septicemia (an older term for “blood poisoning”) had longer lengths of stay and more than 8-fold increased in-hospital mortality than patients hospitalized for other diagnoses.<sup>3</sup> Severe sepsis was estimated to affect more than 750,000 Americans per year in 1995, with nearly 30% mortality;<sup>4</sup> a more recent study still found mortality ranging from 29%–37%.<sup>5</sup>

Early recognition and intensive treatment are crucial to decreasing morbidity and mortality from sepsis. Treatment includes intensive supportive care and addressing the underlying infectious cause. However, as sepsis has multiple causative etiologies and non-specific initial symptoms, it can be challenging to diagnose and intervene in a timely fashion.

House Concurrent Resolution 202 SD 1 requested the Director of Health to convene a task force to recommend ways to reduce incidents of sepsis and sepsis deaths in the state and, in so doing, consider the following:

1. Examine and identify barriers to quality care for patients with sepsis;
2. Review and assess national models, best practices, and guidelines comparative to Hawaii’s needs;
3. Consider options for improving early recognition, identification, and treatment of sepsis and septic shock in Hawaii’s hospitals;
4. Improve the collection, use, and reporting of quality measures by medical staff related to the recognition and treatment of sepsis;
5. Provide recommendations to better educate the public about sepsis, including its symptoms, diagnoses, treatment, and preventive measures;
6. Identify barriers and make recommendations to address the costs of sepsis and costs necessary to combat sepsis; and
7. Any other recommendation deemed relevant by the Director of Health to further the purpose of this measure.

HCR 202 further charged that the findings and recommendations be considered and incorporated as feasible as part of a comprehensive plan to be developed by the Department of Health to combat sepsis in Hawaii, and that the task force include in their report any proposed legislation.

### **Sepsis Task Force Composition and Activities**

The Sepsis Task Force convened five (5) times from August through December 2014 to address the requests of HCR 202 SD 1. Membership comprised the following individuals:

Sarah Y. Park, MD—Chair  
State Epidemiologist  
Chief, Disease Outbreak Control Division  
Hawaii State Department of Health

Melissa Viray, MD—Co-Chair  
Deputy State Epidemiologist  
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Melinda Ashton, MD  
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Mary-Anne Nolan, RN, MSN  
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Sara Keala Tanaka, MPH  
Manager, Provider Quality Programs  
Hawaii Medical Service Association (HMSA)

Malia Espinda  
Government Relations Legislative Analyst  
The Queen's Medical Center (formerly)

The Task Force distilled HCR 202 into the following discrete tasks:

1. Review and assess national models, best practices, guidelines, and the medical literature regarding sepsis compared with Hawaii's needs
2. Quantify as best as possible the status of and trends in sepsis and sepsis mortality in Hawaii
3. Assess current activities to reduce sepsis morbidity and mortality in Hawaii healthcare facilities
4. Consider recommendations to better educate the public about sepsis including its symptoms, diagnosis, treatment, and preventive measures
5. Make recommendations for assuring timely clinical recognition and early treatment of sepsis in Hawaii

**Findings and Recommendations**

Regarding reviewing and assessing national models, best practices, guidelines, and the medical literature regarding sepsis compared to Hawaii's needs:

Sepsis is a complex entity, with multiple causative etiologies and non-specific initial symptoms. No single test will diagnose sepsis or predict who will develop sepsis. The medical literature continues to evolve regarding the optimal treatment for sepsis as new treatments emerge and findings from ongoing research are reported; overarching themes consistently involve identifying the condition promptly, intervening/treating early, and controlling the source of the infection.

The Society of Critical Care Medicine and the European Society of Intensive Care Medicine have collaborated on the *Surviving Sepsis Campaign* (SSC), which includes three (3) editions of evidence-based guidelines, the last of which was published in 2012,<sup>6</sup> as well as "care bundles" that simplify and operationalize care processes emphasizing early intervention for sepsis. Additionally, the collaborative has continued to produce updates<sup>7</sup> as new data have emerged.

The SSC guidelines are widely considered to represent a compilation of the evidence-based best practices to date, and organizations such as the Institute for Healthcare Improvement (IHI) and the Centers for Disease Control and Prevention (CDC) have advocated for or based their resources on the SSC recommendations. Multiple studies have documented a decrease in mortality after implementation of SSC recommendations and/or participation in the SSC.<sup>8-11</sup> Decreases in mortality also glean cost benefits; non-survivors are more costly per hospital stay than survivors.<sup>4</sup>

Among their sepsis resources, CDC has listed several programs reporting success with sepsis interventions (Appendix 1). These programs have focused on different aspects for development, but frequently cited factors leading to improvements have been: reducing variation in the processes of sepsis identification and early intervention through establishment of protocols and/or algorithms, implementing multi-disciplinary and system-wide change, educational and communication improvement initiatives, and providing feedback and success stories to healthcare facility staff. However, as mentioned above, because the literature continues to evolve, adoption of specific practices by a facility should be considered and discussed by practicing expert clinicians who keep apprised of recent developments in the literature; operationalizing implementation should be tailored to each facility's needs and capabilities.

The Sepsis Task Force does not recommend mandating legislation to implement sepsis guidelines and/or protocols. No one specific practice or modality would be appropriate to recommend; specific protocols established in one point in time are likely to rapidly become outdated and may not be generalizable to all types of facilities. This is highlighted by changes recently recommended to National Quality Forum (NQF) measure #0500.<sup>12,13</sup> NQF is a non-profit organization that promotes healthcare quality through development of consensus standards; federal agencies such as the Centers for Medicare and Medicaid Services (CMS) frequently adopt NQF measures for public reporting and payment programs, as for instance, with HAI reporting.<sup>14</sup> Measure #0500 establishes specific standards to be met by facilities regarding sepsis care. However, high-quality data have emerged that did not support a portion of measure #0500's requirements. Clinical subject matter experts at academic medical centers have also raised concerns about mandating legislation, in their case at the federal level.<sup>15</sup>

#### Regarding quantifying as best as possible the status of and trends in sepsis and sepsis mortality in Hawaii:

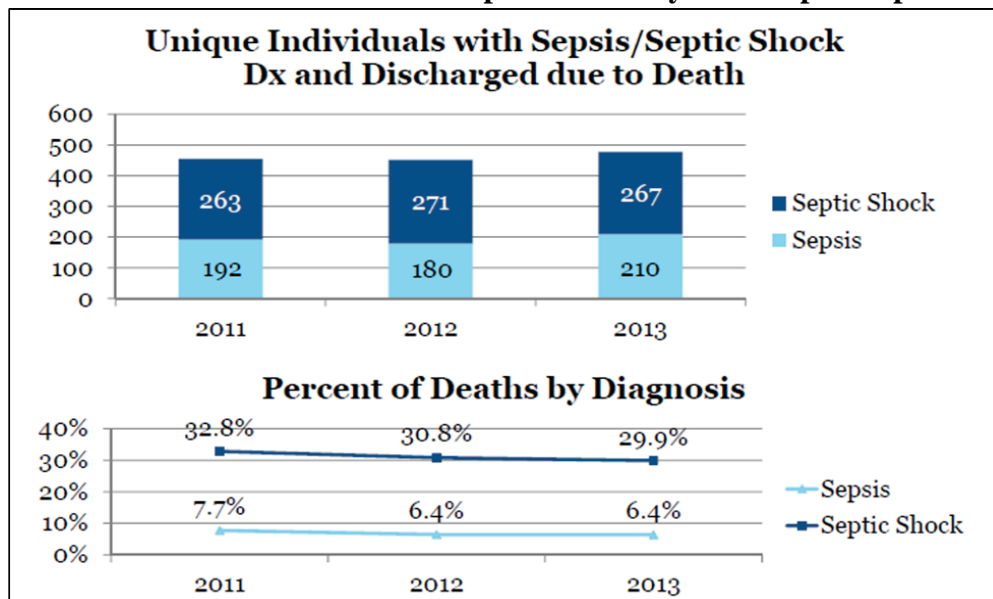
There are no Hawaii-specific data in the literature regarding the current status of sepsis and sepsis mortality. However, it is important to understand local epidemiology and trends; national estimates may not be representative of Hawaii. It would also be valuable to establish a baseline for Hawaii for future evaluations of the impact of interventions.

Sepsis incidence is difficult to ascertain, especially because sepsis is not a reportable condition, and there is no single diagnostic test that could identify sepsis cases. Rough estimations are possible using ICD-9 diagnosis codes, but sources of potential data, such as

Hawaii Health Information Corporation (HHIC), are restricted secondary to cost. Limited Hawaii-specific data have been made available to this Task Force from the Hawaii Medical Service Association (HMSA), which reviewed sepsis and sepsis mortality among their members using ICD-9 codes for sepsis, severe sepsis, and septic shock\* from 2011–2013. Caveats regarding the data include that the data: are preliminary, only include HMSA members and are not necessarily representative of the entire state, and have not been validated with clinical data.

Briefly, 10,270 unique HMSA members were identified over the three-year period. Although the proportion of the population with sepsis appeared to be increasing over time, the proportion with septic shock (a more severe illness that is more likely to be coded consistently over time) remained stable. Additionally, in-hospital mortality from sepsis or septic shock has remained stable over the three-year period (Table 1). It is not possible to ascertain the etiology of the apparent increase in sepsis diagnoses with the data currently available; however, the HMSA data provide at least a rough indication of the burden of sepsis and sepsis mortality.

**Table 1: HMSA Members with In-Hospital Mortality from Sepsis/Septic Shock\***



*Data source: HMSA*

\* Sepsis defined as unique individuals with a diagnosis of 995.91 or 995.92:  
 995.91 Systemic inflammatory response syndrome due to infectious process w/out acute organ dysfunction  
 995.92 Systemic inflammatory response syndrome due to infectious process w/ acute organ dysfunction  
 Septic shock defined as unique individuals with a diagnosis of 785.52 or 998.02:  
 785.52 Septic shock  
 998.02 Postoperative shock, septic

Regarding the assessment of current activities to reduce sepsis morbidity and mortality in Hawaii healthcare facilities:

To assess current sepsis care improvement activities in the state, a survey was developed and distributed to hospitals statewide through the Healthcare Association of Hawaii (HAH). The survey was disseminated to 24 facilities, including 14 acute care hospitals, 8 critical access hospitals (CAHs)\*, 1 long-term care facility, and 1 rehabilitation facility; 18 (75%) responded. Overall, almost every facility reported one or more activities to address sepsis morbidity and mortality. However, there was considerable variation regarding the degree to which facilities have been able to engage in sepsis-related activities.

- Eleven (61%) had a group/committee in place to address reduction in sepsis morbidity and/or mortality
- Thirteen (72 %) have looked at incorporating or have implemented guidelines, protocols, or bundled interventions aimed at reducing morbidity and/or mortality from sepsis
- At least one CAH reported seeing few acute care patients and their intention to transfer any case of life-threatening sepsis to an acute care facility, thus obviating their need for sepsis quality improvement initiatives. This is an opportunity for education at non-acute care facilities regarding the critical role of early detection and intervention in reducing sepsis morbidity and mortality.

Facilities tailor their internal reporting and collection of data to their specific requirements; however, they may benefit from having input from a larger body of clinical and administrative subject matter experts (such as with a dedicated Sepsis Best Practices Group) to help determine how and what data to collect, support the best use of quality measures, and assist with troubleshooting within their facilities. Additionally, given the proposed NQF #0500 measure, it is likely that CMS payment or other incentive programs may be forthcoming in the near future; facilities may benefit from working collaboratively as these programs materialize. The Task Force is not recommending that public reporting of sepsis measures be mandated at the state level at this time as a useful set of measures does not exist.

Regarding recommendations to better educate the public about sepsis, including its symptoms, diagnosis, treatment, and preventive measures:

Public education on sepsis, its symptoms, diagnoses, treatment, and preventative measures can be difficult given that sepsis is a clinical syndrome with many causes that requires a clinician to recognize and diagnose. However, organizations such as CDC and the charitable organization Sepsis Alliance ([www.sepsisalliance.org](http://www.sepsisalliance.org)) have worked to promote sepsis awareness. September has been deemed Sepsis Awareness Month by the Sepsis Alliance; for the entire month, Sepsis Alliance, CDC, and various other organizations promote sepsis awareness through social media outreach, blog posts, and educational opportunities. Additionally, September 13<sup>th</sup> is World Sepsis Day, an initiative of the Global Sepsis Alliance,

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\* CAHs are rural facilities that have fewer than 25 inpatient beds but have a 24-hour emergency department.

which promotes sepsis awareness internationally. Individual facilities can be encouraged to adopt sepsis awareness materials made by these groups, particularly during Sepsis Awareness Month. A statewide Sepsis Best Practices Group would be a good means of fostering investment by facilities on an ongoing basis.

Regarding recommendations for assuring timely clinical recognition and early treatment of sepsis in Hawaii:

The Sepsis Task Force has concluded that the optimal approach to work towards early recognition of sepsis and reducing sepsis deaths across the state is to regularly convene experts from Hawaii's acute care hospitals in a Sepsis Best Practice Group that would:

- Discuss best practices, educational opportunities, and emerging federal sepsis policies and regulations, as well as recommend implementation of best practices, as necessary
- Utilize a model similar to the Stroke Task Force already in place
- Comprise a physician champion and administrative representation from each facility
- Hold its inaugural meeting in early 2015
- Be sponsored as a subcommittee of the HAH Quality Committee

A Sepsis Best Practices Group will increase visibility of sepsis work and promote further investment by facilities and stakeholders statewide. Costs are likely to be seen by facilities as they work individually to operationalize and implement bundles. However, more generalized costs may be incurred through the operations of the group as well as in obtaining more representative data on sepsis in Hawaii (e.g., from HHIC). Estimates can be generated at the discretion and need of the Sepsis Best Practices Group and presented to or requested from the State Legislature on an annual basis.

We recommend that the Sepsis Best Practices Group:

- Meet regularly to discuss best practices, educational opportunities, and emerging federal sepsis policies and regulations, as well as recommend implementation of best practices, as necessary
- Facilitate the performance of a Sepsis Improvement needs-assessment within each facility so that facilities can best determine resource allocation
- If and when CMS elects to implement NQF measure #0500 (e.g., through a CMS inpatient prospective payment system rule), address the impact that it is likely to have and the implications for Hawaii hospitals
- Work towards defining a more representative sepsis incidence baseline in the state, either through the use of administrative or clinical data
- Partner with their associated CAHs to disseminate current best practices regarding early recognition and intervention in sepsis
- Encourage the adoption of sepsis educational materials and initiatives by facilities as discussed above



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**Appendix 1: Select examples of collaboratives to improve sepsis mortality**

<b>Collaborative/ Hospital System</b>	<b>State</b>	<b>Reported program successes</b>	<b>Reference</b>
Baptist Memorial Hospital	TN	Greater than 40% reduction in mortality compared to baseline rates	<a href="#"><u>Putting the Pieces Together</u></a>
Christiana Care	DE	Severe sepsis/septic shock mortality was reduced from 62 to 17% (53% reduction in overall sepsis mortality)	<a href="#"><u>Sepsis Alert Program Leads to More Timely Diagnosis and Treatment</u></a>
Kaiser Permanente Northern California	CA	Mortality rate from community-acquired sepsis fell from 32% in January 2006 to 13% in February 2010	<a href="#"><u>Removing Sepsis</u></a>
Methodist Medical Center of Illinois	IL	Inpatient sepsis mortality declined to 19% in 2009 to 11% in 2011	<a href="#"><u>Think Sepsis—A Multidisciplinary Approach to Identify Early Sepsis and Improve Patient Outcomes</u></a>
St. Alexius Medical Center	IL	Mortality was reduced by 36%	<a href="#"><u>Improving Sepsis Mortality and Cost of Care through Quality Improvement</u></a>
South Nassau Communities Hospital	NY	The mortality rate for patients with a primary diagnosis of sepsis declined from 24% to 19%, a reduction of 20%	<a href="#"><u>Reducing Sepsis Mortality Through Early Identification of Systemic Inflammatory Response Syndrome and Implementation of "Change Bundles"</u></a>
Stony Brook University Medical Center	NY	The mortality rate for patients with severe sepsis declined from 27% to 18%, a reduction of 34%	<a href="#"><u>Reducing Sepsis Mortality</u></a>
STOP Sepsis Collaborative	NY	Between January 2011 and September 2012, inpatient mortality from severe sepsis was reduced by 22%	<a href="#"><u>Reducing Sepsis Mortality</u></a>
University of California San Francisco	CA	There was a reduction in overall sepsis mortality by 44% during the study period, and by 49.8% 2 years afterwards	<a href="#"><u>Nine-Hospital Collaborative Reduces Sepsis Mortality by Approximately 50 Percent</u></a>

*Source: Centers for Disease Control and Prevention*