The WHO resolution on sepsis: what action is needed in Australia?

Australia needs a coordinated nationwide plan to reduce preventable deaths and disability from sepsis

On 26 May 2017, the World Health Organization (WHO) adopted a resolution on sepsis that urges member states to take specific actions to reduce the burden of sepsis across all age groups.[1] The resolution, co-sponsored by Australia, recognises that sepsis is a leading but poorly recognised cause of death and disability that imposes enormous costs on health care systems. The resolution presents a unique opportunity to initiate coordinated national action appropriate to Australian health care systems and settings.

Burden of sepsis: Australian estimates and gaps in accurate reporting

Sepsis, defined as life-threatening organ dysfunction due to a dysregulated host response to infection, is documented to cause or contribute to 50% of in-hospital deaths in the United States and remains the most expensive condition treated in US hospitals.[2] In Australia, the true burden of sepsis is unknown, with available national data being limited to deaths occurring in intensive care unit-treated patients, which misses sepsis cases in pre-hospital, remote, emergency and ward settings.[3,4] Current estimates suggest that there are 18 000 episodes of intensive care unit-treated sepsis in Australia each year and at least 5000 deaths which disproportionately affect the very young, the very old, and Aboriginal and Torres Strait Islander people. The reference standard for diagnosing sepsis remains clinical detection of infection-induced organ dysfunction, and screening methods such as the quick Sepsis-related Organ Dysfunction Assessment tool or Systemic Inflammatory Response Syndrome criteria have insufficient sensitivity and specificity.[5] Capturing sepsis diagnoses through hospital coding significantly under-counts the burden of disease.[6] Epidemiology studies and disease surveillance have proven impractical because organ dysfunction is inadequately captured or coded in most settings.[7] Accurate sepsis monitoring in Australia requires improved International Classification of Diseases-based coding; where this has occurred in other countries, sepsis incidence has been found to be much higher than previously estimated.[8] The development of electronic health records may substantially improve our capacity to identify sepsis in real time, and to accurately and efficiently assess its incidence. It is thus timely to define minimal data standards to capture sepsis across Australia as a prerequisite to accurately monitoring disease burden and the effectiveness of new interventions.[8]

However, while more accurate data on incidence and mortality rates assist evaluation of efforts to improve prevention and in-hospital management, they fail to reflect the long term impact of sepsis on patients and families. Sepsis survivors suffer physical, cognitive and psychological sequelae which affect their wellbeing and that of their families and carers for decades.[9] Currently, there are no coordinated follow-up services in Australia to address the needs of thousands of sepsis survivors and their families.

Lack of awareness of sepsis in the community and health care workforce

A recent survey by the Australian Sepsis Network and The George Institute for Global Health (https://www.australiansepsisnetwork.net.au/news/survey-reveals-common-killer-australians-never-heard) reported that only 40% of Australians have heard of sepsis and only 14% know any of its signs. Lack of awareness results in delayed presentation to health care providers and because early bundled intervention (particularly, prompt antibiotic treatment) remains the most effective treatment,[10] such delays increase the risk of preventable deaths and disability. Sepsis is a time-critical medical emergency and as up to 80% of sepsis is community acquired, public health campaigns to educate the public about its signs and symptoms and the importance of seeking urgent medical care represent a critical step in improving outcomes. Coupled to this is the importance of ensuring that the health care workers to whom patients with sepsis first present — notably general practitioners, ambulance officers and emergency department triage staff — are trained to recognise sepsis and to respond appropriately to the time-critical nature of the condition. In the United Kingdom, improved sepsis awareness, both in the community and the health care workforce, was a key recommendation of the Parliamentary and Health Service Ombudsman.[11]

The success of the New South Wales Sepsis Kills program, a quality improvement program that promoted recognition of sepsis and intervention within 60 minutes — including taking blood cultures, measuring serum lactate levels, administration of intravenous antibiotics, and fluid resuscitation — demonstrates the substantial improvements that flow from such an approach.[12] Elsewhere, a detailed examination of sepsis care in the UK, published by the National Confidential Enquiry into Patient Outcome and Death (https://www.ncepod.org.uk/2015report2/downloads/JustSaySepsis_FullReport.pdf), documented the delays in the recognition and management of sepsis that are common around the world. The key recommendations in this enquiry mirror recommendations from root cause analyses

Luregn J Schlapbach[1]

Kelly Thompson[2]

Simon R Finfer[2]

1 Child Health Research Centre, University of Queensland, Brisbane, QLD.

2 The George Institute for Global Health, University of New South Wales, Sydney, NSW.

sfinfer@georgeinstitute.org.au

doi: 10.5694/mja2.50279

of sepsis-related deaths in Australia; notably that hospitals have a protocol for the early identification and immediate management of patients with sepsis and all health care professionals receive training in the recognition of sepsis (http://www.cec.health.nsw.gov.au/__data/assets/pdf_file/0004/259375/patient-safety-report-sepsis-2012.pdf).

Current initiatives to improve sepsis outcomes in Australia

International experience and the scientific literature support the use of care bundles and protocols encompassing screening, recognition and treatment for sepsis. The Surviving Sepsis Campaign has been advocating for treatment bundles delivering blood culture sampling, antibiotic administration and cardiovascular support within one hour of the diagnosis of sepsis or septic shock.[10] The introduction of such approaches has consistently been associated with reduced mortality, shorter duration of life support treatments and faster resolution of organ dysfunction, all of which reduce short and longer term health care-related costs.[13,14]

A clinical focus report published by the NSW Clinical Excellence Commission in 2009 highlighted 167 incidents in which delayed recognition and treatment of sepsis resulted in patient harm and preventable deaths.[15] This led to the development of the Sepsis Kills program (http://www.cec.health.nsw.gov.au/patient-safety-programs/adult-patient-safety/sepsis-kills). Building on the success of Sepsis Kills, Queensland has developed the Sepsis Breakthrough Collaborative (https://clinicalexcellence.qld.gov.au/priority-areas/safety-and-quality/sepsis), and Safer Care Victoria has initiated the Think Sepsis: Act Fast scaling collaboration (https://bettersafercare.vic.gov.au/news-and-media/improving-the-management-of-sepsis-across-victoria). While these state-based initiatives to audit and improve in-hospital recognition and treatment of sepsis are welcome, a coordinated national approach that addresses pre-hospital and in-hospital recognition and treatment, and the significant and neglected post-discharge needs of sepsis survivors, is likely to reap greater benefits at a lesser cost.[9]

Challenges specific to sepsis in neonates and children

Every year, over 500 children in Australia require life support for sepsis, resulting in about 50 paediatric deaths each year.[4] Of note, these figures do not include neonatal sepsis. Sepsis risk in children is strongly age dependent, with highest rates seen in premature infants, followed by neonates, infants and pre-school children. Half of all children presenting with sepsis were previously completely healthy.[4] Sepsis in children is typically a fulminant disease, often starting with the insidious signs and symptoms commonly seen with a mild viral infection. This non-specific onset poses a particular challenge to parents, GPs and emergency department staff to recognise a child developing sepsis from the many thousands of children presenting with mild febrile illnesses. Up to one-third of paediatric sepsis survivors will suffer from moderate to severe long term disabilities relating to amputations and neurodevelopmental impairment. The direct health care cost associated with sepsis has been estimated at A$62 062 per child.[4] These figures do not take into account the resulting societal impact due to indirect costs.

Impact of sepsis in Aboriginal and Torres Strait Islander Australians

In a recent systematic review of the population-based incidence of sepsis around the world, the highest published incidence was reported among Aboriginal and Torres Strait Islander adults living in the Northern Territory.[16] In children, population-based mortality due to sepsis and other infections was over twofold higher in Aboriginal and Torres Strait Islander children compared with non-Indigenous children.[17] Marked inequities in health outcomes related to common causes of sepsis such as pneumococcal and staphylococcal infections exist between Aboriginal and Torres Strait Islander and non-Indigenous adolescents in Australia.[18] Initiatives to tackle preventable harm from sepsis among Aboriginal and Torres Strait Islander Australians will be most effective if they are community controlled and led via established and trusted models; for example, the National Aboriginal Community Controlled Health Organisation, the peak body representing 143 Aboriginal community controlled health services across Australia (https://www.naccho.org.au/about/). Any proposed response to sepsis within Aboriginal and Torres Strait Islander communities must be holistic and culturally respectful and use a needs-based approach to improving health and wellbeing.

The need for a national action plan in Australia

While the WHO resolution on sepsis urges specific government actions targeted at the global community, these have varying levels of relevance in Australia. The George Institute for Global Health and the Australian Sepsis Network issued a health policy report in December 2017 (https://www.georgeinstitute.org/sites/default/files/documents/stopping-sepsis-national-action-plan.pdf) which identified four broad recommendations to improve sepsis outcomes in Australia through a national action plan as envisaged by the WHO resolution:

- Establish a nationally coordinated sepsis body to develop and promulgate a national action plan for sepsis.
- Invest in prevention and awareness campaigns targeting both the general community and the health care workforce.
- Establish and implement nationally recognised clinical standards for the detection and treatment of sepsis in both adults and children.
- Invest in community and peer support services for sepsis survivors and their families.

Specific actions and the bodies to undertake them in order for Australia to comply with the resolution are listed in the Supporting Information.

Conclusion

The WHO resolution on sepsis, co-sponsored by Australia, provides a unique and timely impetus to stimulate coordinated action to improve the prevention, diagnosis and management of sepsis in Australia. Sepsis initiatives in Australia should adopt strategies that have been successful in improving outcomes in other time-critical conditions such as myocardial infarction and stroke, and should learn from the experiences that have improved sepsis care in other countries.

Competing interests: No relevant disclosures.

Provenance: Not commissioned; externally peer reviewed. ■

© 2019 AMPCo Pty Ltd

References are available online.

Supporting Information

Additional Supporting Information is included with the online version of this article.

1 Reinhart K, Daniels R, Kissoon N, et al. Recognizing sepsis as a global health priority – a WHO resolution. *N Engl J Med* 2017; 377: 414–417.

2 Liu V, Escobar GJ, Greene JD, et al. Hospital deaths in patients with sepsis from 2 independent cohorts. *JAMA* 2014; 312: 90–92.

3 Kaukonen KM, Bailey M, Suzuki S, et al. Mortality related to severe sepsis and septic shock among critically ill patients in Australia and New Zealand, 2000-2012. *JAMA* 2014; 311: 1308–1316.

4 Schlapbach LJ, Straney L, Alexander J, et al. Mortality related to invasive infections, sepsis, and septic shock in critically ill children in Australia and New Zealand, 2002-13: a multicentre retrospective cohort study. *Lancet Infect Dis* 2015; 15: 46–54.

5 Churpek MM, Snyder A, Han X, et al. Quick Sepsis-related Organ Failure Assessment, systemic inflammatory response syndrome, and early warning scores for detecting clinical deterioration in infected patients outside the intensive care unit. *Am J Respir Crit Care Med* 2017; 195: 906–11.

6 Heldens M, Schout M, Hammond NE, et al. Sepsis incidence and mortality are underestimated in Australian intensive care unit administrative data. *Med J Aust* 2018; 209: 255–260. https://www.mja.com.au/journal/2018/209/6/sepsis-incidence-and-mortality-are-underestimated-australian-intensive-care-unit

7 Machado FR, Nsutebu E, AbDulaziz S, et al. Sepsis 3 from the perspective of clinicians and quality improvement initiatives. *J Crit Care* 2017; 40: 315–317.

8 Rudd KE, Delaney A, Finfer S. Counting sepsis, an imprecise but improving science. *JAMA* 2017; 318: 1228–1229.

9 Prescott HC, Angus DC. Enhancing recovery from sepsis: a review. *JAMA* 2018; 319: 62–75.

10 Seymour CW, Gesten F, Prescott HC, et al. Time to treatment and mortality during mandated emergency care for sepsis. *N Engl J Med* 2017; 376: 2235–2244.

11 Parliamentary and Health Service Ombudsman. Time to Act: Severe sepsis – rapid diagnosis and treatment saves lives. London: Parliamentary and Health Service Ombudsman, 2013.

12 Burrell AR, McLaws ML, Fullick M, et al. SEPSIS KILLS: early intervention saves lives. *Med J Aust* 2016; 204: 73–73.e7. https://www.mja.com.au/journal/2016/204/2/sepsis-kills-early-intervention-saves-lives

13 Thursky K, Lingaratnam S, Jayarajan J, et al. Implementation of a whole of hospital sepsis clinical pathway in a cancer hospital: impact on sepsis management, outcomes and costs. *BMJ Open Quality* 2018; 7: e000355.

14 Rhodes A, Evans LE, Alhazzani W, et al. Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016. *Intensive Care Med* 2017; 43: 304–377.

15 Launay E, Gras-Le Guen C, Martinot A, et al. Why children with severe bacterial infection die: a population-based study of determinants and consequences of suboptimal care with a special emphasis on methodological issues. *PLoS One* 2014; 9: e107286.

16 Fleischmann C, Scherag A, Adhikari NK, et al. Assessment of global incidence and mortality of hospital-treated sepsis. Current estimates and limitations. *Am J Respir Crit Care Med* 2016; 193: 259–272.

17 Ostrowski JA, MacLaren G, Alexander J, et al. The burden of invasive infections in critically ill Indigenous children in Australia. *Med J Aust* 2017; 206: 78–84. https://www.mja.com.au/journal/2017/206/2/burden-invasive-infections-critically-ill-indigenous-children-australia

18 Einsiedel LJ, Fernandes LA, Woodman RJ. Racial disparities in infection-related mortality at Alice Springs Hospital, Central Australia, 2000–2005. *Med J Aust* 2008; 188: 568–571. https://www.mja.com.au/journal/2008/188/10/racial-disparities-infection-related-mortality-alice-springs-hospital-central ■