



POLICY BRIEF

A CALL TO ACTION: Sepsis is Africa's Neglected Silent Killer

March 2019

KEY MESSAGES

- 1. Sepsis is a major preventable killer, disproportionately affecting low and middle income countries including much of Africa**
- 2. The massive human and financial costs attributable to sepsis are severely under-estimated due to lack of data, research and evidence on sepsis, particularly in Africa**
- 3. Many lives can be saved by efforts to raise awareness on and prioritise sepsis**
- 4. Addressing sepsis will improve overall quality of health care and strengthen health systems**

CONTEXT

Sepsis is a life-threatening condition resulting from severe infection and is a leading cause of preventable death worldwide. With its high burden of infection, Africa is expected to bear a disproportionate proportion of global sepsis. The huge human and financial costs associated with sepsis can be attributable to its under-prioritisation in health systems, in terms of resourcing, surveillance, and reporting. In low and middle-income countries (LMICs), including much of Africa, a significant proportion of sepsis can be attributed to the consequences of weak health systems, including poor sanitation and hygiene as well as poor quality health care. Priority investments for preventing sepsis in Africa include: introducing awareness and advocacy campaigns, improving sanitation and hygiene in health facilities, measuring and collecting data on sepsis, and conducting research to fill in sepsis management evidence gaps. Actionable policy recommendations are outlined later in this brief.

What is Sepsis?

Sepsis is defined as the body's overwhelming and toxic response to infection—leading to tissue damage, organ failure, and often death. Sepsis is caused when infectious organisms, found both within and outside of health clinics and hospitals, spread throughout the whole body. Patients who develop sepsis may experience a range of symptoms that are often related to where the infection originated. Common symptoms include feeling weak, chills/fever, hypothermia, nausea, low blood pressure, and fast heart rate. If sepsis progresses, patients may experience confusion or reduced consciousness, reduced urination, severe breathlessness, inability to stand or walk unaided, multiple organ failure, shock and death.

Because there is no accurate and simple method to test for sepsis, it is typically diagnosed by doctors based on patient history, symptoms, and blood tests. However, this approach often results in inconsistent and delayed diagnoses, which jeopardise the likelihood of patients' full-recovery. If caught early, sepsis can typically be treated with antibiotics, while failing organs can be supported with fluids, oxygen and other drugs. The best way to prevent sepsis is by reducing infection rates through improved sanitation and hygiene and vaccines. To avoid sepsis from progressing to severe illness and disability, early identification and treatment of infections—including source control and antibiotics—is critical.



Burden of Sepsis

Human Costs

More than 30 million people get sepsis every year, with over 7 million of them ending in death¹. Although country and continent-specific data on sepsis are lacking, LMICs, including many African countries, are expected to be disproportionately burdened by sepsis where rates of infection are growing¹. In fact, at least 2 million sepsis deaths are estimated to occur in Africa¹. These statistics, however, are presumed to be gross underestimates, particularly across Africa, where sepsis is rarely diagnosed, reported, or registered as cause of death².

Neonates and Children

Sepsis is associated with a massive number of life years lost as it kills many youth and children¹. Globally, an estimated 3 million newborns and 1.2 million children suffer from sepsis every year³. In LMICs, infections (including those that result in sepsis) cause up to half of all neonatal mortality¹. Additionally, each year, 1 million newborn deaths are associated with maternal infection, including sepsis⁴.

Pregnant Women and Mothers

Sepsis is the third biggest cause of maternal mortality, accounting for 11% of global maternal deaths⁵. Over 95% of deaths due to maternal sepsis occur in LMICs⁶. Accounting for two-thirds of maternal deaths, Africa is expected to have high rates of maternal mortality attributed to sepsis⁷.

Financial Costs

Although only available for high income countries (HICs), estimates on the financial burden of sepsis indicate massive universal costs. An average sepsis patient in Europe, for instance, is estimated to cost the healthcare system 25,000 Euros⁸. Meanwhile in 2008, the United States spent an estimated \$ 14.6 billion USD on sepsis hospitalisations⁸.

Because sepsis is underreported in LMICs, the real financial burden in Africa is unknown but includes direct costs to the

healthcare system, as well as indirect costs to the economy due to losing previously healthy working-age persons.

Why does sepsis exist?

Poor sanitation and hygiene

Since sepsis is caused by infection, poor sanitation and hygiene play an important role. A 2017 progress report found that Sub-Saharan Africa is not meeting the sustainable development goal (SDG) targets for drinking water, sanitation and hygiene⁹. Specifically, only a little over half of drinking water services were deemed as either safely managed (24%) or basic (34%)⁹. Additionally, there was only 28% coverage of basic sanitation services and 15% coverage of basic handwashing facilities with soap and water⁹. Such poor sanitation and hygiene lead to high levels of healthcare associated infections (HAIs), including sepsis. In fact, the frequency of HAIs is at least 2-3 times higher in LMICs than in HICs¹. For example, data show that 20% of women in Africa acquire surgical site infection after caesarean section¹.

Under-Vaccination and Immunisation

Vaccines are a principle method of reducing risk of infection. However, in many LMICs, like much of Africa, vaccination frequencies vary by illness, region, population, and year. Currently, national immunisation programmes across Africa cover basic immunisation for seven out of ten infants each year, a massive improvement from only decades earlier¹⁰. However, disparities in vaccination and immunisation hamper the advancements that have been made. While 12 Sub-Saharan countries report over 71% of children 12-23 months receiving all 8 basic vaccinations, 29 countries have under 71% coverage, including 9 countries with under 39% coverage¹¹. Sub-national immunisation rates also vary. In Uganda, for example, national immunisation coverage is 55%¹¹. In the majority of regions, however, coverage is between 38% and 54%, with over 70% coverage only in two regions¹¹. Such statistics are evidence that further immunisation efforts are needed in the region.

Inadequate Infection Management and Overall Poor Quality Health Care

Inadequate infection prevention and control (IPC) is ultimately a result of inadequate quality health care and is leading to emerging problems like antimicrobial resistance (AMR). In fact, an estimated 30% of deaths due to neonatal sepsis are caused by resistant pathogens¹². To date, there is minimal research on indicators for quality of health care in LMICs¹³. Most of the studies are limited to a few health facilities and are therefore not generalisable to entire countries, let alone regions and continents¹³. Poor health outcomes among Africans, however, indicate overall weak regional health systems and quality of health care.

Efforts to address sepsis are notably cross-cutting and are critical for achieving the United Nation's targets in SDG 3: Good Health and Wellbeing (specifically targets 3.1 maternal mortality; 3.2 neonatal and under 5 mortality; 3.3 infectious diseases; 3.8 universal health coverage), which are set to expire in 2030¹⁴. Improving sepsis diagnosis, treatment and prevention will: a) improve IPC; b) reduce preventable death and its impact on the economy; c) reduce impact of AMR; d) reduce disability; e) improve neonatal health; f) improve maternal health; and g) reduce sepsis-related death among patients with infectious diseases (especially HIV, tuberculosis and malaria)¹. More broadly, addressing sepsis will improve health facilities' quality of care and strengthen health systems¹.

Benefits of taking action against sepsis

Evidence from targeted investments to address sepsis demonstrate notable returns. The United Kingdom, for example, has seen improvement in care for patients with severe infections and critical illnesses and reductions in mortality due to severe bacterial infections. In New York, a sepsis improvement mandate was met with a 50% reduction in sepsis mortality over six years in one of the United States' largest health care systems¹⁵. Similarly, early sepsis management interventions in Australia and

¹WHO Sepsis Technical Expert Meeting - Meeting report. Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO.

²African Sepsis Alliance. [2017, October 20]. Kampala Declaration. Retrieved December 21, 2018, from African Sepsis Alliance website: <https://static1.squarespace.com/static/5a058c03ace864161674ce2f/v/5a09a95c-c83025174a36b9d18/15105626218/18/Kampala+Declaration.pdf>

³Waischmann-Sruzak C, Goldfarb DM, Schlotmann P, Schlapbach U, Reinhart K, Kissoun N. The global burden of paediatric and neonatal sepsis: a systematic review. *The Lancet Respiratory medicine* 2018; 4(5): 223-30.

⁴Black RE, Laxminarayan R, Temmerman M, Walker N, eds. *Reproductive, Maternal, Newborn, and Child*

Health: Disease Control Priorities, Third Edition (Volume 2). Washington [DC]: The International Bank for Reconstruction and Development / The World Bank; 2016.

⁵World Health Organization. [2017]. Statement on Maternal Sepsis (Rep.). Retrieved January 2, 2019, from World Health Organization website: <http://apps.who.int/iris/bitstream/handle/10665/254608/WHO-RHR-1702-eng.pdf;jsessionid=34D18C637C2BFB8572AB4ND78C9B7A65?sequence=1>

⁶Say L, Chou D, Gemmel A, et al. Global causes of maternal death: a WHO systematic analysis. *The Lancet Global Health* 2016; 2(6): e323-33.

⁷World Health Organization. [2017, May 24]. Global Health Observatory (GHO) Data: Maternal mortality

Retrieved December 21, 2018, from https://www.who.int/gho/maternal_health/mortality/maternal/en/index.html

⁸Hall MJ, Williams SN, DeFrances CJ, Golosinsky A (2011) Inpatient care for septicemia or sepsis: A challenge for patients and hospitals. NCHS data brief. Hyattsville, MD: National Center for Health Statistics DOI: <http://www.cdc.gov/nchs/data/databriefs/db022.htm>

⁹World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). [2017]. Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines. Geneva, Licence: CC BY-NC-SA 3.0 IGO.

Uganda resulted in sepsis patients' faster receipt of antibiotics and fluid resuscitation and lower mortality rates^{16,17}.

More broadly, coordinated efforts by the Global Sepsis Alliance (GSA) and their regional body, the African Sepsis Alliance (ASA), present promising effects of advocacy and partnership building in the fight against sepsis. Direct results from the ASA's work include a) the Kampala Declaration published in October 2017 and signed by over 3000 people in more than 150 countries committing to improving care for sepsis patients and severely ill patients in Africa; and b) the Khartoum Resolution published in February 2018 as a commitment to work with the Khartoum Ministry of Health to organise a sepsis conference for African Ministers of Health^{2,18}. The GSA/ASA model has even been adopted by the national Sudan Sepsis Alliance—which won the 2017 GSA Award for its accomplishments in sepsis care and awareness¹⁸.

What is needed to prevent sepsis in Africa?

Awareness, Education and Training

Despite its massive death toll, sepsis remains widely unknown and under-prioritised—by the general public, health care workers, and influential decision-makers. In fact, sepsis under-diagnosis

and under-reporting are consequences of the lack of awareness on sepsis as well as drivers of its under-prioritisation. Targeted advocacy and awareness campaigns are therefore urgently needed.

In addition, health practitioners' education and training need to integrate IPC, including how to identify, diagnose, treat and prevent sepsis¹. An up-to-date global clinical management sepsis guide is needed and once developed, health practitioners should be trained to use the guidelines¹. Priority health practitioners include medical and other allied health students, doctors, nurses and midwives—who have a unique role in addressing sepsis among women and newborns¹.

Data, Research and Evidence

Unlike other major killers, little is known about sepsis, particularly in Africa. Because data on sepsis are not collected, its real burden is unknown. Therefore, sepsis needs to be measured—including the number of sepsis cases, deaths attributable to sepsis, and cost of treating sepsis patients. Further research on sepsis is needed to fill critical knowledge gaps. Priority research questions/areas particularly in LMICs and across Africa include:

1. Robust LMIC-relevant clinical trials of novel treatments and clinical management bundles

2. Measuring and identifying sepsis in health centres and communities within low-resource settings (where 60-80% of sepsis cases are acquired)¹
3. Identifying best practices for integrating sepsis and IPC into health systems
4. Understanding country-specific contexts for sepsis, including economic impact¹
5. Case studies on (un)successful interventions, programmes and policies addressing sepsis
6. Observational studies to optimise clinical diagnosis, management and policy¹ including:
 - a. Comparison and validation of case definitions
 - b. Evaluation of laboratory tests (including biomarkers) which could be helpful in LMICs
 - c. Aetiological identification, including endemic diseases not common in HICs

Improved sanitation and hygiene in health care facilities

Because of the strong link between sepsis and infection, sanitation and hygiene need to be improved in health service facilities. This improvement includes providing access to clean drinking water, increased compliance with hand washing, sanitary food preparation, and sterilising medical tools and equipment⁹. Such measures should be prioritised as they are extremely cost-effective, especially in low-resource environments.

Improving sepsis diagnosis, treatment and prevention will:

Benefits of taking action against sepsis

Efforts to address sepsis are notably cross-cutting and are critical for achieving the United Nation's targets in SDG 3: Good Health and Wellbeing, specifically targets 3.1 maternal mortality; 3.2 neonatal and under-5 mortality; 3.3 infectious diseases; 3.8 universal health coverage.



¹⁶World Health Organisation. (2015). Africa Regional Strategic Plan for Immunizations: 2014-2020 (Rep.). Retrieved December 21, 2018, from http://www.afro.who.int/sites/default/files/2017-06/oms-ivb-rap-afr-en-20150408_Final_seri140317_0.pdf#page=1

¹⁷USAID. STACompiler. The DHS Program. Received all 8 basic vaccinations. Retrieved January 7, 2019, from <https://www.statcompiler.com/en/#1>

¹⁸Laxminarayan R, Matiaso P, Pant S, et al. Access to effective antimicrobials: a worldwide challenge. *Lancet* 2016; 387(10014): 168-75.

¹⁹Kruk, M. E., Kelley, E., Syed, S. B., Tarp, F., Addison, T., & Akachi, Y. (2017, June). Measuring quality of health-care services: What is known and where are the gaps? *Bulletin of the World Health Organization*. Retrieved December 21, 2018, from <https://www.who.int/bulletin/volumes/95/6/17195099/en/>

²⁰United Nations (2015). Sustainable Development Goals. New York City, New York.

²¹Doeffler, M. E., D'Angelo, J., Jacobsen, D., Jarrett, M. F., Kaboreniel, A. I., Masick, K. D., ... Site, L. (2015). Methods for Reducing Sepsis Mortality in Emergency Departments and Triage Units. *The Joint Commission Journal on Quality and Patient Safety*, 41(5). doi:10.1016/s1553-7250(15)41027-x

²²Burrell, A. R., McLaws, M., Fullick, M., Sullivan, R. B., & Sindhushake, D. (2016). SEPSIS KILLS: Early intervention saves lives. *The Medical Journal of Australia*, 204(2), 73. doi:10.5694/mja15.00657

²³Jacob, S. T., Banura, P., Baeten, J. M., Moore, C. C., Meya, D., Nakyingi, L., ... Scheld, W. M. (2012). The impact of early monitored management on survival in hospitalized adult Ugandan patients with severe sepsis. *Critical Care Medicine*, 40(7), 2050-2058. doi:10.1097/ccm.0b013e31824e65d7

²⁴African Sepsis Alliance. (2018, February 14). International Sepsis Conference in Sudan & Khartoum Resolution. Retrieved January 16, 2019, from <https://www.worldsepsisday.org/news/2018/2/14/international-sepsis-conference-in-sudan-khartoum-resolution>

Improved access to vaccinations

To reduce risk of infection, vaccinations are imperative. Immunisations are key public health interventions, and many existing vaccines can prevent causes of sepsis (e.g., meningitis, pneumonia, cholera, typhoid). Governments should prioritise these preventive strategies, using international recommendations and local knowledge to design and administer their immunisation programmes.

Integrated sepsis prevention and control into health systems and disease surveillance

Sepsis often occurs because of a failure of the health system. It frequently reflects the fact that IPC measures are not in place (including AMR preventive measures), sanitation, hygiene and quality of health care are substandard, and/or health practitioners are not adequately trained and supported. Due to its intersectional nature, sepsis cannot be addressed as an isolated health issue. To comprehensively address sepsis, sepsis prevention and treatment must be incorporated into broader health systems, IPC and disease surveillance. As such, sepsis prevention and management should constitute key indicators of health care quality and health systems' performance.

Actionable policy recommendations to address sepsis in Africa

The following recommendations are based on existing evidence on sepsis and build upon the aforementioned conditions that are needed to prevent sepsis in Africa.

Declare sepsis a national/ regional health and research priority

In May 2017, the World Health Assembly passed a resolution making sepsis a global health priority¹⁹. Announcing sepsis a national or regional health priority will bring much needed awareness, resources (money, donors, stakeholders) and interest (research, data collection) to the issue. Research priorities should also be outlined, in line with country and region-specific data.

Develop a national sepsis action plan and implementation guide

The World Health Assembly's 2017 resolution recommends member states develop national action plans to improve sepsis prevention, recognition, management, and rehabilitation (countries can use the World Health Organisation's national sepsis action plan template once it is developed)¹⁹. The action plans should have corresponding implementation guides with performance indicators and targets to ensure policy is translated into practice. The action plans and implementation guides should include budget allocations with anticipated short and long-term funding sources.

Institute national technical working groups on sepsis

Coordinated action by various stakeholders is needed to comprehensively address sepsis. National technical working groups, led by Ministries of Health, are impactful platforms to synchronise cross-sector stakeholder action, avoid duplication of efforts and maximise impact.

Include sepsis as an indicator for quality of health care

Data on infection and sepsis-related death should be used as performance indicators for health facilities and entire health systems. Experts posit that as sepsis prevalence and mortality decrease, the overall quality of care and strength of health systems will increase. The United Kingdom's example of introducing national quality improvement targets for screening of critically ill patients for sepsis, rapid administration of antibiotics and antibiotic stewardship offer promising indicators for improved sepsis care²⁰.

Develop and implement sepsis improvement projects at hospital, regional and national level

Quality improvement projects are required in African countries to assess the impact of single or multi-faceted interventions. While documented sepsis improvement mandates and programmes have improved outcomes in HICs, similar efforts are required in Africa. Expense related data should also be collected to track the cost-effectiveness of interventions and to inform budget allocations needed to adequately address sepsis.

CONCLUSION

Sepsis is a massive global burden, particularly afflicting LMICs which include much of Africa. Collective and concerted action is urgently needed to save lives and avoid deaths from sepsis. Priority investments include raising awareness on sepsis, filling in data and evidence gaps on sepsis, and integrating sepsis into health systems' IPC and disease surveillance.

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¹⁹World Health Assembly. (2017). Improving the prevention, diagnosis and clinical management of sepsis, Agenda Item 12.2, WHA70.7, World Health Assembly Resolution.

²⁰NHS England. (2017, July 17). CQUIN Indicator Specification Information on CQUIN 2017/18 - 2018/19 (Annex). Retrieved January 16, 2019, from NHS England website: [https://www.](https://www.england.nhs.uk/wp-content/uploads/2017/07/cquin-indicator-specification-information-january-2019.pdf)

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