



Brief summary

29th June 2021

The quality of laboratory blood culture testing at five regional hospitals in Uganda needs to be improved¹

¹Reference: Kisame, R.; Najjemba, R.; van Griensven, J.; Kitutu, F.E.; Takarinda, K.; Thekkur, P.; Delamou, A.; Walwema, R.; Kakooza, F.; Mugerwa, I.; et al. Blood Culture Testing Outcomes among Non-Malarial Febrile Children at Antimicrobial Resistance Surveillance Sites in Uganda, 2017–2018. *Trop. Med. Infect. Dis.* 2021, 6, 71. <https://doi.org/10.3390/trropicalmed6020071>.

e-mail:
kisamerogers@yahoo.co.uk

Key Messages

- Analysis of results of 959 blood culture samples at five regional hospitals in Uganda revealed that patient management may have been negatively affected as the tests were not performed to the required standard.
- Failure to perform the laboratory blood culture tests appropriately, results in less data to inform national treatment guidelines and antimicrobial resistance (AMR) prevention and control strategies.
- More effective use of available resources could be achieved by optimization and routine monitoring of each stage in the blood culture process. This should improve the quality of patient care and AMR surveillance.

What is the problem and why is it important?

Bloodstream infections due to multidrug-resistant bacteria are a growing public health threat globally. Laboratory blood culture testing plays an important role in diagnosing and effectively treating these infections. Failure to perform these tests to the required standard could result in the selection of less appropriate antimicrobials for a patient.

Inconsistent compliance to laboratory standards for 1) growing of bacteria (culture), 2) separating grown bacteria from a mixed population (isolation), 3) confirming the type of bacteria (identification), and 4) determining their resistance to specific antimicrobial agents (antimicrobial susceptibility testing), and poor reporting means there is less routine data to inform national treatment guidelines and antimicrobial resistance prevention and control strategies.

This research assessed laboratory blood culture process outcomes from hospitalized children aged below five years at five regional hospitals, and the extent to which the required standards were met.

How did we measure it?

We reviewed 959 records of children with a fever but no malaria who received a blood culture test between October 2017 to September 2018 at five regional hospitals. These data were reviewed against agreed national standards for performing and reporting antimicrobial susceptibility testing data for patient management and antimicrobial resistance surveillance.

Optimal blood culture testing targets*

Culture and isolation

Indicator 1: % of specimen with bacteria growth

Target: 6-12%

Indicator 2: number of bacteria organisms isolated (denominator for next steps in the process)

Pathogen identification

Indicator: % of bacterial organisms completely identified

Target: 80%

Antimicrobial Susceptibility Testing

Indicator: % of identified bacterial organisms subjected to antimicrobial resistance testing

Target: 80%

Data completeness

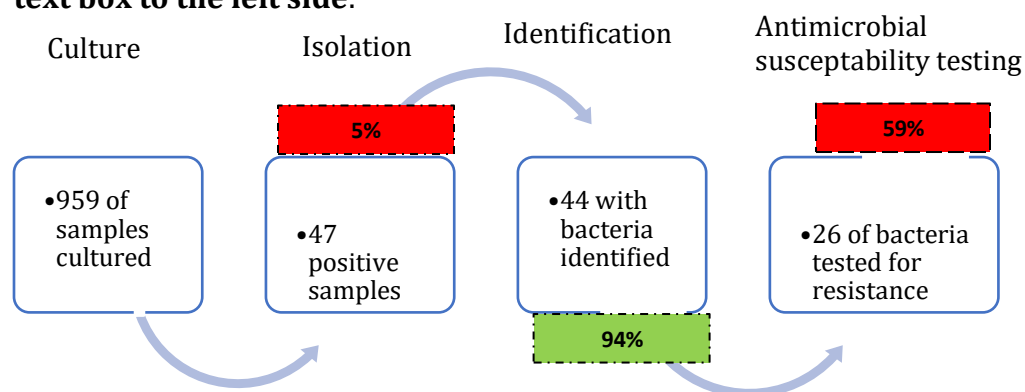
Indicator: % of complete data for a specific set of reporting variables

Target: 80%

**Clinical and laboratory Standards Institute, 2007*

What did we find?

- Of the 959 cultured blood specimen, only 5% had disease-causing bacteria, which is below the accepted 6–12% performance threshold (target). This is likely to reflect poor laboratory practice.
- Recording of specimen and laboratory parameters was inadequate and none of the laboratories consistently documented or monitored recognised quality indicators.
- For the quality indicators that were monitored across the testing process, none of the laboratories met established targets for culture and isolation as well as antimicrobial susceptibility testing as shown in the figure below. Established blood culture performance targets are detailed in the **text box to the left side**.



- Only 40% of antimicrobial susceptibility testing data met the required reporting requirements, which is far below the 80% data completeness targets (**text box to the left side**).

Implications

- Poor blood culture performance may lead to poor patient management. This could prolong the length of hospital stay and increase mortality.
- The low bacterial recovery reduces the amount of routine laboratory data to guide the development/review of treatment guidelines and antimicrobial resistance containment strategies.
- Hospitals should optimize and routinely monitoring each stage in the blood culture process to improve the support to clinicians and patients.
- If the national AMR coordination committee supports the establishment of a strategy to improve blood culture testing and data management processes at the site level, we could make more effective use of the available resources. This would enhance the reliability of lab data for clinical care and surveillance.