

## Summary brief

October 2022

### Blood culture and drug susceptibility testing at the Ho Teaching Hospital: too little, too late.<sup>1</sup>



*Inappropriate antibiotic use drives antimicrobial resistance.*

#### Key Messages

1. Bacteria in the bloodstream create infections that cause severe illness and even death. Treatment requires appropriate and rational use of antibiotics.
2. Blood cultures test for the type of bacteria present to help guide physicians in selecting the right antibiotic for treatment.
3. A study at the Ho Teaching Hospital (HTH) showed that 92% of the time, doctors did not request these tests despite their value in guiding antibiotic treatment.
4. Further studies should focus on understanding the reasons for the low uptake of blood cultures among HTH doctors, as well as the gaps in laboratory procedures for processing blood cultures. This can feed into designing and enforcing protocols for requesting and conducting blood cultures and for prescribing antibiotics in these cases.

#### What is the problem and why is it important?

Bloodstream infections are very common and can shut down major organs like the heart, the kidney and the brain. Inappropriate treatment can result in death. Between 2019 and 2021, 14% of all people admitted to the Ho Teaching Hospital (HTH) had at least one bloodstream infection<sup>1</sup>, making it one of the most common reasons for admission to the facility. Antibiotics form the mainstay of treatment, but deciding the most appropriate one for each patient should ideally be guided by the results of blood culture and drug susceptibility tests. Two studies at the HTH between 2019 and 2020 showed that antibiotics were prescribed for most inpatients, including newborns, without the necessary laboratory tests that can identify the right antibiotic for the specific infection. Without these tests to guide treatment, patients risk being treated with the wrong antibiotic. This can result in delayed recovery, increasing healthcare costs and premature death.

#### How did we measure it?

A consortium of researchers from the School of Medicine of the University of Health and Allied Sciences and the HTH examined the electronic health records for all persons admitted to the HTH from January 2019 to December 2021. In all inpatients who were clinically diagnosed or suspected of a bloodstream infection, we looked for those who had blood culture requests and at what point during their admission these were issued. We also analysed the usefulness of the test results for their treatment by determining the laboratory turnaround time for testing. We analysed the results of their blood culture and drug

susceptibility tests in order to determine which pathogens were responsible for their infections and the levels of antibiotic resistance.

---

### What did we find?

Results on the use and quality of testing both at the clinical and the laboratory levels are as follows:

*Low use of blood cultures results in the inefficient use of human resources, laboratory supplies, medicines and time.*

1. Of the 4,278 patients in our study, doctors did not request blood culture and drug susceptibility testing in 92% of the cases. This included the most vulnerable patient population - newborns with sepsis.
2. For the 8% who had the requests, there was a delay of 2 days (median) in making that decision, by which time these patients were already on non-targeted antibiotic therapy. This explains the low yield of the test, with over 75% of samples not growing any organism at all.
3. About 15% of the samples grew only contaminants, implying inadequate sample collection techniques.
3. The time from admission to test result was 10 days (median), with the results thereby arriving too late to impact clinical management.
4. For all the 22 disease-causing bacteria isolated, some of the antibiotics tested were inappropriate for the specific bacteria, further limiting the clinical usefulness of the test result.

### Implications and Recommendations

These delays and substandard blood collection practices adversely affect the quality of care provided at the HTH and risk the health and lives of its patients. For instance, the compounding delays in deciding to test and in laboratory processing puts vulnerable patients, like the newborns, at greatest risk as they usually die within days without the appropriate treatment. For them and other patients, it is definitely too little, too late. To resolve these issues, we suggest these four measures.

1. The Medical Director of HTH, together with the Director of Research, Policy, Planning, Monitoring and Evaluation, should initiate and fund further studies to investigate:
  - a. Reasons for the low acceptability of blood culture and drug susceptibility testing among doctors of the facility.
  - b. Reasons for the long laboratory turnaround times.
  - c. Patient outcomes in these cases.
2. Based on the findings of these new studies (in point 1 above), the HTH Medical Director should establish and enforce an evidence-informed and feasible protocol for blood culture and drug susceptibility testing in HTH.
3. The Laboratory Quality Officer should improve the internal quality control measures for the conduct of blood cultures with drug susceptibility testing.
4. The UHAS-HTH Antimicrobial Stewardship Committee should establish and enforce guidelines for the appropriate and rational use of antibiotics for the management of bloodstream infections.

<sup>1</sup>Use and Quality of Blood Cultures for the Diagnosis of Blood-stream Infections: A Cross-sectional Study in the Ho Teaching Hospital, Ghana, 2019-2021. [under review]

e-mail: ebyiadom@uhas.edu.gh

