Are Laboratory Services Coming of Age in Sub-Saharan Africa?

Imelda Bates¹ and Kathryn Maitland²³
¹Tropical Haematology, Liverpool School of Tropical Medicine, Liverpool, and ²Imperial College of the United Kingdom, London, United Kingdom; and ³The Centre for Geographic Medicine Research, Kenya Medical Research Institute, Kilifi, Kenya

(See the viewpoint by Petti et al. on pages 377–82)

In this issue of Clinical Infectious Diseases, Petti and colleagues [1] highlight the need for increased investment in laboratory services to avoid compromising patient care. Health care professionals are waking up to the realization that the development of new drugs and treatment strategies has far outstripped the ability of health care systems to deliver them to individuals who need them. The decision has been made by leading global health care funders that cost should not be a deterrent to providing effective treatment, even in the poorest countries. As a result, there are major drives to rapidly increase availability of antiretroviral drugs and antimalarial combination therapies. A similar and potentially stronger argument for prioritizing effectiveness over cost pertains to the provision of accurate frontline diagnostic services. Yet, as Petti and colleagues [1] illustrate, there is widespread use of “empiricism without laboratory support for diagnosing disease” in sub-Saharan Africa, which would not be tolerated in resource-plenty countries.

What can be done to redress the imbalance and bring investments in diagnostics to a level that will support cost-effective deployment of available treatment regimens in sub-Saharan Africa? Let us consider how this might be achieved by exploring opportunities within the major areas of concern discussed by Petti et al. [1]: clinical misdiagnosis, inadequate health care infrastructure, and laboratory capability and diagnostic accuracy. Almost none of these opportunities can be realized by laboratory services in isolation; they depend on close partnerships between technical and clinical professionals and local and national health care managers.

CLINICAL MISDIAGNOSIS

For many common infections in sub-Saharan Africa, including severe and non-severe malaria and septicemia, clinical diagnosis is not adequately sensitive or specific. Because malarial and bacterial infections share similar presenting features, syndromic management [2] results in overtreatment of both conditions, increasing the expense and threatening the longevity of the limited repertoire of inexpensive antimicrobials. Often, frontline medical personnel have to make immediate clinical decisions on the basis of a limited number of diagnostic tests. Equally important are the refinement of this initial diagnosis and the targeting of therapies over the ensuing hours and days, which is greatly facilitated by good diagnostic facilities; thus, the laboratory is the most important determinant in this process. Ideally, rapid and accurate diagnostic testing would be available at the first consultation, to enable personnel to make the correct diagnosis and to avoid the waste of resources and increased ill health associated with incorrect initial diagnoses. In some cases, such diagnostic tools are available but are not in routine use, because they are considered to be too expensive or because they have not been adequately evaluated in real-life situations. Such tools include rapid dipstick malaria tests, anemia and HIV tests, and finger-prick hemoglobinometric tests. Much more investment is needed to evaluate and adapt existing tools and to develop new diagnostic approaches for common conditions. This is likely to be most effectively achieved through partnerships between researchers, policy makers, and commercial companies that are similar to the programs that have been used for drug development (e.g., Medicines for Malaria Venture). The availability of such diagnostic tools is not likely to greatly impact clinical care unless their use is underpinned by evidence-based guidelines that are implemented, supervised, audited, and embedded within local practice. The process of producing guidelines is based on the synthesis of published evidence from diverse sources and then adaptation to suit local circumstances, and it needs to involve collaboration between clinicians and laboratory professionals. A proposal to simplify the complex process of guideline development has been proposed recently by Raine et al. [3].
INADEQUATE HEALTH CARE INFRASTRUCTURE

Laboratory services are one of the most neglected areas of health care provision in sub-Saharan Africa and are disproportionately affected by the staff shortages, poor communications, inadequate equipment, low morale, and lack of training that impinge on all those involved in delivering health care in poorer African countries. The reforms currently underway in the health care sector in many sub-Saharan African countries and the consequent decentralization of planning and financing could be used as an opportunity for laboratory services to move up on the priority list of essential services. This will only happen if laboratories represent themselves on key decision-making bodies, rather than being represented by other sections of health care services, such as pharmacy. Within top-level management, the voice of clinicians is generally much more powerful than that of laboratory professionals. Clinicians therefore have a responsibility to support and advocate for their technical colleagues in the laboratory service, to ensure that they are involved in decisions affecting the laboratory at all levels, and to promote, facilitate, and demand high-quality and responsive laboratory support for effective patient care.

LABORATORY CAPABILITY AND DIAGNOSTIC ACCURACY

The fact that a test was done by a senior technician or that it was performed on a sophisticated piece of equipment in no way guarantees the accuracy of the results. Establishing, maintaining, and demonstrating the accuracy of diagnostic tests is a major challenge for most laboratories in sub-Saharan Africa. To do this, they need to have the skills and resources to institute regular internal quality checks for each test, reliable documentation processes, and access to an external reference center that is itself linked to and accredited by international quality-assessment networks. Laboratories must be able to show that they perform well in such an external quality-assessment scheme before clinicians can be confident that the results of tests they request will be accurate. The complexity and cost of setting up and maintaining such a quality-assurance system means that only a very few laboratories, almost exclusively those that are tertiary or privately owned, can provide evidence that their results are accurate. There are a few examples of innovative local schemes for simple external quality checks on key laboratory tests—for instance, sending blood samples, malaria slides, or sputum smears for tuberculosis diagnosis to neighboring laboratories and then meeting regularly to compare results and to reflect on any discrepancies. In addition, there are particularly good examples of local quality-assurance systems designed to evaluate testing in tuberculosis control programs that could be expanded to include the malaria test (another microscopy-based test) and further extended to other essential laboratory investigations, such as hemoglobin and transfusion-related tests. Even these local schemes require a high degree of motivation and organization by the laboratory staff, as well as support from clinicians and regional or national health care managers. Quality-assurance networks are one of the areas in which nongovernmental organizations and the private sector could play a much greater role, particularly in places where governmental health care systems are ineffective or dysfunctional. Outsourcing external quality assessment to such agencies would bring many mutual benefits, especially because many of the public-sector laboratory staff also work in the private sector.

The current international focus on rapidly widening the access to antiretrovirals can be perceived as either a threat to or an opportunity for laboratory services in sub-Saharan Africa. It is a potential threat because strong vertical programs concerned with HIV care and management focus on the HIV-related aspects of laboratory services, thereby fragmenting the service and diverting scarce resources, particularly human resources, away from important non-HIV tests, such as those for malaria, anemia, and tuberculosis. On the other hand, if laboratory aspects of HIV programs are able to integrate into and strengthen existing systems, they will provide a unique opportunity to build the capacity of long-neglected laboratory services in sub-Saharan Africa.

It is very surprising that the article by Petti et al. [1], which is wholly concerned with the provision of laboratory services in sub-Saharan Africa, does not include an African author. Is this indicative of the dearth of indigenous laboratory advocates in sub-Saharan Africa? As treatment costs for common conditions increase in poorer countries, the balance must shift away from syndromic management toward achievement of specific diagnoses. Laboratory services will have an increasingly important role to play in improving the quality and effectiveness of patient care, but, to do this, laboratories and their advocates need to be given a much louder voice on the international health care stage.

Acknowledgments


References