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<p>If it is accepted that health care access to diagnosis and treatment is a universal human right, the principal challenge is how to deliver that health care to all people. Health systems that function are the most effective way to deliver such care; these health systems should cover all of the diseases facing a population. The central role of laboratories in making medical decisions is crucial. If organizations engaged in health systems building tackle a disease category, such as cancer, multiple modalities within and outside of the laboratory have to be improved or installed to make an effective system.</p>	
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<p>Volunteerism in pathology is an uncommon experience. This article attempts to shed light on this experience based on guided narrative interviews. The authors' interviews suggest that prototypical pathology volunteers participate in long-term missions, tend to be later in their careers, are motivated by personal reasons, get involved in volunteering through nongovernmental organizations, focus on capacity building, and at least partially self-fund their efforts.</p>	
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<p>Like in all areas of science, it is important for funders and investigators of pathology to work together to develop a well-designed, well-executed clinical research agenda. In the first section of this article, the authors discuss how the National Institutes of Health (NIH) peer-review process applies to global health pathology research projects. Then, the authors present an illustrative sampling of NIH-funded projects with performance sites in low- and middle-income countries with 2 examples focused on cancer and anatomic pathology. Finally, the authors relate the research agenda to overarching strategic recommendations for enhancing global pathology.</p>	
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<p>Quality patient care requires correct and timely evidence-based diagnoses. Pathology and laboratory medicine training varies significantly across the continent but is inadequate to serve the needs of the population. This article summarizes the current state of pathology workforce and training in sub-Saharan Africa, discusses challenges to recruitment and retention,</p>	

and outlines the necessary elements for training and sustaining a robust workforce in pathology and laboratory medicine. The authors provide several case studies of institutions around the continent that include expansion of existing programs, a de novo program, South-South collaborations, and skill building for the existing workforce.

**From Access to Collaboration: Four African Pathologists Profile Their Use of the Internet and Social Media**

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Julia Royall, Micongwe Moses Isyagi, Yawale Iliyasu, Robert Lukande, and Edda Vuhahula

The shared practice of pathology via the Internet holds great potential for pathologists in sub-Saharan Africa (SSA) and their global partners. Application of the Internet is constrained by issues of bandwidth, cost, and power. The penetration of mobile telephony and the arrival of smartphones have changed the use of Internet and social media in Africa and therefore the work of the 4 African pathologists featured in this article. As pathology in SSA struggles for visibility and usefulness, the Internet and its electronic applications provide a critical infrastructure as well as a podium for pathologists across the continent.

**Pathology-Based Research in Africa**

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Maria P. Lemos, Terrie E. Taylor, Suzanne M. McGoldrick, Malcolm E. Molyneux, Manoj Menon, Steve Kussick, Nonhlanhla N. Mkhize, Neil A. Martinson, Andrea Stritmatter, and Julie Randolph-Habecker

The process of conducting pathology research in Africa can be challenging. But the rewards in terms of knowledge gained, quality of collaborations, and impact on communities affected by infectious disease and cancer are great. This article reviews 3 different research efforts: fatal malaria in Malawi, mucosal immunity to HIV in South Africa, and cancer research in Uganda. What unifies them is the use of pathology-based approaches to answer vital questions, such as physiology, pathogenesis, predictors of clinical course, and diagnostic testing schemes.

**Lymphoma and Pathology in Sub-Saharan Africa: Current Approaches and Future Directions**

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Tamiwe Tomoka, Nathan D. Montgomery, Eric Powers, Bal Mukunda Dhungel, Elizabeth A. Morgan, Maurice Mulenga, Satish Gopal, and Yuri Fedoriv

The care of patients with lymphoma relies heavily on accurate tissue diagnosis and classification. In sub-Saharan Africa, where lymphoma burden is increasing because of population growth, aging, and continued epidemic levels of human immunodeficiency virus infection, diagnostic pathology services are limited. This article summarizes lymphoma epidemiology, current diagnostic capacity, and obstacles and opportunities for improving practice in the region.

**Building Laboratory Capacity to Strengthen Health Systems: The Partners In Health Experience**

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Juan Daniel Orozco, Lauren A. Greenberg, Ishaan K. Desai, Fabienne Anglade, Deogratias Ruhangaza, Mira Johnson, Louise C. Ivers, Danny A. Milner Jr, and Paul E. Farmer

The diagnostic laboratory is essential to patient care and to the achievement of health equity. Through the development of quality

laboratories in settings burdened by poverty and weak health systems, Partners In Health has demonstrated the critical contributions of clinical laboratories to the care of patients with HIV, tuberculosis, and cancer, among other conditions. The lessons learned through the organization's experience include the importance of well-trained and well-supported staff; reliable access to supplies, reagents, and diagnostic equipment; adequate facilities to provide diagnostic services; the integration of laboratories into networks of care; and accompaniment of the public health sector.

**Building Cross-Country Networks for Laboratory Capacity and Improvement** 119

Miriam Schneidman, Martin Matu, John Nkengasong, Willie Githui, Simeon Kalyesubula-Kibuuka, and Kelly Araujo Silva

Laboratory networks are vital to well-functioning public health systems and disease control efforts. Cross-country laboratory networks play a critical role in supporting epidemiologic surveillance, accelerating disease outbreak response, and tracking drug resistance. The East Africa Public Health Laboratory Network was established to bolster diagnostic and disease surveillance capacity. The network supports the introduction of regional quality standards; facilitates the rollout and evaluation of new diagnostic tools; and serves as a platform for training, research, and knowledge sharing. Participating facilities benefitted from state-of-the-art investments, capacity building, and mentorship; conducted multicountry research studies; and contributed to disease outbreak response.

**Strengthening Laboratory Management Toward Accreditation, A Model Program for Pathology Laboratory Improvement** 131

Linda R. Andiric, Lawrence A. Chavez, Mira Johnson, Kenneth Landgraf, and Danny A. Milner Jr

The Strengthening Laboratory Management Toward Accreditation (SLMTA) program and subsequent Stepwise Laboratory Quality Improvement Process Toward Accreditation (SLIPTA) checklist were a response to the need for high-quality laboratories to combat the human immunodeficiency virus (HIV) epidemic and provide patients with the highest-quality care. The two tools work together to create a culture of quality in laboratories and allow the identification of gaps. The ultimate goal for any laboratory is to achieve a standard benchmark for quality, and these programs have been highly successful in initially affecting the HIV epidemic but continuously improving laboratory quality across all diseases.

**Practical Successes in Telepathology Experiences in Africa** 141

Nathan D. Montgomery, Tamiwe Tomoka, Robert Krysiak, Eric Powers, Maurice Mulenga, Coxcilly Kampani, Fred Chimzimu, Michael K. Owino, Bal Mukunda Dhungel, Satish Gopal, and Yuri Fedoriw

Across much of Africa, there is a critical shortage of pathology services necessary for clinical care. Even in settings where specialty-level clinical care, such as medical oncology, is available, access to anatomic pathology services has often lagged behind. Pathology laboratories in the region are challenging to establish and maintain. This article describes the

successful implementation of telepathology services in Malawi and reviews other successful programs developed to support diagnostic pathology in resource-limited settings.

**World Health Organization List of Priority Medical Devices for Cancer Management to Promote Universal Coverage**

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André M. Ilbawi and Adriana Velazquez-Berumen

Universal coverage of basic laboratory services is fundamental to achieving sustainable development goals and attaining health for all. Yet, comprehensive laboratory services are unavailable to large percentages of the global population. To help policymakers identify a basic package of services for cancer, the World Health Organization (WHO) published Priority Medical Devices for Cancer Management. The package of services includes key interventions, associated devices and technologies, and the requirements for health workforce and infrastructure. These services must be linked to national strategic policies and plans and regulatory and quality assurance processes.

**Breast Cancer in Low- and Middle-Income Countries: Why We Need Pathology Capability to Solve This Challenge**

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Yehoda M. Martei, Lydia E. Pace, Jane E. Brock, and Lawrence N. Shulman

Breast cancer is the leading cause of cancer mortality among women in developing countries. Timely and accurate histopathologic diagnosis of breast cancer is critical to delivering high-quality breast cancer care to patients in low- and middle-income countries (LMIC). The most important prognostic factors in breast cancer along with tumor size and nodal status are tumor grade, estrogen receptor status, as well as HER2 status in countries where specific targeted therapies are available. In addition, detailed and complete cancer registry data are needed to assess a country's disease burden and guide disease prioritization and allocation of resources for breast cancer treatment. Innovations in leapfrog technology and low-cost point-of-care tests for molecular evaluations are needed to provide accurate and timely pathology, with the ultimate goal of improving survival outcomes for patients with breast cancer in LMIC.

**Cytopathology in Low Medical Infrastructure Countries: Why and How to Integrate to Capacitate Health Care**

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Andrew S. Field

Fine-needle aspiration cytology is a rapid, accurate, minimally invasive, inexpensive biopsy technique requiring minimal laboratory infrastructure and proceduralist costs. It provides infectious and noncommunicable disease diagnoses and will play an essential role in the establishment of cancer services in low-income and middle-income countries (LMICs). The use of molecular and other ancillary tests on cytology material is rapidly expanding in high-income countries and will spread to LMICs. Establishing cytology services requires increased training of cytopathologists and cyto-technologists, increased education of clinicians in the use of diagnostic cytopathology, and commitment and funding from governments and specialist training groups.

**Biospecimens and Biobanking in Global Health****183**

Maimuna Mendy, Rita T. Lawlor, Anne Linda van Kappel, Peter H.J. Riegman, Fay Betsou, Oliver D. Cohen, and Marianne K. Henderson

Biobanks provide a critical infrastructure to support research in human health. Biospecimens and their accompanying data are increasingly needed to support biomedical research and clinical care. The original text was initially published in the Handbook for Cancer Research in Africa. The value of this publication is great because it underlines the importance of biobanks in Africa as a key resource to increase quality scientific research and participate in global health research. Therefore, a revision to extend these principles to other low resource contexts, include updated material and references, and add the topic of biobank sustainability was relevant.