HEALTH SERVICES RESEARCH

Multisector Collaborations and Global Oncology: The Only Way Forward

Charmaine Blanchard, MD[1]; Buhle Lubuzo, MMedSc[2]; Frederick Chite Asirwa, MD[3]; Xolisile Dlamini[4]; Susan C. Msadabwe-Chikuni, MD[5]; Michael Mwachiro, MBChB[6]; Cyprien Shyirambere, MD[7]; Deo Ruhangaza, MD[7]; Dan A. Milner, Jr, MD, MSc, MBA[8]; Katherine Van Loon, MD, MPH[9]; Rebecca DeBoer, MD[9]; Phangisile Mtshali, BA[10]; Ute Dugan, MD, PhD[11]; Ellen Baker, MD, MPH[12]; and Lawrence N. Shulman, MD[13]

abstract

PURPOSE At the 12th meeting of AORTIC (African Organization for Research and Training in Cancer) in Maputo, Mozambique, held between November 5 and November 8, 2019, a special workshop was organized to focus on the need for collaboration and coordination between governments and health systems in Africa with academic, industry, association, and other nongovernmental organizations to effect sustainable positive change for the care of patients with cancer.

METHODS Representatives from seven different projects in Africa presented implementation science and demonstration projects of their to date efforts in cancer system improvement including patient access, South-South partnerships, in-country specialized training, palliative care consortium, treatment outcomes, and focused pathology and diagnostic capacity building. Key partners of the various projects served as moderators and commentators during the session.

RESULTS From across all the presentations, lessons learned and exemplary evidence of the value of partnerships were gathered and summarized.

CONCLUSION The concluding synthesis of the presentations determined that with the broad needs across cancer requiring in-depth expertise at each point on a patient's journey, no single organization can effect change alone. Multipartner collaborations not only should be the norm but should also be coordinated so that efforts are not duplicated and maximum patient access to cancer diagnosis and care is achieved.

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INTRODUCTION

With the focused strengthening of basic health systems in low- and middle-income countries (LMICs) leading to better patient outcomes for maternal-child health and infectious disease, noncommunicable diseases such as cancer, heart disease, and diabetes are rapidly becoming unmasked as large health issues. The incidence of cancer is increasing worldwide with the fastest growth in LMICs. Additionally, patients in many LMICs do not have access to quality cancer care and therefore bear a disproportionate mortality burden (60% of all mortality from cancer) and higher cancer mortality rates (80% *v* 35% in high-income countries [HICs]).[1]

During the AIDS epidemic, the disease was particularly ravaging in LMICs, where healthcare infrastructure was weak and life-saving medicines were not available. Through global will and broad collaborations between governments and ministries, academic institutions, and the private sector including pharmaceutical companies, nongovernmental organizations (NGOs), and funders, rapid, successful, and sustained progress has been made, saving countless lives when antiviral therapy became available. By contrast, the diagnosis and treatment of cancer is far more complex than that of HIV because of the numerous cancer types and heterogeneous treatments across stages; requirements for various diagnostic tools including cytology, pathology, flow cytometry, and molecular diagnostics; and need for multidisciplinary care coordination. Surgical care, radiation therapy, and chemotherapy each require complex and costly infrastructure and a well-trained workforce. However, the cancer system, once established, has incredible synergy across cancers and patient types.

Because of these factors, the likelihood of establishing successful and high-quality cancer programs in LMICs might be increased through partnerships, like those established in the AIDS epidemic, between governments and ministries, academic partners, NGOs, and the private sector. The need for such collaboration is becoming increasingly clear, and a growing number of examples of successful partnerships with good results

ASSOCIATED CONTENT

Appendix

Author affiliations and support information (if applicable) appear at the end of this article.

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CONTEXT

Key Objective

At the November 2019 meeting of the African Organization for Research and Training in Cancer (AORTIC), a workshop was organized to focus on the need for collaboration and coordination between governments and health systems in Africa with academic, industry, association, and other nongovernmental organizations to effect sustainable positive change for the care of patients with cancer.

Knowledge Generated

Representatives from seven different projects in Africa presented implementation science and demonstration projects of their to date efforts in cancer system improvement including patient access, South-South partnerships, in-country specialized training, palliative care consortia, treatment outcomes, and pathology and diagnostic capacity building.

Relevance

With cancer care requiring broad areas of expertise, no single organization can effect change alone. Multipartner collaborations are critical for shared learning and so efforts are not duplicated, which will optimize advances in cancer care delivery in resource-constrained settings.

attest to it. This manuscript contains examples in support of this collaborative concept.

When establishing cancer care in resource-constrained settings, it is imperative to take a scientific approach to the project. In many circumstances, the provision of cancer care is carried out using novel approaches because of the context of the local healthcare infrastructure and resource limitations. Prospective data collection is an essential first step. Patient demographics, specifics of diagnostics, treatment, and outcomes are all essential to assess. Detailed analyses will provide critical information about the effectiveness of each component of care and will highlight areas where care is suboptimal and interventions to improve care should be developed.

Experts gathered at the meeting of the African Organization for Research and Training in Cancer (AORTIC) in November 2019, in Maputo, Mozambique. At the conference, experiences were shared and the following sections describe pilot projects from a variety of settings, each taking a unique approach to an aspect or several aspects of care. All can be appreciated for their structured efforts, robust collaborations, and scientific approaches.

IMPLEMENTATION RESEARCH AND DEMONSTRATION PROJECTS

Project 1: Lung Cancer in South Africa

Dr Charmaine Blanchard (University of Witwatersrand—Wits) and Ms Buhle Lubuzo (University of KwaZulu Natal—UKZN) presented "The Multi-National Lung Cancer Control Program (MLCCP): Overcoming barriers to lung cancer diagnosis and treatment." This project encompassed the work of two teams—one in Gauteng province (Wits) and the other in the province of KwaZulu Natal (UKZN)—which aims to identify individual and health system barriers that delay patients with lung cancer accessing help, diagnosis, and treatment within the public health system.

The Wits team first used the Delphi Method[2] and engaged members of health management (five), primary care doctors (10), nurses (10), oncologists and pulmonologists (25), palliative care clinicians (three), and NGO key leaders (10) for a total N = 63. The first round included 5-10 responses per participant to each of the three questions relating to barriers experienced, followed by a 1-day workshop for ranking, deliberation, and consensus. The consensus process was completed by 27 (43%) respondents (Table 1).

In a second approach, the UKZN team performed 19 in-depth interviews and nominal group techniques (NGT) to collect additional data. The IDI process identified similar and additional barriers (Fig 1).[3] NGT (seven respondents) identified the need for specialized resources, awareness, referral guidelines, and education or training as the priorities.

Also, the inadequacy of systems that support access to healthcare services results in the rising numbers of lung cancer fatalities in South Africa: lack of public knowledge, awareness, and stigma delay cancer diagnosis and treatment. A prevalent lack of trust is compounded by misdiagnosis, poor bedside manners, patient loads in clinics, and lack of coordination of care. Finding solutions to barriers whether they are individual- and/or health system–related is vital to facilitate increased identification, early diagnosis, and treatment to promote survival of patients with cancer.

Project 2: Cancer Care Capacity Building in the Kingdom of Eswatini

Dr Fredrick Chite Asirwa, medical oncologist and director of the International Cancer Institute (ICI) in Eldoret, Kenya, provided an overview of the successful partnership between ICI and the government of Eswatini to improve their cancer care services with the Eswatini Oncology Exchange Program. The program started with a needs assessment by Xolisile Dlamini from the Eswatini Ministry of Health (MOH)

TABLE 1. Summary of Five Most Important Barriers at Each Level of the Health System

Patient Factors—Seeking Help and Accessing Care	Primary and Secondary Services—Delay in Referral	Tertiary Hospital Services—Diagnosis and Treatment
Lack of knowledge and awareness	Inadequate knowledge and training	Inadequate diagnostic resources and biomolecular assessment
Repeated visits—misdiagnosis	Lack of guidelines or protocols	Late presentation of patients
Fears—diagnosis and stigma	Substandard or inadequate diagnostics facilities	Long waiting lists and delays
Personal and family struggles	Long delays in getting care	Absence of multidisciplinary team
Asymptomatic early lesions (T1)	Lack of symptoms for follow-up	Lack of patient-centered approach

and the identification of capacity building efforts as a major gap in cancer control. Specifically, the need for training at all levels, improvement of pathology services, expansion of physical space for clinics, implementation of supporting infrastructure, access to chemotherapy, and supplies were identified. At the onset of the program, a memorandum of understanding (MOU) was signed between ICI and the Eswatini MOH. Kenyan healthcare professionals' visits included a clinical oncologist, two pathologists, two histotechnologists, and one surgical and one medical oncologist. The National Cancer Control Plan (NCCP) was established and launched through the exchange program's collaborative work. Furthermore, the chemotherapy unit was upgraded and the MOH hired an oncologist and a pathologist. Side by side with in-person trainings in Kenya and Eswatini, a weekly multicountry virtual tumor board was created, and multiregional multidisciplinary teams were formed.

Dr Asirwa summarized the framework for future partnerships of this kind to achieve sustainable cancer care capacity objectives:

Partnering with an experienced cancer center. The Oncology Exchange Program model kick starts the process of building cancer care capacity with boots on the ground of oncologists from established cancer centers in Sub-Saharan Africa (SSA). This approach leverages established Oncology Centers of Excellence on the continent (eg, Ampath, ICI Kenya) for resource-constrained settings and can establish local multidisciplinary teams for cancer diagnosis and treatment at country's central hospital(s). It also leverages telemedicine for tumor boards, patient case discussions, pathology, and training. Importantly, the approach easily establishes referral mechanisms for specialized cancer treatments with cancer centers in geographic proximity. This model can be applied to other

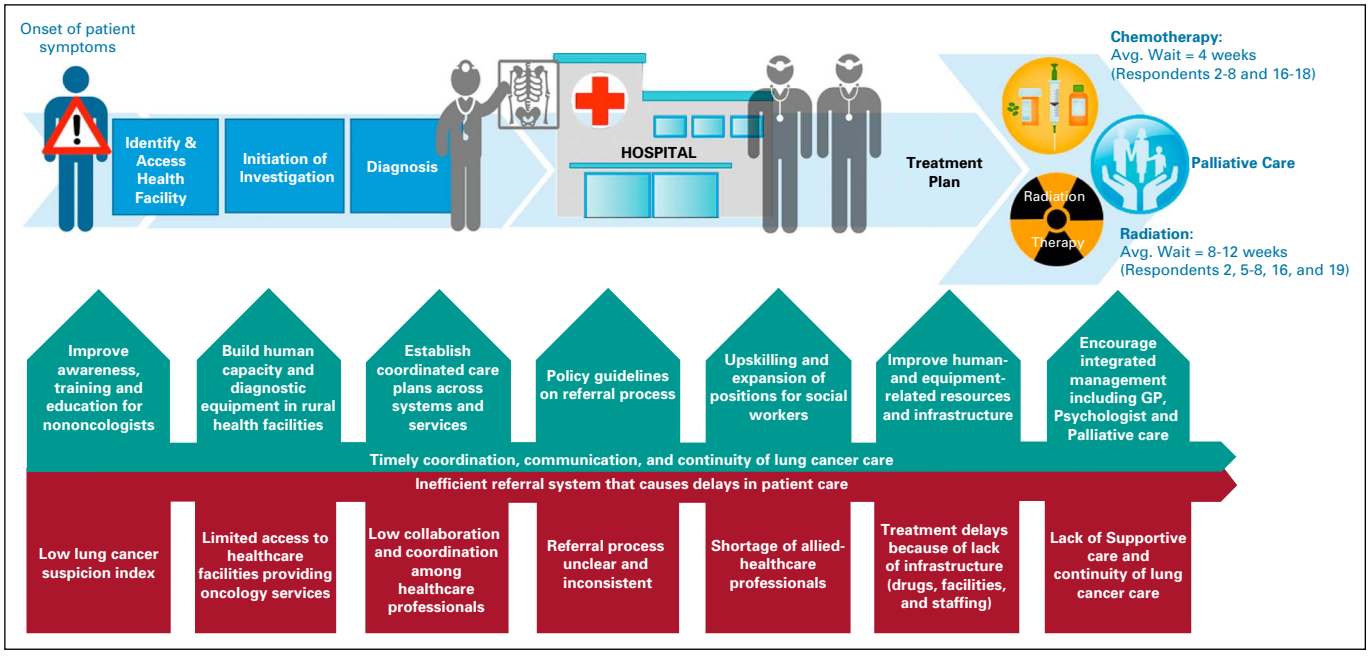

FIG 1. IDI generated data on the diverse issues regarding barriers to lung cancer care. IDI, in-depth interviews.

resource-constrained settings and serves as a culturally appropriate model for South-South and North-South collaborations as well.

Partnering with the country's MOH. To be successful, the partnership must be based on engagement and commitment from local MoHs through the NCCP, which allows key stakeholders to join forces with their initiatives in a coordinated way. For example, PEPFAR (the President's Emergency Plan for AIDS Relief), CHAI (Clinton Health Access Initiative), and the ACSP (American Society for Clinical Pathology) are all active in Eswatini. Local coordination of efforts through the MoH will more efficiently guide resource allocation and utilization.

Leveraging current medical care facilities (HIV and TB clinics). Oncology training enables primary healthcare providers to offer screening, preventative, palliative, and continuation of care closer to patient's homes.

Project 3: Clinical Oncology Specialty Training in Zambia

Dr Susan C. Msadabwe-Chikuni, a radiation oncologist and national director of the clinical oncology training program in Zambia, recounted the impact of professional training curricula in her session "Building a Clinical Oncology Specialist Training Program in Zambia." SSA is experiencing a growing burden of cancer morbidity, mortality, and a lack of resources for health expenditures. With a population of 17 million, Zambia reports 7,380 cancer deaths among 12,052 new cases per year (61% mortality) with a prevalence of 24,565 cases totally as of 2018.[4] The distribution of cancers includes cervix and/or uterus (25%), Kaposi Sarcoma (14%), prostate (10%), breast (7%), non-Hodgkin lymphoma (5%), and other cancers combined (38%).[5] From 2007 until 2018, Zambian cancer services at the Cancer Diseases Hospital (CDH) in Lusaka have seen growth from a small hospital with four oncologists and 30 employees to seven oncologists and 435 employees including independent laboratory, radiology, nuclear medicine, and inpatient facilities. The growth of healthcare infrastructure, along with an increased awareness of cancer and potential treatment, has often resulted in local oncology teams reaching their capacity limits. CDH sees 23% of all new cancer cases per year.[6] Zambia had no local training program in oncology and therefore decided to establish a local training program. Estimates indicate that Zambia will need 120 oncologists by 2030, and this oncology training program aims to train 40 specialists in the next 10 years.[7]

Prior to this program, CDH had experience creating oncology-related training programs including for radiotherapy technicians. Importantly, CDH has an existing adaptable curriculum for a broader training for local healthcare professionals in oncology. The program enrolled three cohorts from 2017 to 2020. The program currently has 10 trainees in the first two cohorts, of which the first cohort will graduate in 2021. Zambia is receiving international trainees including doctors from Malawi, Lesotho, and Papua New Guinea. Collaboration is crucial for the success of a new program, and CDH has partnered with multiple institutions for external and internal country support. MD Anderson Cancer Center (Houston, TX) provides ECHO telementoring, didactics, and in-person lectures on a range of topics. Brighton/Sussex Hospital provides tumor site–specific clinical training and examination techniques. The University of Zambia School of Health Sciences and Department of Medical Education as well as the Zambia Colleges of Medicine and Surgery have assisted this successful program through educational support and oversight of training. Looking ahead, it will be important to secure funding, ensure the quality of training for healthcare providers, increase the number of teaching staff, and provide adequate administrative support.

Project 4: Palliative Stents for Esophageal Cancer in East Africa

Dr Michael Mwachiro, a general surgeon and director of the endoscopy unit at Tenwek Hospital in Western Kenya, presented "A Stepwise Approach to Implementation of Esophageal Stenting for Palliation of Esophageal Cancer in East Africa." Esophageal cancer is a malignancy characterized by considerable geographic variability; the eastern corridor of Africa, extending from Ethiopia to South Africa, is affected by a disproportionately high incidence of esophageal squamous cell carcinoma. Patients typically present with dysphagia because of malignant obstruction. Palliative measures, such as deployment of a self-expanding metal stent (SEMS), may provide relief of symptoms and extend life by relieving malnutrition. The African Esophageal Cancer Consortium (AfrECC) was established in 2016 to facilitate research collaborations in environmental, molecular, and genetic epidemiology; early detection, clinical management, treatment, and palliation; capacity building; and interventions to reduce the burden of ESCC in SSA.[8]

Tenwek Hospital is a faith-based community hospital in Western Kenya, which has served many years as a referral site for patients with esophageal cancer, pioneering the placement of SEMS without fluoroscopy. Data from $>$ 1,000 patients report SEMS as a safe way to effectively palliate malignant obstruction in a low-resource setting.[9] Despite the high burden of esophageal cancer throughout Eastern Africa, SEMS was not widely accessible. Building upon the experience from Tenwek Hospital, AfrECC partnered with CHAI to expand access to SEMS at national referral hospitals in Kenya, Tanzania, Zambia, and Malawi.

A stepwise approach was described by Dr Mwachiro.[9] (1) Collaborators conducted an analysis of barriers to access in Tanzania, Kenya, Zambia, and Malawi. (2) A market analysis was conducted to assess potential demand for SEMS in four countries. (3) Following an extensive analysis of SEMS quality and interest from international manufacturers, Boston Scientific Corporation (BSC) announced its

commitment to collaborate with AfrECC and CHAI to launch an access program and provided SEMS to patients throughout eastern Africa at a subsidized price. (4) Independently, processes for device registration and procurement were undertaken by stakeholders in each country to ensure adherence to local regulations. (5) An innovative train-the-trainer model was developed to train endoscopists in core competencies, including creation of a didactic curriculum and training video for SEMS deployment and standardization of trainee evaluations. (6) A medical device registry was established using REDCap to track patient safety, adverse events, competency of endoscopists, supply chain management, and diversion avoidance. (7) Guiding principles of accountability were established for current and future allocation of resources, including both SEMS access and training among participating AfrECC members.

Project 5: Treatment of Hodgkin Lymphoma in Rwanda

Dr Cyprien Shyirambere, Director of Oncology at Partners in Health/Inshuti Mu Buzima (PIH/IMB), presented "Hodgkin Lymphoma Treatment in Rwanda: An Implementation Success Story" as a case study demonstrating how collaborative partnerships can produce high-quality cancer care in low-resource settings. The Butaro Cancer Center of Excellence (BCCOE) opened at Butaro District Hospital in July 2012 as the first center to provide services across the cancer care continuum in Rwanda. BCCOE is a collaboration between the Rwandan Ministry of Health, the NGO Partners In Health, the Dana-Farber/Brigham and Women's Cancer Center, and other partners. BCCOE provides pathologic diagnosis, chemotherapy, surgery, long-term follow-up, palliative care, socioeconomic support, and referrals to radiotherapy. Cancers that are curable or highly treatable with available resources are prioritized. The most common adult diagnoses seen at BCCOE are breast, cervical, head and neck, gastric, and colorectal cancers, and the most common pediatric diagnoses are nephroblastoma, acute lymphoblastic leukemia, and Hodgkin lymphoma (HL). Over 11,000 patients have been enrolled at BCCOE since 2012.

The innovative care delivery implementation strategy at BCCOE includes several important features including (a) context-adapted treatment protocols developed through international collaboration and endorsed by the Rwandan MoH; (b) care delivery by nonspecialists through a task shifting model, including nurses trained to mix and administer chemotherapy and internists, pediatricians, and general practitioners trained and supervised to provide oncology care; (c) routine clinical consultation with US-based oncology specialists through weekly videoconferences and regular email exchanges and telepathology; (d) longitudinal on-site training and mentorship by regular visiting oncology experts; (e) systems to promote protocol adherence including electronic orders, clinical data collection forms, and patient tracking measures; and (f) infrastructure for ongoing program evaluation through observational research.

HL serves as a demonstrative case study for this innovative care delivery system. In HICs, HL is highly curable with ABVD (doxorubicin, bleomycin, vinblastine, and dacarbazine), a low-intensity chemotherapy regimen that can be given as a single modality treatment. Although ABVD has been the standard of care for HL for 40 years and all four drugs are off-patent, relatively affordable, and included in the WHO Model List of Essential Medicines, many patients in LMICs do not have access to this curative therapy. At BCCOE, a treatment protocol using six cycles of ABVD was implemented for adult and pediatric patients, and both quality indicators and clinical outcomes were measured.

A retrospective cohort study of all patients with confirmed HL at BCCOE between 2012 and 2018 was performed to evaluate both quality-of-care delivery and clinical impact.[10] 85 patients were included with a median age at diagnosis of 16.8 years (interquartile range, 11.0 to 30.5), a strikingly younger age distribution compared with cohorts in HICs. Most patients presented with B symptoms, advanced stage, and anemia, which are established poor prognostic factors in HL and were associated with worse survival in this analysis ($P < .01$ for all three variables). By several indicators, clinical management may be considered high quality; all treatment candidates received ABVD with rare exceptions, the median duration of ABVD was only 2 weeks longer than expected, and most patients received at least an 85% dose intensity, which was independently associated with better survival ($P < .01$). Nevertheless, analysis of quality indicators highlighted targets for improvement: delays from initial presentation to diagnosis, delays during treatment, treatment abandonment, and loss to follow-up related to social and financial barriers.

Nearly half of the patients in this cohort (43%) and the majority of those who completed treatment (54%) are in clinical remission at the time of data analysis, with a 3-year survival estimate of 63% (95% CI, 50% to 74%). These results are highly significant considering that prior to the establishment of BCCOE in 2012, most patients with HL in Rwanda, as in many LICs, died of their disease. This study demonstrates that HL can be successfully treated and potentially cured in a low-resource setting with implementation of a basic cancer care delivery system. Despite this tremendous progress, however, BCCOE is only halfway to the goal of achieving equity for patients with HL in Rwanda; ongoing program evaluation, interventions to target barriers to care delivery, and expanded access to salvage therapies will be key to continuing to improve outcomes. It is important to note, however, that the maintenance of clinical databases allowed us to assess how this known effective treatment worked in a low-resource setting. Through the analysis of these patients, it was possible to not only determine effectiveness of the current treatment but also identify opportunities for improvement and design of

interventions that could lead to better patient outcomes through a continuous improvement process.

Project 6: Pathology Capacity Building for Cancer Systems in Rwanda

Dr Dan Milner, chief medical officer of ASCP, and Dr Deo Ruhangaza, pathologist from the Butaro Center of Excellence in Cancer Care, presented "Solving Cancer Diagnostics Challenges through Collaborative Partnerships."

Based on a survey of African health systems, the number of pathologists is severely lacking in the majority of Africa (with pathologist to patient ratios ranging from no active pathologists, 1 to more than 5 million patients, and only as high as 1-200,000 patients). In the United States and the United Kingdom, these ratios are 1:19,232 and 1:15,108, respectively.[11] The state of pathology diagnostic laboratories for cancer can range from no existing laboratory to fully functioning laboratories that can be exemplary for other laboratories. Assessment of each site is crucial, and every possibility can be found (no lab, pathologist but no lab, lab but no pathologists, understaffed, not meeting standard of care, and exemplary lab). Importantly, 50% of these assessed situations could benefit from telepathology. Telepathology can be implemented in a variety of formats (static, dynamic, whole slide, or automated histology or artificial intelligence). The choice of whole slide imaging has many benefits beyond clinical care including education resource creation, conference support, research, and archiving.

Telepathology was the core technology and intervention of the ASCP Partners for Cancer Diagnosis and Treatment Initiative, which began in Africa. After ASCP assessment, a large range of needs at individual sites was found, including histology equipment, immunohistochemistry equipment, anatomic pathology laboratory information systems, reagents, service contracts, internet upgrades, educational programs, in-person hands-on training, textbook support, and conference support. All these interventions require new or expanded partnerships with multiple organizations. On a global scale, the need for access to standardized reporting in multiple languages created new collaborations and the recognition of additional ancillary cancer care needs such as flow cytometry and cytology required further partner engagement. In total, ASCP for its cancer outreach program has more than 80 partners of various levels of engagement.

The Butaro Center of Excellence in Cancer Care had multiple pathology interventions through the Brigham and Women's Hospital prior to ASCP's engagement, which included the installation of a histology laboratory and training, provision of a manual immunohistochemistry system, and static image (iPath) telepathology from 2012 to 2016. In 2016, ASCP introduced upgraded histology equipment and a whole slide scanning technology for telepathology. In parallel, Dr Deo Ruhangaza arrived as the first pathologist on-site. With an average growth rate of 13% per year, sample numbers have grown from 1,652 in 2016 to 2,400 in 2019. Of these cases, 10%-15% are sent for secondary consultation through the telepathology system or sent abroad (complex hematopathology cases). Butaro performs on average 134 IHC stains per month using a panel of 34 antibodies. The laboratory is currently supporting pathology services for 10 surrounding hospitals including Eastern Democratic Republic of Congo and Burundi.

There remains the need for additional resources to manage the high volume of pathology samples cost-effectively within the system. The current capacity of the laboratory is 250 blocks per day. The operating costs are just more than $200,000 in US dollars (USD) per year. This results in $100 USD per sample; however at capacity, the cost would be less than $5 USD per sample. Therefore, economy of both scope and scale requires increased volume. However, growing the volume and reducing costs are directly tied to patient awareness, clinician access to biopsy tools, and specimen transport networks. Although pathology staffing at Butaro is sufficient for the current volume, as volume grows, additional pathologists will be needed.

SUMMARY OF LESSONS LEARNED

Each of the projects described reveal constructive approaches to specific cancer care challenges. The strengthening of cancer care delivery infrastructure in LMIC is still in its early phases, and we are learning as we go. The imperative to continue this work, though, is strong as the number of potentially curable and treatable cancers rises in these countries. The success of these efforts will depend on many factors including funding, building of human capacity, scientific approaches, and collaboration from many sectors of society.

Several principles can be considered as we move forward.

1. The approach to developing high-quality cancer care must be holistic. Screening, early detection, surgery, systemic therapies, radiation, pathology, and radiology all need to be considered, but may be implemented in a stepwise incremental manner.
2. An incremental approach to the development of cancer care delivery will likely be necessary in most settings, but certain services must be considered essentially linked. It is, for instance, impossible to provide safe and effective cancer treatment without an accurate pathology diagnosis. Screening should not be undertaken unless there is treatment capacity for the cancer being screened for.
3. The measurement of success of any program will always be patient outcomes. Although research and training take many forms, all should ultimately be measured on the outcomes of patients.
4. Development of cancer programs in LMICs should be viewed through the lens of implementation research. This will require prospectively collected clinical and biologic data on patients that will allow the analysis of the

safety and efficacy of cancer programs and will identify challenges in care delivery and opportunities for the development of interventions that will lead to improved outcomes.

5. Partnerships will be key in the development of cancer programs in LMICs and will lead to earlier and more rapid advances throughout the world than if programs work in isolation. Partnerships must be characterized by true collaborations, mutual respect, on-going relationships building trust, and common goals focused on the needs of the LMIC.

    a. Partnerships between cancer centers in LMICs and HICs will be essential for sharing in-country expertise and long-term, on-going accompaniment.
    b. Partnerships among cancer centers within a geographic region will be essential for sharing experiences and learning and for developing strategies for collaborative programs going forward.
    c. Partnerships between cancer programs from both HICs and LMICs and the private sector will be critical and will be mutually beneficial in bringing new technologies, medicines, and other needs to LMICs.
    d. Partnerships between cancer programs and NGOs will be mutually beneficial in strengthening healthcare infrastructures in LMICs.
    e. Partnerships between cancer programs from both HICs and LMICs and large public organizations such as the WHO, the National Cancer Institute of the United States, ASCO, the European Society of Medical Oncology, and the Union International for Cancer Control will be critical to raise the public visibility of this work, to act as conveners, and to aid in securing funding. These partnerships will also be critical in developing policy and global direction.

The development of cancer programs in LMICs presents a tremendous challenge to all those involved, but is one that we must meet, and meet with vision, energy, and direction, and in a collaborative manner. Bringing potentially curative and palliative treatments to patients with cancer throughout the world who currently lack access to high-quality care should be a public health priority and reflects basic human rights.

AFFILIATIONS

[1]University of Witwatersrand, Johannesburg, South Africa
[2]University of KwaZulu Natal, South Africa
[3]International Cancer Institute, Eldoret, Kenya
[4]Ministry of Health, Mbabani, Kingdom of Eswatini
[5]Cancer Diseases Hospital, Lusaka, Zambia
[6]Tenwek Hospital, Bomet, Kenya
[7]Butaro District Hospital, Butaro, Rwanda
[8]American Society for Clinical Pathology, Chicago, IL
[9]University of California, San Francisco, San Francisco, CA
[10]Bristol-Myers Squibb Foundation, Johannesburg, ZA
[11]Bristol-Myers Squibb, New York, NY
[12]University of Texas, MD Anderson Cancer Center, Houston, TX
[13]University of Pennsylvania, Abramson Cancer Center, Philadelphia, PA

CORRESPONDING AUTHOR

Lawrence N. Shulman, MD, University of Pennsylvania, 3400 Civic Center Blvd, Philadelphia, PA 19104; e-mail: Lawrence.shulman@pennmedicine.upenn.edu.

AUTHOR CONTRIBUTIONS

Conception and design: Buhle Lubuzo, Frederick Chite Asirwa, Michael Mwachiro, Cyprien Shyirambere, Dan A. Milner, Jr, Phangisile Mtshali, Ute Dugan, Ellen Baker, Lawrence N. Shulman
Administrative support: Lawrence N. Shulman
Provision of study materials or patients: Susan C. Msadabwe-Chikuni
Collection and assembly of data: Charmaine Blanchard, Buhle Lubuzo, Frederick Chite Asirwa, Xolisile Dlamini, Susan C. Msadabwe-Chikuni, Michael Mwachiro, Cyprien Shyirambere, Deo Ruhangaza, Dan A. Milner, Jr, Katherine Van Loon, Rebecca DeBoer, Ute Dugan
Data analysis and interpretation: Buhle Lubuzo, Susan C. Msadabwe-Chikuni, Michael Mwachiro, Cyprien Shyirambere, Dan A. Milner, Jr, Rebecca DeBoer
Manuscript writing: All authors
Final approval of manuscript: All authors
Accountable for all aspects of the work: All authors

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Frederick Chite Asirwa
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Michael Mwachiro
Consulting or Advisory Role: Boston Scientific

Katherine Van Loon
Speakers' Bureau: Physicans' Education Resource, Amgen
Research Funding: Celgene Cancer Carelinks

Phangisile Mtshali
Employment: Bristol-Myers Squibb
Stock and Other Ownership Interests: Bristol-Myers Squibb
Travel, Accommodations, Expenses: Bristol-Myers Squibb

Ute Dugan
Employment: Bristol-Myers Squibb
Stock and Other Ownership Interests: Bristol-Myers Squibb
Travel, Accommodations, Expenses: Bristol-Myers Squibb

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APPENDIX

TABLE A1. Participants

Name	Affiliation or Institution	Role or Area of Expertise
Charmaine Blanchard, MD	University of Witwatersrand, Johannesburg, South Africa	Palliative Medicine Medical Officer
Buhle Lubuzo, MMedSc	University of KwaZulu Natal, South Africa	Public Health Medicine Researcher
Chite Asirwa, MD	International Cancer Institute, Eldoret Kenya	Medical Oncologist
Xolisile Dlamini	Ministry of Health, Kingdom of Eswatini	Epidemiologist
Susan Msadabwe-Chikuni, MD	Cancer Diseases Hospital, Lusaka, Zambia	Radiation Oncologist
Michael Mwachiro, MBChB	Tenwek Hospital, Kenya	General Surgeon and Endoscopist
Cyprien Shyirambere, MD	Butaro District Hospital, Butaro, Rwanda	Pediatrician
Deo Ruhangaza, MD	Butaro District Hospital, Butaro, Rwanda	Pathologist
Dan A. Milner, MD, MSc, MBA	American Society for Clinical Pathology, Chicago, IL	Pathologist
Katherine Van Loon, MD, MPH	University of California, San Francisco, San Francisco, CA	Medical Oncologist
Rebecca DeBoer, MD	University of California, San Francisco, San Francisco, CA	Medical Oncologist
Phangisile Mtshali	Bristol Myers Squibb Foundation, Johannesburg, ZA	Director, BMSF
Ute Dugan, MD, PhD	Bristol Myers Squibb, New York, NY	Medical Oncologist
Ellen Baker, MD, MPH	University of Texas MD Anderson Cancer Center, Houston, TX	Internist
Lawrence Shulman, MD	Abramson Cancer Center, University of Pennsylvania, Philadelphia, PA	Medical Oncologist