

GAFL 798-001 2021C

EMPA Capstone Project: Corrado Cancedda

Development of a Strategic Plan for the Botswana – University of Pennsylvania Partnership

EXECUTIVE SUMMARY

About the Botswana - University of Pennsylvania Partnership

The Past 20 Years

Since 2001, the Botswana - University of Pennsylvania Partnership (BUP) has been supporting the training, mentoring, and supervision of talented and driven clinicians, public health experts, educators, and investigators from Botswana. To pursue its mission, in association with the University of Botswana (UB) and the Botswana Ministry of Health and Wellness (MOHW), BUP has leveraged the resources and expertise available at the Perelman School of Medicine (PSOM), the Children's Hospital of Philadelphia (CHOP), and other institutions affiliated with the University of Pennsylvania (Penn).

In the past 20 years, BUP secured approximately \$32,000,000 from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) and numerous awards from the National Institute of Health (NIH) and other research funds. Almost 200 papers were published in peer-reviewed journals and co-authored by U.S. and Botswana investigators. Thousands of U.S. and Botswana students were trained across a broad range of medical specialties and sub-specialties. Lastly, tens of thousands of patients were cared for across a multitude of public hospitals and clinics, starting with Princess Marina Hospital in Gaborone.

BUP in the Present

BUP's staff is currently comprised of approximately five Botswana-based faculty and 70 clinical, research, and administrative personnel. Additionally, approximately 80 trainees and 40 faculty from Penn used to visit BUP every year (prior to the COVID-19 pandemic). BUP is now finally returning to a pre-COVID-19 baseline.

Initially, BUP's focus was on prevention and treatment of HIV and tuberculosis but it has since expanded to include areas as diverse as dermatology, internal medicine, infectious diseases, laboratory science, oncology, pathology, pediatrics, radiology, rural health and community health, surgery, and trauma and rehabilitation. In all these areas, BUP conducts a combination of research, training, and health service delivery activities.

Vision for BUP's Next 20 Years

The Evolving Landscape in Global Health and In Botswana

Despite these achievements, significant challenges remain both in Botswana and more broadly. Global health as a field is undergoing a major transition in order to achieve universal health coverage (as well as the other health targets within the Sustainable Development Goals (SDGs)),

improve preparedness for future pandemics, and address the negative impact of global warming and environmental degradation on health. Botswana is also undergoing a major transition as the country seeks to reach high-income status by 2036, serve as health care hub for sub-Saharan Africa, and further expand access to high quality and comprehensive health services to its rural and underserved populations. BUP's strategic provides a roadmap to define the partnership's goals and approaches to these challenges and offer a replicable and sustainable model of engagement in Botswana (and, more broadly, in global health) going forward.

The Need for Transformational Partnerships and BUP's Theory of Change

For every activity conducted or project implemented in Botswana, BUP is committed to pursuing primarily transformational partnerships. Rather than on organizational benefits, transformational partnerships focus primarily on the greater societal good and often require all participating organizations to change practices in profound ways.

BUP sees partnerships not only as a platform to implement projects that advance health, but also as a catalyst for organizational capacity strengthening and transformation. The organizations in need of capacity strengthening are the MOHW and UB as well as Penn/CHOP. The MOHW and UB need to sustain the projects initiated with support from Penn and scale these projects in other parts of the country. Simultaneously, Penn and CHOP need to enhance support of their faculty and trainees interested in careers in global health.

BUP's Strategic Plan

BUP's Strategic Goals

- **Improve Access, Coverage, Quality, and Safety of Health Services Delivery** and Ultimately Improve Health Outcomes in Botswana
- **Strengthen Capacity in Botswana** to Sustain/Scale Programs/Projects
- **Strengthen Capacity at Penn** to Sustain/Scale Programs/Projects
- **Generate and Disseminate New Knowledge** in Bio-Medical Research, Health Service Delivery, Capacity Strengthening, and Effectiveness/Quality of Partnerships
- **Improve the Effectiveness/Quality of the Partnership**

These goals are interconnected and mutually reinforcing. One goal cannot be achieved without achieving the others.

BUP's Strategic Planning Process and Strategic Plan

BUP's strategic plan will unfold over a five-year timeline (2022 to 2027). Working groups for each area of engagement identified a set of objectives and activities for each strategic goal. Each working group included Penn/CHOP faculty, trainees, and staff and their counterparts from the main partners in Botswana (especially the MOHW and UB). The objectives and activities in Year 1-3 are more detailed and usually linked to ongoing projects and currently available funding. The objectives and activities in Year 4-5 are aspirational and dependent the availability of additional funding going forward.

At the end of every academic year, each working group will be asked to report progress on the objectives and activities for the year that just ended, revise (as needed) the objectives and activities for the following years.

The pursuit of these goals will incentivize BUP to further enact the organization's mission statement, guiding principles, and theory of change. It will also help strengthen synergies among projects and encourage longitudinal and long-term thinking. Every Penn/CHOP and UB faculty or trainee who works in Botswana through BUP should articulate how and the extent to which their projects and activities are aligned to these goals and the MOHW's priorities.

*To be finalized, the strategic plan will need additional review/editing from members of the working groups for each area of engagement and the leadership at Penn and in Botswana

SECTION 1: ABOUT THE BOTSWANA – UNIVERSITY OF PENNSYLVANIA PARTNERSHIP

Mission Statement

“Improving Health in Botswana and Beyond through the Power of Partnership”

Guiding Principles

- **Equity:** prioritization of needs of partners (including patients, households, and communities) with greatest vulnerability and lowest level of agency, resources, expertise
- **Accountability:** commitment to shared goals, reliability, willingness to change, honesty about one’s concerns, ideas, and needs
- **Empathy:** profound appreciation for each partner’s values, priorities, agency, and vulnerability
- **Data and Evidence:** ongoing evaluation of partnership quality and effectiveness and adoption of corrective measures when necessary

BUP over the Past 20 Years

Since 2001, the Botswana - University of Pennsylvania Partnership (BUP) has been supporting the training, mentoring, and supervision of talented and driven clinicians, public health experts, educators, and investigators from Botswana. This support has occurred at the bedside (in Botswana’s and Penn's main hospitals and clinics), in the classroom (both in person and virtually), at the laboratory bench, and during the design and implementation of research and health service delivery projects. To pursue its mission, in association with the University of Botswana (UB) and the Botswana Ministry of Health and Wellness (MOHW), BUP has leveraged the resources and expertise available at the Perelman School of Medicine (PSOM), the Children’s Hospital of Philadelphia (CHOP), and other institutions affiliated with the University of Pennsylvania (Penn). The highlights of the past 20 years include many activities and milestones (Table 1).

Table 1. Highlights of the Past 20 Years at BUP*

Governance and Collaborations
<ul style="list-style-type: none">• Penn was invited by ACHAP (African Comprehensive AIDS Partnership) the Bill and Melinda Gates Foundation, the Merck Foundation, and the Government of Botswana to support Botswana’s response to the HIV pandemic in 2001• BUP established a formal working relationships through Memoranda of Agreements with the Ministry of Health and Wellness (MOHW) and the University of Botswana (UB) in 2004• Hundreds of partnerships, collaborations, and professional exchanges occurred between U.S. and Batswana academics and clinicians because of BUP since then
Programs and Initiatives

<ul style="list-style-type: none"> • BUP launched the HIV Care & Support Program in 2003, which scaled up access to high quality and comprehensive preventive and curative health services for tens of thousands of HIV patients • BUP also launched: <ul style="list-style-type: none"> ○ A Telemedicine program in 2007 ○ A Cervical cancer screening and treatment program in 2009 ○ The Medical Education Partnership Initiative in 2010
Funding
<ul style="list-style-type: none"> • BUP secured approximately \$32,000,000 from the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR) and numerous awards from the National Institute of Health (NIH) and other research funds
Research
<ul style="list-style-type: none"> • Almost 200 papers were published in peer reviewed journals and co-authored by U.S. and Botswana investigators
Training
<ul style="list-style-type: none"> • Thousands of U.S. and Botswana students were trained across a broad range of medical specialties and sub-specialties, both in Philadelphia and Botswana • BUP supported undergraduate education, doctorate degrees, master degrees, post-graduate education, and continuing professional development for Botswana students • Every year, BUP supports the training of four Botswana Master Students in Epidemiology and Infectious Diseases at Penn and the training of four Botswana Master Students in Trauma and Injury at University of Botswana • Prior to the COVID-19 pandemic, Penn would regularly host Botswana medical students in Philadelphia for clinical observerships and research rotations.
Health Service Delivery
<ul style="list-style-type: none"> • Tens of thousands of patients were cared for across a broad range of medical specialties and sub-specialties (especially Internal Medicine, Infectious Diseases, Oncology, and Pediatrics) across a multitude of public hospitals and clinics, starting with Princess Marina Hospital in Gaborone

*This list is by no means comprehensive. For detail, please refer to the individual strategic plans by area of engagement

BUP in the Present

BUP’s staff is currently comprised of approximately five Botswana-based faculty and 70 clinical, research, and administrative personnel (all of whom are from Botswana). Additionally, approximately 80 trainees (including undergraduates, doctoral students, medical residents, and clinical fellows) and 40 faculty (including clinicians, educators, and researchers) from Penn used to visit BUP every year (prior to the COVID-19 pandemic). BUP is now finally returning to a pre-COVID-19 baseline.



SECTION 2: VISION FOR BUP'S NEXT 20 YEARS

The Big Picture: The Need for a New World Health

Global health as we know it today was initially born as tropical medicine during the era of colonialism and later evolved into international health during the cold war years (Figure 1) (1, 2). While the legacy of tropical medicine is mostly negative, the legacy of international health is more complex. These were the years of the Alma Ata declaration, which promoted health as a fundamental human right, and the great vaccination campaigns, which helped eradicate deadly diseases such as smallpox (3). However, these were also the years of development policies that help funding for global health to a minimum, addressed only a limited set of diseases, and created false dichotomies (such as prevention over care) that stifled global health for the following two decades and that continue to have a negative impact on the field to this day (4).

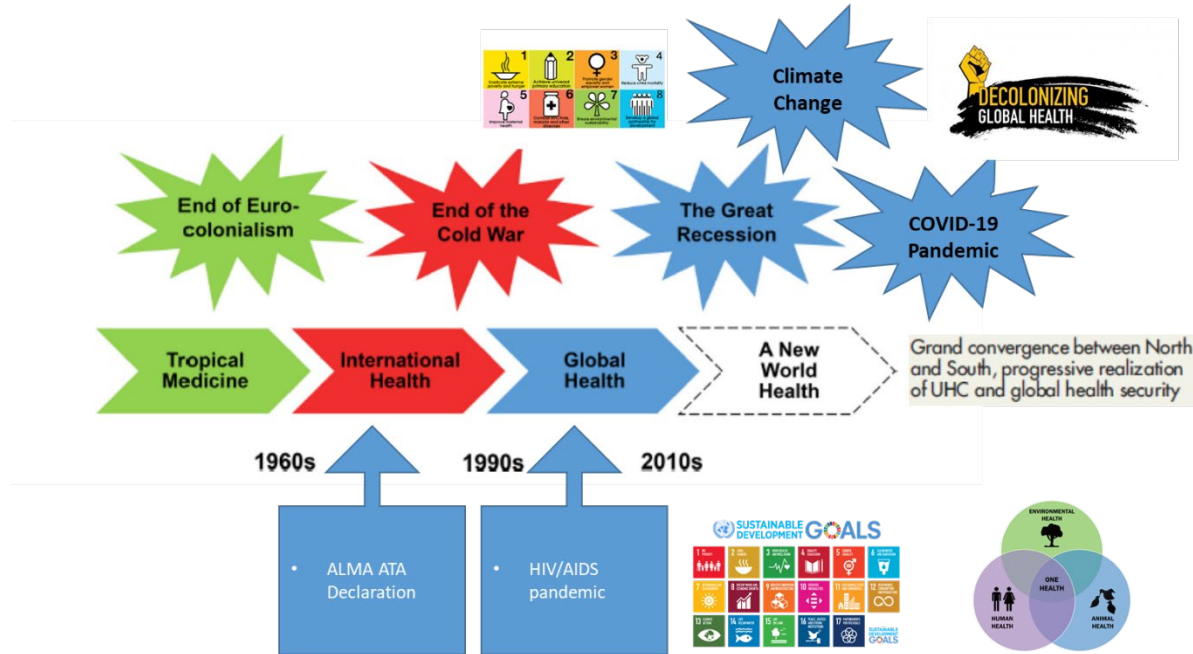
The past 20 years have witnessed an unprecedented growth in investments in global health (5). The devastating impact of the HIV/AIDS pandemic and the moral imperative of having to initiate patients on anti-retroviral treatment in Sub-Saharan Africa served as a catalyst for this growth (6). The net result has been the enhanced engagement of a multitude of international and national actors (governments, non-governmental organizations, multilateral institutions, academic institutions, and philanthropy) and the mobilization of considerable resources. New donors (such as the Global Fund for AIDS, Tuberculosis, and Malaria, PEPFAR, and the Bill and Melinda Gates Foundation played) increased funding for global health almost five-fold compared to earlier years (7). The launch of the Millennium Development Goals (MDGs) and, later, of the Sustainable Development Goals (SDGs) offered a set of common goals, including targets for health (8, 9).

There have been corresponding significant improvements in health outcomes and health equity (10, 11). However, long-standing and deep structural dysfunctions within the global health ecosystem limit the extent to which low-income countries and communities may advance the health of their populations. There are major funding gaps preventing the achievement of the health targets within the third SDG (SDG3 or the “health SDG”) (12). Additionally, the global health eco-system has failed to adequately respond to the current COVID-19 pandemic and the negative impact of climate change and environmental degradation on health (13, 14). New concepts (such as One Health and decolonization of global health) have emerged in recent years

and are now part of the mainstream conversation in global health (15, 16). A new vision for world health is needed to address these complex and multi-faceted challenges (2).

How can BUP raise up to these challenges and offer a replicable and sustainable model of engagement in global health going forward?

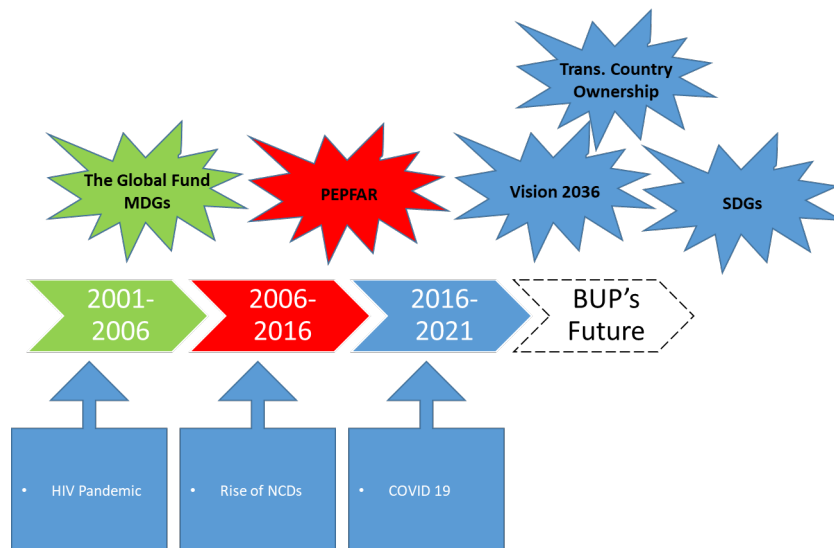
Figure 1. Evolution of Global Health



The Need to Adapt to the Evolving Landscape in Botswana

In the beginning, 20 years ago, BUP’s efforts focused on prevention and treatment of HIV and tuberculosis and because the Botswana was in the middle of a devastating epidemic (Figure 2).

Figure 2. BUP and the Evolving Landscape in Botswana



Since then, Botswana has made great strides in managing HIV and BUP’s focus has expanded to include other diseases (such as non-communicable diseases like diabetes, cancer, and mental health disorders) that affect both patients with HIV and the general population (17,18).

Additionally, Botswana seeks to become a high-income country by 2036 (a goal outlined in the government’s “Vision 2036” strategy) and to serve as a health care hub for sub-Saharan Africa (19). Ensuring that its people live long and healthy lives is a critical component of this strategy. To support “Vision 2036” and the SDGs and to address Botswana’s current burden of diseases, BUP conducts a wide range of research, training, and health service delivery activities across many areas of engagement (while also providing operational support to these activities) (Table 2).

Funding for BUP derives from a variety of sources: (a) direct support from the Perelman School of Medicine (PSOM) at the University of Pennsylvania; (b) direct support from Penn’s health system; (c) direct support from CHOP; (d) research grants for the NIH and the Fogarty International Center (FIC), and other U.S. governmental agencies; (e) implementation grants from the Centers for Diseases Control and Prevention (CDC) and PEPFAR; (f) other external research grants; (g) other external implementation grants; (h) philanthropy and gifts; and (i) internal grants from PSOM/CHOP (including grants from the Center for AIDS Research (CFAR)) (Table 3).

Table 2. Current Areas of Engagement for BUP

Area of Engagement	Operational Support	Research	Training	Health Service Delivery
Operations				
General Operations	X			
Diagnostic and Laboratory Technology				
Dermatology		X	X	X
Laboratory Sciences	X	X	X	
Radiology		X	X	X
Pathology			X	X
Telemedicine	X	X	X	
Internal Medicine				
Internal Medicine			X	X
Infectious Diseases	X	X	X	X
Other Subspecialties				
Oncology				
Clinical Oncology		X	X	X
Radiation Oncology		X	X	X
Pediatrics				
General Pediatrics			X	X
Adolescent Medicine		X		X
Infectious Diseases	X	X	X	X
Other Subspecialties			X	X
Research				
Research Operations	X		X	
Vulnerable Populations and Women’s Health				
Primary Health Care and Rural Health	X		X	X
Women’s Health		X		
Other Areas				
Social Work				
Surgery			X	X
Trauma, Injury, and Rehabilitation	X	X	X	X
Veterinary Medicine		X	X	

Despite these achievements, there are persistent challenges. Development assistance for health has decreased and become less consistent, rural and underserved populations (for example in the Kalahari Desert and the Okavango Delta) need greater access to primary health care, the country was deeply impacted by the COVID-19 pandemic, and Botswana remains vulnerable to both climate change and environmental degradation and their negative impact on health (20-23).

How can BUP raise up to these challenges and offer a replicable and sustainable model of engagement in Botswana going forward?

Table 3. Funding Sources for BUP for the 2020 Fiscal Year

Funding Sources	Amount
Sponsored Programs*	\$ 2,434,388
Other Income**	\$ 55,628
Cash Transfers to Programs***	\$ 881,801
Total	\$ 3,371,817

*Approximately 55% of CDC/PEPFAR implementation grants, 12% from NIH and FIC grants, 24% from other external grants and gifts, and 7% for internal grants from CHOP and PSOM

**From rental of BUP facilities to Penn faculty and students

***Approximately 74% from PSOM and 26% from Penn’s health system out of a \$ 775,801 total. CHOP supports 50% salary for the BUP Director of Research at approximately \$106,000/year

BUP’s Strategy: The Need for Transformational Partnerships to Rise Up to the Challenge

What sets apart BUP is its approach to partnership. Partnerships in global health are important for two reasons: (a) many countries and communities do not yet have all the resources necessary to meet the health needs of their populations; and (b) some challenges are of such scale/complexity and/or span across national and geographic boundaries such that no country and community can tackle them in isolation.

Unfortunately, empirical evidence for the effectiveness of global health partnerships is limited (5). Anecdotally, many partnerships fail to achieve their goals because of inequitable partnership benefits, low trust and accountability and poor evaluation and quality improvement practices. Further evidence is needed to determine whether overcoming these dysfunctions will aid in advancing health globally (24-28).

A recent publication on the British Medical Journal Global Health classifies global health partnerships as transactional, collaborative, and transformational (29). When a partnership is transactional, the primary focus is on organizational benefits and the partner with the most power usually accrues the most benefits (Figure 3). When a partnership is collaborative, the focus is not only on organizational benefits but also on the greater societal good (in the case of global health, continued improvements in health outcomes and reductions in health inequities) while the benefits are distributed more fairly among the partners. Finally, when a partnership is transformational, the focus is primarily on the greater societal good, which requires significant

redistribution of power among partners and organizations to change in more fundamental ways than just by tweaking or revising their policies and practices.

For every activity conducted or project implemented in Botswana, BUP is committed to pursuing primarily transformational partnerships.

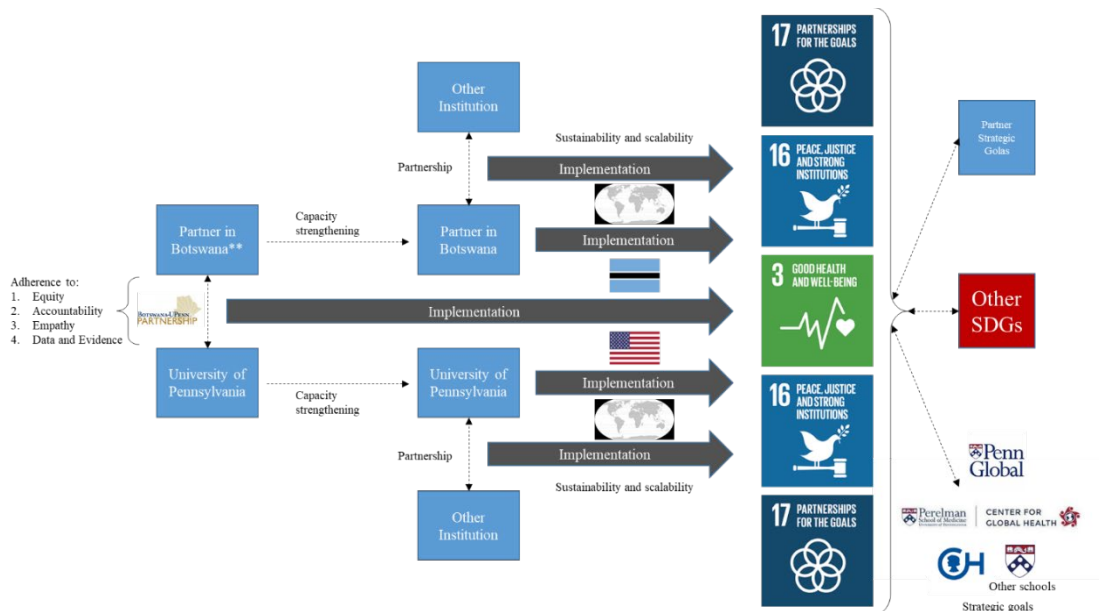
Figure 3. Transactional, Collaborative, and Transformational Partnerships



BUP’s Theory of Change

BUP sees partnerships not only as a platform to implement projects that advance health, but also as a catalyst for organizational capacity strengthening and transformation in the pursuit of sustainable outcomes. As a result, BUP developed a theory of change to inform all of its different projects (Figure 4).

Figure 4. Partnerships as a Catalyst for Organizational Capacity Strengthening and Transformation



In this theory, there is an alignment between the activities, objectives, and strategic goals of BUP, those of the partners in Botswana and at Penn/CHOP, and the SDGs (especially (but not only) SDG3, SDG16 (strong institutions), and SDG17 (partnerships for the goals)) (9). As noted above, each of the BUP partners has room to grow in their individual functionality, and in their interconnections and continuity. The MOHW and UB would benefit from additional personnel and stronger systems to sustain the projects initiated through BUP and scale these projects in other parts of the country. Simultaneously, Penn and CHOP need to strengthen their administrative and career development pathways to enhance support of their faculty and trainees interested in careers in global health. Additionally, Penn could apply the lessons learned in Botswana in other countries (United States included) to advance the health of marginalized communities.

SECTION 3: BUP'S STRATEGIC PLAN

BUP's Strategic Goals

BUP has identified five strategic goals, which are the following:

1. **Improve Access, Coverage, Quality, and Safety of Health Services Delivery** and Ultimately Improve Health Outcomes in Botswana
2. **Strengthen Capacity in Botswana** to Sustain/Scale Programs/Projects
3. **Strengthen Capacity at Penn** to Sustain/Scale Programs/Projects
4. **Generate and Disseminate New Knowledge** in Bio-Medical Research, Health Service Delivery, Capacity Strengthening, and Effectiveness/Quality of Partnerships
5. **Improve the Effectiveness/Quality of the Partnership**

These goals are interconnected and mutually reinforcing. One goal cannot be achieved without achieving the others. The pursuit of these goals will incentivize BUP to further enact its own mission statement, guiding principles, and theory of change. It will also help strengthen synergies among projects and encourage longitudinal and long-term thinking. Every Penn/CHOP and UB faculty or trainee who works in Botswana through BUP will need to articulate how and the extent to which their projects and activities are aligned to these goals and the MOHW's priorities.

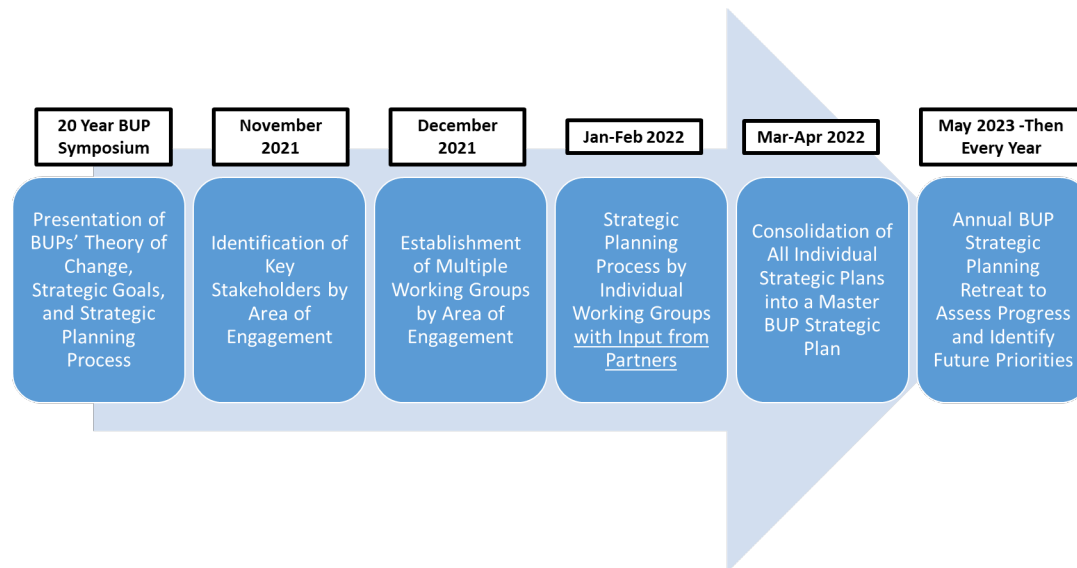
BUP's Strategic Planning Process and Strategic Plan

BUP's strategic plan will unfold over a five-year timeline (2022 to 2027). Working groups for each area of engagement were selected during the symposium to celebrate BUP's 20th Year Anniversary in November 2020 (Figure 5). Each group included Penn/CHOP faculty, trainees, and staff and their counterparts from the main partners in Botswana (especially the MOHW and UB). The working groups identified a set of objectives and activities for each strategic goal. The objectives and activities in Year 1-3 are more detailed and usually linked to ongoing projects and currently available funding. The objectives and activities in Year 4-5 are aspirational and dependent the availability of additional funding going forward.

At the end of every academic year (starting with May 2023), each working group will be asked to report progress on the objectives and activities for the year that just ended, revise (as needed)

the objectives and activities for the following two years, and develop objectives and activities for the following years.

Figure 4. Process and Timeline for Development and Revision of BUP Strategic Plan



Metrics of success for Goal 1 (**Improve Access, Coverage, Quality, and Safety of Health Services Delivery**) include improvements in both access to and quality of care for specific diseases and public health priorities. These improvements can occur because BUP projects can lead to the following results:

- Enhancement in infrastructure, equipment, and supplies in hospitals, clinics, and communities
- Increase in the number and improvement the competency of health professionals (physicians, nurses, midwives, mental health specialists, social workers, laboratory technicians, etc.)
- Direct patient care by Penn faculty and trainees during their rotations in Botswana (and occasionally through virtual consultations)

Metrics of success for Goal 2 (**Strengthen Capacity in Botswana**) include:

- Increase in the number of clinicians, public health experts, educators, and researchers trained in Botswana
- Improvement in availability and quality of training (for example through new/revised curricula, new online platforms, and enhanced mentoring and supervision)
- Strengthening of organizational infrastructure, policies, and processes in Botswana to ensure long-term sustainability for the projects supported by BUP
- Penn faculty and trainees serving as teachers, mentors, and peers to colleagues and trainees in Botswana and sharing access to their own resources back in Philadelphia

Metrics of success for Goal 3 (**Strengthen Capacity at Penn**) include:

- Enhanced engagement of Penn faculty and trainees in Botswana
- Strengthening of organizational infrastructure, policies, and processes to support work overseas and help advance the careers of faculty interested in global health (for example, through the establishment of global health fellowships for junior faculty)
- Bridging the lessons learned in Botswana to inform and advance policies to improve health equity in other countries as well as domestically (30)

Metrics of success for Goal 4 (**Generate and Disseminate New Knowledge**) include:

- Number/type (or impact factor) of publications by Penn and Botswana investigators and the number/type of research projects funded, launched, and implemented in Botswana with support from BUP
- Diversification of BUP's research projects across multiple lines of inquiry (such as basic bio-medical research, clinical and translational research, monitoring and evaluation and quality improvement, and implementation research)

Metrics of success for Goal 5 (**Improve the Effectiveness/Quality of the Partnership**) include:

- Development by Penn and Botswana partners of joint strategic plans
- Establishment of platforms and systems to monitor progress and ensure mutual accountability
- Successful fundraising to support BUP's projects and activities
- Achievement of programmatic and financial sustainability for the projects supported by BUP

Goal 5 emphasizes the importance of being very deliberate when establishing strong partnerships. Too often, global health partnerships have been considered primarily as a means to an end. Instead, BUP considers them an end in of itself and the pre-condition for achieving anything with profound and long-term impact

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Operations: General Operations

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Generate New Knowledge	Write article of BUP's 20 year anniversary, past, present, and future	Submit/publish article on BUP's 20 year anniversary, past, present, and future		
Strengthen the Quality of the Partnership	Strategy, Planning, and Implementation			
	Finalize BUP mission/vision and organizational strategy, objectives, and plans	Assess progress on a regular basis through strategic planning meetings/symposia and reports	Continue assessing progress on a regular basis through strategic planning meetings/symposia and reports	Continue assessing progress on a regular basis through strategic planning meetings/symposia and reports
	Communication			
	Post new BUP mission/vision and organizational strategy, objectives, and plans on BUP website			
	Share new BUP mission/vision and organizational strategy, objectives, and plans on BUP website with partners at Penn and in Botswana			
	Participate in health related social/public events (Cancer Awareness Day, HIV/AIDS day, etc.) and increase awareness/visibility of BUP in Botswana	Continue participating in health related social/public events (Cancer Awareness Day, HIV/AIDS day, etc.) and increase awareness/visibility of BUP in Botswana	Continue participating in health related social/public events (Cancer Awareness Day, HIV/AIDS day, etc.) and increase awareness/visibility of BUP in Botswana	
	Administration			
	Start consolidating new BUP mission/vision and new organizational strategy, objectives, and plans in new MOUs/MOAs with MOHW	Finalize consolidation of new BUP mission/vision and new organizational strategy, objectives, and plans in new MOUs/MOAs with MOHW		
	Develop policies to activate Catalyst for Health Equity (BUP-affiliated local entity) for grant application/implementation as needed	Possibly activate Catalyst for Health Equity (BUP-affiliated local entity) for grant application/implementation as needed	Continue to possibly activate Catalyst for Health Equity (BUP-affiliated local entity) for grant application/implementation as needed	
	Human Resources			
	Survey BUP staff for well-being	Address findings of survey on staff well-being with proper policies and initiatives at BUP	Continue addressing findings of survey on staff well-being with proper policies and initiatives at BUP	
	Continue to ensure staff safety for COVID-19 through social distancing, mask wearing, hand washing, other mitigation practices, and vaccination/boosting	Launch Wellness Day for BUP employees		
	Resume annual Christmas party if possible based on COVID-19 situation			
		Consider adopting Sage software for payroll management		
		Consider adopting progressive contracting for BUP employees		
		Consider purchasing uniform for BUP operations staff		
Finance				
Ensure engagement/leadership role of BUP finance team in development/finalization of annual budget for BUP	Continue ensuring engagement/leadership role of BUP finance team in development/finalization of annual budget for BUP	Continue active engagement/leadership role of BUP finance team in development/finalization of annual budget for BUP		
Finalize guidelines for overhead/direct support costs for all grant proposals				

Ensure engagement/guidance from BUP finance team for all grant proposals prior to submission	Continue ensuring engagement/guidance from BUP finance team for all grant proposals prior to submission	Continue ensuring engagement/guidance from BUP finance team for all grant proposals prior to submission	
Establish database for all BUP funding sources (grants, awards, donations) with information such as: (a) dollar amount; (b) number of years; (c) start date; (d) end date	Update database for all BUP funding sources (grants, awards, donations)	Continue updating database for all BUP funding sources (grants, awards, donations)	
Improve policies and processes to track expenses and generate reports for all programs implemented through BUP	Strengthen the capacity of BUP finance team to generate financial reports: (a) Balance Sheet; (b) Income Statement; and (c) Cash Flow Statement		
	Consider purchasing accounting software for BUP finance		
	Consider strengthening capacity of BUP finance team to manage grants through training and/or additional hires		
Information Technology (IT)			
Provide guidance on purchase, maintenance, and repair of IT equipment/supplies to BUP employees and Penn principal investigators (PIs)	Continue providing guidance on purchase, maintenance, and repair of IT equipment/supplies to BUP employees and Penn PIs	Continue providing guidance on purchase, maintenance, and repair of IT equipment/supplies to BUP employees and Penn PIs	
Support BUP employees and Penn faculty and students with virtual meetings, events, and platforms	Continue supporting BUP employees and Penn faculty and students with virtual meetings, events, and platforms	Continue supporting BUP employees and Penn faculty and students with virtual meetings, events, and platforms	
Global Health and Logistics			
Lead orientation, transportation, housing, and administrative support for growing number of Penn faculty and students as well as other visitors	Continue to lead orientation, transportation, housing, and administrative support for growing number of Penn faculty and students as well as other visitors	Continue to lead orientation, transportation, housing, and administrative support for growing number of Penn faculty and students as well as other visitors	
Other Partnerships			
Possibly expand BUP's programs and activities: - <i>Anesthesia</i> : start developing a strategic plan? - <i>Dentistry</i> : start developing a strategic plan? - <i>Emergency Medicine</i> : start rotation of global health fellows? - <i>Lauder Institute</i> : possibly start rotation of Penn Master in Business Administration (MBA) and Master of the Arts (MA) in International Studies in Botswana and twinning program with MBA and MA students at University of Botswana (UB) - <i>Social Work</i> : resume rotations by Penn social work students? - <i>Surgery</i> (adult and pediatric): clinical care + training + research by visiting faculty? Start developing a strategic plan? - <i>Veterinary Medicine</i> : (a) support PhD student from Botswana University of Agriculture and Natural Resources (BUAN) through a 2 year stint in research laboratory in Philadelphia; (b) conduct a feasibility assessment to identify global health opportunities in agriculture and nutrition	Possibly continue expanding BUP's programs and activities to include and/or grow the contribution of other medical specialties/subspecialties and even disciplines outside of Medicine	Possibly expanding BUP's programs and activities to include and/or grow the contribution of other medical specialties/subspecialties and even disciplines outside of Medicine	

Diagnostic and Laboratory Technology: Dermatology

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivery	Resume clinical care by rotating Dermatology residents (1/year)	Scale up clinical care by rotating Dermatology residents (6/year)	Sustain clinical care by rotating Dermatology residents (6/year)	
	Continue support of Albinism Care Program at PMH	Continue support of Albinism Care Program at Princess Marina Hospital (PMH) and begin expansion beyond PMH	Continue support of Albinism Care Program at PMH and continue expansion beyond PMH	
	Continue utilization of mobile clinical decision tools (Visual Dx) at PMH and other current health facilities	Scale up utilization of mobile clinical decision tools (Visual Dx) to other health facilities	Continue scale up of utilization of mobile clinical decision tools (Visual Dx) to other health facilities	
	Ensure proper adherence to COVID-19 protocols at PHM and other current health facilities			
		Support (if recruitment occurs), newly recruited University of Botswana (UB) Dermatology faculty	Continue supporting (if recruitment occurs), newly recruited UB Dermatology faculty	
			Support clinical care by newly recruited Dermatology nurse at PMH	Ensure that the Dermatology nurse becomes lead clinician at PMH
			Facilitate utilization of volunteering Batswana private Dermatologists for clinical care at PMH (1/2 day/week of extra clinical care)	
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Resume mentorship and supervision of Ministry of Health and Wellness (MOHW) clinicians and UB students by rotating Dermatology residents (1/year)	Scale up training, mentorship, and supervision of MOHW clinicians and IB students by rotating Dermatology residents (6/year)	Sustain training, mentorship, and supervision of MOHW clinicians and UB students by rotating Dermatology residents (6/year)	
		Enroll nurse from PMH in Dermatology training program	Mentor and supervise newly trained Dermatology nurse at PMH	
		Support (if recruitment occurred) training, mentorship, and supervision of MOHW clinicians and UB students by newly recruited UB Dermatology faculty	Continue supporting (if recruitment occurred) training, mentorship, and supervision of MOHW clinicians and UB students by UB Dermatology faculty	Support establishment of Dermatology Master in Medicine (MMed) program or certificate program by UB Dermatology faculty
		Support training, mentorship, and supervision of MOHW clinicians and UB students by volunteering Batswana private Dermatologists	Continue supporting training, mentorship, and supervision of MOHW clinicians and UB students by volunteering Batswana private Dermatologists	
			Start training nurses across the country on skin cancer screening and patient education	
		Strengthen/establish system for Telemedicine consultative services in Dermatology and Dermopathology	Continue supporting system for Telemedicine consultative services in Dermatology and Dermopathology	
Strengthen Capacity of People and Systems at Penn to Sustain/Scale Programs	Resume deployment of at least 1 Penn Dermatology resident to Botswana	Scale up/sustain deployment of Penn Dermatology residents	Scale up/sustain deployment of Penn Dermatology residents	
	Standardize/improve orientation and goal setting for rotating University of Pennsylvania (Penn) Dermatology residents			
Generate New Knowledge	Perform baseline assessment of equipment/supplies needs for Dermatology and Dermopathology			
	Perform baseline assessment of telemedicine consultative services for Dermatology and Dermopathology			
	Complete submission of the following manuscripts: Retrospective Analysis of Skin Neoplasms; Analysis of WhatsApp for	Continue research activities with the goals of publishing at least one new manuscript by 2025	Continue research activities with the goals of publishing at least one new manuscript by 2025	

	Teledermatology; and Pilot Implementation of Mobile Clinical Decision Support Tool for Dermatology			
	Support Dr Bwanali Jereni in his PhD research project on albinism: protocol finalization and fundraising	Support Dr Bwanali Jereni in his PhD research project on albinism: quality data collection	Support Dr Bwanali Jereni in his PhD research project on albinism: data cleaning an analysis	
Strengthen the Quality of the Partnership	Re-design BUP Dermatology program and increase integration with current national system led by Batswana Dermatologists (role for volunteering Batswana private Dermatologists?)	Hold annual meeting with Batswana Dermatologist to assess the BUP Dermatology Program	Continue holding annual meeting with Batswana Dermatologist to assess the BUP Dermatology Program	
	Advocate for recruitment of a Dermatology faculty by UB	Continue advocating for recruitment of a Dermatology faculty by UB (if recruitment has not occurred)	Continue advocating for recruitment of a Dermatology faculty by UB (if recruitment has not occurred)	
	Seek funding (with PMH) to continue supporting the Albinism Care Program at PMH and expand beyond PMH			
	Work with UB eHealth Unit on a plan to scale up utilization of mobile clinical decision tools (Visual Dx) to other health facilities			
	Invite Batswana Dermatologists to participate in Dermatology Grand Rounds at Penn and case sharing in virtual format	Continue participation of Batswana Dermatologists in Dermatology Grand Rounds at Penn and case sharing in virtual format	Continue participation of Batswana Dermatologists in Dermatology Grand Rounds at Penn and case sharing in virtual format	
	Seek funding for enrollment of nurse from PMH and Dermatology training program			
	Seek funding to address gaps identified by baseline assessment of equipment/supplies needs for Dermatology and Dermopathology			
	After baseline assessment of telemedicine consultative services for Dermatology and Dermopathology, explore possible objectives and activities for Years 2-5 with Batswana Dermatologists			

Diagnostic and Laboratory Technology: Laboratory Sciences

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Train, mentor, and supervise a University of Botswana (UB) Master in Philosophy (Mphil) student and support transition to PhD in Medical Sciences to support the program in breast cancer and pharmacogenetics at UB			
	Recruit, train, mentor, and supervise a UB Mphil student to establish a One Health program at UB	Expand the One Health program and establish a Neglected Tropical Diseases (NTD) program at UB	Scale up activities to support the malaria eradication effort at the Ministry of Health and Wellness (MOHW)	
	Recruit a UB post-doctoral fellow for the Laboratory Center			
	Expand the pharmacogenetics/genomics program at UB (starting from a baseline of 6 articles already published) with a focus on cancer and infectious diseases	Continue expanding the pharmacogenetics/genomics program at UB with a focus on cancer and infectious diseases	Establish the Laboratory Center as a regional reference laboratory for pharmacogenetics/genomics	Expand the reach of the Laboratory Center as a regional reference laboratory for pharmacogenetics/genomics
	Procure a qPCR machine for the Laboratory Center	Procure a sequencing machine for the Laboratory Center		
			Establish a rotation to Penn for UB postgraduate students for research training (complemented by online training, mentoring, and supervision when in Botswana)	
Strengthen Capacity of People and Systems at Penn to Sustain/Scale Programs	Mentor and supervise a Children's Hospital of Philadelphia (CHOP) research fellow on a research project on arbovirus detection and transmission	Increase the number of Penn students coming to Botswana for research projects and ensure a mutually beneficial relationship with UB students	Establish an analytical chemistry facility and provide training to Penn faculty and students	
	Mentor and supervise a PhD student on a research project on mass spectrometry applied to arbovirus detection and transmission			
	Submit grants for research projects in cancer genomics and One Health	Continue submitting grants for research projects in cancer genomics and One Health	Continue submitting grants for research projects in cancer genomics and One Health	
Generate New Knowledge	Finalize and submit 10 papers (currently in preparation)	Continue writing and submitting papers on ongoing research projects	Continue writing and submitting papers on ongoing research projects	
		Start deploying UB researchers and students to Zimbabwe to conduct a study on a malaria cohort in Gokwe district	Continue deploying UB researchers and students to Zimbabwe to conduct a study on a malaria cohort in Gokwe district (expand UB participation to the Faculty of Medicine)	
Strengthen the Quality of the Partnership	Plan co-ownership of the Laboratory Center with UB (Faculty of Medicine and/or Faculty of Health Sciences?) with sharing of revenues and costs	Start co-ownership of the Laboratory Center with UB (Faculty of Medicine and/or Faculty of Health Sciences?) with sharing of revenues and costs (two Co-Directors, one from BUP and one from UB)	Continue co-ownership of the Laboratory Center with UB (Faculty of Medicine and/or Faculty of Health Sciences?) with sharing of revenues and costs (one Director from UB and one Deputy Director from BUP)	Transition to complete ownership of the Laboratory Center to UB ((Faculty of Medicine and/or Faculty of Health Sciences?))
	Establish/expand partnerships with University of Michigan and University of Birmingham to expand the pharmacogenetics/genomics program at UB			Expand collaborations with other research institutions/organizations in Botswana such as Botswana Institute of Technology, Research, and Innovation (BITRI), Botswana International University of Science and Technology (BIUST), etc.
	Work with partners in Zimbabwe to establish a malaria cohort in Gokwe district and finalize arrangements to deploy UB researchers and students to conduct the study			

Diagnostic and Laboratory Technology: Radiology

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivered	Clinical care by rotating Penn residents, fellows, and (possibly) Penn faculty (remotely) at Princess Marina Hospital (PMH), Sir Ketumile Masire Teaching Hospital (SKMTH), and in Maun	Scale up clinical care by rotating Penn residents, fellows, and (possibly) Penn faculty (remotely) at PMH, SKMTH, and in Maun	Sustain clinical care by rotating Penn residents, fellows, and (possibly) Penn faculty (remotely) at PMH, SKMTH, and in Maun	
		Clinical care by non-Penn residents and fellows through partnership between Rad-AID, BUP, University of Botswana (UB)	Scale up clinical care by non-Penn residents and fellows through partnership between Rad-AID, BUP, and UB	
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Training, mentoring, and supervision of UB medical students and Master in Medicine (MMed) students by Penn residents, fellows, and (possibly) Penn faculty (remotely) at PMH, SKMTH, and in Maun	Scale up training, mentoring, and supervision of UB medical students and MMed students by Penn residents, fellows, and (possibly) Penn faculty (remotely) at PMH, SKMTH, and in Maun	Scale up training, mentoring, and supervision of UB medical students and MMed students by Penn residents, fellows, and (possibly) Penn faculty (remotely) at PMH, SKMTH, and in Maun	
		Training, mentoring, and supervision of UB medical students and MMed students by non-Penn residents and fellows through partnership between Rad-AID, BUP, UB	Scale up training, mentoring, and supervision of UB medical students and MMed students by non-Penn residents and fellows through partnership between Rad-AID, BUP, UB	
		Establish rotations at Hospital of University of Pennsylvania (HUP) and Children's Hospital of Philadelphia (CHOP) of UB MMed students	Continue rotations at HUP and CHOP of UB MMed students	
		Pilot utilization of picture archiving and communication system (PACS) system outside of major cities in Botswana (Maun as the first site?)	Possibly scale up utilization of PACS system outside of major cities in Botswana (Maun as the first site?)	
Strengthen Capacity of People and Systems at Penn to sustain/scale programs	Deploy Penn residents and fellows to Botswana	Scale up deployment of Penn residents and fellows to Botswana	Sustain deployment of Penn residents and fellows to Botswana	
Generate New Knowledge	Provide support to research projects for MMed students	Continue support to research projects for MMed students	Continue support to research projects for MMed students	
	Launch/conduct research projects based on needs/priorities identified by Penn residents, fellows, and faculty and partners at UB and Ministry of Health and Wellness (MOHW)	Continue launching/conducting research projects based on needs/priorities identified by Penn residents, fellows, and faculty and partners at UB and MOHW	Continue launching/conducting research projects based on needs/priorities identified by Penn residents, fellows, and faculty and partners at UB and MOHW	
Strengthen the Quality of the Partnership	Coordinate with Department of Radiology at UB to ensure alignment of BUP activities with local priorities and monitor progress	Continue coordinating with Department of Radiology at UB to ensure alignment of BUP activities with local priorities and monitor progress	Continue coordinating with Department of Radiology at UB to ensure alignment of BUP activities with local priorities and monitor progress	
	Formalize partnership between Rad-AID, BUP, UB to deploy to Botswana residents and fellows from US academic institutions not affiliated to Penn			

Diagnostic and Laboratory Technology: Pathology

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivered	Possibly resume provision of clinical services by Prof Kum Cooper and Penn residents during bi-annual trips	Possibly continue provision of clinical services by Prof Kum Cooper and Penn residents during bi-annual trips	Possibly continue provision of clinical services by Prof Kum Cooper and Penn residents during bi-annual trips	
	Start clinical care through a tele-pathology program at National Health Laboratory (NHL) with support from Philadelphia-based Penn faculty (soft start?)			
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Possibly resume training, mentoring, and supervision of University of Botswana (UB) Master in Medicine (MMed) students by Prof Kum Cooper and Penn residents during bi-annual trips	Possibly continue training, mentoring, and supervision of UB MMed students by Prof Kum Cooper and Penn residents during bi-annual trips	Possibly continue training, mentoring, and supervision of UB MMed students by Prof Kum Cooper and Penn residents during bi-annual trips	
			Possibly resume rotation in Philadelphia for MMed students	
	Identify, train, mentor, and supervise a "tele-pathology champion" at NHL; establish a tele-pathology program at NHL			
Strengthen Capacity of People and Systems at Penn to Sustain/Scale Programs	Identify Philadelphia-based Penn faculty willing to support the tele-pathology program at by offering their time to review cases and do teaching			
Generate New Knowledge	Resume support of research projects for MMed students	Continue support of research projects for MMed students	Continue support of research projects for MMed students	
Strengthen the Quality of the Partnership	Follow up with Department of Pathology at UB to ensure alignment of BUP activities with local priorities and monitor progress	Continue following up with Department of Pathology at UB to ensure alignment of BUP activities with local priorities and monitor progress	Continue following up with Department of Pathology at UB to ensure alignment of BUP activities with local priorities and monitor progress	

Internal Medicine: Internal Medicine and Other Subspecialties

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivered	Provide clinical care in Internal Medicine as well as sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?) by visiting faculty and fellows at Princess Marina Hospital (PMH)	Continue providing clinical care in Internal Medicine as well as sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?) by visiting faculty and fellows at PMH	Continue providing clinical care in Internal Medicine as well as sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?) by visiting faculty and fellows at PMH (and possibly scale up to other health facilities)	Scale up clinical care in Internal Medicine as well as sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?) by newly trained Batswana specialists
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Training, mentoring, and supervision of University of Botswana (UB) medical students and Master in Medicine (MMed) students in sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?) by visiting faculty at PMH	Continue training, mentoring, and supervision of UB medical students and MMed students in sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?) by visiting faculty at PMH	Continue training, mentoring, and supervision of UB medical students and MMed students in sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?) by visiting faculty at PMH	
		Possibly start certificate program for Family Physicians and General Practitioners in sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?)	Possibly continue certificate program for Family Physicians and General Practitioners in sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?)	
			Possibly start clinical fellowships for Internal Medicine specialists in sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?)	Possibly scale up clinical fellowships for Internal Medicine specialists in sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?)
Strengthen Capacity of People and Systems at Penn to sustain/scale programs	Deploy faculty and clinical fellows from sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?)	Scale up deployment of faculty and clinical fellows from sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?)	Sustain deployment of faculty and clinical fellows from sub-specialties to be determined (Cardiology, Nephrology, and Pulmonary Critical Care?)	
			Possibly establish global health fellowship for Internal Medicine at Hospital of University of Pennsylvania (HUP)	
Generate New Knowledge	Provide support to research projects for MMed students	Continue support to research projects for MMed students	Continue support to research projects for MMed students	
Strengthen the Quality of the Partnership	Strengthen partnership with Department of Medicine at UB to finalize strategic plan, seek feedback/input on programmatic matters, and pursue long-term programmatic and financial sustainability	Sustain partnership with Department of Medicine at UB to monitor progress on strategic plan, seek feedback/input on programmatic matters, and continue pursuing long-term programmatic and financial sustainability	Sustain partnership with Department of Medicine at UB to monitor progress on strategic plan, seek feedback/input on programmatic matters, and continue pursuing long-term programmatic and financial sustainability	

Internal Medicine: Infectious Diseases

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivered	Provide clinical care in adult and Pediatric Infectious Diseases by visiting faculty at Princess Marina Hospital (PMH) and in Maun	Continue providing clinical care in adult and Pediatric Infectious Diseases by visiting faculty at PMH and in Maun	Continue providing clinical care in adult and Pediatric Infectious Diseases by visiting faculty at PMH and in Maun and possibly scale to other health facilities	
	SHARE Program: Patients at Botswana's two largest public referral hospitals (Nyangabwe Referral Hospital (NRH), PMH) will have cultures processed using high-accuracy culture system		SHARE Program: Implement evidence-based interventions to reduce risk of healthcare-associated infections and colonization with multidrug-resistant organisms	SHARE Program: Reduce incidence of healthcare associated infections
	MOSAIC Study: Identify current antibiotic stewardship (AS) practices in place at inpatient healthcare facilities; determine barriers and facilitators to AS	MOSAIC Study: Develop educational interventions to address issues noted in prior years of work	MOSAIC Study: Develop and test strategies to improve AS (dependent on additional funding); another opportunities might be to expand the MOSAIC focus to ambulatory and community settings (MOSAIC currently only focused on acute care)	NIMBi Study: Reduce incidence of sepsis in hospitalized neonates
				Ntemoga Study: Improve neurocognitive screening and support for children affected by HIV
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Training, mentoring, and supervision of University of Botswana (UB) medical students and Master in Medicine (MMed) students in adult and pediatric Infectious Diseases by visiting faculty at PMH and Maun	Continue training, mentoring, and supervision of UB medical students and MMed students in adult and pediatric Infectious Diseases by visiting faculty at PMH and Maun	Continue training, mentoring, and supervision of UB medical students and MMed students in adult and pediatric Infectious Diseases by visiting faculty at PMH and Maun and possibly scale up to other health facilities	Help establish pediatric and adult Infectious Diseases fellowships at UB
	Training, mentoring, and supervision of Botswana junior investigators through D43-sponsored Master in Epidemiology (MsE) in HIV	Continue training, mentoring, and supervision of Botswana junior investigators through D43-sponsored MsE in HIV	Continue training, mentoring, and supervision of Botswana junior investigators through D43-sponsored MsE in HIV	
	SHARE Program: Launch a Basics of Hospital Epidemiology certificate course as continuing education (CE) for hospital Infection Prevention and Control (IPC) teams and anti-microbial sensitivity (AMS) committees	SHARE Program: Support anti-microbial resistance (AMR)-related projects for 1-2 masters candidates at UB		SHARE Program: Support technical work of 3 doctoral-level scientists whose seminal work began out of BUP projects
	SHARE Program: Train all microbiology lab staff at PMH and NRH on VITEK-2 system for anti-microbial sensitivity	SHARE Program: Launch a national AMR database with input from public and private laboratories		
	SHARE Program: Implement automated culture incubation, identification, and antimicrobial sensitivity testing at Botswana's two largest public referral hospitals (NRH, PMH)			Support for creation of diagnosis and treatment pathways for all common pediatric Infectious Diseases diagnoses
	SHARE Program: Implement enhanced microbiology laboratory data management systems at Botswana's two largest public referral hospitals (NRH, PMH)			
	Ntemoga Study (based at Botswana-Baylor Partnership (BBP) with BUP faculty involvement): Support Billy Tsima (UB faculty) to write a first-author paper based on our collaborative work	MOSAIC Study: Could put in here that MOSAIC will help determine how to develop and implement new AS approaches that will build and strengthen capacity at hospitals (and perhaps nationally)		

	Ntemoga Study (based at BBP with BUP faculty involvement): Support Shathani Rampa (Motswana completing PhD in U.S.) to write a first-author paper based on our collaborative work.	IMPALA Study: Surveillance for Extended Spectrum Cephalosporin Resistant Enterobacteriaceae (ESCrE) in community, clinic, and hospital settings. Developed local lab capacity at PMH/NHL. Helped to identify prevalence of ESCrE by region and by setting; identify potential targets for intervention	IMPALA Study: Would be great to develop sequencing capacity in country as part of this or as part of other projects	
	Ntemoga Study (based at BBP with BUP faculty involvement): Support Lingani Mbakile-Mahlanza (UB faculty) to write a first-author paper based on our collaborative work			
	Support to Maemo Lesiapeto (Ministry of Health and Wellness (MOHW) employee and Penn MsE graduate) to develop and publish her research related to nutrition of children impacted by HIV			
	SHARE Program: Early career support and mentorship for Dr. Stryko			
	CFAR Pilot: Hansel Otero (Children's Hospital of Philadelphia (CHOP) Radiology) evaluating brain structure in HIV-exposed uninfected (HEU) vs HIV-unexposed uninfected (HUU) neonates	MOSAIC: Build capacity for AS socio-behavioral work and development of new methods (Julie Szymczak)		
	AMS Study: CHOP Global Health Pilot to UB PI Bedada and CHOP PI Kitt, evaluating antibiotic use in pediatric surgical unit at PMH			
Generate New Knowledge	SHARE Program: Determine the prevalence and acquisition of colonization with multidrug resistance organisms among hospitalized patients at Botswana's largest public referral hospital (PMH)			
	NIMBi Study: Determine the prevalence and acquisition of colonization of organisms causing sepsis in hospitalized neonates and determine how HIV exposure and maternal transfer of antibodies influence colonization and sepsis risk	NIMBi Study & SHARE Program: Develop IPC bundle and assess reduction in risk of multi-drug resistant organism (MDRO) colonization in hospitalized neonates	NIMBi Study: Randomized control study (RCT) looking at possible preventive effects AZT vs. IPC bundle on reducing risk of sepsis in hospitalized neonates (baby level vs. unit level)	
	NIMBi Study: Publish 3 manuscripts on the epidemiology of neonatal sepsis, association with neonatal antibody levels, link with environmental exposures, and HIV exposure	IMPALA Study: will identify colonization prevalence by region and setting; will also identify risk factors for ESCrE colonization		
	NIMBi Study: Identification of candidate process measures which can be implemented to reduce acquisition of MDROs			
	AMS Study: CHOP Global Health Pilot Grant: Preventing avoidable treatment-related harm with assessment of yield of standardization of antibiotics in a pediatric surgical unit in Botswana	MOSAIC Study: Will identify infrastructure and capacity of AS programs at hospitals nationally in Botswana.		
	Ntemoga Study (based at BBP with BUP faculty leadership): Evaluation of neurocognitive function in HIV positive vs HEU vs HUU children in Botswana	Ntemoga Study: Plan follow-up study looking at neurocognitive rehabilitation for children affected by HIV		

Strengthen the Quality of the Partnership	SHARE Program: Seek regular input from, and develop accountability plans with, MOHW partners in Clinical services, laboratory services, and monitoring & evaluation			Help establish pediatric and adult ID fellowships at UB
	SHARE Program: Launch a national collaborative network of infection prevention & control teams and antimicrobial stewardship committees dedicated to knowledge and tool sharing. (Spontaneous, un-prompted communication within the network)	MOSAIC Study: this is helping to bridge AS expertise at Penn and Botswana. MOSAIC study also involves sites at Zimbabwe and South Africa. So this provides opportunities to bridge across southern Africa as well		Develop UB faculty to protect their time to focus on internationally-recognized high-quality research and negotiate infrastructure to support a model that allows faculty to be research-focused.
	SHARE Program: Establish collaboration with regional disease surveillance networks (National Institute for Communicable Diseases (NICD) in South Africa)			
	Ntemoga Study: Working closely with stakeholders including MOHW, Ministry of Basic Education (MOBE), Botswana-Baylor Partnership, local schools, to strengthen capacity for neurodevelopmental testing of children, particularly those who are HIV-affected			
	CFAR Pilot: Hansel Otero (CHOP Radiology) partnering closely with BBP through the FLOURISH study to support assessment of a longitudinal cohort of HEU children			

Oncology: Clinical Oncology and Radiation Oncology

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivered	Improve patient support/navigation and car linkage after diagnosis for cervical cancer patients			
	Delivery of evidence-concordant care in patients getting concurrent Three-dimensional conformal radiation therapy (CRT) for advanced cancers			
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Engagement of University of Botswana (UB) faculty and students in research, training, and health service delivery activities related to the BUP oncology program			
Strengthen Capacity of People and Systems at Penn to sustain/scale programs	Engagement of Penn faculty and students in research, training, and health service delivery activities related to the BUP oncology program			
Generate New Knowledge	Greater dissemination (at Princess Marina Hospital (PMH), Cancer Advisory Board (CAB), Ministry of Health and Wellness (MOHW), and UB) of findings from cancer research projects by the BUP-UB collaborative team			
Strengthen the Quality of the Partnership	Coordinate with collaborators and lead oncologists at PMH, MOHW, and UB to ensure alignment of BUP activities with local priorities and monitor progress			

Pediatrics: General Pediatrics, Adolescent Medicine, and Other Subspecialties

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivery	Increase reach and capacity for Children's Hospital of Philadelphia (CHOP) global health fellows providing pediatric care as members of the Department of Pediatrics at University of Botswana (UB) expanding from just Princess Marina Hospital (PMH) to Sir Ketumile Masire Teaching Hospital (SKMTH) and other hospitals/clinics	Continue to increase reach and capacity for CHOP global health fellows providing pediatric care as members of the Department of Pediatrics at UB expanding from just PMH to SKMTH and other hospitals/clinics	Continue to increase reach and capacity for CHOP global health fellows providing pediatric care as members of the Department of Pediatrics at UB expanding from just PMH to SKMTH and other hospitals/clinics	
	Increase the number of adolescents seen by a consultant physician by using existing networks and outreach clinics (the Youth Friendly Services (YFS) clinic network specifically but also those in Infectious Disease Control Centers (IDCCs))	Continue to increase the number of adolescents seen by a consultant physician by using existing networks and outreach clinics (the YFS clinic network specifically but also those in IDCCs)	Continue to increase the number of adolescents seen by a consultant physician by using existing networks and outreach clinics (the YFS clinic network specifically but also those in IDCCs)	Work with the Department of Pediatrics at UB to establish a clinical fellowship in Adolescent Medicine (with support from practicing Adolescent Medicine specialists in Botswana/Sub-Saharan region and at CHOP)
	Improve access to and quality of mental health services (psychology and psychiatry) for children and adolescents	Continue improving access to and quality of mental health services (psychology and psychiatry) for children and adolescents	Continue improving access to and quality of mental health services (psychology and psychiatry) for children and adolescents	
		Improve access to and quality of neonatal care	Continue improving access to and quality of neonatal care	
		Assist UB pediatricians in improving survival of children by providing support for neonatal resuscitation and advance life support training	Continue assisting UB pediatricians in improving survival of children by providing support for neonatal resuscitation and advance life support training	
			Increase access to and quality of subspecialty care for children and adolescents	
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Training, mentorship, and supervision of UB Pediatric Master in Medicine (MMed) students and medical students by CHOP global health fellows and visiting CHOP faculty and residents	Continue training, mentorship, and supervision of UB Pediatric MMed students and medical students by CHOP global health fellows and visiting CHOP faculty and residents	Continue training, mentorship, and supervision of UB Pediatric MMed students and medical students by CHOP global health fellows and visiting CHOP faculty and residents	
	Training of Ministry of Health and Wellness (MOHW) clinicians in pediatric and adolescent psychology and psychiatry	Continue training of MOHW clinicians in pediatric and adolescent psychology and psychiatry	Continue training of MOHW clinicians in pediatric and adolescent psychology and psychiatry	
		Support practicing neonatal care practitioners through CHOP nursing fellowship program	Support practicing neonatal care practitioners through CHOP nursing fellowship program	
		Support practicing pediatric sub-specialists at UB and more broadly in Botswana through collaborations with CHOP sub-specialists and possibly trips to Philadelphia	Continue supporting practicing pediatric sub-specialists at UB and more broadly in Botswana through collaborations with CHOP sub-specialists and possibly trips to Philadelphia	
			Training, mentorship, and supervision of MOHW medical officers outside of Gaborone in pediatric care	
			Establish semi-annual course to support leadership development at UB	
Strengthen Capacity of People and Systems at Penn to Sustain/Scale Programs	Strengthen orientation/curriculum of visiting CHOP residents to enhance teaching of/benefits to UB medical students/MMed students			Modify/enhance orientation/curriculum of visiting CHOP residents based on lessons learned and formal evaluation of a "visiting learner" model
		Expand the engagement of visiting CHOP residents beyond Gaborone	Continue expanding the engagement of CHOP visiting residents beyond Gaborone	
		Leverage experience of CHOP faculty, fellows, residents in Botswana to advance	Continue leveraging experience of CHOP faculty, fellows, residents in Botswana to	

		health equity and rights-based approaches to health in Philadelphia	advance health equity and rights-based approaches to health in Philadelphia	
		Deploy CHOP nursing fellows to support neonatal care in Botswana	Continue deploying CHOP nursing fellows to support neonatal care in Botswana	
	Increase deployment of CHOP faculty across a variety of pediatric sub-specialties	Continue deployment of CHOP faculty across a variety of pediatric sub-specialties	Continue deployment of CHOP faculty across a variety of pediatric sub-specialties	
Generate New Knowledge	Increase the number of collaborative research projects and programs in areas like adolescent health, antibiotic stewardship, rehabilitation, etc. (with CHOP and UB co-principal investigators (PIs) and gradual mentoring of UB co-PIs to independence)	Continue increasing the number of collaborative research projects and programs to additional areas (HIV, Tuberculosis, other infectious diseases, etc.) -- <u>Special focus on neonatology and resuscitation</u>	Continue increasing the number of collaborative research projects and programs to additional areas (HIV, Tuberculosis, other infectious diseases, etc.) -- <u>Special focus on neonatology and resuscitation</u>	Ensure that all research programs and projects supported by BUP result in at least one publication
	Mentor and supervise UB Pediatric MMed students with their research projects/capstones	Continue mentoring and supervising UB Pediatric MMed students with their research projects/capstones	Continue mentoring and supervising UB Pediatric MMed students with their research projects/capstones	
			Increase the number of Departments and Divisions at CHOP engaged in research in Botswana (3-4 folds?)	
Strengthen the Quality of the Partnership	Coordinate with Department of Pediatrics at UB to monitor progress of strategic plan, seek feedback/input on programmatic matters (i.e. type, number, and expected contribution of CHOP visitors), and pursue sustainability on ongoing projects	Continue coordinating with Department of Pediatrics at UB to monitor progress of strategic plan, seek feedback/input on programmatic matters (i.e. type, number, and expected contribution of CHOP visitors), and pursue sustainability on ongoing projects	Continue coordinating with Department of Pediatrics at UB to monitor progress of strategic plan, seek feedback/input on programmatic matters (i.e. type, number, and expected contribution of CHOP visitors), and pursue sustainability on ongoing projects	
	Assess the quality of the partnership and change partnership governance and practices as needed	Continue assessing the quality of the partnership and changing partnership governance and practices as needed	Continue assessing the quality of the partnership and changing partnership governance and practices as needed	Enhance South to South Collaborations by connecting all of CHOP's global health pediatric programs through conferences and training (both in person and virtual)
	Support pursuit of funding opportunities by UB investigators such as publication funding and competitive research grants	Support pursuit of funding opportunities by UB investigators such as publication funding and competitive research grants	Support pursuit of funding opportunities by UB investigators such as publication funding and competitive research grants	Support UB Foundation's fundraising efforts and help UB achieve financial sustainability

Research: Research Operations

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivery	Ensure direct link between research findings across specialty/subspecialty areas and improved access to/quality of care in the same areas through:	Continue ensuring direct link between research findings across specialty/subspecialty areas and improved access to/quality of care in the same areas through:	Continue ensuring direct link between research findings across specialty/subspecialty areas and improved access to/quality of care in the same areas through:	
	- Dissemination of findings by Principal Investigators (PIs) and their teams to practicing clinicians	- Dissemination of findings by PIs and their teams to practicing clinicians	- Dissemination of findings by PIs and their teams to practicing clinicians	
	- Diversifying research projects to include implementation science at monitoring and evaluation/quality improvement (M&E/QI)	- Diversifying research projects to include implementation science at M&E/QI	- Diversifying research projects to include implementation science at M&E/QI	
	- Establishing/enhancing service delivery platforms where research is conducted (i.e. Pediatric ward at Princess Marina Hospital (PMH), rehabilitation laboratory at Sir Ketumile Masire Teaching Hospital (SKMTH), rural villages in Ngamiland district)	- Establishing/enhancing service delivery platforms where research is conducted (i.e. Pediatric ward at PMH, rehabilitation laboratory at SKMTH, rural villages in Ngamiland district)	- Establishing/enhancing service delivery platforms where research is conducted (i.e. Pediatric ward at PMH, rehabilitation laboratory at SKMTH, rural villages in Ngamiland district)	
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Ensure that most research projects in Botswana have a University of Botswana (UB)/Botswana co-PI (to be gradually mentored towards complete independence)	Continue ensuring that most research projects in Botswana have a UB/Batswana co-PI (to be gradually mentored towards complete independence)	Continue ensuring that most research projects in Botswana have a UB/Batswana co-PI (to be gradually mentored towards complete independence)	
	Establish the Sedibeng consultation service to support, mentor, supervise UB faculty and Master in Medicine (MMed) students and other potential stakeholders on study design, data collection/analysis, scientific writing, and dissemination of results	Operate the Sedibeng consultation service to support, mentor, supervise UB faculty and MMed students and other potential stakeholders on study design, data collection/analysis, scientific writing, and dissemination of results	Continue operating the Sedibeng consultation service to support, mentor, supervise UB faculty and MMed students and other potential stakeholders on study design, data collection/analysis, scientific writing, and dissemination of results	
	Support, mentor, and supervise UB investigators and research training in the Laboratory Center	Continue supporting, mentoring, and supervising UB investigators and research training in the Laboratory Center	Continue supporting, mentoring, and supervising UB investigators and research training in the Laboratory Center	
		Work with UB leadership (Faculty of Medicine and Faculty of Health Sciences) and Department/Division Chairs to incorporate a research curriculum for junior faculty and in their training programs	Continue working with UB leadership (Faculty of Medicine and Faculty of Health Sciences) and Department/Division Chairs to incorporate a research curriculum for junior faculty and in their training programs	
			Increase access to BUP research projects to UB medical students interested in research	
		Improve research knowledge and skills of Botswana research coordinators and research assistants at BUP through "cross pollination", regular research meetings, and teaching by PIs	Continue improving research knowledge and skills of Botswana research coordinators and research assistants at BUP through "cross pollination", regular research meetings, and teaching by PIs	
Strengthen Capacity of People and Systems at Penn to Sustain/Scale Programs	Improve the "matching process" with Penn trainees interested in research. - At least one Penn trainees/year working with at UB researcher - At least two students per year working Penn researchers on Botswana-based research project			
		Expand the number and type of research projects pursued by Penn faculty and trainees in Botswana to include new areas of inquiry	Continue expanding the number and type of research projects pursued by Penn faculty and trainees in Botswana to include new	

		(i.e. non-communicable diseases (NCDs), surgery, implementation science, community/school health?) and possibly even disciplines outside of Medicine (nursing, dentistry, veterinary science?)	areas of inquiry (i.e. NCDs, surgery, implementation science, community/school health?) and possibly even disciplines outside of Medicine (nursing, dentistry, veterinary science?)	
Generate New Knowledge	Ensure that most research projects in Botswana are eventually published (with fair representation of both Penn and UB/Batswana investigators)	Continue ensuring that most research projects in Botswana are eventually published (with fair representation of both Penn and UB/Batswana investigators)	Continue ensuring that most research projects in Botswana are eventually published (with fair representation of both Penn and UB/Batswana investigators)	
		Increase research projects across new areas of inquiry (i.e. NCDs, surgery, implementation science, community/school health?) and possibly even disciplines outside of Medicine (nursing, dentistry, and veterinary science?)	Continue increasing research projects across new areas of inquiry (i.e. NCDs, surgery, implementation science, community/school health?) and possibly even disciplines outside of Medicine (nursing, dentistry, and veterinary science?)	
			Study/evaluate the effectiveness of the Community Advisory Board (CAB) and Sedibeng and publish findings for possible replication in other countries	
Strengthen the Quality of the Partnership	Ensure relevance, feasibility, and alignment to national priorities of research projects through engagement of CAB	Continue ensuring relevance, feasibility, and alignment to national priorities of research projects through engagement of CAB	Continue ensuring relevance, feasibility, and alignment to national priorities of research projects through engagement of CAB	
	Meet regularly with UB leadership (Faculty of Medicine and Health Sciences) to monitor progress of strategic plan, seek feedback/input on programmatic matters, and further strengthen research capacity at UB	Continue meeting regularly with UB leadership (Faculty of Medicine and Health Sciences) to monitor progress of strategic plan, seek feedback/input on programmatic matters, and further strengthen research capacity at UB	Continue meeting regularly with UB leadership (Faculty of Medicine and Health Sciences) to monitor progress of strategic plan, seek feedback/input on programmatic matters, and further strengthen research capacity at UB	
			Expand research collaborations beyond UB to include Botswana - Baylor Partnership (BBP), Botswana - Harvard Partnership (BHP), Botswana - University of Maryland School of Medicine Health Initiative (BUMMHI), Rutgers University, and other research organizations/institutions	

Vulnerable Populations and Women's Health: Primary Health Care and Rural Health

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivered	Support the implementation of community-based multi-disciplinary and multi-sectoral health interventions in the villages of Matsaudi and Phuduhudu (in Ngamiland District) based on findings of household assessments	Support the implementation/quality improvement of the community-based multi-disciplinary and multi-sectoral health interventions in the villages of Matsaudi and Phuduhudu (in Ngamiland District) based on the evaluation of the outcomes	Support the implementation/quality improvement of the community-based multi-disciplinary and multi-sectoral health interventions in the villages of Matsaudi and Phuduhudu (in Ngamiland District) based on the evaluation of the outcomes	
		Possibly (if funding is secured) expand the support of rural and community health activities to include: (a) other villages; (b) other health posts and clinics	Possibly (if funding is secured) expand the support of rural and community health activities to include: (a) other villages; (b) other health posts and clinics	Support the Ministry of Health and Wellness (MOHW) to establish state of the art health systems in Ngamiland and/or Okavango districts (and possibly other rural areas in Botswana) to deliver high quality and comprehensive primary health care and address social, economic, and environmental determinants of health
	Support the strengthening of links between households/village health committees and health posts in Matsaudi and Phuduhudu by increasing outreach efforts from health promotion officers from referral clinics and incorporating findings of household assessments in health records	Possibly (if funding is secured) support strengthening of links between households/village health committees and health posts in other villages by increasing outreach efforts from health promotion officers from referral clinics and incorporating findings of household assessments in health records	Possibly (if funding is secured) support strengthening of links between households/village health committees and health posts in other villages by increasing outreach efforts from health promotion officers from referral clinics and incorporating findings of household assessments in health records	
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Support participation of University of Botswana (UB) Master in Medicine (MMed) students in Family Medicine to conduct household assessment and implement multi-disciplinary and multi-sectoral health interventions in Matsaudi and Phuduhudu	Continue and possibly (if funding is secured) scale up support of participation of UB MMed students in Family Medicine to conduct household assessment and implement multi-disciplinary and multi-sectoral health interventions in additional villages	Continue and possibly (if funding is secured) scale up support of participation of UB MMed students in Family Medicine to conduct household assessment and implement multi-disciplinary and multi-sectoral health interventions in additional villages	Support the MOHW to establish state of the art health systems in Ngamiland and/or Okavango districts (and possibly other rural areas in Botswana) to deliver high quality and comprehensive primary health care and address social, economic, and environmental determinants of health
	Support participation of UB Public Health students as well as nursing students in Maun to conduct household assessment and implement multi-disciplinary and multi-sectoral health interventions in Matsaudi and Phuduhudu	Continue and possibly (if funding is secured) scale up support of participation of UB Public Health students as well as nursing students in Maun to conduct household assessment and implement multi-disciplinary and multi-sectoral health interventions in additional villages	Continue and possibly (if funding is secured) scale up support of participation of UB Public Health students as well as nursing students in Maun to conduct household assessment and implement multi-disciplinary and multi-sectoral health interventions in additional villages	
		Possibly (if funding is secured) support the expansion in the number and type of Batswana trainees to include nutrition, social work, veterinary medicine, agriculture, engineering, etc.	Possibly (if funding is secured) support the expansion in the number and type of Batswana trainees to include nutrition, social work, veterinary medicine, agriculture, engineering, etc.	
Strengthen Capacity of People and Systems at Penn to sustain/scale programs		Possibly (if funding is secured) enhance engagement of Penn faculty and trainees in rural and community health, possibly even outside of Medicine (Veterinary Sciences?)	Possibly (if funding is secured) enhance engagement of Penn faculty and trainees in rural and community health, possibly even outside of Medicine (Veterinary Sciences?)	
Generate New Knowledge	Support completion of household assessment for health issues as well as social, economics, and environmental determinants of health in Matsaudi and Phuduhudu	Possibly (if funding is secured) support completion of household assessment for health issues as well as social, economic, and environmental determinants of health in additional villages	Possibly (if funding is secured) support completion of household assessment for health issues as well as social, economic, and environmental determinants of health in additional villages	Support the MOHW to establish state of the art health systems in Ngamiland and/or Okavango districts (and possibly other rural areas in Botswana) to deliver high quality and comprehensive primary health care and address social, economic, and environmental determinants of health

		Support evaluation of outcomes for community-based multi-disciplinary and multi-sectoral health interventions in Matsaudi and Phuduhudu	Possibly (if funding is secured) support evaluation of outcomes for community-based multi-disciplinary and multi-sectoral health interventions in Matsaudi and Phuduhudu	
Strengthen the Quality of the Partnership	Work closely (under the leadership of the MOHW) and coordinate with/seek guidance from the District Health Management Team (DHMT) in Ngamiland, Department of Family Medicine at UB, clinicians from referral clinics, and Village Health Committees and Village Development Committees to complete household assessment, implement intervention, evaluate outcomes, and develop sustainability plans for Matsaudi and Phuduhudu	Continue working closely (under the leadership of the MOHW) and coordinating with/seeking guidance from DHMT in Ngamiland/Okavango, Department of Family Medicine at UB, clinicians from referral clinics, and Village Health Committees and Village Development Committees to complete household assessment, implement intervention, evaluate outcomes, and develop sustainability plans for additional villages	Continue working closely (under the leadership of the MOHW) and coordinating with/seeking guidance from DHMT in Ngamiland/Okavango, Department of Family Medicine at UB, clinicians from referral clinics, and Village Health Committees and Village Development Committees to complete household assessment, implement intervention, evaluate outcomes, and develop sustainability plans for additional villages	
	Support seeking matching funding for Matsaudi and Phuduhudu from Community Trusts and private businesses	Continue supporting seeking matching funding and seek sustainability funding for Matsaudi and Phuduhudu from Community Trusts and private businesses	Continue supporting seeking sustainability funding for Matsaudi and Phuduhudu from Community Trusts and private businesses	
	Seek funding to expand engagement in primary health care and community health to include: (a) other villages; (b) health posts and clinics	Continue seeking expand engagement in primary health care and community health to include: (a) other villages; (b) health posts and clinics	Continue seeking funding to expand engagement in primary health care and community health to include: (a) other villages; (b) health posts and clinics	

Other Areas: Trauma, Injury, and Rehabilitation

Strategic Goals	Year 1 (July 1st 2022 to June 30th 2023)	Year 2 (July 1st 2023 to June 30th 2024)	Year 3 (July 1st 2024 to June 30th 2025)	Year 4-5 (July 1st 2025 to June 30th 2027)
Improve Access, Coverage, Quality, and Safety of Health Services Delivered	Pilot/support multi-disciplinary assistive technology rehabilitation in Botswana (with initial focus on Rehabilitation and Prosthetic Laboratory (RPRL) at Sir Ketumile Masire Teaching Hospital (SKMTH) and referral system (Mahalapye District Hospital (MDH) and Community Stroke Center)	Continue to pilot/support multi-disciplinary assistive technology rehabilitation in Botswana (with initial focus on RPRL at SKMTH and referral system)	Continue to pilot/support multi-disciplinary assistive technology rehabilitation in Botswana (with initial focus on RPRL at SKMTH and referral system)	Develop the RPRL at SKMTH into a multi-disciplinary assistive technology rehabilitation center
	- Support assistive technology gait laboratory	- Continue supporting assistive technology gait laboratory	- Continue supporting assistive technology gait laboratory	- Scale up assistive technology gait laboratory
	- Support rehabilitation CARES platform	- Continue supporting rehabilitation CARES platform	- Continue supporting rehabilitation CARES platform	- Scale up rehabilitation CARES platform (to two other locations?)
	- Support tele-rehabilitation and m-health (tablet-based platforms)	- Continue supporting tele-rehabilitation and m-health (tablet-based platforms)	- Continue supporting tele-rehabilitation and m-health (tablet-based platforms)	- Scale up tele-rehabilitation and m-health (tablet-based platforms)
	- Utilize iFiT prosthetic knees, feet, and coverage from the U.S. for amputees	- Continue utilizing iFiT prosthetic knees, feet, and coverage from the U.S. for amputees	- Continue utilizing iFiT prosthetic knees, feet, and coverage from the U.S. for amputees	- Manufacture prosthetic knees, feet, and coverage in Botswana and utilize them for amputees
			Develop E-Health platform (for storing and retrieving data) for rehabilitation that communicates with other E-Health platforms operated by the Government of Botswana	Scale up E-Health platform (for storing and retrieving data) for rehabilitation that communicates with other E-Health platforms operated by the Government of Botswana - Leverage Big Data to do precision medicine?
			Develop rehabilitation assessment and therapy support through assistive technology for adult populations with neuro-motor problems (traumatic brain injury (TBI), cerebro-vascular accident (CVA), peripheral neuropathies, amputees, etc.)	Scale up rehabilitation assessment and therapy support through assistive technology for pediatric population with neuro-motor problems
			Develop rehabilitation assessment and therapy support through assistive technology for adult populations with neuro-cognitive problems (TBI, CVA, Alzheimer's, HIV, etc.)	Scale up rehabilitation assessment and therapy support through assistive technology for pediatric population with neuro-cognitive problems
Strengthen Capacity of People and Systems in Botswana to sustain/scale programs	Training, mentoring, and supervision of Botswana junior investigators through D43-sponsored Master in Epidemiology (MSE) in trauma	Continue training, mentoring, and supervision of Botswana junior investigators through D43-sponsored MSE in trauma	Continue training, mentoring, and supervision of Botswana junior investigators through D43-sponsored MSE in trauma	Establish satellite clinics in Francistown, Maun, and Ramotswa
	Train, mentor, and supervise Study Coordinator in RPRL at SKMTH	Continue training, mentoring, and supervising Study Coordinator in RPRL at SKMTH, recruit and support additional staff as needed	Continue training, mentoring, and supervising Study Coordinator in RPRL at SKMTH, recruit and support additional staff as needed	Finalize staffing for RPRL at SKMTH and referral system (MDH, Community Stroke Center, etc.) - Study Coordinator, Research Assistant/Social Media Admin, Research Therapists, Research Therapist for Pediatrics, Research Engineer, Computer Scientist, Psychologist, Prosthetist, and Orthopedic Technician
	Train (in person and virtually) Botswana physical therapists in neuro-cognitive, neuro-	Continue training (in person and virtually) Botswana physical therapists (and allied health professionals) in neuro-cognitive,	Continue training (in person and virtually) Botswana physical therapists (and allied health professionals) in neuro-cognitive,	Seek approval of E-Learning platform and certificate programs offered by RPRL at SKMTH by Botswana Qualification

	motor, and robotic assessment (quarterly workshops/courses)	neuro-motor, and robotic assessment (quarterly workshops/courses)	neuro-motor, and robotic assessment (quarterly workshops/courses) (10 total by end of Year 3)	Authority and Botswana Health Professional Council
	Train Botswana physical therapists in utilization of iFiT prosthetic knees, feet, and coverage from the U.S. for amputees (quarterly workshops/courses)	Continue training Botswana physical therapists (and allied health professionals) in utilization of iFiT prosthetic knees, feet, and coverage from the U.S. for amputees (quarterly workshops/courses)	Continue training Botswana physical therapists (and allied health professionals) in utilization of iFiT prosthetic knees, feet, and coverage from the U.S. for amputees (10 total by end of Year 3) (quarterly workshops/courses)	
	Train engineering, computer science, and psychology students in rehabilitation (incorporate rehabilitation training in their curricula) - <u>Focus on multi-disciplinary and inter-professional training</u>	Continue training engineering, computer science, and psychology students (as well as Medicine students) in rehabilitation - <u>Focus on multi-disciplinary and inter-professional training</u> - At least 2 students/year per discipline with end of year research or design projects	Continue training engineering, computer science, and psychology students (as well as Medicine students) in rehabilitation - <u>Focus on multi-disciplinary and inter-professional training</u> - At least 2 students/year per discipline with end of year research or design projects	Expand rehabilitation training for physicians in Botswana (especially Family Medicine and Internal Medicine specialists) by leveraging the International Rehabilitation Forum (IRF) fellowship program established by Dr Andrew Hang
		Develop virtual Design Thinking workshop/course for engineers and hospital engineering staff		Establish a multi-disciplinary and inter-professional training program in rehabilitation/prosthetics/robotics at University of Botswana (UB) for engineers, computer scientists, psychologists, and physicians in Botswana
				Strengthen capacity for instrumentation, biomechanics, mechatronics, and robotics in Botswana
Strengthen Capacity of People and Systems at Penn to Sustain/Scale Programs	Mentor and supervise Engineering PhD student at Penn on project in global health and design	Scale up engagement of Engineering faculty and students at Penn (1 faculty/year and 1 student/year)	Sustain engagement of Engineering faculty and students at Penn (1 faculty/year and 1 student/year)	
	Train Penn bio-informatics interns in global health			
	Engage Chair of Rehabilitation Medicine at Penn (Prof. Dillingham) and his team	Scale up engagement of Engineering faculty and students at Penn (1 faculty/year and 1 student/year)	Sustain engagement of Engineering faculty and students at Penn (1 faculty/year and 1 student/year)	
		Engage global health residents at Penn (1 resident/year)	Scale up/sustain engagement of global health residents at Penn (1 resident/year)	
Generate New Knowledge	Publish at least two articles on feasibility studies for prosthetics and robotics	Continue writing/publishing articles (iFiT feasibility? Robot feasibility? Robot assessment? Neuro-motor and neuro-cognitive issues in patients with CVA or HIV?)	Continue writing/publishing articles (iFiT feasibility? Robot feasibility? Robot assessment? Neuro-motor and neuro-cognitive issues in patients with CVA or HIV?)	
	Publish an article on rehabilitation training for physical therapists, engineers, computer scientists, and psychologists	Continue writing/publishing articles (capacity building in rehabilitation?)	Continue writing/publishing articles (capacity building in rehabilitation?)	
	Publish an article on geographic information system (GIS) mapping			
	Write/publish a chapter on work in Botswana in academic book on rehabilitation			
			Establish a virtual dissemination portal and increase social media presence	
			Leverage US and international professional associations (American Academy of Pediatrics (AAP), International Society of Physical and Rehabilitation Medicine (ISPRM), Institute of Electrical and Electronics Engineers (IEEE), American Society of Mechanical Engineers (ASME),	

			American Academy of Neurology (AAN) to increase awareness of program in Botswana	
Strengthen the Quality of the Partnership	Consolidate/expand collaboration with Department of Biomedical Engineering at SKMTH (monitor progress/modify as needed strategic plan?) as well as MDH and Community Stroke Center	Continue consolidating/expanding collaboration with Department of Biomedical Engineering at SKMTH (monitor progress/modify as needed strategic plan?) as well as MDH and Community Stroke Center	Continue consolidating/expanding collaboration with Department of Biomedical Engineering at SKMTH (monitor progress/modify as needed strategic plan?) as well as MDH and Community Stroke Center	
	Consolidate/expand collaboration with Botswana physical therapists (monitor progress/modify as needed strategic plan?)	Continue consolidating/expanding collaboration with Botswana physical therapists (monitor progress/modify as needed strategic plan?)	Continue consolidating/expanding collaboration with Botswana physical therapists (monitor progress/modify as needed strategic plan?)	
	Consolidate/expand collaboration with Mechanical Engineering and Industrial Engineering at UB (monitor progress/modify as needed strategic plan?) as well Botswana prosthetists and prosthetic manufacturers in Botswana	Continue consolidating/expanding collaboration with Mechanical Engineering and Industrial Engineering at UB (monitor progress/modify as needed strategic plan?) as well Botswana prosthetists and prosthetic manufacturers in Botswana	Continue consolidating/expanding collaboration with Mechanical Engineering and Industrial Engineering at UB (monitor progress/modify as needed strategic plan?) as well Botswana prosthetists and prosthetic manufacturers in Botswana	
		Establish collaboration with Spinalis, Botswana Medicines Regulatory Authority (BoMRA) and Botswana Institute of Technology, Research, and Innovation (BITRI) as well as other health facilities in Botswana	Consolidate/expand collaboration with Spinalis, BoMRA, and BiTRI as well as other health facilities in Botswana	
	Utilize funding from a Fulbright grant and Rehabilitation Medicine at Penn to implement the program and conduct planned activities	Submit K43 proposal on training in neuro-cognitive assessment of HIV patients, R21 proposal to support research work in Botswana, NSF proposal to support clinical work in Botswana	Submit D43 to support research training in Botswana as well as other grants as needed	
		Seek funding from US Embassy in Botswana and Ministry of Health and Wellness (MOHW)	Continue seeking funding from US Embassy in Botswana and MOHW	
		Seek funding from the Centers for Diseases Control and Prevention (CDC) and Unicef	Continue seeking funding from CDC and Unicef	