BUP 2012 Year-end Report

“In response to the increasing incidence of cervical cancer, Government, in collaboration with the US Centre for Disease Control and the University of Pennsylvania, is introducing a new screening and treatment method for pre-cancerous lesions of the cervix.”

- Excerpt from the 2012 State of the Nation Address by President Ian Khama on November 6, 2012.

Program Overview

*Sharing the expertise of a world-class university with our partners in Botswana to build capacity and excellence in clinical care, education, and research.*

The overall mission of the Botswana-UPenn Partnership (BUP) program is to help build capacity in health care in Botswana. The University of Pennsylvania (Penn) has worked in Botswana since 2001 and currently employs approximately 90 full-time staff in country. The Partnership works with the Government of Botswana Ministry of Health (MOH) and the University of Botswana (UB) to build capacity in Botswana, initially in response to the HIV/AIDS epidemic, but now on a broader level to provide high quality care in internal medicine, family medicine, and pediatrics. Penn is taking a broad interdisciplinary approach to train health-care personnel throughout Botswana and to offer experience in global health to Penn trainees, and to develop joint research programs that address issues relevant to the health and welfare of the citizens of Botswana.

History of Penn’s Involvement

Penn was originally invited by ACHAP (African Comprehensive AIDS Partnership, the Bill and Melinda Gates Foundation, the Merck Foundation, and the Government of Botswana) in 2001 to train health care workers on the management of HIV-infected patients in Botswana, a country that at that time had the highest HIV prevalence rate worldwide. The mission of BUP today is to serve as Technical Advisers for clinical care and education, and build research collaborations with key stakeholders in Botswana.

Background on Botswana

The landlocked Botswana located in Southern Africa and approximately the size of France, has a widely dispersed population of 2 million people. Botswana is an upper middle-income country, with English as an official language, a long history of good governance and democratically elected leadership, and the highest ranking of African nations by Transparency International. Botswana also currently has the 2nd highest HIV prevalence rate in the world and, like many African nations, a shortage of trained physicians. Botswana has both a national healthcare and education system that has been primarily funded by the nation’s significant diamond wealth.

Partnership Governance

The BUP established good formal working relationships through Memoranda of Agreements with the Ministry of Health (2004) and Memoranda of Understanding with the University of Botswana (2006) for joint projects aimed at improving health and healthcare education in Botswana. Country-based staff and leadership help campus-based leaders fine-tune plans to fit local needs and navigate local requirements. The University of Pennsylvania registered in Botswana as an external company in 2010.

A. Current Programs & Initiatives: Clinical
With primary funding from PEPFAR (President’s Emergency Plan for AIDS Relief), the BUP serves as technical advisors for four major clinical areas: HIV Care & Support, Adult & Pediatric TB, Women’s Health, and Telemedicine.

1. HIV Care & Support Program
The HIV Care & support is the oldest BUP program, started in 2003, to provide technical support for the national rollout of antiretroviral therapy treatment for HIV infected citizens. The current goal of the program is to improve the quality of care received by HIV-positive individuals with co-morbid conditions and complications of chronic disease. The three program areas of focus include:
   • Providing postgraduate medical education to local healthcare workers
   • Providing physician outreach to eight southern district hospitals for clinical mentoring in inpatient and outpatient setting
   • Assisting the MOH with the development of national treatment guidelines for inpatient care

Measuring annual outcomes:
   • Number of HIV patients treated: 575
   • Number of health care workers trained: 675
   • Number of guidelines completed: 1
   • Number of guidelines reviewed and under revision: 6
   • Number of guidelines ready for review: 6

2. TB – Adult and Pediatric
Tuberculosis is a common co-infection among HIV/AIDS patients in Botswana and is one of the leading causes of death. BUP TB programs include:
   • Providing mentoring for clinicians involved in management of complicated TB/HIV cases, including drug-resistant TB (DR-TB)
   • Providing expert care to patients with TB/HIV and DR-TB
   • Supporting UB in undergraduate and post-graduate medical education
   • Providing technical assistance to the MOH on National TB Guidelines
   • Helping to implement TB contact tracing program
   • Enhancing diagnosis of TB in pediatric patients by gastric aspirates

Measuring annual outcomes:
   • Number of HIV-TB co-infected patients started on TB therapy: 240
   • Number of HIV-TB patients started on antiretroviral therapy (ART): 140
   • Contacts screened: 360 adult and 240 pediatric
   • Trained over 300 HCW on gastric aspirates nationally
   • Initiated TB treatment in HIV infected children: 20
   • Initiated HIV treatment in TB infected children: 25

3. Women’s Health: Cervical Cancer Screening & Treatment
The BUP Women’s Health Program was established in 2009 and is led by BUP Country Director, Doreen Ramogola-Masire, MD. The first program was a pilot project to screen and treat pre-cervical cancer lesions using the “See & Treat” approach for cervical cancer prevention. Current projects include:
   • Providing cervical cancer prevention services for HIV-infected women using visual inspection after acetic acid with enhanced digital imaging
   • Providing treatment of precancerous cervical lesions using cryotherapy provided by nurses and loop electrical excision procedure (LEEP) provided by BUP specialists
   • Providing technical assistance to the MOH for other women’s health issues including advising on national HIV issues and maternal mortality issues in Botswana
• Providing technical assistance to UB SOM in teaching undergraduates and training postgraduates

Measuring annual outcomes:
• Number of HIV women screened for cervical cancer annually: 2000
• Number of women examined by colposcopy: 1100
• Number treated with cryotherapy, cautery or LEEP: 750
• TB symptom screening in HIV women: 2000
• Referral of women for TB evaluation: 100

4. Telemedicine
Carrie Kovarik, MD, launched the BUP tele-dermatology program in 2007, which has expanded into a broad telemedicine program that seeks to circumnavigate the challenging landline IT infrastructure in the region and a severe shortage of healthcare workers (particularly specialists). The program uses cell phones equipped with digital cameras and other electronic tools to transmit health information for education, diagnosis, and treatment.

Current efforts include:
• Organizing and hosting a national Health Informatics Conference with local partners
• Providing support to the MOH for a national informatics strategy and in-service training
• Providing curriculum integration to schools at UB
• Providing support to a live robotic tele-pathology system whereby a motorized microscope in Gaborone is used to remotely read and assess pathology slides by off-site technicians.
• Providing access to specialty care with mobile oral telemedicine, mobile cervical cancer screening, mobile tele-dermatology, and mobile tele-radiology
• Providing access to medical resources including national treatment guidelines using an SMS query system and mobile tele-mentoring

Measuring annual outcomes:
• 170 smartphones distributed to UB SOM trainees
• Sponsored telemedicine workshop at UB
• Six publications describing the telemedicine program

B. Current Programs & Initiatives: Educational
The Partnership has medical initiatives directed at medical students and trainees in Botswana and at medical and other trainees at Penn.

1. Medical Education Partnership Initiative (MEPI): The UB program represents a collaboration with the UB School of Medicine and the Harvard School of Public Health, under MEPI to strengthen medical education in Botswana.

Measuring annual outcomes for the BUP program at UB SOM:
• Provides 32 weeks of inpatient attending support on the UB Internal Medicine teaching wards
• Provides 21 weeks of inpatient attending on the UB Pediatrics teaching ward
• Precepts two weekly clinics in Internal Medicine and one in Pediatrics
• Performs bedside teaching with Family Medicine residents
• Provides teaching on management of TB to UB SOM trainees
• Helping to equip a joint UP-Penn molecular biology lab at UB
• Provides training to UB undergraduate and graduate medical students in bench-research methodology in the joint UB-Penn research lab at UB
• Works with UB SOM to integrate health informatics into curriculum
• Equipping SOM students with mobile devices and medical information software
C. Current Programs & Initiatives: Research

BUP research infrastructure has improved immensely in the past year. We obtained office space for our clinical program on the UB campus in April 2012, which provides 16 offices and a conference room. This new space enabled us to convert our prior office space near PMH into research offices. We moved a portacabin that we had purchased as office space in Francistown to the UB campus in Gaborone to provide an additional six research offices and a conference room. Importantly, we were offered shared research lab space in the new Faculty of Health Sciences Building on the UB campus. We used carry forward funds from our MEPI grant to purchase equipment for the shared lab, and we hired a PhD molecular biologist to run the lab.

The Penn CFAR grant provides funding to help support the research infrastructure in Botswana. Funding partially supports a Director (Friedman), an Associate Director (Steenhoff), an IRB specialist at Penn, personnel in Botswana to help investigators prepare IRB submissions and consent forms, study nurses and lab technicians, office space and Internet access for Penn scientists visiting Botswana, and assistance in identifying potential scientific collaborators in Botswana.

BUP is helping to support many grants in Botswana (see attached spread sheet and summary table below), including 5 NIH research grants, a Gates Grand Challenge grant, HRSA and CDC grants, NIH and Doris Duke training grants, and many CFAR pilot projects funded by the Penn CFAR. BUP researchers in Botswana and at Penn published 4 papers in 2006, 2 in 2007, 10 in 2008, 52 in 2009, 12 in 2010, 32 in 2011 and 36 in 2012. BUP currently receives grant funding of nearly $9.13M per year, which represents 90% growth since FY11.

<table>
<thead>
<tr>
<th>Funding</th>
<th>FY11</th>
<th>FY12</th>
<th>FY13</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct costs: grants</td>
<td>$4,054,208</td>
<td>$5,281,912</td>
<td>$7,725,844</td>
<td>$17,061,964</td>
</tr>
<tr>
<td>Indirect costs: grants</td>
<td>$744,475</td>
<td>$915,060</td>
<td>$1,406,092</td>
<td>$3,065,627</td>
</tr>
<tr>
<td>Total costs</td>
<td>$4,798,683</td>
<td>$6,196,972</td>
<td>$9,131,936</td>
<td>$20,128,591</td>
</tr>
</tbody>
</table>

D. Current Programs and Initiatives – Global Health Experience for Penn Trainees

<table>
<thead>
<tr>
<th></th>
<th>Penn Faculty</th>
<th>Penn Fellows &amp; Residents</th>
<th>Penn Dental Students</th>
<th>Penn Medicine Students</th>
<th>Penn Nursing Students</th>
<th>Penn Summer Intern Students</th>
<th>Penn Other (staff, DDCRF)</th>
<th>Non Penn Fellows &amp; Residents</th>
<th>Other Non Penn</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-2004</td>
<td>N/A</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>7</td>
</tr>
<tr>
<td>2005</td>
<td>N/A</td>
<td>29</td>
<td>0</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>0</td>
<td>N/A</td>
<td>53</td>
</tr>
<tr>
<td>2006</td>
<td>N/A</td>
<td>22</td>
<td>0</td>
<td>25</td>
<td>0</td>
<td>0</td>
<td>N/A</td>
<td>3</td>
<td>3</td>
<td>53</td>
</tr>
<tr>
<td>2007</td>
<td>N/A</td>
<td>15</td>
<td>0</td>
<td>52</td>
<td>0</td>
<td>N/A</td>
<td>N/A</td>
<td>1</td>
<td>4</td>
<td>72</td>
</tr>
<tr>
<td>2008</td>
<td>14</td>
<td>26</td>
<td>0</td>
<td>21</td>
<td>9</td>
<td>14</td>
<td>6</td>
<td>14</td>
<td>32</td>
<td>136</td>
</tr>
<tr>
<td>2009</td>
<td>32</td>
<td>40</td>
<td>2</td>
<td>30</td>
<td>8</td>
<td>14</td>
<td>19</td>
<td>15</td>
<td>4</td>
<td>164</td>
</tr>
<tr>
<td>2010</td>
<td>19</td>
<td>33</td>
<td>6</td>
<td>31</td>
<td>9</td>
<td>14</td>
<td>17</td>
<td>13</td>
<td>9</td>
<td>151</td>
</tr>
<tr>
<td>2011</td>
<td>19</td>
<td>33</td>
<td>6</td>
<td>33</td>
<td>12</td>
<td>14</td>
<td>29</td>
<td>18</td>
<td>13</td>
<td>177</td>
</tr>
<tr>
<td>2012</td>
<td>21</td>
<td>34</td>
<td>2</td>
<td>31</td>
<td>7</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>14</td>
<td>145</td>
</tr>
<tr>
<td></td>
<td>105</td>
<td>233</td>
<td>16</td>
<td>253</td>
<td>45</td>
<td>66</td>
<td>83</td>
<td>78</td>
<td>79</td>
<td>958</td>
</tr>
</tbody>
</table>
Description of Programs listed in Table:

1. Penn Faculty
Most faculty who travel to Botswana are doing so to establish research collaborations or to further develop already established collaborations in country.

2. Penn Fellows and Residents
a. Residents – Internal Medicine PGY3
   Botswana Medicine Elective (since 2001): The Botswana Elective is a 5-week experience at PMH. Residents work on a medical firm as a senior resident co-running ward rounds with Medical Officers from the MOH or UB residents and teaching UB medical students. Residents apply for 8-12 slots. The funding received by BUP from the DOM pays to support flight up to $2200 per resident and to provide housing. Total number of participants to date: 140+

   b. Residents – Global Health Track in Internal Medicine for PGY2 & PGY3
   Botswana Global Health Elective (since 2008): Global Health Track Residents spend 6 weeks working abroad as PGY2 and 6 weeks as PGY3. The PGY2 year is similar to above, while the PGY3 year has a bigger focus on outpatient and community outreach. The funding received by BUP from the DOM pays to support these residents. Total number of participants to date: ~ 8

   c. Residents – Dermatology
   Botswana Teledermatology Rotation (since 2007): Residents from Penn and other institutions apply to the American Academy of Dermatology to participate in the Botswana elective. The American Academy of Dermatology provides funding for 12 U.S. and Canadian senior dermatology residents to participate in a 4-6 week dermatology elective in Botswana. Total number of participants to date: 12+ Penn / 83+ non-Penn

   d. Residents – OB/GYN
   Botswana Global Health Elective (since 2009): The Botswana OB/GYN elective is a 4-week experience offered to 1-2 residents per year to work in the BUP Women’s Health Clinic, which is funded by a gift to BUP to support $2500 for each of two residents to cover flight and housing. Total number of participants to date: 4

   e. Residents – Pediatrics
   CHOP Global Health Elective (since 2005): The CHOP Global Health rotation to Botswana affords a 4-week experience of in-patient pediatrics for pediatric residents. Residents work at PMH with local healthcare professionals. The Department of Pediatrics offers financial support for residents who do a Global Health elective to offset some costs of travel and lodging. Total number of participants to date: 26+

   f. Residents – Other
   Global Health Rotation: Residents from other departments, particularly radiology and radiation oncology participate in rotations to Botswana for four weeks. The number of slot varies each year based on the cap established by UPHS for residents/fellows to be in Botswana. The program heads identify the residents. Funding varies by department. Total number of participants to date: 28+

3. Students – Dental
International Externship (since 2009): Penn Dental students spend 4 weeks in Botswana serving as dental assistants and working under the tutelage of the oral surgeon, Dr. Phuthego at PMH. Students
are reimbursed by their school for a portion of their airfare. Students pay for housing at the BUP subsidized Penn rate. Total number of participants to date: 16

4. Students - Medical
   a. Medicine, MS4
      Clinical Elective in Medicine (since 2002): The experience is 7 weeks and provides students with an Orientation & Didactics Week (Intro to Setswana/ HIV/ TB/ Opportunistic Infections/ basic medicine and pediatrics in Botswana) followed by inpatient medicine at PMH for 2 weeks and 4 weeks at a District Hospital. Students earn 4 weeks of credit from Penn. Students are selected by lottery run by the Global Health Programs office and are provided with $1700 from that office for travel and additional funding is provided for housing at the BUP flats. Total number of participants to date: 236
   
   b. Students, MS1
      Research Elective (since 2010): The BUP provides through the SOM Global Health Programs office summer research internships for 6-10 rising first year medical students to participate in research in Botswana during the summer break. Opportunities are for 6-8 weeks. Students apply through the Global Health Programs office and are selected based on interviews with the supervising researcher. The Global Health Programs office provides funding as for MS4 students. Total number of participants to date: 17
   
   c. Students – MS3/4
      Clinical Elective in Dermatology (2010-2011): Students rotate on the dermatology service in Botswana working with senior dermatology residents and the local dermatologist. Penn MS3/4 students apply to this program through Dr. Carrie Kovarik. The Dermatology Department may provide funding or students fund their own travel. Students are charged the BUP-subsidized Penn housing rate of $20 per night. Total number of participants to date: 4

5. Students – Nursing
   Nursing 341 (Nursing in the Community: Clinical): Nursing students submit an application to complete their Community Heath clinical rotation in Gaborone, Botswana during the Penn summer term in August. Students have regularly-scheduled and supervised clinical practice in government community health clinics. Students apply to the Global Health Affairs office in the SON for selection for the Botswana program in the fall semester. This course is offered to second-degree, non-traditional nursing students. Tuition covers this course, while the SON charges students an additional program fee to cover costs. Total number of participants to date: 45

6. Penn Summer Intern Students (College, GSE, Law, SEAS, SP2, Vet, Wharton)
   International Internship Program (IIP) (since 2008): BUP offers 10-week summer internships in Botswana from late May until late July for 10-15 Penn students across various schools at Penn. The Internship provides an opportunity for Penn students outside of the health sciences to experience life in Botswana and obtain practical work experience in a developing country. Current Penn undergraduate students may apply. Penn graduate students are eligible to apply from the Schools of Education, Social Policy & Practice, Veterinary Medicine or other graduate students if they can demonstrate that the internship is integral to their academic career and that they plan to return to Penn to complete their studies after the rotation. The application is available online. Finalists are interviewed with final placements made in March. Each student intern is provided a stipend through the BUP with funding from the Provost’s Office to book round-trip travel to Botswana. Housing is
provided at UB dormitories or near the placement site. Students are responsible for their own food, incidental, and local travel expenses or excursions. Total number of participants to date: 66

7. Other
   a. Penn Staff, Doris Duke Research Medical Students
      This category includes library staff, IRB members, nurses, BUP administrative personnel, and Doris Duke medical students doing a year-out research project in Botswana.

   b. Non-Penn Fellows and Residents
      This category includes mainly Dermatology residents and fellows from non-Penn programs and occasionally other residents from non-Penn programs.

   c. Other Non-Penn
      This category includes pre-med and medical students doing research with BUP in Botswana.

E. Onsite Facilities
   Housing for Penn Trainees (rental): a) Pilane Court; current annual lease, 457,620 Pula = ~ $57,000:
      A gated 3-flat complex, each flat with 3 bedrooms. The complex includes a lounge/library, outdoor eating area, pool and garden. The flats can house up to 24 people and is walking distance to PMH. b) ICC flat; current annual lease, 96,430 Pula = ~ $12,000: a 3 bedroom flat in a gated and guarded apartment complex that has a recreational area and pool. This flat is walking distance to PMH.

   Research office space near center city (rental; current annual lease, 182,857 Pula = ~ $22,800):
      Office building at 214 Independence Way that has 6 offices and a large open area with work cubicles. On the property we have a portacabin (owned by BUP) with 2 research offices and a converted garage/maids quarters that has a conference room and an office.

   Research office space on UB campus (owned by BUP): We have a portacabin with 6 offices and a conference room.

   Faculty and administrative office space on UB campus (rental; current annual lease, 120,000 Pula = ~$15,000): We have 16 offices and a conference room for our administrative and clinical faculty.

   Portacabins for enrolling patients into TB trials (owned by BUP): We have 5 1-room portacabins located adjacent to MOH Health Clinics that we use to enroll subjects into TB research studies.

   Housing for Harvey Friedman (rental; current annual lease, 116,538 Pula = $14,500): The Friedmans rent a 3-bedroom townhouse approximately 15 minutes drive from Princess Marina Hospital. This property is used by the Friedmans during their trips to Botswana (approximately 9 weeks annually), and occasionally used by other faculty during trips to Botswana.

   Each of the above is supported by PSOM, except the Friedman rental that is supported by a Botswana gift account. Housekeeping services for each of the properties are supported by the PSOM.

   Lab research space at the National Health Lab (no rent paid, space provided by MOH): We have a small lab approximately 300 NSF at the MOH National Health Lab near PMH. The lab is used to process clinical research samples. Various investigators purchased laminar airflow hoods, -80C freezer, -20C freezer, centrifuges and a PCR machine.
Lab research space at the Faculty of Health Sciences Building at UB (no rent paid, space provided by UB): We share a large lab, approximately 1800 NSF with the UB Faculty of Health Sciences. We are providing equipment purchased with carry forward MEPI funds (approximately $190,000).

Research space within Harvard School of Public Health lab space at Princess Marina Hospital: One Penn team (Bisson/Weissman) is working within Harvard’s research space to do ELISPOT assays. A modest fee was paid by the Bisson grant to Harvard for use of space and equipment.

Other assets: We own 10 cars that are used for research and administrative purposes. Cars were purchased (one donated as a gift), either using grant or SOM/UPHS funds.

F. Training opportunities for UB staff and faculty at Penn
We offer a staff training exchange program for professional and administrative staff at UB to learn best practices and new technology for supporting new initiatives at UB. In past years, we have supported a staff accountant in Penn Business Services (2009), a librarian in the Biomedical Library (2011) and most recently, a building engineer in the Facilities Department of HUP. Staff interns spend from six to nine months working in the host Penn departments. We also offer visiting professorships for UB faculty at Penn. Most recently the Africa Center at Penn hosted Joyce Mathangwane for one year in 2012.