

Faced with Rising Numbers of Fungal Infections, Botswana Receives Technical Support through Russian-American Partnership

Russian Mycologist Provides Technical Assistance to the National Health Laboratory in Gaborone through the USAID-supported Strategic Health Partnership Initiative

Fungal infections have emerged as a significant public health concern in many countries spanning the globe, particularly in developing nations burdened by high prevalence of HIV and AIDS. Because HIV weakens the body's ability to fight off disease, infections that normally cause little or no concern for a healthy individual can quickly become disabling or even deadly. Candidiasis, pneumocystis pneumonia, cryptococcosis, and disseminated mycosis, for example, are some of the most common opportunistic fungal infections affecting people living with HIV.

"The introduction of medical breakthroughs such organ and tissue transplants, immunosuppressive therapy, and invasive diagnostic and treatment procedures, combined with the HIV/AIDS pandemic and achievements in the treatment of bacterial infections, have led to a significant increase in the number of immune-compromised individuals," explains Dr. Olga Shurpitskaya, a medical mycologist at the St. Petersburg Medical Academy for Postgraduate Education in Russia.



Dr. Olga Shurpitskaya works with Lab Technician Irene Tsimako, providing training and mentoring on preparing mycological specimens.

"These people are very much at risk of developing fungal disease," Dr. Shurpitskaya continues, explaining that mycosis rates are increasing at an alarming pace, with invasive cases resulting in high mortality. "The spectrum of mycotic agents is also rapidly increasing and many types are resistant to antifungal medications," she says. "That is why early diagnosis and proper identification of the pathogen are paramount for successful treatment, as well as for preventing their spread."

In Botswana — where the latest data available from UNAIDS reveals an HIV prevalence rate of 23.9 percent among people between the ages of 15 and 49 — the ability of medical professionals to accurately diagnose and treat fungal infections is severely hampered by the country's lack of mycology experts.

At the request of Botswana's Ministry of Health, Dr. Shurpitskaya traveled to Gaborone in early 2010 to provide technical assistance at the National Health Laboratory's Microbiology Department. Her mentorship was sponsored through the Strategic Health Partnership Initiative, a unique multilateral project spearheaded by Russia's

Ministry of Health and Social Development, the US Agency for International Development (USAID), and the American International Health Alliance (AIHA).

Strengthening Existing Capacity, Nurturing a New Lab Specialty in Botswana

When Dr. Shurpitskaya arrived at the National Health Laboratory in late January, she was tasked with improving institutional and human capacity in three critical areas: biosafety; mycology, and quality control. Working hand in hand with National Health Laboratory Head Dr. Isaac Mtoni, Chief Scientific Microbiologist Margaret Bafana, and their staff at the Microbiology Department, she started by conducting a comprehensive assessment of the lab.

“Mycology is still in its early stages in Botswana and it will take some time to become fully established in the country, Dr. Shurpitskaya acknowledges. “Although no one is currently practicing in the field, based on the lab staff I have spoken to I have noticed that there is a great deal of interest in the specialty. It’s also important to note that establishing the Mycology Department at the National Health Laboratory is big step forward in the development of all diagnostic service capacity in the country,” she points out, underscoring the important role mycologists play in the fight against HIV and AIDS.



“While all the Microbiology Department personnel involved with testing are able to conduct basic diagnostics related to fungal infections, they require additional training in the field of medical mycology in order to lay the foundation for establishing a separate Mycology Department,” says Dr. Shurpitskaya. Other elements of that foundation include procuring equipment, developing standard operating procedures (SOPs), and renovating and reorganizing the lab itself to ensure it meets biosafety standards. “There were so many issues that it was difficult to know where to start when I first arrived,” she says.

“The lab does have the equipment necessary for performing diagnostic procedures, but much of it — including the biosafety cabinet — is not in working order. Instead, this broken equipment is

occupying space and preventing the reorganization of lab in accordance with international biosafety standards,” she explains.

Biosafety is a significant problem, according to Dr. Shurpitskaya, because the lab is currently outfitted with wooden tables, bulletin boards, and shelving, as well as fabric curtains that cannot be disinfected.

“There are sufficient supplies of disinfectants and protective clothing and equipment for staff, but the existing air conditioning unit can blow spores around and the wooden furniture, cardboard boxes filled with research and documentation, and archived materials do not meet acceptable biosafety requirements,” she explains.

Air quality is also a problem, Dr. Shurpitskaya says. “We introduced sterility checks using sedimentation methods in six places throughout the lab and set up a corresponding register. The initial results were bad ... four areas were contaminated with cultures on the other two still pending.” She recommended repeating the air checks after regular disinfection procedures every two weeks to maintain safety levels.

As with air quality, some other problems are also procedural. “Work areas are disinfected at the beginning and end of each day and at other times as needed, but the freezers and incubators are not. Also, patient samples are collected right in the lab rather than in a separate room, which should not be done ... there are many other issues,” she says, some simple to fix and some not.

Dr. Shurpitskaya’s assessment indicated that diagnostic procedures were being performed in accordance with the lab’s draft SOPs, which are now undergoing an extensive review and updating process. It also revealed the need for additional training and continuing education opportunities for lab personnel.

“Some of our procedures are outdated and, with regard to mycology, very much neglected because of the general lack of capacity in that area, so we’ve been eager to learn the new methods and techniques that Dr. Shurpitskaya has been sharing with us,” says Lab Technician Irene Tsimako.

Human resource capacity for medical laboratories is a serious problem throughout Botswana, with existing staff spread thin among various departments. While most staff at the Microbiology Department have laboratory technician degrees from the Gaborone-based Institute of Health Sciences, there is a need for ongoing training to upgrade skills and perhaps even specialize on



“The medical professionals I’ve met in Botswana have been very interested in taking part in this program to improve diagnostic capacity. They want to move the health system forward. For me, it has been an interesting experience, too, because it’s my first international experience and I’ve had a chance to work with specimens that I don’t routinely see in Russia.”

— Dr. Olga Shurpitskaya

areas where the need is most evident. For the fledgling Mycology Department to be effective, that training will have to extend beyond lab staff, according to Ms. Tsimako. "Doctors are often responsible for collecting specimens. If they are not doing it properly, the process is compromised," she explains.

Dr. Shurpitskaya agrees. "In Russia, we have excellent physicians who are experts in clinical mycology, but here doctors don't pay a lot of attention to mycological diseases. In fact, lab mycology should be much closer to clinical practice ... we need to work together, rather than fragment the services, to be most effective," she maintains.

Planning for the Future

In April 2009, the Microbiology Lab was bifurcated, with skin, nail, hair, and tissue samples being handled onsite and the testing of sputum, broncho-alveolar lavage, bronchial washing, cerebrospinal fluid, blood, urine, urethral, and vaginal specimens processed at the nearby Princess Marina Hospital Laboratory. "The intention was for this lab to become a public health facility focused on mainly on research and surveillance, more so than diagnosis," Dr. Shurpitskaya says.

This is problematic for plans to make the National Health Laboratory a referral lab, she explains, because "a referral lab must have the capacity to handle all these activities, which includes housing a store of control samples."

Obtaining control samples is necessary for the Mycology Lab's success, as well, and Dr. Shurpitskaya helped staff place orders for control species of *Candida* and other fungi, along with bacterial samples from the American Microbiology Society.

There are also possible plans to renovate the lab premises in the future at which time conditions that inhibit compliance with biosafety guidelines can be more effectively addressed, according to Ms. Tsimako. "In the meantime, we've been doing everything we can to address whatever deficiencies we can," she says. These steps include procurement and proper organization of necessary equipment and supplies; implementation of daily, weekly, and monthly cleaning, monitoring, and disinfection procedures; and updating of SOPs. "Infection control and housekeeping, for example, are two simple, inexpensive things that we can do right now to make tangible, positive improvements," she continues.

"Implementing change depends on the lab's management," Dr. Shurpitskaya stresses. "All it takes is one person who understands the problems, has the knowledge and interest in making a difference, and makes the appropriate plans to do so. We have that here," she stresses, noting that she has provided a comprehensive list of short, medium, and long-term steps staff need to take to bring the lab up to biosafety standards and improve quality.

"It all starts with awareness," Ms. Tsimako concludes. "That is what Dr. Shurpitskaya is doing for



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us. She's raising awareness about how we can do things better."

More about the Strategic Health Partnership Initiative

Launched in late 2007, the Strategic Health Partnership Initiative is a direct result of the 2005 Bratislava Initiatives, a joint Russian-American presidential agreement designed to strengthen cooperation on a number of cross-cutting issues, including the global fight against HIV/AIDS. It represents a unique collaboration between Russia's Ministry of Health and Social Development and the United States Government through USAID. Designed to bolster Russia's capacity to provide technical assistance to developing nations around the globe, the project exemplifies successful Russian-American cooperation within the global public health arena.

AIHA's HIV/AIDS Twinning Center program — which supports PEPFAR's capacity building efforts in Africa — and the Regional Knowledge Hub for the Care and Treatment of HIV/AIDS in Eurasia play an important role in strengthening Russia's international technical assistance strategy. Leveraging relationships established through Twinning Center partnerships in Africa and the AIDS Training and Education Centers established in Russia with support from the Regional Knowledge Hub, AIHA is helping deploy a cohort of highly qualified Russian experts who share their knowledge and technical skills with colleagues in other countries in the region and in Botswana, Ethiopia, Namibia, and Tanzania. These experts work closely with the ministries of health and CDC staff in targeted nations to help strengthen critical laboratory services.