Since the introduction of antiretroviral treatment in the 1990s, a diagnosis of AIDS no longer means imminent death. Many people with HIV now live long, relatively healthy lives. Mortality rates, however, are still higher in people with HIV and they die younger. Researchers would like to know why.

“We know that HIV patients are at increased risk of developing cancer, heart attacks, and strokes,” said Dr. Scott Dryden-Peterson, a doctor at the Harvard AIDS Initiative (HAI). “If they survive for longer, they have more time to develop these illnesses.” Scott’s research explores the interaction of HIV and cancer in resource-limited settings, particularly sub-Saharan Africa, where over 20 million people are living with HIV.

Cancer in Africa

The AIDS epidemic has caused a major change in cancer patterns. Cervical cancer, an AIDS-related cancer, is now the most common cancer in African women. Kaposi sarcoma, an AIDS-defining cancer that can cause purple or red lesions on the skin, is the most common cancer in men and the third most common in women.

AIDS is not the only reason for escalating cancer rates in Africa. Other factors include an aging population, an increase in smoking, and unhealthy changes in diet. Historically, cancer has been a low public health priority in Africa. Governments have been more concerned with the threat of infectious diseases, such as AIDS, malaria, and tuberculosis. A lack of medical records makes it difficult to study changing cancer rates. Data on cancer is just beginning to be collected in Africa and there is little or no historical data to compare it with.

Botswana, where Scott Dryden-Peterson conducts research, is the only African country that has a single national cancer registry. Scott is looking at rates and types of cancer in those living with HIV. He is also looking at the difference in rates between people who have HIV and people who don’t.

“For an individual woman with breast cancer and HIV, there isn’t a big

(continues on page 3)
While visiting the Harvard School of Public Health, Dr. Piot sat down with Spotlight Editor Martha Henry to answer questions.

Do you consider yourself an AIDS activist?

Yes, without any doubt. I’m an AIDS activist, a scientist, sometimes a diplomat, sometimes an entrepreneur — all at the same time.

In 2012 there was a lot of talk about “the end of AIDS.” What’s your reaction when you hear that phrase?

I think it’s not credible. According to UNAIDS, last year there were 1.7 million deaths from AIDS and 2.5 million people became infected. HIV incidence (new infections) was on the rise in a country like Uganda. So I think we better stop talking about the end of AIDS. We’ve made major achievements, there’s no doubt about it, but I don’t think we’ll see the end of AIDS in my generation.

One of your mantras when you were head of UNAIDS was “keeping AIDS as a global issue, not one of poor Africa.” Why was that important?

Well, I think that one of the major assets, if you can say so, is that HIV is happening everywhere. It’s a global issue. Every day in the U.S. several people become infected with HIV, just as in South Africa, just as in Thailand, just as in Brazil. In our ever more connected world, I think that makes it a very powerful paradigm for globalization. We know that if a disease happens only in Africa, it becomes marginalized. Pharmaceutical industries are not going to invest in new drugs, research dollars will also be less. These are the realities.

How important will scientific research be to eventually ending the AIDS epidemic?

When you look at our achievements to date, it’s due, on the one hand, to science, but also to politics. The most spectacular scientific breakthrough was the discovery of antiretroviral therapy as treatment. When science and politics and programs on the ground are in sync, I think we can move mountains.

Science without politics has no impact; politics without science can be dangerous. - Peter Piot

But without the science, I don’t see how the money can do more. So we need to know more about what works, what doesn’t work, and where to invest our funding.

HAI (HIV/AIDS Initiative) is dedicated to research and education to end the AIDS epidemic in Africa and developing countries. For over two decades, HAI has been at the forefront of HIV/AIDS laboratory research, clinical trials, education, and leadership.

Visit our website to make a donation. www.aids.harvard.edu
epidemiologic signal that the risk for breast cancer is elevated, although in Botswana, clinicians think there is an increased risk because they see a lot of very young women with HIV who also have advanced breast cancer,” said Scott. His research will help confirm whether the data backs up doctors’ anecdotal evidence.

From Environmental Science to Infectious Disease

Working as an AIDS doctor in Africa wasn’t an obvious choice for Scott. He grew up in the temperate rainforest of southeast Alaska. His parents were both schoolteachers and are now commercial salmon fishermen. Scott and his sister spent part of each summer on the family’s fishing boat.

As an undergrad at Harvard, Scott studied environmental science and was a star swimmer. He worked in a forest research station in Borneo before attending Harvard Medical School. A fellowship in infectious diseases took him to the Botswana Harvard AIDS Institute Partnership (BHP) for the first time in 2008. Scott lived in Botswana with his wife and daughter for a year and a half.

These days, Scott has two daughters and spends three months of the year in Botswana. When in Boston, Scott is an instructor at Harvard Medical School and an attending physician at the oncology infectious disease service at Brigham & Women’s Hospital. He sees cancer patients, but he treats their infections rather than their cancer. “It’s a specialty within a specialty,” he says.

Interplay

Scott likes the blend of patient care, teaching, and investigation. He is the Principal Investigator of a pilot study, *HIV and Malignancy in Botswana*. For the study, he and his colleagues have established the Botswana Prospective Cancer Cohort. Started in 2010, the cohort enrolls all cancer patients at Princess Marina, the largest hospital in Botswana. About two-thirds of the country’s cancer cases are treated there. Patients who don’t know their HIV status are tested for the virus.

Scott’s study will follow patients into the future and record their health outcomes. Though the study is still in progress, there have already been major findings. Of the patients with cancer in Botswana, two-thirds of them have HIV. “It was surprising,” said Scott. “I didn’t think it would be nearly that high.”

Also surprising, many of the people presenting with Kaposi sarcoma had been on HIV therapy for an average of five years before they developed their cancer, suggesting that their cancers were still developing despite being on antiretrovirals (ARVs). “That was somewhat discouraging and surprising at the same time,” said Scott. “We’re evaluating the impact of ARVs and other risk-modifying factors on the incidence of cancer and patient outcomes.”

Information for Solutions

The results from Scott’s study will provide much-needed information about the prevalence of cancers in Africa, both in people with and without HIV. Working with the Botswana Ministry of Health, Scott is helping to establish guidelines for treating cancers in a country that until recently sent most of its cancer patients to South Africa for treatment.

Of the patients with cancer in Botswana, two-thirds of them have HIV.

“In many places in sub-Saharan Africa, the quality of medical care went up dramatically as AIDS therapy came in,” explained Dr. Max Essex, Chair of HAI. “People recognized the opportunities to both diagnose and treat more complicated diseases.”

As AIDS tragically changed Africa for the worse, the response to AIDS brought about constructive changes to the knowledge, infrastructure, and the expectations of what is possible. “Having learned that drug prices for treatment of AIDS could go down dramatically, many people ask why can’t drug prices go down as dramatically for treating forms of cancer,” said Essex. “And in many cases they can.”

Scott Dryden-Peterson, like many of his young colleagues, is expanding the definition of what it means to be an AIDS researcher. His work exploring how HIV interacts with cancer and other diseases will become increasingly important as the epidemic matures and more and more patients grow old. Scott recently received a prestigious K23 Career Development Award from the National Institutes of Health. While continuing his work, he’ll begin a Master’s in Epidemiology at the Harvard School of Public Health to further enhance his research skills.
The 39-year-old woman, vomiting and with severe abdominal pain, was admitted to the Emergency Room at a Botswana hospital. Prior to her arrival, she hadn’t been eating well and had lost a lot of weight. She had never been tested for HIV.

These facts were presented a few months later at the Botswana-Harvard Tumor Board meeting, held concurrently in a conference room at the Botswana Harvard AIDS Institute Partnership (BHP) in Gaborone, Botswana, and in the Department of Radiation Oncology at Massachusetts General Hospital (MGH) in Boston. It was a challenge to connect the audio-visual feed between rooms 7,000 miles apart, but soon both groups were looking at the same pathology images.

In Botswana, Dr. Memory Bvochora-Nsing, a radiation oncologist, described the test results for her patient. The woman was HIV-positive with a low CD4 count, meaning her immune system was severely compromised. Dr. Joseph Makhema, C.E.O. of the BHP and one of the doctors in the crowded room in Botswana, had started the patient on antiretroviral drugs to treat her HIV.

Memory, a native of Zimbabwe, is one of just a few oncologists working in Botswana. Until recently, most people diagnosed with cancer in Botswana were sent to South Africa for treatment. This was difficult for patients and expensive for the healthcare system. Today, Botswana is developing its own cancer treatment programs.

From the pathology images, the woman had also been diagnosed with low-grade lymphoma, yet because of her symptoms and the severity of her illness, Memory thought that she was suffering from high-grade B cell lymphoma instead.

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That’s where the white coats huddling around the microphone at MGH in Boston helped out. The Tumor Board holds monthly meetings to review cancer cases from Botswana and have experts weigh in on treatment decisions. Most of the cancer patients are also infected with HIV.

Dr. Jeremy Abramson, a lymphoma specialist whom another doctor described as “the go-to guy for all HIV-related lymphomas and Kaposi sarcoma,” offered reassuring words to Memory. “I was pleased to see your treatment plan,” said Jeremy. “That’s exactly what I would have done in this scenario.”

“I’m very happy you say that because I had to make a decision,” said Memory. “The clinical presentation was contrary to the pathology. The patient was very sick. We just decided to go on and treat it as a high-grade [lymphoma]. I thought that if we go for the pathology review and wait for things, she might, you know…”

“It’s a much greater sin to over-treat a low-grade lymphoma than to undertreat a high-grade lymphoma,” replied Jeremy. “This patient has a very good chance of being cured [of the lymphoma] with the therapy you initiated.”

In Boston, pathologist Dr. Aliyah Sohani confirmed that the cancer cells were characteristic of a high-grade lymphoma. She told Memory about a website where she can post pathology images. MGH pathologists will look at the images and offer an informal second opinion in a few days or less.

Dr. Jason Efstathiou, a radiation oncologist at MGH, gently guided the proceedings.
Models of Care

In Botswana, about 25% of adults have HIV. In 2001, the government showed extraordinary vision in deciding to provide antiretroviral (ARV) medication to all in need. The national HIV/AIDS treatment plan was created, scaled-up, and continues to provide life-saving ARVs today.

Questions that always need to be asked about ambitious government programs are, how well is it working and what does it cost?

The Models of Care project was designed to provide answers. From 2007 to 2011, researchers led by HAI Executive Director Dr. Richard Marlink examined the costs and effectiveness of the Botswana National Antiretroviral Treatment Program. Collaborating with the Botswana Harvard AIDS Institute Partnership (BHP), the Ministry of Health, and the African Comprehensive HIV/AIDS Partnerships (ACHAP), The Models of Care program consisted of three study arms:

1. Evaluation of the program at the individual patient level
2. Costing of the program over time
3. Creation of specific clinical cohorts to answer Botswana-specific care and treatment questions

The Models of Care researchers just issued their final report, with study results, analysis, and specific recommendations. The report serves to inform the debate regarding the efficacy, financial sustainability, feasibility, and effectiveness of existing models of clinical healthcare delivery and laboratory monitoring in Botswana.

To download a copy of the final report, visit our website: www.aids.harvard.edu.

Should Not Telling Be a Felony?

If you have HIV, should it be a crime to have sex with someone and not disclose your status? What if you have HIV, but wear a condom and take medication so your viral load is undetectable?

On February 28th, law professors from Harvard and Northeastern met at the Harvard School of Public Health to debate the legal, moral and practical perspectives of HIV non-disclosure. Dr. Iain MacLeod, a post-doc at HAI, moderated the panel.

Lymphoma image from pathology report
**Plague: The App**

*Plague*, the new app for Apple and Android devices, is an enjoyably addictive way to learn about epidemiology and, if you're on a roll, completely destroy mankind.

To play, you choose a type of pathogen, such as a virus, bacterium or parasite, and a country to launch your epidemic. To win, you must learn how to balance transmission rates with the severity and lethality of your disease. As in the real world, scientists begin to work on a cure once the disease becomes a recognizable threat.

The app was developed for $5,000 by 25-year-old James Vaughan and several freelancers. Launched in May 2012, *Plague* quickly became a global hit. To date, over 100 million games have been played. At HAI we don’t often root for the pathogen, but we’re glad for any tool that teaches about the complex interactions necessary to spread (and stop) HIV.

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**HIV & Cancer Issue**

HIV and cancer may sound like a double dose of despair, but the fact that we’re devoting this issue of Spotlight to the subject is not all bad news. Millions of people with HIV now receive life-saving antiretroviral therapy. As more and more people with HIV live much longer lives, researchers are rushing to understand what the implications are. How does chronic HIV infection affect cancer rates? And how can we extend the lessons learned from HIV/AIDS to strengthen cancer treatment in the developing world?

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