

# Opening Doors



The long, low building sandwiched between a railway station and a busy traffic roundabout could be a 1950s American motel. It's anything but. It's the busy DarDar Clinic in central Dar es Salaam, Tanzania. Some 2,000 Tanzanians who are HIV-positive are taking part there in a clinical trial, sponsored by the U.S. National Institutes of Health (NIH), to test an experimental tuberculosis vaccine. More than 8% of the adults in Tanzania—which has a population of 37 million—are infected with HIV, and between 10% and 25% of those with HIV are at risk of developing disseminated tuberculosis.

The principal investigator for the trial is Dr. C. Fordham von Reyn, chief of infectious diseases at Dartmouth. He also heads the overall DarDar Health Project, established in 2000, of which the trial is one part. DarDar is a collaboration between Dartmouth Medical School and Tanzania's Muhimbili University College of Health Sciences (MUCHS) in Dar es Salaam. The project's name was drawn from the first syllables of "Dartmouth" and "Dar es Salaam" and also evokes the Swahili word for sister—"dada."

In addition to the clinical trial, the DarDar Health Project also includes a primary-care clinic for patients who are enrolled in the trial; a pediatric clinic for their children; a training grant, underwritten by the NIH's Fogarty International Center, which allows MUCHS faculty to earn degrees at DMS—master's degrees in public health and Ph.D.'s in basic science disciplines; jointly taught courses on HIV/AIDS and tuberculosis (TB); a faculty exchange program; opportunities for MUCHS students to visit DMS; and an elective that allows Dartmouth medical students to work at the DarDar Clinic and at MUCHS. (See [http://dartmed.dartmouth.edu/fall06/html/opening\\_doors\\_we.php](http://dartmed.dartmouth.edu/fall06/html/opening_doors_we.php) for two **WEB EXTRAS** about the project and <http://dms.dartmouth.edu/dardar/> for a website detailing its various elements.)

The clinical trial of the TB vaccine was the foundation on which all these activities were built. TB is the main cause of death in HIV/AIDS patients in Tanzania, as in many developing countries.



Background, the facade of the DarDar Clinic in Tanzania. Top, a caregiver takes a patient into an exam room. Bottom, the skyline of Dar es Salaam, Tanzania.

The disease usually affects the lungs, but in immunocompromised individuals it can disseminate, or spread, throughout the bloodstream. In resource-poor settings, disseminated TB often goes unrecognized and untreated. “Part of the DarDar study,” explains von Reyn, “is to determine how blood cultures can help diagnose TB cases that are otherwise missed.”

A second, even more important part of the study is a double-blind vaccine trial. Patients get five injections over 12 months of either an experimental TB vaccine (*Mycobacterium vaccae*) or a placebo; then they report back to the clinic for follow-up visits every three months for three to five years. The treatments are coded so neither the patients nor the researchers giving the treatments know who gets the vaccine and who gets the placebo. “Our strategy in this study is to give a booster vaccine to HIV patients who had the standard TB vaccine, BCG, at birth . . . to help reduce the risk of people with HIV getting tuberculosis,” says von Reyn. The BCG (bacille Calmette-Guérin) vaccine is used in many countries with a high prevalence of TB—though not in the U.S. It is 80 percent effective in preventing childhood forms of the disease but loses its effectiveness by adulthood. “Our hypothesis is that the [experimental] vaccine will reduce the risk of TB by 50 percent,” von Reyn adds.

**I**n 2008, the researchers will break the code and evaluate the results to see whether the experimental vaccine is effective. If it is, “the vaccine can be given to people with HIV on a large scale to reduce the incidence of TB,” says von Reyn. In the meantime, faculty and students from MUCHS and from DMS—like von Reyn, who makes several trips a year to Tanzania, and like Cara Mathews, who shares her experiences there in a story that starts on page 34—will continue to travel back and forth, opening doors from one culture to another. From one medical system to another. From one people to another.

**Dartmouth has had a significant partnership with a Tanzanian medical school since 2000. What began as a single clinical trial is now a multifaceted exchange program that is opening doors, opening minds, and changing lives.**

**Text by Laura Stephenson Carter and Cara A. Mathews, M.D.  
Photographs by Patrick J. Saine**

Photojournalist P.J. Saine's work has appeared many times in these pages—most recently in a Fall 2005 feature that followed a DHMC resident for 24 hours. Saine was the manager of ophthalmic photography at DHMC from 1997 through January of 2006 and now works as a freelance photographer in Virginia. The photos in this feature were taken in March of 2006; pictures of patients were taken only with their permission. The introductory text on these two pages and the captions on the following pages were written by Laura Carter, the associate editor of DARTMOUTH MEDICINE. The personal account starting on page 34 was written by Cara Mathews, a DMS '05. Some of the quotations in the captions were collected in interviews that Carter conducted and some were drawn from a video that was produced by Daniel Kaser, a second-year DMS student who interviewed a number of people at the DarDar Clinic in 2005. For more on Kaser's experiences, see the “Student Notebook” essay on page 27.

# A veil lifted

By Cara A. Mathews, M.D.

**Spending six weeks in Tanzania working in the DarDar Project made a permanent impact on a Dartmouth medical student.**

It took about two weeks before I was able to function comfortably in Dar es Salaam—ride the public buses, find food, and walk the streets. Around the same time, I began to refine my plans for a future in international health. But I had begun to appreciate the role of AIDS in Tanzanian society on my first day in the clinic—and I was still learning when I left for home six weeks later.

**April 29, 2004**

*Patient after patient today with very low CD4 counts (interestingly, many Tanzanians are quite savvy about CD4 counts, much more so than Americans). They are often the last surviving members of their families who are able to care for children/nieces/nephews/grandchildren. One woman started crying when asked whether she would be able to afford her baby's formula. Many, many tears, as the docs here are often the only confidants for the patients.*

Death and illness touch the majority of Tanzanian lives and are not reserved for the elderly or the random, unlucky younger person. One 17-year-old-patient was orphaned when her parents and younger brother died in a farming accident. She traveled to Dar es Salaam from her rural village to seek employment and a new life. Instead, she was unable to find work, dated a man for a short time, and became HIV-positive. On her screening paperwork, she was able to list only one friend as a contact. No one else in Dar knew her well. Soon, her entire nuclear family will be gone—three from the farming accident and one (herself) from AIDS.

The effects of illness reach beyond the very poor, too. Among the middle-class employees of the Infectious Disease Clinic (IDC), there was a 27-year-old widow whose husband had died of appendicitis

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*Mathews, a Dartmouth College '99 and DMS '05, was the first Dartmouth student to do a six-week elective in Tanzania with the DarDar Project. She divided her time there between seeing patients at the Infectious Disease Clinic, where the DarDar trial is being conducted, and participating in rounds at Muhimbili National Hospital. The dated passages in italics were drawn from a journal she kept while she was in Tanzania, and the other passages are reflections that she wrote in July of 2004, upon her return to the U.S. She is now a second-year resident in obstetrics and gynecology at Women and Infants Hospital in Providence, R.I.*

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**The DarDar Project's Infectious Disease Clinic, pictured above (and on pages 32 and 33), is just across the street from the Dar es Salaam railway station, right. Monday is the clinic's busiest day; about 40 patients have appointments that day.**



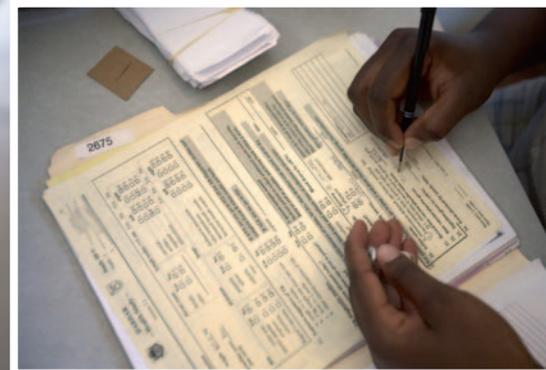
**Above, a crowd of patients is waiting at the reception desk when the clinic opens at 8:00 a.m. on a Monday. Many are hoping to get their examination over with before they start work for the day.**



Left, the clinic waiting room fills up quickly. Tanzanian patients are “accustomed to waiting long periods of time,” says Dr. Richard Waddell, a DMS faculty member and coinvestigator of the DarDar trial. “When they come for a visit, they just wait. They come long distances on multiple buses crammed with people . . . and they don’t complain.” Above, when patients check in they’re given a number, handwritten on cardboard, like at a deli counter in the U.S.



Good records are key to a successful study. Above, is a log book listing patient appointments. Below, data is entered in the patients’ charts by hand and is later put on a computer.



The patient above has just been given a slip with the date of her next appointment. “The services available here are excellent,” a different patient observed. “The workers are very cooperative and do not stigmatize us at all.” As a result, the people who are enrolled in the trial come to the clinic even for care unrelated to the study. “We didn’t expect we’d be primary-care providers,” says Waddell, “but because of the wonderful working relationship our Tanzanian project staff have developed with people in the study, the patients . . . see our place as a place where they get caring care.”

and a 30-year-old doctor who has been supporting her mother and young brother since the death of her physician father. Because of the commonality of death, extended families are crucial in caring for and raising children. I frequently answered questions about life in America, but was particularly struck when a well-educated young engineer asked me: “What is the situation in America—do most people our age support their younger brothers and sisters?”

AIDS is similar to other diseases in Africa—patients get sick and, even with treatment, eventually stop getting better. Then they die. But AIDS is unique in that it carries a social stigma. The number-one medical complaint I witnessed at the IDC was papular pruritic eruption—a skin condition that leaves scars, identifying the bearer as HIV-positive. Patients beg, “Can you give me something to make these scars go away?” not “Can you give me something to stop the itching?” They don’t want their neighbors to know that they are ill, and often-times even their families are unaware. Doctors play an important role as counselors and listeners, not just as purveyors of knowledge and prescriptions. I watched a high-ranking police officer, who was supporting his children and his nieces and nephews after the death of his sister, sob as he discussed his poor CD4 results. “What will they do?” he worried. He cried openly for what I suspect was the first time. Unfortunately, we had no answers for him.

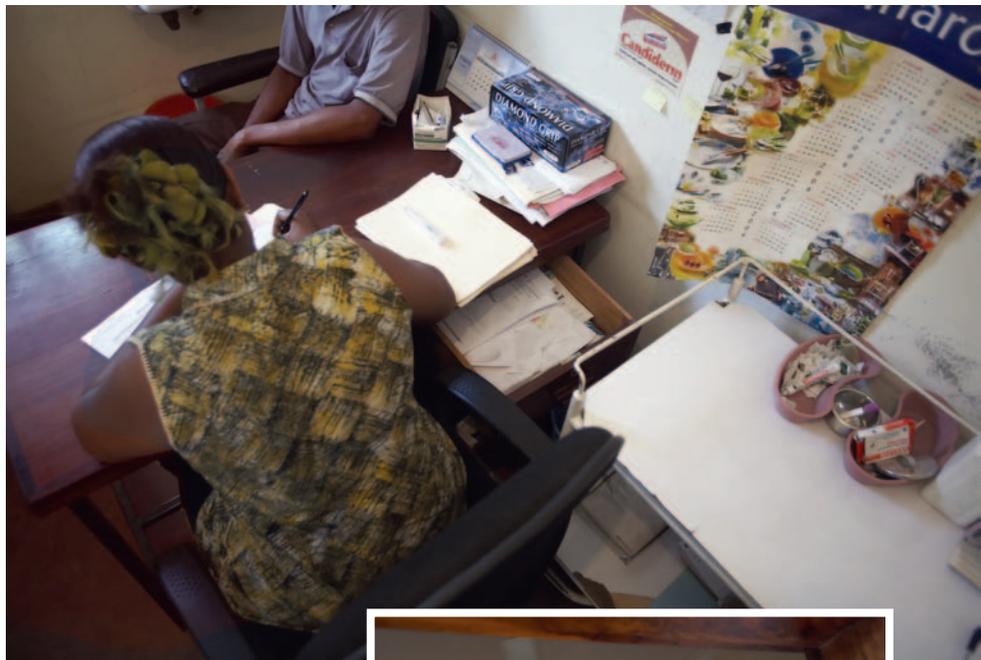
**May 6, 2004**

*I find that I’m never bored here, even when I spend hours alone. It’s a struggle merely to accomplish simple, daily tasks. Just going to the grocery store, getting the goods back to where I’m staying, and making dinner can take all day—it makes me feel like an elderly person. And it takes an incredible amount of effort to get to work in a presentable fashion. I am so hot and tired after riding the daladala [a small, local bus] and walking that I cannot imagine having to come home and cook dinner for a family. This morning I went to mass with Sister Brigid and then had a cappuccino and muffin at the Royal Palm Hotel before being dropped off at MNH [Muhimbili National Hospital] for medicine rounds. I felt completely different at 1:00 p.m. than I did on Tuesday when I was late for the daladala and had to walk/run/taxi to MNH. The climate affects productivity, but folks in Dar who are moving from air-conditioned autos to air-conditioned offices are unaware.*

Before I left the United States I was warned: in Tanzania, it’s normal to set up a meeting and have people not show up, even after it has been reconfirmed several times. A brochure for a Tanzanian culture/Swahili class explained that tardiness is a normal



**Each appointment begins with confirmation of the patient’s identity and a weigh-in, since weight loss is a common symptom of TB. Above, Tanzanian medical officer Dr. Lawrence Lekashingo weighs a patient. “TB is the leading cause of death among HIV-positive patients” Lekashingo explains.**

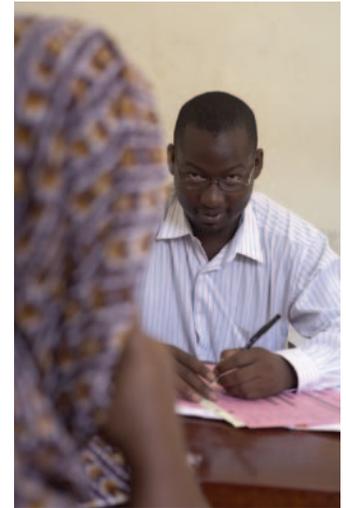


**Above, clinical officer Safina Sheshe checks a patient’s status and then gives him a dose of either the TB vaccine or a placebo. But neither she nor the patient knows which he’s getting, because the study is double-blind. The vaccines (and placebos) are stored in a refrigerator, at right.**





At left, this patient's TB test was negative, so she has come in just for a check-up. Then she sits and waits outside another office, above, to receive her travel allotment. Getting to appointments is very hard for patients in the study, so if they show up they are reimbursed for travel—the equivalent of cab fare, about \$2.00.



Dr. Johnson Lyimo, above, talks with a patient. He is among the Tanzanian faculty who have come to DMS as a Fogarty Fellow to earn a master of public health degree. Dr. Charles Wira, a DMS physiologist, admires "the determination and sacrifice these [Fogarty Fellows] are willing to make" in order "to improve the quality of the lives of their countrymen." Wira was codirector of a DarDar immunology course.



Then it's another patient's turn to get his travel reimbursement. Above, nursing officer Esther Kayichile watches him sign the register indicating that he has received his payment. Besides cabs, the other transportation option is a local bus known as the "daladala," which costs about 20¢. At right, another patient gets her vaccination site checked; the scar is barely visible. All of the patients in this feature gave permission for their photo to be taken, although some asked that their face not be pictured. AIDS still carries a major stigma in Tanzanian society. The diagnosis can be "frightening," notes Dr. Lisa Adams, a DMS faculty member and the director of the DarDar pediatric program. She says the typical HIV-positive mother is torn between "the burden of not being able to confide in anyone in her family" and "wanting to do the right thing for her children."



part of the culture and should not be considered rude. Still, it was difficult not to be irritated as I stood outside a building waiting in the hot sun for a couple of hours. On one of my last days in Dar, I learned that many people do not even use Swahili time (which starts with 0:00 at 6:00 a.m., when the sun rises) but identify “waking time,” “eating time,” and “cleaning time.”

Historically, assigning time of day by task made sense. Even the modern-day lack of timeliness is understandable when one realizes how often buses break down, are full, or don’t show up or traffic is simply stopped for hours. An incredible amount of effort is expended just trying to travel in Dar, never mind attempting to appear clean and presentable upon arrival.

The IDC is a leader among health-care centers in Tanzania in attempting to schedule patient visits. “Morning” is circled on nearly every appointment card, in the hope that the patient will, at least, return.

The lack of systems and infrastructure has a medical corollary as well. I was struck by how incredibly simple organizational problems hinder care. Before going on rounds at MNH, I expected the major roadblocks to health care would be a lack of technologically advanced tests and procedures. But many were available (although not all patients could afford them). The interventional radiology department, for instance, scheduled angiograms daily. But the lack of organization was the major factor impeding care; it even prevented doctors from getting timely results from routine blood tests.

Food for patients consisted of bottled water and large containers of ugali (similar to grits) provided by family members and stored under patients’ beds. Rounds started when the attending physicians showed up and were conducted in English. Patients, therefore, were none the wiser when the attending said, for instance, “No, this is not the correct management. This patient should have test X conducted and should have been started on drug Y when he was admitted four days ago.” Patient rights are something in the distant future for Tanzania, and malpractice is a nonissue.

But I was extremely impressed by the knowledge of the attendings, the capabilities of the students and residents in conducting physical exams, and the general care provided for the patients.

#### May 14, 2004

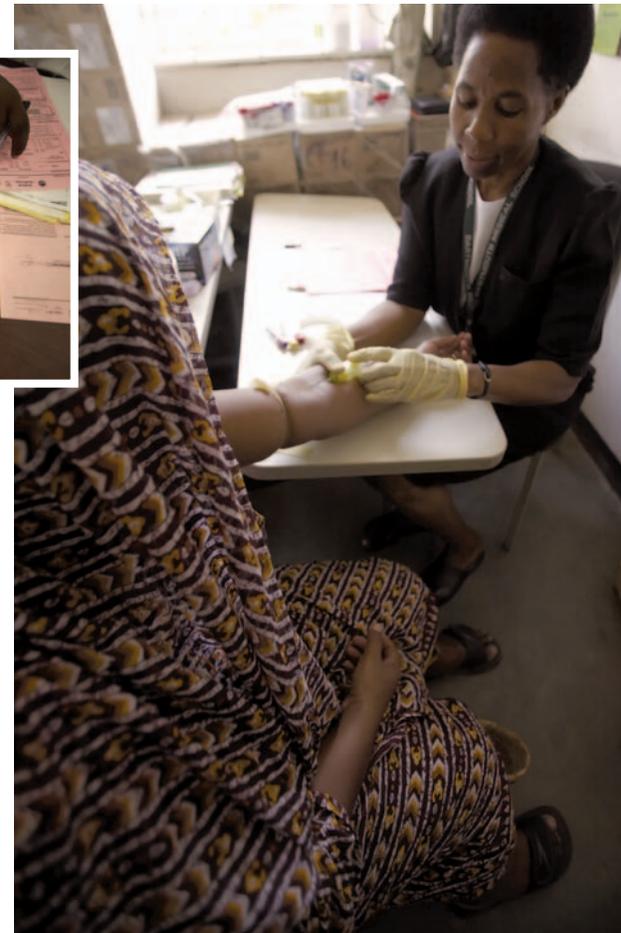
*I’ve always wanted to start a clinic in a small town in an underserved country, train local folks to run it, and create a self-sustaining operation. But now I wonder what it will take. Would one year be enough to get a clinic going? Could you do it if you had young children?*



**Dr. Lillian Mtei, above, is the clinical coordinator for the DarDar study. Photographer Patrick Saine describes her as “upbeat” and “enthusiastic.” In fact, Dartmouth visitors come away impressed by all the Tanzanian staff on the project. “Day in, day out,” says Daniel Kaser, a DMS student who spent the summer of 2005 there, “I was impressed with . . . how welcoming people were.”**

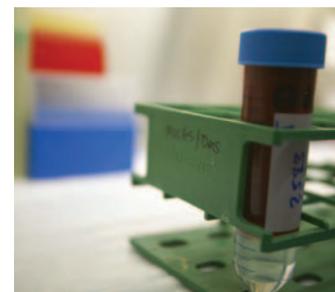
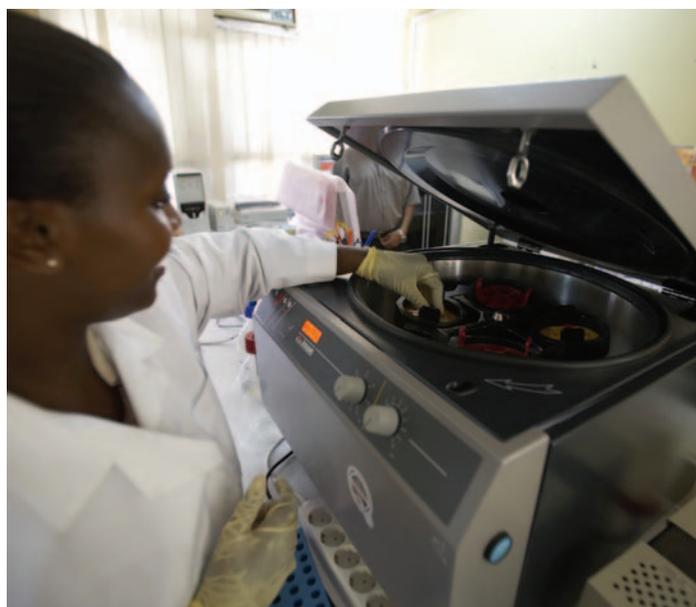


**Above, an HIV-positive patient discusses with her doctor whether she’s eligible for antiretroviral treatment; an array of antiretrovirals is displayed in a CD case on the desk. Unfortunately, her T-cell count is too high for that treatment option. At right, Amelda Urusa draws a blood sample from a patient. Next, the patient will get a TB test.**

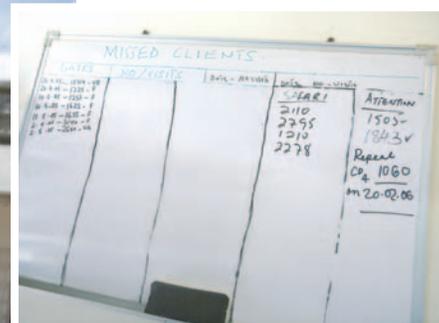




Blood samples are transported in a picnic cooler from the clinic, above, to the lab at Muhimbili University, right, where they undergo testing.



At left, lab technologist Betty Mchaki has run a set of blood samples through a number of tests before incubating them. Above, another sample awaits its turn. The green rack says "MUCHS/DMS," referring to Muhimbili University College of Health Sciences and Dartmouth Medical School.



A whiteboard in the clinic, above right, lists any patients who miss a routine visit. If patients miss two consecutive appointments, then a member of the medical staff goes looking for them. Above, Safina Sheshe and a colleague are about to look for six such patients. "This is much more difficult than might be imagined for two reasons," explains photographer Patrick Saine. "This population can be very itinerant—if they do not like the landlord . . . then they just move on. There are no . . . long-term leases and no forwarding addresses . . . which leads to the second problem," he adds. "There may be neighbors who know where they have moved, but because there are no street addresses, the directions are on the order of 'Turn right at the large drainpipe and left at the big mango tree.'" But maintaining the study population is essential for a reliable outcome, so the staff works hard at finding lost patients. Mangoes are common in Tanzania—at right, Amelda Urasa takes a break to go out and buy one from a street vendor in front of the clinic.



My first night in Tanzania, I ate dinner with 10 visiting Italian health professionals. One doctor explained that he had opted to volunteer with a health-services division for two years rather than complete Italy's two-year military service. He and his wife, also a health professional, had spent six months in Ethiopia before their funding was diverted to the army for a peacekeeping mission there. Now, with their 7-year-old and 3-year-old children, they are ready to return to Africa for a few years. "Are you crazy?" I thought. "Two years here with two kids?" But by the end of my six weeks in Tanzania, I had reconsidered.

A veil was lifted from my eyes in Dar. I now believe that instead of my previously envisioned two-week-a-year commitment to international health, my career will be deeply entwined in such work.

Upon my return to DMS, I began drafting classmates to volunteer in my still-hypothetical clinic. A future orthopaedic surgeon, two pediatricians, a plastic surgeon, two internists, and one emergency room physician have already signed up. I envision a hospital that functions without foreign physicians but capitalizes on different specialists-in-residence. Visiting physicians would give lectures, attend rounds, and help train young, local physicians. Surgeons would operate and teach common procedures. My Dartmouth classmates are the most community-minded and motivated people I know, but finding and organizing a volunteer experience can be an overwhelming task; an effective organizational network would tap a substantial resource.

**D**uring my time in Dar, I was exposed to a variety of international organizations and their volunteers: religious groups, such as the Catholic church, which runs clinics and hospitals; foreign academic institutions, which conduct research and provide services; foreign governments, which fund patient care and run public-health projects; and nongovernmental organizations, which focus on a variety of specific issues. One of the most significant learning experiences was to realize how many different approaches to international health exist. My eyes were opened to the possibilities, and my mind is constantly churning. In addition to my plan to start a hospital, I also expect to be involved with other international projects.

I am considering specializing in gynecological oncology and am interested in doing research during my residency that's related to reproductive cancers in developing countries. Not surprisingly, there is no Pap-smear screening program for cervical cancer in Tanzania. The organizational effort required to start such a program would be huge, and the cost

*Continued on page 58*



**Dr. Kisali Pallangyo, above, is former dean and now principal and provost of MUCHS. He's fostered a collaborative relationship between the institutions despite challenges such as frequent power outages (the electricity failed twice while the photographer was in his office). The city's power comes from a hydroelectric dam on a river that is flowing at 25% of its capacity due to drought. At right is the MUCHS campus.**



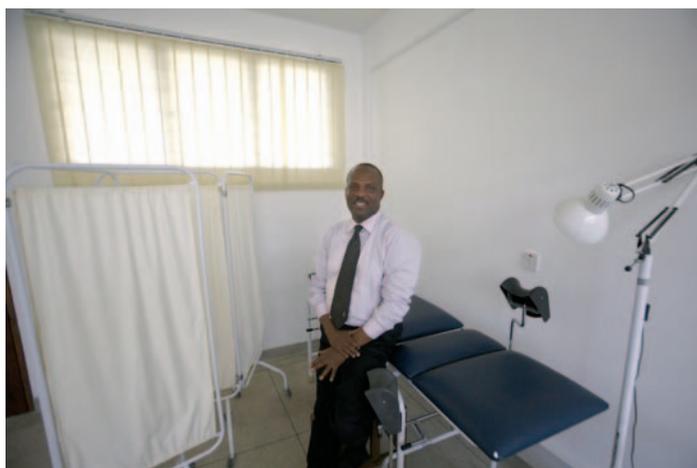
**Above, MUCHS students relax on campus. Several Tanzanian students have visited DMS through the DarDar Project, including Isaac Maro, who is sitting on top of the table. "I believe prevention is the better option compared to cure," says Maro, who hopes to specialize in infectious diseases.**



Above, these MUCHS students are taking an exam in a classroom that looks very similar to those at DMS. At right, an ophthalmologist on the MUCHS faculty is giving a lecture on glaucoma to a group of residents from the MUCHS-affiliated hospital. The ophthalmology department was in the process of moving to new quarters, so this storeroom was serving as a makeshift classroom.



Above is pediatric grand rounds, with a difference. At MUCHS, patients are present at grand rounds presentations. A mother and her baby sit up front (at the far left) while the physicians discuss the baby's symptoms, pass around x-rays, consider the differential diagnosis, and recommend a treatment plan. Students ask questions, and faculty offer input. At left, Dr. Helga Naburi (in beige), director of the DarDar pediatric clinic, chats with some students after grand rounds.



Dr. Muhammad Bakari, director of the DarDar study, is pictured at left in his clinic, after attending to patients. Above is a local hospital not affiliated with MUCHS. There are lots of private hospitals in the city, many of them owned by doctors.

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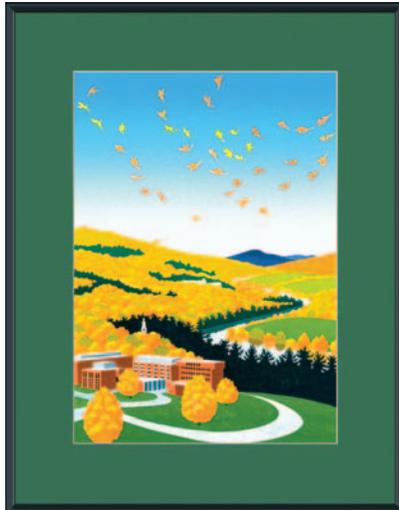
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## Opening doors

*continued from page 40*

of the labwork and interpretations prohibitive. Although cervical cancer is common and deadly for otherwise healthy young women, even most female physicians there have never had an annual gynecological exam. What would a feasible screening program in such a setting look like?

I know I'll view this trip as a major event when I look back on it later in my life. My interest in international health is not a passing whim—a great foreign adventure during medical school. It is now a part of me, a part of every day, a part of my future.

### Epilogue

Two years after I wrote the journal entries and reflections above, and one year into my residency in obstetrics and gynecology, my plans have evolved but not changed dramatically. I still intend to complete a fellowship in gynecological oncology. I still plan to practice at a hospital that has a partnership with a program in the developing world. The lack of routine preventive care in many countries still keeps me awake at night.

What surprises me is how much my everyday behavior is influenced by my time in Dar. On any given day, several of my clinic patients skip appointments without canceling. When I follow up with them at a later visit, they often blame transportation problems: "I don't have a car, there is no bus to my neighborhood, and my friend didn't show up." I understand what it means to lack resources differently than I used to. Our specialty ob-gyn emergency room is open 24 hours a day, staffed overnight by an on-call team of residents. At 3:30 a.m., when the on-call doctor has missed dinner and is exhausted, it seems a misuse of a high-tech emergency room to handle a routine question like "What is the best birth control for me?" But after a five-minute interview, it becomes apparent that for a patient who works nights, has no doctor, and takes care of two children at home during the day, preventing another pregnancy is very important—and 3:30 a.m. is her one chance to get an answer.

I also make everyday use of what I learned from caring for people of another culture, with different medical beliefs, while speaking another language. A majority of the patients I now treat were born outside the U.S.

I often feel as if I'm in an international clinic, here in Providence, R.I. In fact, practicing international health in the 21st century does not necessarily involve traveling to far-off lands to treat impoverished patients in remote jungles. It also means taking care of the Dominican patient who asks "Will I be ready to fly home next week?" or the Liberian woman who comes to the hospital in labor but has had no prior obstetric care. Many of my patients travel frequently to visit family and friends in their home countries, and I can visualize the advice I give about starting prenatal vitamins prior to conception spreading like a wave to women in Cape Verde, Nigeria, Ecuador, and Cambodia.

In Dar, I realized how much patients there appreciated my attempts to speak Swahili. I also recognized the efficiency of not using a translator. Now, a majority of my patients are Spanish-speaking. Before I started my residency, I traveled twice to Guatemala to learn Spanish and to work in the highlands—once with a traditional midwife and once in a free pediatric clinic.

My time in Dar and in Guatemala also exposed me to alternative medical beliefs. There is a difference between gaining an academic understanding of cultural differences and actually experiencing them. After watching a Mayan woman, surrounded by the female members of her family, breathe through labor pains in her midwife's courtyard, it was clear to me why my Guatemalan patient at Providence's Women and Infants Hospital had reservations about intravenous lines and epidural catheters for pain relief.

I am also much more aware of my own shortcomings and of gaps in my understanding. It is a common belief among many Liberian patients that a cesarean section causes permanent infertility, and many patients would choose a stillbirth over a c-section. As the Western physician standing in a labor room, watching and listening to the heart rate of a fetus who is not tolerating labor well, I find it nearly impossible to have a respectful conversation about cultural differences. Sometimes I just don't—just can't—get it. But at least I can see the differences in a way I couldn't have before.

Two years later, I still envision a career improving the lives of women with gynecological cancers in the United States and around the world. I am curious to see what further surprises the future will bring. ■



## PARTNERS FOR LIFE

### Donna

For over two decades, DHMC has cared for Donna's family. When her son injured his spine, he came to DHMC for expert care. When her husband was diagnosed with non-Hodgkin's lymphoma, he consulted with DHMC's oncologists about treatment options. And when her son-in-law needed a hip replacement, he came to DHMC for his surgery.

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