

Site Visit Report: Moi University School of Dentistry, Eldoret, Kenya,
March 24-April 3, 2009

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During a two-week period from March 24 to April 3, 2009, I participated in my second visit to Moi University at Eldoret, Kenya. I was accompanied by my husband, Dr. Keith Yoder, who is an IUSD volunteer faculty member, a private practice dentist, and has had five years of experience providing dental services at a hospital in East Africa. During our previous visit in 2003, we were accompanied by Dr. Timothy Carlson and his wife, Mrs. Ann Carlson. At that time Moi University School of Dentistry was in planning stages. During the period July 22-26, 2006 Dean Lawrence Goldblatt visited Moi University and in a written report described the progress toward initiating a school of dentistry as well as collaborative research related to the effects of long-term antiretroviral therapy on the oral mucosa. Dean Goldblatt returned to Eldoret to participate in the official opening of the Moi University School of Dentistry in November 2007. Dr. Mythily Srinivasan visited Eldoret to proceed with the oral mucosa research project for four days in January 2009. Dean Goldblatt is scheduled to return to Eldoret in August 2009 to present the keynote address at a professional conference.

Upon arrival we met with initially with Dean Caroline Kibosia, Dr. Kenneth Okemwa and Dr. Conway Sang to review planned activities for the two-week period in Eldoret. We began our visit with courtesy calls to Dean of Medicine, Prof Fabian Esemai, Head of the COBES program Prof. Mangera and Dean of the School of Public Health, Dr. Diana Menya, and the Research and Sponsored Projects' Administrator, Christine Chuani. Each of the Moi University officials graciously welcomed us to Eldoret and wish us success in our work.

During our visit we stayed at the IU House near campus where we met faculty and students from Brown University and Indiana University and learned of their diverse roles in Eldoret. Dr. Joseph Mamlin encouraged our work with the new school of dentistry and said that his goal for dentistry will be fulfilled when dental services are available in the villages.

During the two weeks in Eldoret we participated in the following general activities:

- Met with Moi University and AMPATH officials and personnel
- Participated in tutor training for the Community Based Education and Service (COBES) Program for all health science students
- Provided a presentation about my of fluorosis research in East Africa for faculty, medical and dental students
- Toured of Moi Teaching and Referral Hospital and dental clinic, AMPATH in Eldoret and Mosoriot, Riley Mother and Baby Hospital, Amani Workshop, Rivatex factory.

- Visited a hostel for children served by the Orphans and Vulnerable Children's Program funded by the United States Aid to Developing Countries.
- Attended a presentation on the status of Eldoret's street children and program development
- Participated in dental student problem based learning.
- Participation in COBES preparation, consultations with district officials, and field activities in Mosoriot with dental, medical, public health and nursing students
- Keith Yoder provided a presentation related to the practice of dentistry in the United States for members of the District Dental Association
- Participated in planning meetings with MUSOD Dean and faculty members.
- Drove down the escarpment into the Rift Valley to Kerio with dental school faculty and four medical students to begin a student led study to measure dental fluorosis in primary school children in the fluorspar mining area.

Moi University School of Dentistry opened its door to students in January 2008. Fourteen Kenyan students, five men and nine women, were admitted and are currently in their second year of the curriculum. A second class of 22 students was admitted in January 2009 and are now pursuing their basic science courses with medical, nursing and public health students. A class of ten students is expected to be admitted in 2010. A joint governmental board selects students for admission; the schools of dentistry at Nairobi and Eldoret do not participate in the selection process, as is the process for all government sponsored students (GSS). Each country in East Africa has its own accreditation process. Dental school course work and school holidays are being adjusted so that in the future course work will begin, as was traditional, in September rather than January as has been the case for the past two years. Dental graduates are obligated to one year of internship and two years working in a government hospital. The political/health divisions are: Province (hospitals); District (hospitals and health centers); Subdistrict (dispensaries). There are eight provinces in Kenya each having at least one hospital. Dentists are found at district hospitals, but not below that level. There are approximately 600 dentists in Kenya which has a population of about 36 million people.

The Moi University School of Dentistry (SOD) is currently housed in a building on campus that accommodates faculty offices, a classroom and a conference room, and a clinical room with space for three dental chairs and air compressors. Construction of a new building is expected to occur in 2009 on a substantial piece of land adjacent to the current School of Dentistry building. The new building will be shared with schools of public health and nursing and will have adequate space to install the 22 dental chairs and units that were donated by a German development organization.. The campus is expecting to connect via fiber optic cables by June 2009. Dr. Kibosia said they are considering beginning Kenya's first program to train dental hygienists in 2012.

The current Moi SOD faculty includes Dr. Caroline Kibosia, Dean who holds masters degrees in pediatric dentistry and public health. Dr. Kenneth Okemwa holds a masters degree in public health and directs the students public health education including their Community Based Education and Service (COBES) program. Dr. Conway Sang has advanced training in cytology and directs oral pathology training. Dr Osama and Dr.

Mohammed are Egyptian dentists who direct oral surgery and prosthodontics. Dr. Scott Omotimbai is a new dental graduate who is a tutor in problem based learning (PBL).

The purpose for our visit was to explore potential areas of collaboration since the SOD is now operational, to gain insight into the COBES program and to begin to formalize a partnership. Draft proposed goals for the IUSD-Moi School of Dentistry Partnership are to:

1. Enhance infrastructure for the partnership's teaching, research and service missions
2. Promote faculty and student development and exchange
3. Facilitate availability of oral health services in Eldoret and district villages
4. Provide oral health consultation for the ongoing IU-Moi Partnership and Non-governmental organization (NGO) programs.

Examples of humanitarian programs existing in Eldoret that could benefit from oral health consultation include: Riley Mother and Baby Hospital; USAID's Orphans and Vulnerable Children's Program; the Street Children's Project; Home HIV testing; Prevention of Mother to Child Transmission (PMTCT)

Dr. Kibosia will use Moi University's format to begin the process of formalizing a Memorandum of Agreement between IUSD and Moi University SOD. The intention is for the agreement to be refined by both sides and formally signed when Dean Goldblatt visits Moi University in August 2009

Potential Collaborations and Action Items for the Areas of Teaching, Research, Patient Care and Service. Attached is a timeline that I prepared to provide a visual image of the curriculum and academic areas of assistance requested:

Teaching:

Immediate Priorities

- Request IUSD faculty appointments for Moi University SOD (MUSOC) faculty to enable access to full text journals and educational resources online from the IUSD library
- MUSOD has an immediate, critical need for a minimum of ten "phantom head" mannequins and air driven laboratory handpiece units by January 2010 to enable teaching preclinical techniques for the incoming third year dental students. We can search for these items from other schools of dentistry who may have upgraded to more sophisticated models.
- MUSOD has an urgent need for faculty with expertise in oral biology and human dentition to teach modules for third year students in January 2010 and dental materials for fourth year students in 2011. IUSD faculty and alumni who are specialists can be invited to participate in these teaching assignments. (see attached Excel timeline file). Following is a summary of the identified requests for teaching expertise:

- IUSD faculty requested to teach 2-3 week (or more) modules:
 - June-July 2009 Oral Biology, Dental Anatomy
 - Jan-March 2010 Dental Materials
 - June-July 2010 Oral Medicine, Oral Pathology
 - Jan-Feb 2011 Pediatric Dentistry, Oral Pathology, Operative
 - Jan-Feb 2012 Orthodontics, Endodontics
 - 2012 Possibly begin Kenya's first Dental Hygiene program

Additional Priorities

- Investigate the potential for MUSOD students to have online access to IUSD electronic library holdings
- Search for opportunities and funding to enable faculty exchanges and post-graduation education
- Consider taping selected lectures at IUSD and making them available on DVD for MUSOD use.
- In January 2011 MUSOD will need equipment and supplies for a dental laboratory that can be used to process prosthetic appliances. We can search for surplus equipment from dental laboratories and other schools of dentistry.
- Moi University Health Sciences schools use problem based learning (PBL) as a basic component of their educational methodology. IUSD also uses PBL extensively. The methodologies vary in how they are applied and can lend themselves to intra-school consultation and collaboration.
- We propose establishing student exchange programs to enable IUSD and MUSOD dental students to study and work at the others' campus. We propose that four IUSD dental students come to MUSOD for three weeks in May-June 2010 following their third year at IUSD. MUSOD students, with support from IUSD International Service-Learning fundraising could begin coming to IUSD with Moi Medical students who are visiting IUSM in April 2011. The student exchange would focus on joining each other in community based work. In Eldoret that would focus on programs such as COBES, AMPATH, the Street Children's Program, Orphans and Vulnerable Children's Program, joining medical students for patient rounds and participating in potential school-based programs and activities. IUSD could provide MUSOD students with community-based programs, problem based learning sessions and the Moi dental students could possibly also join Moi medical students for some rotations with IUSM.
- Augment MUSOD library holdings with surplus copies of texts from IUSD

Research:

Immediate Priority

- Dean Goldblatt and Dr. Srinivasan in cooperation with Dr. Conway Sang of Moi University, are in the process of submitting a grant proposal to NIH to support investigation into the Effects of Long-Term Antiretroviral Therapy on the Oral Mucosa
- Dr. Kimaiyo, Kenyan Medical Director of AMPATH has approached Dr. Kenneth Okemwa with his observation that children on antiretroviral therapy are experiencing a much higher prevalence of severe dental caries. Dental caries leading to infection among these children is a serious threat to their wellbeing and ability to recover. This is a potential area of collaborative research with broad applicability. The high numbers of children receiving ARV therapy through AMPATH would provide a large study population.

Additional Priorities

- More information is needed about identification, prevention and treatment for oral manifestations of HIV/AIDS in the Kenyan population.
- Severe dental fluorosis exists in Kenyans who live near Eldoret. Privately owned fluorspar mines are in Kerio, within a two hour drive into the Rift Valley. Severe fluorosis is very apparent among people living in the area. Skeletal fluorosis has been documented in the area. Research could expand on the 1996 study on severe dental fluorosis that I did in collaboration with Drs. Lameck Mabelya and Valerie Robison in Tanzania.
- Country-wide identification of water fluoride concentrations and development of geographic information system (GIS) maps is needed to locate areas where defluoridation interventions are needed.
- Use of the atraumatic restorative technique (ART) in Kenya may be indicated to provide dental restorative care for people in the many rural areas where neither dental offices or electricity exist. Research could be conducted to identify requirements for adequately training mid-level providers and implementing these services at sub-district levels. ART restorations can be accomplished with simple hand instruments and does not require expensive dental units or equipment.

Patient Care and Service:

Immediate Priority

- MUSOD and the dental clinic at Moi Hospital do not currently have access to spore testing to assure that their autoclaves are working effectively. IUSD's spore testing service may be able to provide services or assist MUSOD to set up their own spore testing capabilities.
- Expertise in equipment maintenance is necessary for efficient operation of a dental clinic. Dr. Dennis Wagner, IUSM, has arranged for technicians from

MUSOM and MUSOD to visit IUPUI for a month, in May or June 2009, to participate in training for maintenance and repair of biomedical equipment. Moi University will provide airfare, but is requesting help for housing, food and incidentals in Indianapolis. If this timeline is not possible alternate dates are possible.

Additional Priorities

- Telemedicine has been developed (or is being developed) between Moi University Teaching and Referral Hospital and IUPUI. With the addition of an intraoral camera, it may be possible to introduce the use of teledentistry to aid in consultation for diagnosis of oral-facial pathologies.
- School-based prevention and treatment programs for oral health do not currently exist in Kenya. IUSD expertise in developing school based programs could be built upon to plan and implement school based programs in Eldoret and surrounding villages. These programs could use faculty and student expertise to triage children and provide dental sealants, atraumatic restorative techniques (ART) when possible, and simple restorative procedures using portable, generator driven dental units. One such unit, donated by Mr. Martin Moore, driven by an air compressor donated by Dr. Donald W. Johnson is now ready to use by MUSOD.
- Dental fluorosis is a pervasive problem in East Africa. A Geographic Information System (GIS) map depicting location and concentrations of fluoride in water would be basic information for beginning a communal or home defluoridation program. MUSOD does not have the capability of analyzing water or the high fluoride cooking additive, magadi, to determine fluoride concentration. I carried 40 sample vials to Eldoret, am carrying about 30 samples back to Indiana for analysis. IUSD could either analyze samples transported via visitors from Eldoret, or could provide expertise to set-up fluoride analysis at MUSOD.
- A large portion of the 3,000 mile Great Rift Valley exists in Ethiopia, Kenya, Tanzania and Malawi. With the volcanic nature of this area comes excessive natural fluoride, dental and to a lesser extent skeletal fluorosis. Because of the rural nature of the population, defluoridation of communal water supplies is seldom feasible. Applying scientific minds to the problem of developing simple, inexpensive home defluoridation units could prevent pervasive fluorosis. Home defluoridation units have been previously built and tested in Tanzania, using bone char made from local materials to filter fluoride from the water. Dr. Valerie Robison an American dentist who previously worked with the Tanzanian government was involved in developing a model that was tested in some homes. I will contact her to learn more about the production of these units.

As in any worthwhile endeavor the issue of funding must be addressed. The IU School of Medicine-Moi University partnership has had immense success in developing a model and infrastructure to be emulated. We are fortunate to have access to their

consultation and encouragement to become an active partner in the programs so that IUSD can participate in a meaningful, substantive way. As with IUSD's other international service-learning programs, students will be required to fund their own travel and may be asked to participate in fund-raising to support travel for their Kenyan counterparts. Faculty travel may be supported, in part, by grants. Contributions may be available from a current IU Foundation donor who has indicated an interest in the IUSD-Moi partnership and has already contributed by purchasing an air compressor to operate the portable unit provided by an Indiana donor. His contribution may be contingent on being matched by IUSD or the faculty member's department. My travel was supported through an application to the Office of the Vice-President for International Affairs. Such funding is offered by Indiana University on a regular basis and can be pursued for travel related to this partnership. Securing equipment to augment MUSOD's needs, and funding for transporting the equipment will require active pursuit of contributions from a variety of sources including other schools of dentistry and the dental product industry.

The same question...how will this be funded?...was discussed in 2000 when we first explored sending a eight students with two faculty to two sites: Mexico and Haiti. The funding was secured through the efforts of faculty and students and the program grew. This year 45 students and eight faculty members are traveling to eight sites in six countries. Student and faculty learning, research, job satisfaction and enthusiasm are clear outcomes of IUSD's international programs; The IUSD-Moi University SOD partnership can take the same route, through creative and determined searches for public and private funding opportunities.

In conclusion, it is apparent that there are many and varied opportunities for faculty and student participation in a partnership between Moi University School of Dentistry and Indiana University School of Dentistry. Each offers the other options for professional and personal development. Creating global alliances in health professions schools prepared graduates for treating people from diverse cultures in a time when world travel is the norm.

We are extremely grateful to Dean Caroline Kibosia, Dr. Kenneth Okemwa and Dr. Conway Sang for their warm hospitality, friendship and selfless dedication to helping us begin to understand the operations of Moi University School of Dentistry, the subtleties of the Kenyan culture and the potential for collaboration between Moi and Indiana Universities' Schools of Dentistry. We are also grateful for being able to take advantage of the infrastructure that exists between Moi and Indiana Universities due to the groundwork initiated by their Schools of Medicine and the AMPATH coalition.