

Tanzania

Site Assessments

March 2006

Refugee Camps

Faculty of Dentistry, Muhimbili University

Tanzania Dental Association



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Special recognition

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Acronyms

- CARE: Cooperative for Assistance and Relief Everywhere, Inc. (www.care.org)
- CDC: Centers for Disease Control and Prevention (www.cdc.gov)
- CIDA: Center for International Development and Affairs (www.ada.org/goto/international)
- DANIDA: Danish International Development Agency (www.um.dk)
- DRC: Democratic Republic of the Congo
- ECHO: European Commission for Humanitarian Aid (www.ec.europa.eu/echo)
- EWB: Engineers Without Borders (www.ewb-international.org)
- FINNIDA: Finnish International Development Agency (www.formin.fi)
- GTZ: Deutsche Gesellschaft für Technische Zusammenarbeit. International cooperation for sustainable development. (www.gtz.de/en)
- HVO: Health Volunteers Overseas (www.hvousing.org)
- ICRC: International Committee of the Red Cross (www.ifrc.org)
- IMF: International Monetary Fund (www.imf.org)
- IRC: International Rescue Committee (www.theirc.org)
- MSF: Médecins Sans Frontières (Doctors without Borders) (www.msf.org)
- NUFFIC: The Universities Organization in the Netherlands for International Development
- SIDA: Swedish International Development Agency (www.sida.se)
- TRCS: Tanzania Red Cross/Red Crescent Society
(www.ifrc.org/where/country/cn6.asp?countryid=189)
- TWESA: Tanzanian Water Environmental Sanitation
- UNHCR: United Nations High Commissioner for Refugees (www.unhcr.org)
- UNICEF: United Nations Children's Fund (www.unicef.org)
- UNWFP: United Nations World Food Program (www.wfp.org)
- WHO: World Health Organization (www.who.int)

Executive Summary

Background: In February and March 2006, a five member team from the American Dental Association (ADA), the Centers for Disease Control and Prevention (CDC) and Health Volunteers Overseas (HVO)/ADA Steering Committee visited Tanzania to assess the need for and feasibility of a volunteer program. The team visit was in response to two requests by Tanzanian authorities:

- 1) Assistance for dental treatment for Burundian and Congolese refugees living in northwestern Tanzania.
- 2) Assistance with continuing education for Tanzania's dental personnel from the Tanzania Dental Association (TDA) and the Faculty of Dentistry, Muhimbili University College of Health Sciences, University of Dar es Salaam, in Dar es Salaam, the capital city.

Oral Health Needs at Refugee Camps: The guidelines of the United Nations High Commission for Refugees does not include dental care. The Tanzania Red Cross Society (TRCS), which provides all health services to refugees, views the lack of adequate dental care as a critical gap because refugees have resided in these camps for up to ten years. They are not allowed to leave the camp except for emergencies.

In the Burundian camps, with a population of 81,679, one Clinical Officer (medical assistant with three years of formal training) provides emergency extractions one day per week. In the Congolese camp (Nyaragusu), with a population of 59,735, two nurses provide extractions two days each week. They have had limited dental training. Equipment, instruments and setting for providing dental treatment in both camps need to be upgraded.

Oral examinations of a sample of 300 child and adult refugees in February 2006 showed a high level of untreated disease. Forty percent of Burundian and 60% of Congolese adults over 20 years old needed removal of hard deposits (calculus) from around their teeth.

Percentage of sample with urgent need for dental treatment due to pain or infections by age and ethnic group.

<i>Ages examined</i>	<i>Burundian</i>	<i>Congolese</i>
4 and 5 years	28%	6%
12 and 15 years	16%	12%
20 and older	30%	20%

Need at Faculty of Dentistry and Tanzania Dental Association: In Dar es Salaam, the faculty at the dental school is debatably the most highly educated in East Africa. The high potential of this faculty is diminished by poor physical conditions of the clinics and equipment, lack of continuing education (CE) opportunities and a need to update the curriculum and instruction in light of modern developments. The TDA, which uses the dental school lecture hall for its meetings, expressed an inability to provide CE on up-to-date practical topics to serve its membership of dentists, dental therapists and dental laboratory technicians.

Objectives of Proposed Program: The need for assistance is great and volunteers would be welcomed by Tanzanian authorities. The site assessment team recommended a program in four phases. Phases one and two could be implemented simultaneously. Phases three and four could also be implemented simultaneously.

Phase 1- Volunteers provide chair-side instruction at the Faculty of Dentistry and short presentations on practical topics at meetings of the TDA.

Phase 2- Partnerships need to be established to secure financial support for basic equipment and supplies for the dental school and for refugee camps. In addition, there are two local hospitals, one in Kasulu (regional government facility) and one in Kabanga, (operated by a Catholic order) that provide referral care for refugee patients with complicated, life-threatening situations (fractures, tumors), but only with permission from the UNHCR. The dental equipment needs to be replaced in the Kabanga hospital, allowing their old equipment to be transferred to the refugee camps.

Phase 3- The Tanzania Red Cross Society (TRCS) can host dental volunteers two times per year for two weeks each time. Volunteers would provide treatment to refugees in a chair-side teaching program with two objectives; to update the skills of personnel currently providing dental treatment and to train three or four additional health workers in dental treatment at both the Congolese and Burundian camps.

Phase 4- Volunteers would provide training to Clinical Officers in the camps. There are 33 Clinical Officers in the Burundian camp and 32 Clinical Officers in the Congolese camp. TRCS recommends a two day training program for each camp---examination, diagnosis and treatment of oral diseases, appropriate antibiotic use and referral for emergencies. An additional focus would be on prevention and individual counseling. The participants would learn what type of counseling and treatment is indicated for a particular diagnosis; they would not be trained to provide clinical treatment (as will the trainees in Phase 3).

I. Country Profile

Country background¹

The United Republic of Tanzania was created in 1964 by the union of Tanganyika (1961 from the UK-administered UN trusteeship) and Zanzibar (1963 from the UK). Located in East Africa and bordered by the Indian Ocean, Burundi, Democratic Republic of the Congo, Kenya, Malawi, Mozambique, Rwanda, Uganda and Zambia, Tanzania covers an area of 364,900 sq mi (945,087 sq km),² slightly larger than twice the size of California.



The capital is currently Dar es Salaam, located on the coast, south of the island of Zanzibar. Tanzania is a republic divided into 26 administrative regions. The legal system is based on British common law.

The topography consists of plains along the coast, a central plateau and highlands in the north and south. It's highest point is Mount Kilimanjaro at 19,340 ft. (5,895 m) and it is bordered by Lake Victoria (the world's second largest freshwater lake) in the north, Lake Tanganyika (the world's second deepest) in the west and Lake Nyasa in the southwest. The climate is tropical along the coast and temperate in the highlands and, by nature, produces flooding in the central plateau during the rainy season and severe drought at other times.

Of a land mass of 342,101 sq mi (886,037 sq km), only 4.52% is arable and an estimated 600 sq miles (1,550 sq km) irrigated (1998); soil degradation, deforestation and desertification further vex a heavily dependent agrarian economy that provides 85% of exports and employs 80% of the estimated work force of 19.22 million (2002). Tanzania is one of the poorest countries in the world with an estimated 36% of the population living below the poverty line.

The population, estimated as 36,766,356 in July 2005, is 99% African; predominately Bantu from more than 130 tribes, the other 1% consists of Asian, European and Arabic origin. Kiswahili (Swahili) is the official language although there are numerous local languages. English is also an official language and the primary language of commerce, administration and

¹ Compiled from data published in the *World Fact Book*.

² Includes the islands of Mafia, Pemba and Zanzibar.

higher education. Arabic is widely spoken in Zanzibar. The literacy rate for Kiswahili (Swahili), English or Arabic is 78.2% (85.9% male and 70.7% female).³

Morbidity and mortality: The birth rate is 38.2 per 1,000 and a death rate 16.7 per 1,000; the population growth rate is estimated at 1.83% (2005). Life expectancy for Tanzanians is 45.2 years. In 2003, HIV/AIDS prevalence among adults was estimated at 8.8%, with 1.6 million people living with HIV/AIDS and a mortality of 160,000 per year. Other major infectious diseases are malaria, bacterial-caused diarrhea, upper respiratory infections, tuberculosis, hepatitis A, typhoid fever, Rift Valley fever and schistosomiasis.

The World Health Organization reports that there were 216 dentists in Tanzania in 2004. The country has only one dental school along with two schools for dental therapists and one school for assistant dental officers. The population between 20 and 29 years of age has on average one missing tooth, which increases to eight among those over age 60 years. Sugar consumption is low relative to other African countries. Per capita sugar consumption in Tanzania in 2002 was 4.8 kg compared to 20.8 kg for Kenya.

Kigoma Region is situated in the western part of Tanzania. It shares boundaries along Lake Tanganyika with the Democratic Republic of Congo (DRC) to the west and Burundi to the north. It has a total area of 45,066 square kilometers with a population of about 1,679,109. The average household size is 6.9 while the annual average population growth from 1988 to 2002 was 4.8. Administratively the region has been divided into four districts. One district, Kasulu, is where the two refugee camps included in this assessment are located—Mtabila and Nyarugusu.

Kigoma is the end of the west bound railway from Dar es Salaam. Trains operate four times a week and it could take two or three days to complete the distance. Precision Air provides air services from Dar es Salaam six times a week (except Thursday). Some inbound flights make a stop in Tabora, while some outbound flights go through Arusha on their way to Dar es Salaam.

Kigoma region has been receiving and hosting refugees since the 1950s but a massive influx was experienced in 1993 from Burundi and in 1997 from the Democratic Republic of Congo.

Refugees⁴

The relatively stable political climate in Tanzania has long attracted a migration of foreign nationals seeking refuge from political turmoil, civil war and, increasingly, famine under the current cycle of drought and chronic food shortages afflicting East and Central Africa. The United Nations High Commissioner for Refugees (UNHCR), who oversees the Tanzanian refugee situation, estimates that there are over 500,000 refugees in Tanzania, 365,600 of them from Burundi, the rest mainly from the DRC. These currently occupy ten camps and three settlements. The Tanzanian government estimates that there are an additional 200,000 Burundian and Congolese refugees living in villages near their border.⁵

³ *Definition:* age 15 or over can read and write.

⁴ United Nations High Commission on Refugees (UNHCR).

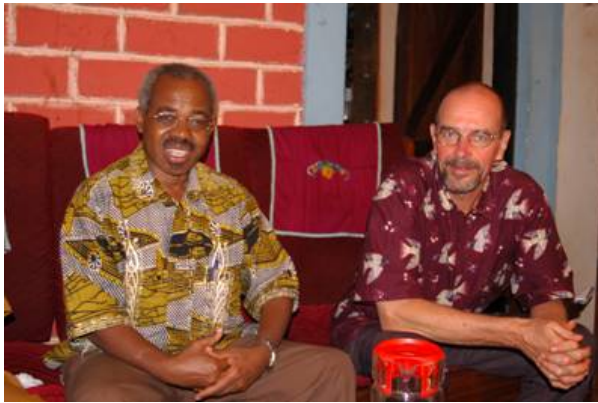
⁵ UNHCR Global Appeal 2006

The UNHCR efforts are carried forward in conjunction with the International Committee of the Red Cross (ICRC) and the Tanzania Red Cross Society (TRCS). The TRCS has an operational center in Kigoma from which three programs are coordinated and managed: 1) refugee program; 2) HIV/AIDS prevention; and 3) Blood Bank.

TRCS provides comprehensive health services to refugees using a network of health centers and three dispensaries (described later in this document). In addition, the ICRC functions to help reestablish contact between refugees and estranged family members and friends with the ultimate aim of repatriation.

Oral health, to date, has not been of consequence in the medical care offered refugees. More information on the socio-economic situation will be provided in section IV.

II. Background Information⁶



Dr. Tumaini and Fr. Flamm

experience with refugee health and humanitarian aid in Africa. He contacted Father Flamm and Dr. Seif Rashid, Director of Health Services at the Tanzania Red Cross Society and presented his findings at the October 2005 meeting of the ADA/HVO Steering Committee.

Father Paul Flamm, a Catholic missionary from the order of the Spiritans working in refugee camps in the Kigoma region, contacted the ADA's Center for International Development and Affairs (CIDA) in May 2005. He inquired about obtaining assistance from ADA volunteers in addressing the high levels of dental needs among the refugees. Dr. Freder Jaramillo at the Center for Disease Control and Prevention (CDC) was asked to follow-up with Father Flamm to obtain additional information, as he had served as program manager for Medecins Sans Frontieres (MFS) and has extensive

Dr. Jaramillo reported that dental care in the refugee camps was limited to extractions provided by three individuals. There was no information about the qualifications of these providers. There was no preventive or restorative care provided. In addition, some photos suggested problems with infection control procedures in the places where extractions were provided. In the discussion, additional information was identified as needed before a formal commitment could be approved. Thus, the ADA/HVO Steering Committee approved a site/needs assessment visit.

The ADA's CIDA solicited and obtained a grant of \$20,000 from the Colgate-Palmolive Company to underwrite the site visit. The CDC agreed to remain involved by providing travel funds for Dr. Jaramillo to conduct an epidemiological study to assess the oral health status of refugees in the camps, and assist the ADA in the environmental assessment of the socio-economic conditions of the refugees using the MFS protocol.

A five-member team, including four ADA/HVO committee members and Dr. Jaramillo from CDC was charged with developing protocols and an implementation plan with further coordination with the TRCS. The team consisted of the following persons:

Dr. Eugenio Beltrán (ADA/HVO and CDC, Division of Oral Health)
Ms. Helen Cherrett (ADA)
Dr. Martin Hobdell (ADA/HVO)
Dr. Freder Jaramillo (CDC, Division of Oral Health)
Dr. Valerie Robison (ADA/HVO)

The following issues were to be researched as part of the site visit:

⁶ Condensed from *Proposal to Develop an ADA Volunteer Program to Service Refugee Camps in Western Tanzania (2005)*.

- 1) Demographics and health status: This included demographic information, morbidity and mortality as well as the physical infrastructure of the health care facilities and the continuity of care. This information was planned to be obtained through interviews with current health care providers and a visual inspection of the proposed health care centers.
- 2) Oral health status: This included an assessment of oral health status and treatment needs in three different age groups, i.e., 4 and 5, 12 and 15, and 20-60 years. Also, the team decided to assess the impact that oral health problems have on the daily living of an individual. Both these data, in turn, would be used to plan appropriate interventions targeting the refugee's oral health needs. The information was planned to be obtained via an intraoral assessment of a sample of refugees and a pre-tested questionnaire.
- 3) Security issues: Security would be checked and verified at different levels. Sources would include government authorities in Dar es Salaam and Kigoma, UNHCR and ICRC staffers, expatriates and local staff running the refugee camps, including camp leaders, health workers and Father Flamm.
- 4) Administrative aspects: As a new area for ADA assistance and volunteer participation, a variety of issues would need to be checked with local authorities. For example: would the Tanzania Dental Association or some other local organization be involved; what visa, work permissions/credentials/licensure would be needed for treating refugees; and, would volunteers be restricted in their movement?
- 5) Volunteer physical needs: Father Flamm indicated that these needs would be covered by TRCS, but a site visit would verify what resources are available. Regarding housing, UNHCR and TRCS facilities as well as the Catholic Mission's House would be checked to determine adequacy of housing, food and water.
- 6) Logistics: A site/needs assessment would identify logistics, or lack thereof, at the camp and local level, such as the availability of translators to Kiswahili and Kurundi, auxiliary personnel and volunteer transportation options, as well as the process for shipping dental materials and supplies.

In March 2006, the team conducted the fact-finding site visit to the Tanzanian refugee camps. The visit was organized to include meetings in Dar es Salaam with the Chief Dental Officer, Ministry of Health, officers of Tanzania Dental Association, the Faculty of Dentistry at Muhimbili University and visits to refugee areas including the cities of Kigoma, Kasulu and the refugee camps of Mtabila I and Mtabila II (an extension of Mtabila I and considered in this report as one camp) and Nyarugusu. In addition, site visits and interviews with Tanzanian health officers were conducted in nearby hospitals that could be used for referral of complicated cases outside of the refugee camp.



Children wearing ADA stickers while waiting for dental examination

III. Report on the Faculty of Dentistry, Muhimbili University College of Health Sciences, University of Dar es Salaam

Background

This account is part of the HVO Site report to the Republic of Tanzania, which was carried out in Dar es Salaam on March 3-9, 2006. It was compiled following discussions with the President and Committee members of the TDA, the Dean of the Faculty of Dentistry, Professor Lameke Mabelya, and Professor Paulo Sarita, Professor of Operative Dentistry.

This part of the report covers ways in which volunteers from ADA/HVO might contribute to the development of the faculty programs and TDA's Continuing Education Program.

The faculty and the TDA were established at approximately the same time, at the end of the 1970s. The first dental students were admitted to the preclinical courses of the medical school in 1979 and studied there for two years while the clinical facilities were under construction.

The Faculty of Dentistry



Front entrance to Faculty of Dentistry

Physical facilities

The building that houses the faculty is a very solid concrete building on four floors, the topmost of which was only recently completed. Apart from this new top floor the building is in a poor state of repair; and there is limited single-room air-conditioning, although the building was originally built to be fully air-conditioned. The original central air-conditioning plant has never functioned and remains corroded throughout the building. The original roof was flat and made of concrete, which from the very beginning leaked during the rainy season due to tropical downpours that are common in East Africa. The new top floor is covered with a pitched, sloping roof and does not leak, but there is an original extension to the building that houses the

ramped lecture theatre, which the new roof does not cover as the extension to the building only rises two stories high. This problem was dramatically illustrated during the site visit to the facility, at which time various members of the team made presentations to the TDA, faculty and dental students. The stage from which the lecturers spoke was subjected to a continuous trickle of water from the ceiling above.



Two views of a Teaching Clinic

The present (old) clinics are dilapidated, most of the equipment is obsolete and non-functional; the cabinetry has collapsed because the base platforms have rotted due to continued hosing down of the floors for cleaning purposes, and the ceilings are water stained as a result of both water seepage from the leaking roof and also the between floor pipe-work, and in places they have disintegrated completely.

Instrument sterilization within the building of the Faculty of Dentistry, as it is at present, is virtually impossible. Two autoclaves were found and both were in an unusable condition. Instruments are instead transported to a distant building for disinfection, cleaning and sterilization, and then brought back packaged for use. The practice of infection control, under these conditions, is acknowledged by the dean and other faculty members, to be in urgent need of improvement.



Burned out autoclave

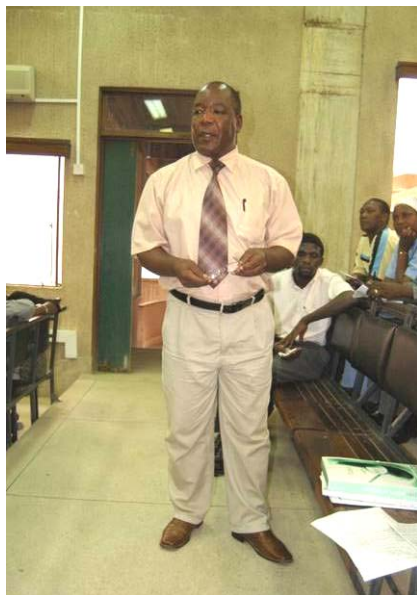
What has been the cause and what has been the faculty's response?

The Muhimbili Hospital and Medical Complex is the long established central health facility in the country and houses not only the hospital facilities, but also health professionals' educational facilities such as the Faculty of Dentistry and the Faculty of Medicine.

The initial impact of post-independence economic and social policies and then, more recently, the structural adjustment programs of the World Bank and International Monetary Fund (IMF) have wreaked havoc with the very fragile health care system in the country: with the downsizing of the workforce, the introduction of user fees and cost-center budgeting. Although, even under these new stringent policy guidelines, a questionably high proportion of the health budget was spent on the Muhimbili complex by the Ministries of Health (patient services) and Education (health professional's education), it was felt unnecessary to maintain the fragile, but vital, infrastructure. As a result the buildings have all suffered.

At the same time as the Muhimbili complex was feeling the pressure of these changes, the University of Dar es Salaam felt similar pressures. This resulted in the health services provision part of the Muhimbili medical complex being separated administratively and financially as an independent entity under the Ministry of Health (MoH). The MoH then required the now independent Muhimbili health services provision part of the Muhimbili complex to run within budget and raise finances from outside the Ministry for things additional to those provided for by the MoH budget.

The health professions education components were left with the Ministry of Education (MoE) where there are other pressures and concerns – some from within the country and others from outside agencies. Currently there is pressure, for example, from the European Union to focus attention on primary education with the result that whatever limited funds are available to the MoE are first channeled to primary education and secondary and tertiary education has to wait their turn. The result is that the Faculty of Dentistry has a very small budget. Moreover, the dental faculty, which had been receiving considerable support from foreign foundations, lost this support at much the same time that the IMF and World Bank policies were coming into force.



Dr. Lameck Mabelya

In discussions with the Dean of the Faculty, Dr. Lameck Mabelya, it was clear that he is making every effort with the support of the university to obtain additional and adequate funds from the MoE. This has happened, for example, with the funding for the additional floor and the correction of the roof problem. He is currently trying to locate funds to equip the modern top floor and to replace or renovate the equipment and cabinetry on the three older floors.

The teaching staff

Starting in the early 1970s Tanzania has experienced a great deal of assistance from foreign governmental and non-governmental agencies for dentistry (and medicine); however, for many years there was little coordination and to some extent it was poorly thought out, as in many other countries around the world. However, in the 1980s strong attempts were made to coordinate activities between the main agencies working in this field (NUFFIC –the Universities Organization in the

Netherlands for International Development, DANIDA –Danish International Development Agency, SIDA –Swedish International Development Agency and FINNIDA –Finnish International Development Agency). Each group focused on the development of slightly different areas, but all made strong efforts to develop the dental faculty through postgraduate training. More recently other agencies have entered the field and some of the original agencies have ceased their support. However, there are still strong collaborations between many of the Scandinavian and Dutch dental schools in research, teaching and faculty development but not to the extent that previously existed. Some faculty members have more recently studied in Japan in highly complex areas such as tissue culture.

The result of all this earlier work is that the faculty of the dental school is debatably the most highly educated in East Africa. Their major difficulties are the physical conditions of the facilities, the lack of continuing educational opportunities within Tanzania and library resources, particularly relevant dental journals. They also recognize the need to revise their curriculum in light of modern developments. On the academic side, Dr. Mabelya recently had the faculty undertake an exercise to identify the major curriculum problems. A summary of these is given in the accompanying table on page 12.



Main lecture hall, Faculty of Dentistry

The patients

There is a further consequence to the separation of the Muhimbili medical complex into two administratively separate parts – the health services provision or hospital entity and the health professional educational entity represented by the Faculties of Dentistry and Medicine. This additional consequence is that the hospital and educational entities are now competing for both patients and staff, but the competition is very unequal. Because the health services provision or hospital entity is able to raise funds from outside the MoH from both within Tanzania, and particularly from overseas, its facilities have been greatly improved and the staff working in the health services provision or hospital section have salaries that have been enhanced by these additional external funds in comparison to the much poorer academic institutions of the Faculties of Dentistry and Medicine. Certainly for the more junior faculty the pull of the salaries in the hospital component of the Muhimbili complex is proving hard to resist and many are moving over to work in the health service provision area, thus depriving the faculties of important young minds.

Equally, patients who seek care now have a choice of either seeking treatment in the hospital part of the Muhimbili health complex or going, for example, to the dental faculty. Because of better facilities in the hospital patients are seeking services there instead of with the dental faculty. The end result is that the dental faculty is now short of patients, which is becoming detrimental to the training of their pre-doctoral and post-doctoral students.

What could ADA/HVO volunteers do to help?

The requests from the faculty are for assistance with curriculum revision and development and for Continuing Education relevant to their revised curriculum, particularly in the areas of restorative care, orthodontics and oral surgery.* The dean also felt that chair-side instruction of students would be of value and prove interesting and informative for the volunteers.

The faculty also needs help in identifying monies so as to replace their old equipment and to assist in equipping the new top floor.

The Tanzania Dental Association is active and has a good record of trying to improve oral health in the country, but like most dental associations in poorer countries does not have the funds to bring in foreign lecturers for CE. The President and Committee expressed a very strong desire for volunteers to be sent to the faculty (where most of the CE courses are taught) to provide courses for their membership. Up-to-date practical topics were seen to be the target for such lectures.



Office of the Tanzania Dental Association at the Faculty of Dentistry

* In this regard some help is already being provided by a Professor of Oral Surgery in the Netherlands through the International College of Dentists.

Issue	Weakness in implementation of old curriculum	Proposed changes	Means and processes	Input	Monitoring	Evaluation
1. Implementation of the curriculum is stressful for teachers and there is lack of complementarity of modules.	<p>1. One teacher teaches from morning to evening throughout the semester.</p> <p>2. One subject is taught in the whole semester.</p> <p>3. There is only one teacher per examinable subject.</p> <p>4. Time for self studying is too short and not indicated in the timetable.</p> <p>5. Limited facilities for self learning; e.g. computers, books, journals and clinical training—lack of functioning units</p>	<p>1. Spread the modules of a subject to more than one semester and group complementary modules together.</p> <p>2. Raise the number of teachers to three per examinable subject.</p> <p>3. Increase number of hours for self learning.</p> <p>4. Make a timetable that will allow self learning.</p> <p>5. Avail self learning facilities including computers, books,, journals, tapes, etc.</p>	<p>1. Identify modules taught in semester 6, 7, 8, 9 and 10, regroup those modules that are complimentary.</p> <p>2, Recruit more teachers as follows:</p> <p>Oral Surgery Dept: Oncology 1 Radiology 1 Traumatology 1 Oral Medicine 1 Needed 4</p> <p>Preventive: Pedo 1* +2 Ortho 1 PCD 3* Needed 4</p> <p>Restorative: Operative 2+1* Perio 1+1* Prosthodontics 1+2* Dental Material 2 Needed 6</p> <p>3. Produce manuals, CD tapes, computers, etc.</p>	<p>1. Funds for curriculum review to rearrange the modules</p> <p>2. Funds for training teachers in different sub-specializations of dentistry.</p> <p>3. Funds for purchasing self learning facilities.</p>	<p>1. Curriculum reviewed.</p> <p>2. 13 teachers trained in: Oncology (1) Radiology (1) Traumatology (1) Oral Medicine (1) Pedodontics (2) Orthodontics (1) Preventive and Community Dentistry (1) Operative Dentistry (2) Periodontology (1) Dental Materials (2)</p> <p>3. Self learning facilities in place.</p> <p>4. Timetable will display time for self studying.</p>	<p>1. Teaching will be less stressful to teachers and complementary modules will be taught concurrently.</p>

Table 1. Evaluation of DDS curriculum by members of the Faculty of Dentistry

IV. Site Assessment: Socio-Demographic Organization of the Camps, Health Care, and Refugees' Health Status

International, Governmental and Non-Governmental Organizations (NGO) providing services in the Refugee camps.

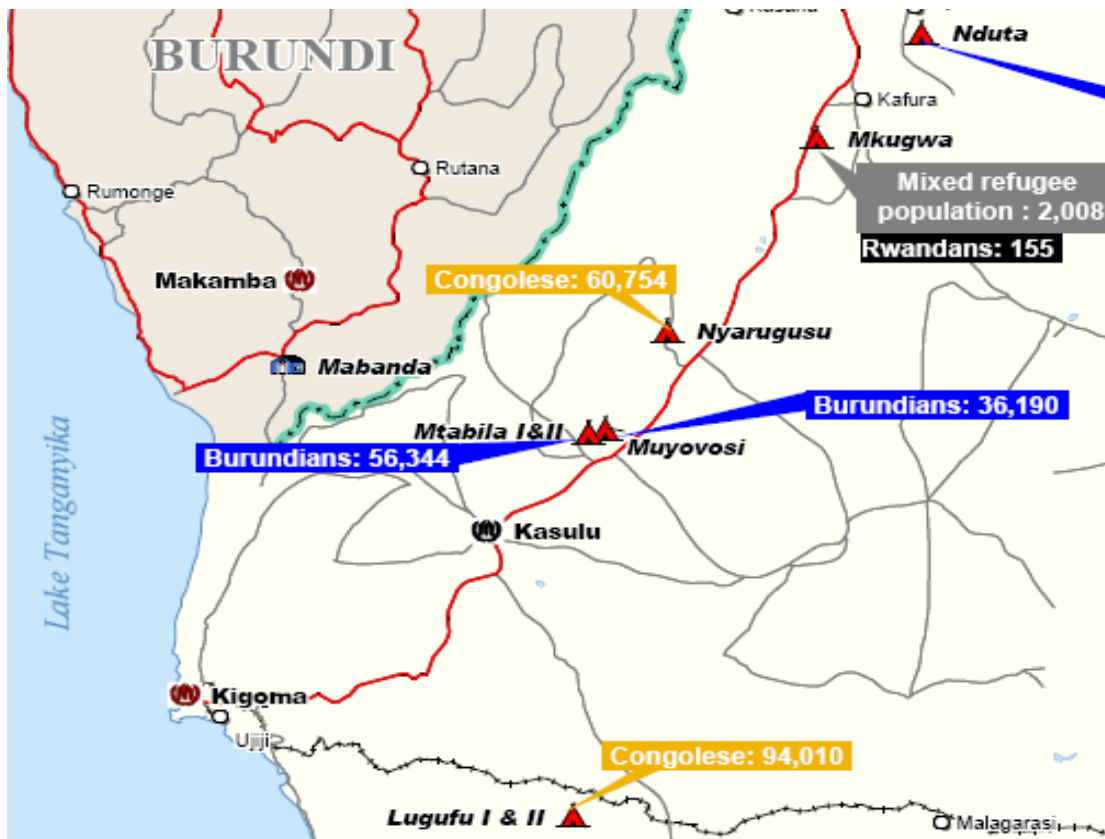
1. Tanzanian Government (through the Ministry of Home Affairs)
 - a. Host country
 - b. Monitors overall activities
 - c. Administers protection (police)
2. United Nation Agencies
 - a. UNHCR overall coordination of activities
 - b. UNWFP in charge of management and distribution of all food items
 - c. UNICEF, supports immunization services, training and educational material
3. International NGOs
 - a. CARE, in charge of environmental protection
 - b. GTZ (German), in charge of logistics and road rehabilitation
 - c. International Federation of Red Cross and Red Crescent Societies give overall support to TRCS
 - d. International Rescue Committee (IRC), in charge of camp management, education and community services, education, and management of repatriation center
 - e. Spanish Red Cross, supports administration of pharmaceuticals to the dispensaries
 - f. Engineers Without Borders, provides technical support on engineering problems in the camps
4. Tanzanian NGOs
 - a. Tanzanian Water Environmental Sanitation (TWESA), in charge of water and sanitation
 - b. Tanzania Red Cross Society/Red Crescent Society (TRCS) in charge of providing health care (preventive, curative, nutrition, reproductive health) through a network of health posts and dispensaries.



TRCS logo

General Geopolitical Information

Most refugee camps are located on the road that connects Kasulu and Mwanza with the exception of the camps of Lugufu (I and II) located south of Kigoma. In consultation with the TRCS, two camps were selected for assessment: 1) Mtabila I and II, which are geographically next to each other (Mtabila II is an extension of Mtabilia I) and will be considered as one camp; with approximately 82,000 Burundians. 2) Nyarugusu, which has a population of approximately 60,000 Congolese (map next page).



Refugee camps in the northwestern region of Tanzania

Cause of Displacement: Displacement by Burundians and Congoleses was due to political instability, war and famine in their home countries. Burundians –predominantly Hutu— arrived after threats in their country from the Tutsi government after the civil war and now there is famine. The civil war has ceased in the Democratic Republic of Congo (DRC), but political instability continues in the eastern provinces which are currently under United Nations supervision. Elections are scheduled for August 2006. Western political analysts do not forecast change in the current political status as a consequence of elections.

Duration: Camps have been in existence for approximately ten years. Burundian refugees arrived by land, crossing the border which is, in some places, just a few kilometers from the current refugee camps. Congoleses refugees arrived crossing Lake Tanganyika. The UNHCR administers repatriation programs for both groups. Current levels are between 200 and 300 per month for Burundians and 1,000 per month for Congoleses. This system is voluntary and repatriations have decreased recently due to political instability in Burundi and Congo, as well as better living standards within the camps compared with their own countries. In fact, there is anecdotal information that some refugees from Burundi have returned after repatriation.

Political and security conditions: Overall these are good in Tanzania. Camps are secure, despite minor incidents, mostly domestic violence and alcohol-related problems. During the

last week of data collection, a gun-robbery incident occurred at night on the main road between Ngaraganza and Nyarugusu, which was followed by a police search in the Mtabila camps. No arms were found. Father Flamm suggested that these are local thugs who act on the assumption that refugees will be the first to be blamed.

There have been concerns about the environmental impact of the camps. Specifically, members of the Tanzanian government have argued that wide areas have been deforested by refugees in search of wood for cooking. This effect is clearly visible in the Mtabila camps where few trees are left.

Environment in which the Refugees have settled

Climate: It is tropical, hot during the day, cooler at night. The rainy season includes the months of February, March and April with strong thunderstorms and lightning. The hottest months are June, July, and August. There are smaller rains in November and December. During the rainy season roads are washed-out and access to certain secondary roads may be difficult even with four-wheel drive vehicles.



Road leading into Mtabila Refugee camps

Accessibility: The main road extends from Kigoma and Kasulu to Bukoba (nine hours away, with branches connecting Mwanza and Dar es Salaam) and is well kept around the year. Most roads are repaired immediately after the rainy season. The ride from Kigoma to the Nyarugusu Red Cross compound, which serves Mtabila camp, takes two to three hours depending on road conditions. The road from Nyarugusu to Mtabila is approximately 30 minutes (19 km/12 miles). Speeding is a problem, even among some TRCS drivers.

During our visit one of their vehicles overturned due to slippery road conditions and inexperience. All drivers will slow down if you ask. All vehicles have radios and keep in contact with the base compound and TRCS headquarters in Kigoma.

Communications: Cell phones work some of the time. Two companies provide wireless service but Vodacom is the most reliable. Charges are high, and calling overseas can cost up to U.S. \$10 per minute for roaming. There are radio stations broadcasting in French and Kiswahili. There is limited satellite TV service. Nyarugusu base camp has a satellite dish and a 32" TV set in a communal room. The Nyarugusu Team Leader has a TV and DVD player connected. Some refugee entrepreneurs have installed satellite dishes and TVs in the camps and charge for shows. Soccer games, especially those from Europe, are very popular. Police stations at the entrance of each camp visited also have satellite dishes. Satellite services are limited to five or six networks from Tanzania, Mozambique and South Africa.

Internet access was nonexistent during the site visit. However, we were informed of services available in one of the camps, run by a group of teachers from one of the schools in Mtabila and which is said to be located behind one of the food distribution centers. There are current plans to provide internet services to the TRCS base camps. There are few printed periodicals and all are from Tanzania. All dispensaries, schools and base camps have bulletin boards.

Water supply: Treated water is available in all camps. In Mtabila three water sources provide on average 28 liters (7.5 gallons) of treated water per person per day. Water is distributed to taps located in several locations throughout camps, but not to homes. We were informed that water is of a good quality and biologically monitored. In the camps water is stored in large rubber bladders.



Water storage bladder at Mtabila II Dispensary

Energy: There is limited electricity, mostly from diesel or gasoline-run generators. Firewood is supplied by camp management; kerosene is sometimes used for cooking.



Refugee housing

Types of shelters: Permanent houses are built by refugees with materials provided by UNHCR. Houses are built with mud bricks and straw roofs conditioned with plastic sheeting provided by UNHCR to isolate the dwelling from rain. Houses are mostly one room with a dirt floor. Some houses are built adding mud over a cane structure. Public and communal buildings are built with mud bricks and aluminum roofs over a wood structure.

Zoning: Camps are divided into zones. Each Mtabila camp has four zones. Each zone is formed by 29 blocks, and there are 216 homes in each block. The urban plan in Mtabila included space between houses with a small plot of land to keep a sustainable crop. No such space exists in Nyarugusu, where the houses are arranged into blocks. All roads both outside and within the camps are red dirt.

Laundry facilities and personal hygiene: All camps have communal laundry slabs located in key locations near water taps. Most adults look clean and well dressed especially on Sundays and when attending the dispensaries for an appointment. Children are dirty most of the time and many are barefoot because of the lack of resources to buy shoes.

Disposal of excreta: There are both individual and group latrines. Family latrine coverage is 95%, garbage pit coverage is 98% and bathing shelter is 95%. There is one sanitation compound, 33 community latrines, and 7,380 family latrines in Mtabila camps I and II.



Laundry slab at Mtabila II Dispensary



Refugee children

Cleanliness of camps: The camps were clean with no litter around, but in the rainy seasons it is very muddy and in the dry seasons everything is covered with a red clay dust. There are small ponds of stagnant water during the rainy season contributing to the risk of malaria. Malaria is one of the main causes of death among children.

Organization of the camps:

Activities in the camps are coordinated by representatives of all governmental,

international and NGO agencies under the overall coordination of the UNHCR. Security within the camps is under control of the Tanzanian Army which maintains a garrison at each camp entrance. Access to the camps is restricted to authorized persons. Permission is granted by the Tanzanian Ministry of the Interior at the request of the TRCS. We needed to show the permission only once. Each camp has its own organizational structure.

Description of the Refugee Population

Both camps have natural leaders and community organizations. Religion is very important, especially among Burundians. Mtabila has an area close to the entrance of the camp exclusively dedicated to churches. There are a number of Roman Catholics churches built around Mtabila I, II and Muyovosi, another nearby Burundian camp. A council of churches coordinates religious activities at the Mtabila and Muyovosi camps.

There are community centers that promote and sell handicrafts and thus provide some income to the community. Burundians make baskets and Congolese wood carvings. Workers from international agencies and NGOs are the primary purchasers of these items.

Refugees can move freely within the camps. Movement out of the camp is prohibited but not strictly enforced. The camps do not have walls, and the only control for people going in and out is the main road leading to the camp. Refugees venture outside the camp in order to work in the fields as agriculture laborers or to trade products and goods. For example, corn is produced in small plots in Mtabila with seed provided by the UN and is exchanged for cassava grown by the Tanzanians. Some donated goods that are not used are sold to Tanzanians who, in turn, sell these items in the nearby Kasulu market. These activities are illegal but poorly enforced and provide the refugees with much needed capital. Tanzanian currency is used in all economic transactions.

Refugees have mixed educational backgrounds, some are professionals (teachers, nurses, technicians), while others are peasant farmers in their home countries. Therefore, the level of literacy is very mixed.

Assessment of socio-demographic development



Secondary school

Education: Primary school is provided free of charge to all children using camp teachers. Secondary schooling must be paid for (\$500 Tanzanian Schillings per month (U.S. \$6-7). Teachers, Burundians or Congolese, are underpaid (U.S. \$20-\$30 per month) and during the site visit, Burundian teachers in the elementary schools were on strike. They claimed they worked two shifts but were paid only for one. All in all, education is better in the refugee camps than outside.

Communal gathering places: Various structures, like round large gazebos (traditional African dwellings), are used for teaching and formal meetings in the dispensaries as well as in the community. We witnessed a breast feeding training in a place where the board showed information from a previous water personnel management meeting.

Food distribution: Every two weeks each family receives staples at a distribution center –maize meal, cooking oil and beans. There are supplemental food



Refugees doing handicrafts at Community Development Center in Nyarugusu



Gazebo used for health promotion activities in Nyarugusu

centers located near the dispensary of each camp. Women in their last three months of pregnancy and the first three months of the infants' life receive supplemental food (enriched flour) on a weekly basis, which they use to prepare porridge. Despite these provisions, we detected clinical signs of protein malnutrition in some older children. A therapeutic feeding program is available for these cases. As mentioned before, there is some food trade between refugee camps and Tanzanians.



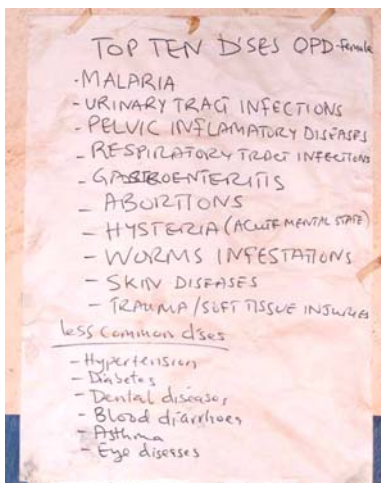
Family structure: Families are monogamous with an average of six to eight children per family. Pregnancies are close to each other, affecting recommended breast feeding practices. There are public health educational programs in women's clubs, and outpatient departments (maternal and child health), on breast feeding and neonatal care.

Public health program for mothers with babies

Sources of income: Some adults work outside the camps as day laborers and need bicycles to leave the camp. Wages are approximately U.S. \$1 per day. Women earn income by selling their home grown produce. A few women are involved in informal trades such as basket weaving. A few children sell fruit but other than that there is little child labor. All these are not secure sources of income and the amount earned is minimal.

Burial sites: Burials are in designated locations in the camp and only shrouds are provided.

Assessing general health status



Poster of top 10 diseases displayed in the dispensary

The top five diseases diagnosed according to the TRCS are: malaria, acute respiratory infections, diarrhea, anemia secondary to malaria and worms. Infectious diseases include HIV, TB, STDs and diseases associated with fecal oral contamination.



Dispensary entrances

Assessment of health care facilities

Facilities: Each camp has a dispensary which includes outpatient (OPD) and inpatient (IPD) departments. The latter have male, female and pediatric wards, an operating theatre (OT) with very basic equipment and a small room for minor procedures. There are 100 beds in Mtabila I and 115 in Mtabila II. Mtabila II dispensary is larger than Mtabila I which does not have an OT. The dispensary in Muyovozi has 80 beds.

Each dispensary has one physician/surgeon, several clinical officers (not physicians) and nurses. Also, each dispensary has a Health Information Team (HIT) in charge of health education and house visits. A team member is in charge of 55 households and visits the community three times a week. These health workers have been recruited from the refugee community and visit the camps, house to house, to provide basic health information.

Facilities are very basic, made of mud bricks and are powered by generators. Overall, all facilities are kept clean. There is an isolation ward at each hospital. In fact, the one in Mtabila was assigned to us to conduct the dental examinations.

Curative services include OPD, IPD, surgical procedures and laboratory services. Treatment protocols are clearly visible on the walls. Preventive services focus on reproductive health including family planning, the Expanded Program on Immunization (EPI), prevention of mother to child transmission of HIV (PMTCT) and home based care and nutrition. The Tanzanians from the host community in the vicinity have access to the health services available in the camps.

Hospitals keep statistics of conditions diagnosed, services provided and other health activities. The indicators used to assess performance include morbidity and mortality rates, number and types of operations, immunization coverage and delivery ratio, average weight of newborns, mother/child visits, malnutrition and weight gain in feeding centres. Health statistics are reported weekly, monthly, quarterly and annually. Each refugee has a “health notebook” to keep track of all health-related activities, diagnoses and treatment received, from outpatient appointments to major surgery.

Poster with monthly and annual statistics at Nyarugusu Dispensary

Dispensaries are capable of managing the conditions that are common in the camps. In addition, there are protocols to refer patients to Tanzanian hospitals if needed. For example, some x-ray procedures have to be referred to the government hospital in Kasulu or the private hospital in Kabanga. When local rural hospitals cannot resolve the problem, the patient is referred to the next tertiary center and finally to Dar es Salaam. The quality and efficiency of these services, however, is less than optimal. UNHCR protocol is to limit these referrals to the most serious cases. Indeed, we examined someone with a cleft lip and a child with a potential osteomyelitis (later confirmed with an x-ray). One patient in the Mtabila II ward had a bullet wound with lymphatic involvement and edema that was compromising the entire lower right leg.

Infection control

practices: All dispensaries have a basic infection control system that includes hand washing, reprocessing of contaminated instruments and material, and handling of body fluids. The central sterilization area is located in the operating theatre and includes a large drum sterilizer and support equipment. This is where the dental extraction equipment is reprocessed. We used this sterilizer to reprocess the instruments used in the dental examinations.



Large drum sterilizer



Disposal container for sharp instruments

Laboratory facilities: These facilities can only manage very basic tests including malaria, worms, TB, parasites, and HIV. We did not see equipment for basic body fluid chemistry.

Pharmacy: Drugs are provided and controlled by ECHO, Spanish Red Cross and TRCS. According to an ECHO pharmacist, all pharmacies have WHO essential drugs available.

Epidemiology: Early warning and surveillance system for outbreaks, e.g., cholera, follow WHO recommendations.

Maintenance: This is provided by TRCS for all medical and non medical equipment.

Public health interventions

Immunization: Campaigns are implemented periodically and especially when a risk for an outbreak increases. These campaigns are delivered by the Health Information Team (HIT). Recognizable by their orange clothing, these teams monitor the refugees' compliance with



immunizations, prenatal care and other health issues. Vaccines are kept following the manufacturer instructions and WHO and EPI guidelines.

Water and sanitation systems: These are well organized with outreach workers providing education on latrines, garbage disposal, dish racks, food preparation, etc.

Pregnancy and family planning: There is a well implemented system for prenatal care and follow-up after delivery which is tied into health education, care of the baby, breast feeding and nutrition. There are also family planning activities including the distribution of condoms, but based on the fact that birth rates have remained high (each family has six to eight children), these campaigns appear to have little effect, according to Dr. Tumaini, acting medical officer in the Mtabila II dispensary.

Sexual Violence and Sexually Transmitted Infections (STI): It is claimed that 7% of adults in the camps are HIV positive. All pregnant women and their spouses are offered voluntary testing and counseling and about 4% of pregnant woman test HIV positive. A program of nevirapine during labor and syrup for infants has been implemented for HIV+ pregnant women to reduce mother to child transmission of the HIV virus. Breastfeeding instructions are given on an individual basis for HIV infected women.



Educating women

Dental Care: Dental care, like eye care, is seen as a type of specialty so is not supported by UNHCR. Provision is only made for basic relief of pain or infection. Extractions are provided in both Mtabila II and Nyarugusu dispensaries. In Mtabila II, services are provided once a week by Victor Msovu who sees approximately 10-30 patients and most are adults but there are a few children. The room is one corner of a multipurpose tent located inside the dispensary and next to OPD in which a wooden chair is located. It is dark and the chair is located immediately inside the entrance. There is no running water in the room and little room to set up instruments. There is no dental x-ray equipment. The floor is a tarp with a lot of mud on it. During our visit about 20 people were waiting for consultation because they were told dentists were coming.



Patients waiting dental treatment provided in multi-purpose tent (white structure)

In Nyarugusu dental services are provided by Mr. Sredi, a Congolese refugee and by a Tanzanian-trained operating theatre nurse. Mr. Sredi treats about 10 to 30 patients twice a week mostly adults and a few children. Mr. Sredi also serves as a nurse anesthetist in the operating room. The dental chair, a wooden chair but with head rest, (that was made by a

refugee) sits inside the minor operating theatre. There is no running water or area for storing instruments.



Hand crafted dental chair, minor operatory theatre in Nyarugusu

Many sources indicate that dental care is much needed in the camps. In theory, referrals could be made to the dental clinical officer at the Kasulu district hospital whose office had just been refurbished with new Dutch dental equipment but as the room does not have a reliable source of energy it is still in its packaging. In addition, the team could not assess the quality of services provided by these dental officers. There is no budget for dental care in the TRCS. Referrals out will be paid for by UNHCR, thus the need to limit the referrals to the most severe cases. Likewise, restorations are deemed too expensive.

Reprocessing of instruments is done in the operating theatre autoclave. Instruments for each camp include eight forceps and two elevators. All instruments are kept in a metal box, wrapped in cloth. Anesthesia is provided from large bottles of lidocaine with disposable syringes.

Dental materials are available in Dar es Salaam. There is no dental dealer in Kigoma.

Dental procedures are tabulated as any other medical procedure. Thus, both dispensaries have reliable statistics. For example, during 2005 in Nyarugusu, 23 children under five years of age and 839 over five years of age attended dental outpatient services. This total of 862 patients represented 13.7% of all outpatient visits. A total of 681 patients came for dental services in 2004 suggesting an increase in demand for services. In addition, there were 1,024 patients with angular stomatitis in 2005.



Dental instruments available to one camp

Training of health personnel working in and near camps

Physicians, clinical officers and nurses are graduates from Tanzanian professional schools. Nurses trained in Burundi and Democratic Republic of Congo have also been recruited to work in the camps. Clinical officers (also called medical assistants) are trained for three years at professional institutions in Tanzania, called Medical Assistant Schools. Some clinical officers may have received a short dental rotation in extractions as part of their training program. Dental surgeons (DDS) are trained at the Faculty of Dentistry in Dar es Salaam in a six year program. Dental therapists (also called dental assistants) are trained in a three year program in which the first year is shared with medical assistants. There are two schools for training dental therapists (dental assistants) in Tanzania and both have been

operating since the early 1980s. One school is in Tanga (northeast on the coast) and the other is in Mbeya (southwest). All DDS and dental therapists working in government facilities work under the supervision of Tanzania's Chief Dental Officer in Dar es Salaam, Dr. R. Senkoro (DDS).

The distribution of dental personnel in the area around the camps is as follows:

- 1) Kigoma Regional hospital (government): one DDS and one dental therapist.
- 2) Kigoma Baptist hospital: one DDS.
- 3) Kasulu District hospital (government): one dental therapist.
- 4) Kabanga Catholic hospital: two dental therapists.

In the camps, a few health personnel have been trained in emergency dental care. Mr. Msovu, a clinical officer at Mtabila, provides extractions one day a week. He was trained as a clinical officer (medical assistant) at the Tanga Medical Assistant School. During his three year training program, he had a short rotation in extractions at the nearby Tanga Dental Assistant School. In Nyaragusu, Mr. Sredi (nurse anesthetist) and an operating theatre nurse provide extractions two days per week and received on the job training.

There are no CE courses on dental topics for the health care personnel in the camps. There are regular CE programs for clinical officers on other topics, usually arranged for two to three days. The person at TRCS in charge of continuing education for health personnel said that it was possible to include dental topics using this format.

V. Oral Health Status and Treatment Needs

Summary

Background: In March 2006, two oral epidemiologists implemented an oral health survey of children and adults as part of a feasibility assessment to provide preventive and curative care for refugee populations living in two camps in the Western Tanzanian district of Kigoma.



Conducting oral health survey



Preparation for oral health survey

Methods: Convenient samples of children, adolescents and adults were examined using WHO and CDC protocols. Examinations took place in the refugee camps at the dispensaries managed by the TRCS in Mtabila II and Nyarugusu. Refugees in Mtabila are from Burundi and in Nyarugusu they are from the Democratic Republic of Congo. TRCS authorities in Dar es Salaam and the Camps provided logistic support to conduct the survey, including housing the examiners, transportation to the camps,

supporting human resources, photocopying and sterilization of instruments. A total of 154 persons were examined in Mtabila and 149 in Nyarugusu. The examinations were conducted from March 14 to March 23, 2006 and included: 1) a visual assessment for dental caries using Klein's decayed, missing and filled teeth index and a modification of Gruebbel's index for caries in primary teeth; 2) a visual assessment for dental fluorosis on eight upper anterior teeth and premolars using Dean's index of fluorosis; 3) a visual-tactile assessment for periodontal status using the WHO Community Periodontal Index (CPI); 4) an overall assessment of urgency of treatment needed using a five-level scale. Data were recorded in customized data entry forms and later entered into computer files using Epi Info. Data were analyzed using SAS.

Results: Among Burundians, the prevalence of dental caries was 64% at age four and five years (primary teeth), 31% at age 12 and 15 years (permanent teeth) and 70% at age 20-60 years (permanent teeth). Among children and adolescents with caries, over 90% of the disease is untreated. Almost three-quarters of the caries experienced among adults are due to untreated disease and the other quarter is due to missing teeth. Twenty-two percent of adults had one or more CPI index teeth with periodontal pockets > 4 mm and 67% had hard deposits (calculus). No dental fluorosis was observed. Over one-quarter of Burundian refugees needed urgent treatment due to pain or infection. Among Congolese, the prevalence of dental caries was 37% at age four and five years (primary teeth), 26% at age 12 and 15 years (permanent teeth) and 44% at age 20-60 years (permanent teeth). These values were lower than those observed among Burundians of similar age but over 90% of the disease was also untreated. More than half of the

caries experienced among adults was due to untreated disease. Almost 40% percent of adults had one or more CPI index teeth with periodontal pockets > 4 mm and 60% had hard deposits (calculus). Few Congolese children had signs of very mild or mild dental fluorosis which were associated with exposures occurring when living in Congo. Six percent of Congolese refugees needed urgent treatment due to pain or infection.

Conclusions: Overall, Burundian refugees had higher levels of dental caries than Congolese refugees, but Congolese had higher levels of periodontal pockets and more severe clinical presentation. Large proportions of these two populations require urgent and non-urgent treatment for dental caries and periodontal diseases. Because oral health is not considered a priority for refugees and the only dental service provided is extractions, there is a high level of missing teeth in the adult population. These data indicate a dire need for preventive and curative interventions as part of the primary health care approach for refugees.

Objective of the Survey

The purpose of the survey was to assess the prevalence and severity of dental caries, enamel fluorosis, periodontal disease, and the urgency of treatment among Burundian and Congolese refugees living in the district of Kigoma, Tanzania, in order to plan and develop preventive and curative interventions for these populations.

Population and sample



Refugees waiting to be examined in Mtabila



Refugees waiting to be examined in Nyarugusu

Convenient samples of children aged 4 and 5 years, adolescents aged 12 and 15 years, and adults over 20 years were obtained via direct contact and recruitment by community health workers from the Mtabila II and Nyarugusu dispensaries. Sample sizes for each refugee camp by age groups are displayed in table 2.

Table 2. Sample sizes by refugee camp and age group. Mtabila and Nyarugusu, Tanzania

Age Groups	Mtabila	Nyarugusu
4 and 5 years	50	49
12 and 15 years	51	50
Adults	53 (median age=32)	50 (median age=36)
All	154	149

Methods

The protocol used in the survey was a modified version of the WHO Basic Oral Health Survey which included items from the CDC protocol for visual-tactile assessments. The protocol is available upon request. Examinations were done at the tooth level using a plane mirror and gauze to clean and dry the teeth and a battery-operated diode front light. The assessment of enamel fluorosis and dental caries was visual. Periodontal status was assessed using WHO periodontal probes.

Children were examined for dental caries (both age groups), enamel fluorosis (only the 12 and 15 year age group) and urgency of treatment (both age groups). Adults were examined for dental caries, periodontal pockets and urgency of treatment. A sample of 12 and 15 year-old local Tanzanians from a school in Nyakitonto, a community located between the Ngaraganza base camp and Mtabila, was included as comparison group.

Data were collected at the tooth level and entered into forms and later transferred into computer files using a customized data entry program in Epi Info version 6.1. Data were analyzed in SAS.

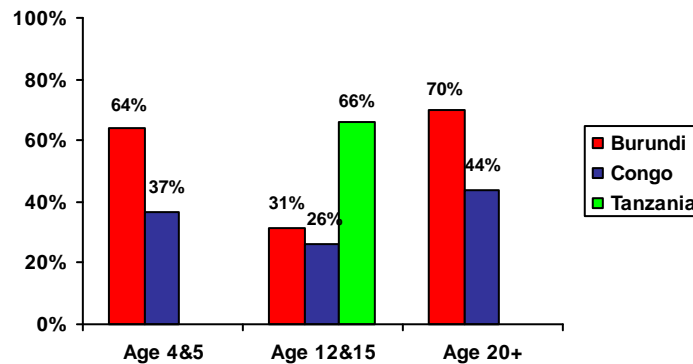
A Kiswahili field-tested questionnaire on oral impacts on daily living and quality of life was given to adolescents and adults. These data have not been analyzed so have not been included in this report.

Main Results (Table 3 includes a summary of findings - page 30)

The prevalence of dental caries was measured as the proportion of the sample having one or more decayed, missing or filled primary teeth (dmft>0) or one or more decayed, missing or filled permanent teeth (DMFT>0). Results are depicted in Figure 1.

- The prevalence of dental caries among Burundian refugees was 64% at age 4 and 5 years, 31% at age 12 and 15 years, and 70% among adults aged 20-60 years.
- The prevalence of dental caries among Congolese refugees was 37% at age 4 and 5 years, 26% at age 12 and 15 years and 44% among adults aged 20-60 years.
- The prevalence of dental caries among Tanzanian adolescents aged 12 and 15 years was 66%.

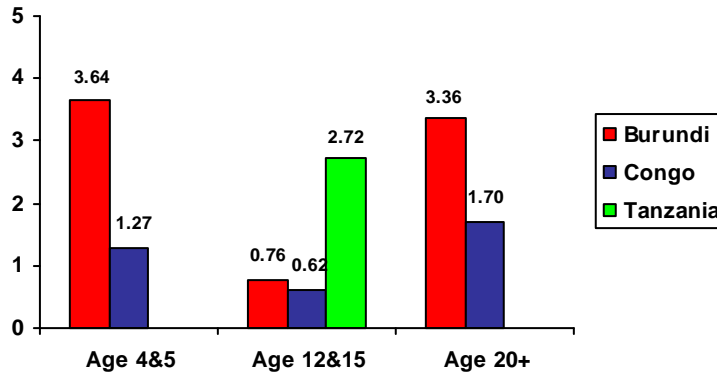
Figure 1. Prevalence of dental caries among Burundians and Congolese refugees and Tanzanians by age group



The severity of dental caries was measured in primary teeth by the mean number of decayed, missing and filled teeth (dmft) and in the permanent dentition by the mean number of decayed, missing and filled teeth (DMFT). The results are depicted in Figure 2.

- The mean dmft among Burundian children aged four and five years was 3.64 teeth. The mean DMFT at age 12 and 15 years was 0.76 teeth, and among adults aged 20 years or older was 3.36 teeth.
- Restored teeth (fillings) were present only in two Burundian adults (data not shown).
- Over 32% of Burundian children aged four and five years had on average four or more primary teeth affected by caries. Ten percent of adolescents aged 12 and 15 years had four or more permanent teeth affected by caries (data not shown).
- The mean dmft among Congolese children aged four and five years was 1.27 teeth. The mean DMFT at age 12 and 15 years was 0.62 and among adults aged 20 years or older was 1.70 teeth.
- Twelve percent of Congolese children aged four and five years had on average four or more primary teeth affected by caries. Eight percent of adolescents aged 12 and 15 years had 4 or more teeth affected by caries (data not shown).
- The mean DMFT among Tanzanian adolescents aged 12 and 15 years was 2.72 teeth.

Figure 2. Mean number of decayed, missing and filled primary teeth (dmft) and decayed, missing and filled permanent teeth (DMFT) among Burundians and Congolese refugees and Tanzanians by age group.



The main results for periodontal status (pockets depths) are depicted in Figure 3.

- All Burundian adults aged 20 years or older had some level of periodontal disease.
- Twenty percent of Burundian adults had one or more periodontal pockets of 4 to 5 mm and 2% had pockets of 6 mm or more. In addition, 67% had calculus and 12% had bleeding gums on probing.
- All Congolese adults aged 20 years or older had some level of periodontal disease.
- Twenty-nine percent of Congolese adults had one or more periodontal pockets of 4 to 5 mm and 10% had pockets of 6 mm or more. In addition, 60% had calculus. There were no adults with just bleeding on probing, all had more serious periodontal involvement.

Figure 3. Maximum Community Periodontal Index (CPI) score among Burundian and Congolese refugees aged 20 years and older.

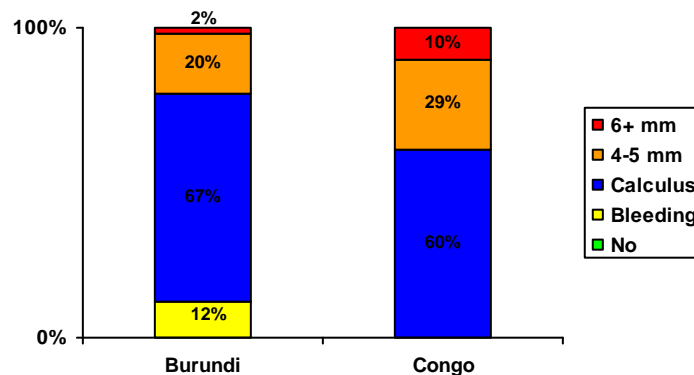


Table 3. Summary Indicators of oral health status among Burgundian and Congolese refugees aged 4 and 5, 12 and older, and Tanzanian adolescents aged 12 and 15 years.

N.A.: Not applicable.

N.R.: Not reported.

Oral Health Indicators	Burundians 4&5 yrs	Congolese 4&5 yrs	Burundians 12&15 yrs	Congolese 12&15 yrs	Tanzanian 12&15 yrs	Burundians ≥ 20 yrs	Congolese ≥ 20 yrs
Prevalence (dmf/DMF>0)	64.0%	36.7 %	31.4 %	26.0%	66.0%	69.8 %	44.0 %
Prevalence (d/D>0)	64.0%	36.7 %	29.4 %	26.0 %	66.0%	69.8%	36.0 %
Severity (mean dmft/DMF)	3.64	1.27	0.76	0.62	2.72	3.36	1.70
Severity (mean d/D)	3.60	1.27	0.69	0.62	2.62	2.21	0.90
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% of Calculus (CPI)	N.A.	N.A.	N.R.	N.R.	N.R.	66.7 %	60.4 %
% 4-5 mm Pockets (CPI)	N.A.	N.A.	N.R.	N.R.	N.R.	19.6 %	29.2 %
% 6+ mm Pockets (CPI)	N.A.	N.A.	N.R.	N.R.	N.R.	1.96 %	10.4 %
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% Cleaning	32.0 %	65.3 %	66.7 %	72.0 %	34.0%	39.6 %	66.0 %
% Simple Restorations	28.0 %	28.6 %	17.7 %	12.0 %	44.0%	22.6 %	14.0 %
% Complex Restorations	2.0 %	0.0 %	0.0 %	2.0 %	0.0	7.6 %	0.0 %
% Urgent Pain/Infection	28.0 %	6.1 %	15.7 %	12.0 %	20.0%	30.2 %	20.0 %

Results for urgency of treatment are depicted in Figures 4, 5 and 6 for each age group, respectively.

Figure 4. Urgency of treatment needs among Burundian and Congolese children aged 4 and 5 years.

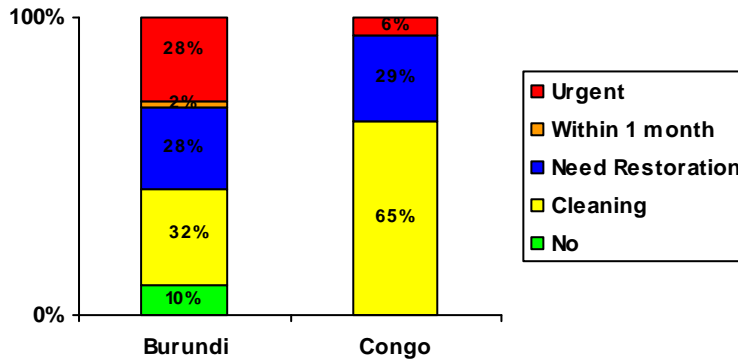


Figure 5. Urgency of treatment needs among Burundian, Congolese and Tanzanian adolescents aged 12 and 15 years.

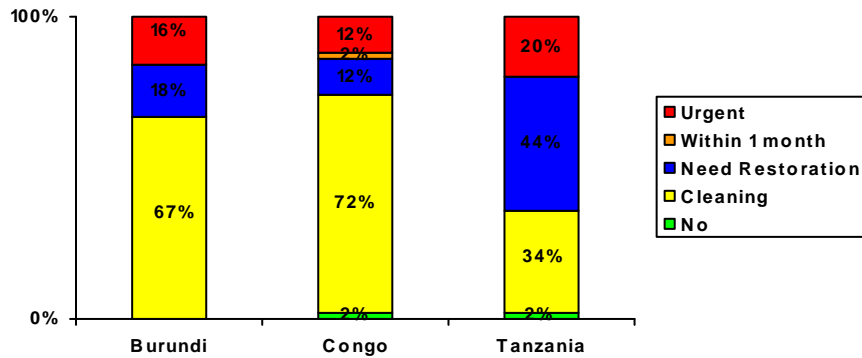
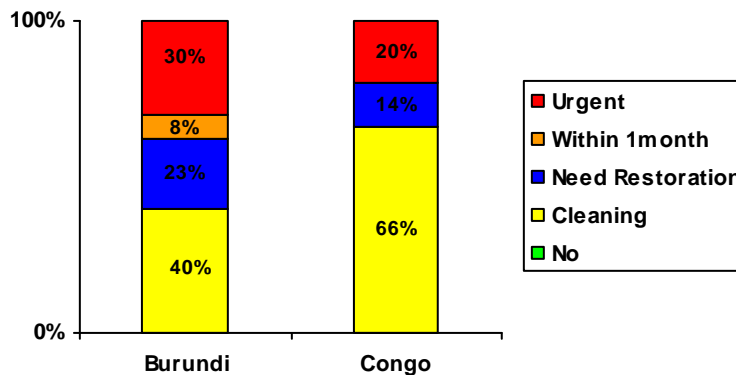


Figure 6. Urgency of treatment needs among Burundian and Congolese adults aged 20 years or older.



- Twenty-eight percent of Burundian children aged four and five years, 16% of adolescents aged 12 and 15 years and 30% of adults aged 20 years or older had urgent need for dental treatment due to pain or infection.
- An additional 32% among Burundian children aged four and five years, 67% of adolescents 12 and 15 years and 40% of adults aged 20 years or older need dental prophylaxis to remove hard deposits (calculus) around their teeth.
- Six percent of Congolese children aged four and five years, 12% of adolescents aged 12 and 15 years and 20% of adults aged 20 years or older had urgent need of dental treatment due to pain or infection.
- An additional 65% among Congolese children aged four and five years, 72% of adolescents 12 and 15 years and 66% of adults aged 20 years or older need dental prophylaxis to remove hard deposits (calculus) around their teeth.
- Twenty percent of Tanzanian adolescents aged 12 and 15 years had urgent need for dental treatment due to pain or infection. Almost two-thirds have dental problems requiring treatment more than just a prophylaxis.

Discussion

Burundian refugees had higher levels of dental caries than Congolese refugees in each age group. Congolese refugees, on the other hand, had higher levels of periodontal pockets and more severe periodontal disease. Both diseases are chronic and multifactor, thus there is no simple reason why Burundian refugees had higher levels of dental caries than Congolese. Both receive the same type of diet and the access to dental care (restricted to extractions) is similar in both camps.



Severe early childhood caries



Gingival overgrowth

One potential factor could be the accessibility to local markets and exchange of goods with Tanzanians, which seems to be more common among Burundians. Neither is there a good explanation for the higher levels of periodontal pockets among Congolese. They did have a larger need for tooth cleaning and removal of hard deposits but current science does not support these deposits as risk factors for periodontal disease. These findings need to be followed up by studies testing different hypotheses.

One interesting finding in both populations is the high prevalence of dental caries among young children and lower prevalence and severity in the permanent teeth of adolescents. Clearly, young children are exposed to cariogenic diets. Because nutrition is managed by the UN World Food Program, its effect on dental caries, in addition to cultural aspects of lactation and oral hygiene, need to be investigated. Many adolescents attending high schools were caries free in their permanent teeth reflecting maybe their higher socio-economic status, as they need to pay TSH \$500 per (U.S. 40 cents) month for tuition.

Large proportions of these two populations require urgent and non-urgent treatment for dental caries and periodontal diseases. The only dental service provided is extractions, which explains the high level of missing teeth in the adult population. There is an urgent need to implement programs focused on preventing disease through personal hygiene and professional removal of hard deposits. These interventions should parallel the current focus on removal of teeth affected by decay beyond repair, and restoring teeth affected by decay.

These data do not intend to represent the Burundian and Congolese refugees. There were clear limitations in sampling due to time constraints and the constant demographic change due to voluntary repatriation and influx of additional refugees. However, these are the only available data so far and, although the point estimates could vary in a truly representative sample of the population, we believe any representative sample will show the same overall patterns of disease as this convenient sample. Thus, these data could be used, with a fair amount for reliability, on the planning of preventive and curative interventions.



Periodontal destruction in a 4 year old child



Extractions done for cultural/ritualistic reasons



Retained primary molar with periodontal destruction

Conclusions and Recommendations

These data indicate a dire need for preventive and curative interventions among Burundians and Congolese refugees as well as among Tanzanian natives living in the Western District of Kigoma. The task for providing long-term care for these populations should start with tailored and effective programs to promote healthy behaviors and professional removal of hard deposits. These interventions should start before or at least provided simultaneously with curative care. The great proportion of untreated decay in the pit and fissures (data not presented in this report) suggests the possibility of providing pit and fissure sealants to prevent dental caries. An investigation should be conducted to study the feasibility of fluoridating the water treatment plants in the camps.

VI. Proposed HVO Program

Goals and Objectives:

The overall goals of the HVO program are: 1) to update the training of dental students and existing dental personnel in the country through continuing education and, 2) to improve capacity and quality of dental care for dramatically under-served refugee populations.

There are four phases in the proposed program and ADA/HVO volunteers could participate in any phase(s), depending upon their interest and experience.

Phase 1- Volunteers provide chair-side instruction and lectures at the Faculty of Dentistry and short presentations on practical topics at meetings of the Tanzania Dental Association (TDA). The Faculty of Dentistry has evaluated the DDS curriculum and has requested updates in oral surgery, orthodontics and restorative dentistry. The TDA would welcome continuing education on several topics at its annual meeting or at other times during the year, depending upon a volunteer's schedule. The annual TDA meetings are attended by all dental personnel in the country: dental faculty, government dentists, private practitioners, dental therapists, dental auxiliaries and dental laboratory technicians. General dentists and specialists (with some teaching experience) are recommended for Phase 1.

Phase 2- Partnerships are needed to secure financial support for basic dental equipment and supplies for the dental school, for two refugee camps and for Kabanga Catholic hospital. This hospital is located more than one hour from the camps. Personnel at Kabanga hospital treat refugees who are referred and transported outside the camps for complicated cases (fractures, tumors), but only with permission from the UNHCR. The two manual dental chairs currently located at Kabanga hospital should be moved to the camps –one chair to Mtabila II and the other to Nyaragusu. The Kabanga hospital dental department should be upgraded in order to better care for referred cases from the camps.

Phase 3- TRCS can host dental volunteers two times per year for two weeks at a time. Preferably the first volunteers visiting the camps should have worked in Africa before as this will be a very challenging but an extremely rewarding volunteer experience. Initially, general dentists with an interest in oral surgery or oral surgeons are desired for the camps and two volunteers are recommended at a time. The focus will be on training of local health personnel and provision of treatment to refugees in camps. The TRCS staff was gracious in hosting the site assessment team and is most anxious to welcome volunteer dentists from the U.S. A curriculum approved by the Tanzanian Ministry of Health for training Clinical Officers in dental treatment will guide the training. Trainees are the three persons currently providing dental care in two camps and three to four additional medical personnel in each camp, for a total of 9-11 persons. Translators will be provided by TRCS.

Trainees should receive chair-side and didactic education in diagnosis, referral, prophylaxis (especially removal of hard deposits), extraction techniques and the use of antibiotics in oral infection, proper infection control and treatment of periodontal disease. They provide no oral health education about disease prevention and should be taught to do so. They also see very few

pediatric patients, yet the epidemiological survey carried out in both camps showed a high prevalence of dental caries in children. There is a need for some training in pediatric dentistry. Dental personnel in the surrounding district hospitals should be included in this training.

Phase 4- The personnel trained in Phase 3, ADA/HVO volunteers and Tanzanian dental personnel with teaching experience (a dentist from Baptist hospital in Kigoma) would then provide a two to three day seminar to clinical officers. Clinical officers have had three years of medical training and are the “backbone” of curative medical care in the camps, working at the outpatient and inpatient departments.

Training would be conducted in two separate seminars: one seminar for 31 Clinical Officers at Mtabila I and II and another seminar for 32 Clinical Officers at Nyaragusu. The topics would be similar to Phase 3, but would not focus on clinical training. The topics would include examination, diagnosis and treatment of oral diseases, appropriate antibiotic use and referral in emergencies. An additional focus would be on prevention of oral diseases. The established curriculum on training Clinical Officers in dental care (Ministry of Health curriculum) should be followed. Funding would need to be found for these endeavors. This is estimated to cost one to two million TSH (\$825-\$1,650 U.S.) per seminar. All training materials would need to be provided because no equipment, supplies, books or journals are available at the camps.

The second component of Phase 4 is to implement oral health promotion in the community and in schools. This program should be handled by TRCS. An oral health promotion component must be added to the dental services in refugee camps and this activity can be taken on by the Health Information Team (HIT) personnel after they have been trained to do so. Each camp has a HIT in charge of health education on various topics and they make house visits. A team member is in charge of 55 households and visits the community three times a week. These health workers have been recruited from the local population.

The oral health survey indicated that oral hygiene was very poor. Trainees from Phase 3 and Tanzanian dental personnel with teaching experience would conduct a training program in oral health promotion to HIT personnel. ADA/HVO volunteers may provide assistance in facilitation, but would not be the primary trainers because local personnel would have been prepared and are better suited for this role. There is an established curriculum approved by the Tanzanian Ministry of Health that can guide training. The next objective would be for HIT personnel to provide this training to pupils in elementary and secondary schools, as part of a health curriculum.

The outcomes of the HVO program will be:

- 1) Improved quality of dental treatment for Tanzanians through continuing education of students and existing dental personnel. (Phase 1)
- 2) Increased capacity for and improved quality of dental treatment at the two camps and at the Kabanga hospital which treats referrals. (Phase 2 and 3)

- 3) Oral health promotion in the community and in schools conducted by the HIT personnel (Phase 4)
- 4) The clinical trainees will include refugees who are currently providing either dental care or medical care in the camps. These clinical personnel and the HIT personnel will eventually repatriate to their own countries (most likely rural areas with no dental services) and can continue to provide dental care to their communities.

Recommendations

HVO Volunteers provide chair-side and classroom continuing education in two week “dental camps” –one week at the Burundian camp and one week at the Congolese camp. This could be planned for two visits per year, maximum, due to the high level of support required by TRC to host a visiting team. Two ADA/HVO volunteers are recommended at a time to teach personnel currently providing clinical care and also dental therapists from surrounding districts.

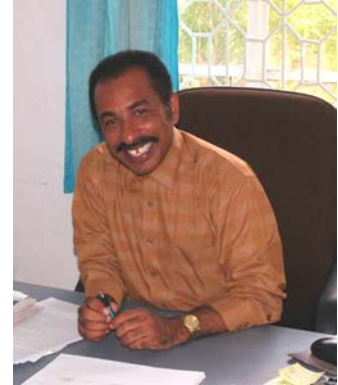
Tanzanian dental therapists provide training to Clinical Officers in a two to three day workshop arranged at each of the two camps. They also provide training in oral health promotion to HIT personnel. Volunteers may be included as facilitators in this effort. Funding will need to be found for these endeavors. This is estimated to cost one to three million TSH (\$825-\$1,650 U.S.). The optimum class size would be 30. All training materials would need to be provided because no equipment, supplies, books or journals are available at the camp.

VI. Logistic Information for Volunteers

Communications with site (Tanzania Red Cross Society—TRCS)

Dr. Seif S. Rashid

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If a program is established a Letter of Understanding would need to be signed by Dr. Rashid.

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Mr. Kibari Tawakal

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Local Contact

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Mr. Mbwana (TRCS Team Leader) is a mechanical engineer by training and speaks Swahili and English. He will house ADA/HVO volunteers in his home in the TRCS compound.

Credentials/Licensure of volunteers

Tanzania requires a temporary license to practice dentistry. It can be obtained from the Tanzania Medical and Dental Board. An application can be requested (Dr. Senkoro - Chief Dental Officer) and filled out in the U.S. and sent with the fee (\$30-50) by mail. Copies of one's current dental license: a DDS or DMD diploma, declaration of area of expertise (e.g. general dentist with experience in oral surgery) and a summary of previous dental humanitarian mission experience must accompany the application. There are no malpractice issues. It is unclear how long this process will take.

Equipment and Materials

A limited set of dental instruments and materials were left in the camp. The list is available from the ADA. Everything else will need to be brought in. Materials can be imported without Tanzanian customs duties as the Red Cross is exempt. However, there will be charges for "clearing and handling" goods from the Dar es Salaam airport. It costs 2,000 TSH (\$1.65 U.S.) per kilo (2.2 pounds) to ship materials to Kigoma via Precision Air. One needs to travel with all materials required and work with the Red Cross at all times. The Tanzania Ministry of Health has prepared a standard instrument list for dental treatment at rural hospitals. This could serve as a guideline for instrument purchases.

Training materials will need to be brought in. Training materials should follow guidelines set forth in two curricula approved by the Tanzania Ministry of Health. These are the curriculum for training Clinical Officers in dental care and the curriculum for training non-dental health personnel to provide oral health promotion in the community and in schools.

Housing for Volunteers

1. Dar es Salaam: Suggested hotel is The Courtyard on Ocean Road, a quality small hotel with good facilities. All rooms face a beautiful courtyard with bougainvillea and hibiscus. Facilities include air-conditioning, TV, mini-bar, safety deposit box in each room, laundry services, business centre, wireless internet, bar, restaurant and swimming pool. Electrical current is 220 volts, with British-style three-square-pin or two-round-pin plug adaptors. The hotel is in walking distance to TRCS headquarters. (U.S. \$85.00 per night in March 2006)

2. TRCS compound in Kigoma: Volunteers must stay in the TRCS compound for many reasons including security. The TRCS Team leader will house volunteers in his brick house, a very basic and rustic accommodation, but it has a living room with a TV, DVD machine and dining facilities. Rooms are spartan but each bed has a mosquito net. Bathroom facilities are also very basic, a flush toilet but no shower and only cold running water. Hot water is provided by a plastic barrel next to the bath. One washes with a small basin in a big basin in the bathtub! Everyone leaves their outdoor shoes at the front door of the house and flip-flops are provided for use indoors but of course you could bring your own in-door footwear. Accommodations are free but the TRCS asks for U.S. \$5.00 a day for food which is very basic (no dairy products).



Sleeping accommodations for volunteers with mosquito netting

There is no working fridge at present (March 2006). Breakfast might include eggs, sausage, bread with butter-spread, tea and coffee (instant with coffee-mate) and fresh fruit. The evening meal can include, rice, pasta, potatoes, cooked bananas, beef, chicken or fish. There is plenty of bottled water. The



Volunteer WC

compound has a bar (beer can be purchased for U.S. \$1.50) and a very basic, limited restaurant. One should purchase additional fruits and vegetables from road side vendors if supplements to the basic meals are desired. Electricity is on from 7pm -7am and for brief periods during the day. There are electrical outlets in the house but no internet access in the compound. Internet access is available in the closest district main town, Kasulu, but only at night when one should not be on the road. A Tanzania cell phone will be provided to volunteers before departure but pre-paid phone cards need to be purchased to make calls. The U.S. can be dialed for about \$2.00/minute, although connections can vary by location and be sporadic.

General Information

Make sure you go to a travel clinic at least six weeks before departure to receive general advice on travel risks such as malaria, prophylaxis and vaccinations .-Yellow Fever is required. **Only use bottled water throughout your stay in this country.** Everyone will first have to fly to Dar es Salaam and stay over even if not teaching at the university. A flight from Dar es Salaam to Kigoma on Precision Airways takes approximately three hours. TRCS will meet volunteers in Kigoma and transport them to the TRCS compound, a journey of two to three hours (depending on the weather) on dirt roads. Any on-site administrative support will be provided by the TRCS Team Leader. Children are not allowed in the compound.



Volunteer kitchen facilities

Spouses are not advised to go, unless they are willing to work in the refugee camps, as there is nothing for them to do in this very restricted environment. As one is not only a guest of the TRCS but also under their security, **you must follow their rules.** Some suggested personal items, though not essential, include battery-run lantern, pillow, extra towels and entertainment items such as cards, games, books, DVDs or battery-operated portable devices. Though the weather is very hot and humid in Dar es Salaam, the area where the refugee camps are situated is temperate and most comfortable. One may, on occasion, even need a



Volunteer Sitting Room

sweater! Though this is basically a casual country when it comes to clothing it is not appropriate to wear shorts or short skirts. Surprisingly it is still very hard to use credit cards except at major hotels in Dar es Salaam, otherwise everyone wants cash, even Precision Airways! In addition, travelers' checks are difficult to exchange except at the National Exchange but these are few and far between except in Dar es Salaam and make sure you have a taxi waiting for you. Basically cash is the order of the day! Volunteers should not drive in Tanzania after dark except in Dar es Salaam.

There are wonderful tourist opportunities in Tanzania - Zanzibar Island, Mt. Kilimanjaro and the Serengeti National Park to name but a few. Near Kigoma are the less frequented Mahale and Katavi National Parks teeming with wildlife and, of course, Gombe National Park (only a short boat ride away depending on the type boat you take) made famous by researcher Jane Goodall. The Hilltop Hotel in Kigoma is a good place to stay but they do not serve alcohol. This hotel can help arrange visits to the Parks mentioned above.

Note: Father Paul Flamm and his colleagues also need to be mentioned in this report because without his initial request the ADA and CDC would not have gone to these refugee camps. Whatever your religion, he is a wonderful human being who can give you a deep insight into the camps, having lived near them in his own compound for over six years. He speaks English, French and Swahili. His compound is one of peace and tranquility where volunteers can spend a day. A Sunday visit to one of the Catholic churches he services in the camps should not be missed.

X. Acknowledgements

This site visit to Tanzania would not have been possible without a generous donation from the **Colgate-Palmolive Company** and the support of **Dr. Anthony Volpe**, Vice-president, Scientific Affairs.

Our hosts and invaluable guides in Tanzania included: **Father Paul Flamm** from the Catholic Missionary order of the Spiritans; from the Tanzania Red Cross Society, **Dr. Seif Rashid**, Director, Health Services, **Mr. Kibari Tawakal**, Disaster Response Manager, **Mr. Richard Vincent Mbwana**, Team Leader Kasulu, **Mr. Julius Tibenda**, Logistic Ccoordinator Kigoma, and **Dr. Tumaini**; **Dr. Lameck Mabelya**, Dean of the Faculty, **Dr. Flora Fabian**, Department of Anatomy and Histology, and **Dr. Bakari Lembariti**, Registrar, School of Medicine at Muhimbili University, College of Health Sciences; and **Dr. Senkoror**, Chief Dental Officer, Tanzania Ministry of Health.

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