

Patrick J. Leahy War Victims Fund

**Orthoprosthetic
Technical Assessment
of POWER's Program
in Mozambique**

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Abbreviations

ADEMO	Association of Disabled Mozambican
AN	National Warehouse of Ministry of Health
BSc	Bachelor of Science
CA	National Center for Supplies of Ministry of Health
CAD	Council for Action on Disability
DAG	Directorate for Administration & Management of Ministry of Health
DAM	Department for Medical Assistance, Ministry of Health
DNS	National Directory of Health
DNSA	Deputy Director of DNS
DPS	Provincial Department of Public Health
DT	Technical Department of Logistics
EEC	European Economic Community
FIN	Finances Department of MISAU
HI	Handicap International
ICRC	International Committee of the Red Cross
JLC-MRCS	Jaipur Limb Campaign & Mozambican Red Cross Society
LOG	Logistics of Ministry of Health
LWVF	Leahy War Victims Fund
MISAU	Ministry of Health
MMCAS	Ministry of Women and Coordination of Social Action
MSc	Master of Science
DPMMCAS	Deputy Provincial of MMCAS
P/O	Prosthetics and Orthotics
PAI	Program for Institutional Support of MMCAS
POWER	Prosthetics and Orthotics World Education & Research
SIRT	System for Identification and referral for Transport of Persons in MMCAS
SMFR	Section of Physical Medicine and Rehabilitation

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Executive Summary

The U.S. Agency for International Development (USAID) has enjoyed a long and successful orthopedic assistance program in Mozambique. The program, which was developed in response to a humanitarian emergency, initially provided essential services for thousands of Mozambicans disabled by the war and its lingering after effects—landmines. In 1994, with peace at hand and the country's first democratic elections successfully completed, the program shifted its approach and began to focus on increasing the quality and quantity of services in an effort to develop sustainable practices and methods.

In 1998, as a result of the establishment of a new unit within the Ministry of Health (MISAU), the Section of Physical Medicine and Rehabilitation (SMFR), and recommendations made in a USAID-sponsored evaluation, the program's focus shifted out of direct involvement in the management and administration of rehabilitation services and into providing technical assistance, long-term training opportunities, and support to indigenous disability advocacy groups. The orthoprosthetic rehabilitation centers became the direct responsibility of the provincial and district hospitals in which they were located, and oversight was to be provided by the SMFR.

Since the reorganization of the program in 1998, the quality and quantity of prosthetic and orthotic services has rapidly declined.

Production in the four main orthopedic centers has dropped by more than 51 percent. In the year 2000, only 309 prostheses were produced in the country, despite a conservative production capacity of more than 1,000 devices per year. The quality of fittings and workmanship has taken an equally startling turn for the worse.

Orthopedic services are the responsibility of the Ministry of Health, but they are given lower priority within the ministry compared to other important preventative and curative health issues. As a result, little interest is paid to these programs, and diminutive resources are allocated for them.

The challenges facing the rehabilitation sector in Mozambique are not unique. Although the MISAU must continue to play a crucial role in this health issue and service, orthoprosthetics will never be cost-effective enough for the government to absorb within its current health budget and manage within its existing structure. A number of alternative management, administrative, and financial structures have been attempted in other African countries. Several of the more successful options are based on public-private sector partnerships and oversight boards outside of the day-to-day management structure. It is incumbent upon the MISAU to further explore, and in a controlled pilot program, examine the potential benefits these models provide.

Introduction

Through the Leahy War Victims Fund (LWVF), the U.S. Agency for International Development's (USAID) mission in Mozambique has been supporting orthopedic assistance since 1989. At that time, civil war continued to rage and civilian casualties from armed attack as well as from landmine accidents continued to mount. In response to the need for prosthetic and orthotic services, USAID began providing support to the International Committee of the Red Cross (ICRC) and later to Handicap International (HI) to assist the Ministry of Health (MISAU) in developing and operating prosthetic and orthotic workshops in five provinces. Over time, the program's purpose expanded to include increasing the capacity of nongovernmental organizations (NGO) and MISAU to provide mobility as well as social and economic integration services for people with disabilities. Since 1995, Prosthetic and Orthotic Worldwide Education and Relief (POWER) has managed all orthopedic assistance funnelled through USAID. To date, USAID/Mozambique has invested more than \$10 million in the rehabilitation sector.

POWER's involvement in the orthopedic sector under its USAID assistance program initially focused on providing direct management and administrative and technical support to the provincial rehabilitation centers. Under this initial cooperative agreement, the quality and quantity of devices produced and services delivered increased substantially. In 1998, a new cooperative agreement was negotiated. Under this agreement, all technical and mana-

gerial oversight and responsibility was subsumed under the MISAU. POWER's role became advisory, with a small amount of financial assistance going toward the production of orthopedic componentry. Both the demand and delivery of services has declined steadily since the technical responsibility for providing orthopedic services was transferred to the MISAU. Client satisfaction is low and staff morale and motivation is waning.

As a result of the declining demand and poor quality of devices delivered, USAID, the LWVF, and POWER determined to conduct an external program evaluation. The evaluation was divided into two parts: (1) an ortho-prosthetic technical review and (2) a feasibility study on the possibility of having a charitable not-for-profit organization manage prosthetic and orthotic services. This report represents the orthopedic technical review.

Country Background

Mozambique has a population of approximately 18 million (1996 statistics) and covers 799,380 square kilometres. It is one of the poorest countries in world. The gross domestic product (GDP) was estimated at \$80 in 1989 and only \$133 in 1995 (MRCS 2000).

After gaining its independence from Portugal in 1975, Mozambique became embroiled in civil war. With the signature of the "Accords de Rome" in 1992, however, that conflict between the Marxist regimes of Maputo,

the Frente de Liberta Vão de Mozambique (FRELIMO), and the anti-Communist armed resistance of the Resistencia Nacional Mocambicana (RENAMO) ended. The country has enjoyed relative peace since that time. Although it has been dominated by President Chissano's party, FRELIMO, since 1994, Mozambique has been governed as a multiparty democracy.

Mozambique demonstrates a strengthening market economy and good economic growth despite its remaining problems and difficulties. Agriculture production, foreign investment, tourism, access to education and health services, and civic participation in local and national affairs are all on the rise.

Overview of Prosthetics and Orthotics Services

Development of Prosthetics and Orthotics Services

During the period when Mozambique was ruled by Portugal, the country had only one private limb-fitting workshop. This workshop, located in the capitol, Maputo, was abandoned after Mozambique gained its independence in 1975. International organizations, in collaboration and partnership with the MISAU, reinitiated prosthetics and orthotics services in the early 1980s as a direct result of the need generated from the civil war.

During the last 20 years, an estimated \$25 million has been provided for physical rehabilitation assistance programs in Mozambique. Major contributors include USAID (through the LWVF this contribution is more than \$10 million), the European Union (EU), and other agencies. During this period, about 14,800 orthopedic appliances were delivered (prostheses and orthoses) through the nine

orthopedic centers established and supported by ICRC, HI, and POWER. Following is a brief description of the various programs and projects.

The International Committee of the Red Cross Program (1981–1995)

In 1981, the International Committee of the Red Cross, in collaboration with the Ministry of Health (MISAU), began offering prosthetics and orthotics services at the central hospital in Maputo. The program operated for 14 years. During this time, the ICRC developed the process for manufacturing orthopedic appliances, local production of orthopedic components, and patient gait training. Activities included on-the-job training for national staff in the different sections. Early in the program, an 18-month training program was established for prosthetics and orthotics technician's assistants.

Statistics under the ICRC Assistance Program (1981-1995)

	Maputo (1981–1995)	Beira (1986–1995)	Quelimane (1986–1995)	Nampula (1989–1995)	Total
Prostheses delivered	4,711	1,728	939	815	8,193
New prostheses patients	2,496	774	648	406	4,324
Orthoses delivered	not reported	287	61	not reported	348
New orthoses patients	not reported	219	45	not reported	264
Pairs of crutches	25,964	not reported	not reported	not reported	25,964

Using staff trained under this program, ICRC then extended P/O services to the provinces of Beira, Quelimane, and Nampula. Before phasing out its program in 1995, the ICRC provided a formal three-year training program in orthopedic technology for 24 national orthopedic technicians.

Handicap International (1986–2000)

Handicap International, in collaboration with the Ministry of Health, set up two small orthopedic workshops in Vilanculos and Inhambane in 1986 and 1987, respectively. In 1990 and 1991, HI set up two more orthopedic workshops in Nampula (North), which produced only orthoses, and Tete (Northwest). Two additional workshops were established in Pemba (far North) in 1993 and in Lichinga (far Northwest) in 1996. All six workshops were attached to district and provincial hospitals. As part of the MISAU system, the centers experienced administrative problems and HI had difficulty in raising adequate and consistent funding.

In 1991, HI received U.S. Agency for International Development/Leahy War Victims Fund financing to implement a one-year training course for orthopedic technicians (note: during the team's visit some of these technicians were wrongly said to have achieved an internationally recognized Category

II level). In 1996–1998, HI also implemented training for physiotherapy technicians (assistant level) in Pemba. The French Cupertino and the British High Commission financed this project. Between 1995 and 1996, HI provided technical assistance in the MISAU's various other projects, i.e., providing equipment for and installing physiotherapy sections in 16 provincial hospitals. This effort was funded by the European Economic Community (EEC) and from the Canadian cooperation and also included assistance for patients transit centers and a community-based rehabilitation (CBR) program, and support to the center for the rehabilitation of Malhangalene children in Maputo.

In 1993–1994, HI handed over the responsibility for overseeing its six orthopedic workshops to the MISAU. However, HI's financial assistance to the MISAU continued. HI also provided support for two technical advisers who were posted at the MISAU office in Maputo. At HI's initiative, MISAU created a department within the ministry to establish policy for, supervise, and manage the physical rehabilitation programs at the national and provincial levels. In 1997, an agreement was signed and the SMFR (Section of Physical Medical and Rehabilitation) was officially created. Three HI technical advisers were posted full time at the SMFR-MISAU office until May 2000. Under the HI structured plan, the SMFR became

Statistic Records under HI's Assistance (1986–2000)

	Vilanculos (1986– 2000)	Inhambane (1987– 2000)	Nampula (1990– 2000)	Tete (1991– 2000)	Pemba (1993– 2000)	Lichinga (1996– 2000)	Total
Prostheses delivered	579	767	0	256	140	14 (*)	1,756
Orthoses delivered	514	316	66 (*)	252	281	5 (*)	1,434
Crutches delivered	2,827	5,541	1,391 (*)	3,443	3,065	250 (*)	9,671

* Some figures for Nampula and Lichinga are either not reported or missing.

responsible for coordinating, overseeing, and establishing policy for orthoprosthetics and rehabilitation activities. However, the SMFR lacked the budget, authority, and credibility to play such a crucial role. These failings persist today.

***POWER Cooperative
Agreement I: 1995–1998***

In October 1995, shortly after ICRC phased out its program, POWER and the MISAU signed a three-year technical assistance agreement. The Leahy War Victims Fund and the local USAID mission provided \$1,824,276 in financing. During this agreement, POWER oversaw the activities of the four former ICRC orthopedic projects (Maputo, Beira, Nampula, and Quelimane). POWER was directly involved in managing these orthopedic centers, i.e., controlling the quality of prosthetics and orthotics, producing components, managing logistics, providing materials, managing patient's services, and arranging for training and education for P/O staff. POWER also supervised the ordering and purchasing of imported equipment and materials.

***POWER Cooperative
Agreement II: 1998–ongoing***

As a result of the establishment of the SMFR as well as the recommendations from a USAID-funded assessment team, a new agreement between POWER and the MISAU was signed in November 1998. The Leahy War Victims Fund provides total funding in the amount of \$2,181,024 for this agreement. Under this agreement, the MISAU has full responsibility for managing the four main orthopedic centers. POWER's role under this agreement is advisory (initially done jointly with HI) and is based at the SMFR-MISAU office. Moreover, under the agreement POWER became involved in providing oversight visits to all nine orthopedic workshops. In January 1999, POWER recruited a certified prosthetist/orthotist (CPO), Mr. Ronald

Doorten, as the advisory monitoring and evaluation officer. Mr. Doorten was retained full time and based at the SMFR-MISAU office. In addition, POWER's obligations under the agreement include

- Funding the acquisition of necessary materials for the fabrication of orthopedic appliances,
- Managing and administering funds and the use of materials in all limb-fitting workshops of the MISAU,
- Managing and collecting statistics for a database of patients,
- Conducting regular technical evaluations with the MISAU and national investigations of the disabled,
- Financing training of technical staff, and
- Producing regular activities reports.

The CPO left Mozambique in 2000 prior to end of his contract because of frustrations with his job and an inability to work productively within a governmental bureaucracy. Mr. Doorten's detailed report of findings and recommendations is essential reading if one is trying to understand the difficulties and dissatisfaction he experienced. As a result of his departure, some of POWER's obligations under the cooperative agreement have not, and will not, be met.

The present POWER agreement will be completed at the end of 2001. In collaboration with USAID and the LWVF, POWER would like to determine whether the current status quo will allow for a productive program or whether the MISAU will be receptive to trying a different service delivery approach. One option that has been presented to the government is the creation of a charitable not-for-profit NGO that can manage P/O services outside of the direct control of the MISAU.

***The Jaipur Limb Campaign Project/
Mozambican Red Cross Society***

In 1998, the Jaipur Limb Campaign Project (JLP) (based in London, UK) and the

Mozambican Red Cross Society (MRCS) set up a not-for-profit service project for amputees in Manjacaze, Xai Xai province. This project began in March 2000. Due to the lack of qualified orthopedic technologists and the poor skills of resident staff, services have been limited to below knee prostheses.

The newly constructed center has hostel-type accommodations with 18 beds and laundry and kitchen services. It is a pleasant environment for both staff and clients. Despite the free services and the nice accommodations offered the center has rarely had more than three patients at any one time since it opened.

To date, the center has registered 170 and delivered 76 prostheses. Follow-up visits to amputees are also part of the services the center provides. Eighteen patients have been visited. The majority of the patients visited live fairly close to the center. Follow-up visits to patients in remote areas are extremely time consuming. The JLC-MRCS orthopedic center is not included in the MISAU's national program.

Number of Amputees and Causes of Disability

According to various governmental and non-governmental surveys, Mozambique has approximately 9,000 amputees. Including other types of physical disability, the total number of persons with disabilities affected is in the range of 25,000.

POWER-SMFR statistics from 1997 to 2000 show an average of 950 new patients per year in need of orthopedic appliances. The number of patients is approximately 10 percent higher than the present total capacity output.

In 2001, amputations from landmines represented about 11 percent of all new patients attending the orthopedic centers. This number is sharply down from 29 percent in 1997. Other major amputations reported are either

from congenital causes or disease. Few amputations are as a result of motor vehicle or industrial accidents.

Current and Potential Capacity of Prosthetics and Orthotics Services

Ten orthopedic workshops are located in nine provinces (out of the 10 provinces in the country) in Mozambique. Two orthopedic workshops are located in the province of Inhambane (north of Maputo). Manica province (west central Mozambique) is the only province without a P/O workshop.

During this evaluation, the team could not visit all of the centers. However, the team visited the centers in Maputo, Beira, Quelimane, Inhambane, and Manjacaze. The condition in these centers were found to be representative of those in all of the centers. The team had access to detailed information about the other orthopaedic workshops in follow-up reports and statistics from the MISAU and POWER.

The country has a sufficient number of orthopedic facilities for the present. Additionally, as noted earlier in this report, over the past 20 years international humanitarian organizations have been committed to assisting in the delivery of services for people with disabilities.

Under the POWER/MISAU partnership from 1995–1998, the number of prostheses delivered in the four main orthopedic centers averaged nearly 700 limbs per year. This capacity was sustained during the period although near the end it dipped slightly. During this time, orthotic production increased significantly and constantly, from less than 200 appliances delivered per year to an average of 439 per year. Orthotic production peaked in 1998 with 634 orthoses delivered.

The output from the other five orthopedic workshops (formerly under HI) during that same time frame averaged only 145 prostheses per year. In 1998, it reached a peak of 167 limbs per year.

Statistics in 1999 show a quick decline in production, which corresponds and is directly related to the point at which HI transferred the responsibility of the workshops to the MISAU. In 2000, only 142 prostheses were delivered from the five HI-assisted workshops. The decline was most dramatic in the four POWER-assisted orthopedic centers. In these centers, production dropped by 51.2 percent. By the end of 2000, only 309 prostheses were delivered.

Combined output figures from 1994–1998, including both prostheses and orthoses from all nine orthopedic centers, show a constant

increase in P/O outputs when POWER was directly involved in the orthopedic activities. This followed a projected 10 percent increase under the POWER/MISAU agreement. However, during the last period 1999–2000, the total capacity for P/O services dropped by an average of 23.3 percent (see general statistics in Appendix E).

Existing Human Resources in P/O

A total of 106 people work in the nine orthopedic centers managed by the SMFR-MISAU. The following chart outlines the numbers of, classification for, and salaries of these people.

Number	Categories	Training	Salary Range (monthly)
1	Head of O/P SMFR-MISAU	O/P technology, Bachelor of Science (BSc)	more than: \$165
21 (*)	Orthopedic technologists Cat. 2 / ISPO	three-year diploma O/P technology, ICRC-ISPO	minimum: \$95 maximum: \$165 USD
30	Orthopedic technicians Cat. 3 / ISPO	less than two-year certificate on-the-job training ICRC-POWER	minimum: \$75 maximum: \$112
34	Bench workers (Category 3)	leather, metal, wood, plastic on-the-job training	minimum: \$47 maximum: \$75
18	Assistants	helpers and cleaners	within the lowest range
2	Administrators	office work	within the medium range

(*) Presently, five orthopedic technologists are not producing devices. Three are attending a three-year (BSc), Cat.1. course in France and will return in July 2001. Two are attending a four-year (Master of Science [MSc]) degree program for orthopedic engineers in Scotland. They will return in 2003.

The developing country norms in P/O services suggest that qualified orthopedic technologists (Category II) assisted by orthopedic technicians (Category III) should have the capacity to deliver at least six prostheses and six orthoses per month. Therefore, the potential capacity for Mozambique should be about 1,056 prostheses and 1,056 orthoses a year (including one month annual leave for staff and work handled by the five absent technicians). Time needed to repair orthopedic appliances is not considered in this calculation because orthopedic technicians

(Category III) and bench workers can perform these duties without lowering the overall production numbers. During the last two years, production figures from all nine centers were 2.5 times (150 percent) lower than Mozambique's potential production capacity.

Mozambique has 122 physiotherapists and physiotherapy assistants operating out of the district and provincial hospitals and distributed in the nine orthopedic centers and 39 hospitals in the country.

Causes and Problems of Low Capacity in Prosthetics and Orthotics Activities

Many factors have contributed to the decline in overall production quantity and quality:

- Five orthopedic technologists left to attend upgrading courses in 1998 and 1999 and three other quit
- POWER management support was phased out in 1998
- Floods in 1999 and 2000 affected the supplies of materials and patients access to P/O services

However, these factors do not explain all the deficiencies of the current situation. Other significant factors include the following:

1. Structure and Responsibility of the MISAU

Understandably, the MISAU's priority is preventive and curative medicine programs. It allocates little or no attention or resources to physical rehabilitation programs. Under current procedures, there is a constant turnover of upper-level managers and directors at both the hospitals and the ministry. This change of personnel has thwarted the introduction and progress of necessary changes.

The sole full-time employee of the SMFR-MISAU, the director, is responsible for co-ordinating all P/O activities, but he has no real authority. SMFR occupies a small office without adequate staff or budget. Plans of action and recommendations from oversight visits are often delayed or hindered by the complex bureaucracy of the MISAU, under which the SMFR operates. Communication is poor and the system, thus far, has operated inefficiently. Although he is obstructed by bureaucracy, even in an optimal environment the head of SSMFR has neither the leadership skills nor the initiative to effectively co-ordinate the national and provincial hospital P/O workshops.

2. Deficiencies in the Development of P/O Services

The team's discussions with national- and provincial-level players (MISAU, DNSA, DAM, SMFR, and MMCAS) in Maputo, Inhambane, Beira, and Quelimane confirmed that P/O services need to be improved. However, such improvements can not and will not be accomplished without additional financial and technical support. The SMFR-MISAU believes that they cannot change the current situation without more external funding. However, the team found that existing problems are systemic and do not necessarily require additional financial resources.

3. Other Problems

- Lack of patients due to transportation problems. Transportation, under the responsibility and coordination of the Ministry of Women and Coordination of Social Action has been unreliable and not well coordinated. Even when POWER negotiated agreements and payments directly to MMCAS, transportation was not being provided.
- Lack of staff motivation. Some centers experienced high absenteeism and in almost all centers staff members rushed off to second and third jobs as soon as the day was complete (or even before). Staff salaries are low and contribute to low productivity. The working environment at the centers is poor and in some cases dangerous. These factors all contributed to the poor quality of P/O services.
- Low production of components. Machinery has broken down and has not been repaired. As a result, the centers have not produced enough, feet, knee joints, and crutches.
- Lack of human and material resources. The system does not have a cost recovery mechanism and the budget allocation from MISAU is not sufficient. Current staff members do not

have the requisite skills to handle the responsibilities of their positions. Under qualified staff are allowed to treat patients and provide services they do not have the skills to provide.

- Lack of proper logistics and supplies. The MISAU central warehouse is understaffed and transportation to the provinces is lacking. Vehicles purchased for use under the rehabilitation program are used for other medical purposes and their use is not coordinated.
- Communication between all departments and staff is poor.

Patient Accessibility to Prosthetic and Orthotic Services

One of the crucial problems with Mozambique's P/O services is the patients' lack of accessibility to those services. Through its provincial branches, the Ministry of Social Affairs (MMCAS) is the office tasked with identifying, registering, transporting, and accommodating the disabled from the districts as well as following up after service delivery. The MMCAS implements the services through its provincial departments (DPAS-PAI and SIRT units).

In Beira and Quelimane, POWER provides \$23,000 per year in financial support to MMCAS, which is about \$2.5 per patient a day for food and lodging and \$25 for transportation. Little is achieved. In Maputo, Quelimane, Beira, and Inhambane, no vehicles are available to transport patients and alternative methods of transportation have not been identified. The team met many patients who had been at the transit center for several weeks but had not yet visited the orthopedic center, despite the fact that the center was less than 5km from the transit center. The car, it was reported, had been broken for one year. MMCAS had not reported this problem to POWER.

The transit centers the team visited were far from full capacity. In many places, the rooms

were occupied more by poor and destitute people than by disabled people. Some rooms are also rented but there is not a realistic cost recovery system.

The ministry (MMCAS-DPAS) does not provide a budget for or maintenance of the transit centers. The centers are therefore forced to "fundraise" on their own. In Quelimane, for example, where POWER negotiated an agreement to reimburse the transportation and food/lodging costs for people being served at the rehabilitation center, MMCAS uses the money to feed and house all the people at the center, including the poor and elderly. In the Quelimane transit center, the poor and elderly far outnumber the people awaiting services at the orthopedic center. As a result, the disabled report receiving only two meals a day consisting solely of beans and rice. Conditions at this transit center are extremely basic. People report staying up to four months. Coordination between the DPAS-MMCAS and SMFR-MISAU for transportation and follow-up visits to disabled people appears difficult. In general, patients visited in different transit centers were not satisfied.

Staff Performance, Motivation, and Oversight

The evaluation team assumed that the P/O technicians working in the workshops were technically acquainted with fabrication methodologies and procedures because they have had many years of experience and most had attended more than one training event. Yet, the team found the quality of job performance was poor in all the places they visited (with exception of Quelimane, where the quality was fair). The team noted careless mistakes, like improperly assembling components, during visits.

In Maputo, the team saw patients whose prostheses had not been fitted properly but who had been discharged and counted as successful outcomes. The team was told that technician assistants (Category 3, the lowest) are

permitted to see and treat patients, duties normally assigned only to orthopedic technologists who are Category 2 and above. The center supervisor indicated that quality control procedures were in place and implemented. However, the team saw numerous, poor-quality devices being used by patients that had been discharged.

The orthopedic workshops the team visited were not busy. Absenteeism and unmotivated staff was often noticed. The orthopedic workshop of Inhambane had neither patients nor prostheses.

Productivity in general was low in the workshops the team visited. In Maputo, six orthopedic technicians who are eligible (and supposed) to retire are permitted to work “moderately” instead. The MISAU’s staff salaries, like those of other government departments, are very low (between \$US 75 and \$US 165 per month) while salaries in the private sector are double for the same level of staff. Staff members note that transportation alone represents a significant expenses (up to \$US 10 per month).

Regardless of the poor the salaries they receive, the technician’s practice of discharging patients with poorly fitted prostheses—in some cases so poor as to cause injury—is unjustifiable. Perhaps the larger question relates to job satisfaction and whether or not the technicians are truly happy coming to their workplace every day. Indeed, most of the technicians the team met are either studying in a different field or working at night in an unrelated position.

Although all P/O centers are formally part of the provincial or district hospital system, hospital directors are not involved in the services. The directors state that they are not involved because they have limited time and orthopedics is not a priority. Recommendations and follow-up reports from POWER and SMFR monitoring trips, therefore, receive little or no consideration and, as a result, have no impact.

Necessary maintenance for machinery and building is severely lacking. Consequently, workshop conditions are declining rapidly.

Technology Used and Quality of Prosthetics and Orthotics Services

In the early 1990s, ICRC introduced the techniques and materials necessary to locally produce polypropylene components. The orthopedic center in Maputo was modified to include a workshop to produce components. The Maputo center produces components for all centers in Mozambique.

The Maputo center employs seven bench workers to produce and assemble feet, knee joints, alignment components, crutches, and other small parts. Despite being well equipped and stocked, the center’s present production capacity is only 40 feet, 10 knee joints, and 15 crutches per month—only enough to meet the needs of the Maputo central workshop.

The same pattern of negligence and poor conditions the team saw throughout the country were also evident in this workshop. For instance, the injection machine used to produce plastic parts for crutches and prostheses has been out of use for more than three months because the brass nozzle had not been fixed. This is a fairly minor repair. Therefore, injected plastic handles for crutches cannot be produced. Instead of repairing the injection machine, the workshop reverted to producing poor-quality metal crutches.

Unnecessarily, this workshop is heavily equipped with tools and machinery (e.g., four different types of lathe machines) from which it is possible to reproduce very sophisticated spare parts. In spite of this fact, the feet produced are too stiff (they cannot flex when the patient is walking) and badly shaped by hand. Knee joint components are poor: the metal tube supporting the knee axis is too weak and the bushings wear out quickly. Furthermore, the workshop is quite disorganized. Although staff members are allocated to departments

and by level, there is either little division of labor or staff members are used inappropriately and ineffectively. The workshop is costly to maintain and the quality of workmanship is poor.

HI/France Technology and Its Acceptance by the MISAU

In the early 1990s, HI/France initiated the use of polyvalent technology in the workshops in

Inhambane, Lichinga, Tete, Pemba, and Vilanculos. It was introduced as "appropriate technology." The principles of this technology consist of producing orthopedic appliances at the lowest cost using local materials available and with minimally trained staff. The professional P/O community has not generally accepted this technology.

Under HI advisement, the SMFR-MISAU officially accepted this standard, adapted it slightly and designated it "improved appropriate technology." By professional standards, this type of limb should only be used as a temporary device or as basic walking aids.

The team evaluated an example of this technique in Inhambane and Manjacase where the Jaipur Limb Campaign, in cooperation with the Mozambique Red Cross, trained workers for three months in India. The devices produced were made by combining a mixture of materials (not well matched) such as aluminium, metal, plastic, wood, and leather with an improvised type of foot. The resulting foot appeared to be poor and often inappropriate. Moreover, although this technique was touted as using locally available materials, and thus appropriate technology, in reality about 70 percent of the materials used to produce these devices need to be imported from places such as South Africa, India, China, or Maputo. As a result the cost of such devices and the time needed to fabricate them may be about the same as the cost of and time needed to produce the more durable polypropylene prosthesis.

SMFR-MISAU Budget

The MISAU's budget is 70 percent funded by foreign sources and represents only 12 percent of the total national budget.

In 2001, the SMFR proposed a budget of \$219,015 to cover the cost of imported materials. This amount represents MISAU's 30 percent share. The rest of the costs were to be covered by HI (20 percent) and POWER (50 percent). A close look at the budget plan showed an additional \$81,237 needed for orthopedic and physiotherapy services at the 10 workshops, this amount included running costs of offices, stationery, small items, staff trips within the provinces, and communication expenditures. The budget did not include salaries or expenditures for the orthopedic workshops, which instead are directly included in the respective provincial/district hospital budget. Some orthopedic appliances and crutches are also sold in hospitals for "special attendance patients" as allowed by the MISAU. The selling prices of these items range from \$37 to \$109 for prostheses, from \$2 to \$68 for orthoses, and \$3 for a pair of crutches. The selling prices are not based on a realistic cost calculation system but are instead viewed as a patient contribution. Based on collected information, the SMFR-MISAU national budget for physical rehabilitation (including physiotherapy) can be estimated at between \$480,000 and \$500,000 per year.

Materials, Purchases, Supplies, and Logistics of SMFR/MISAU

Since 1998, when POWER's roles and responsibilities were changed to advisory, the project has experienced significant difficulties in importing and dispatching materials to the provinces. Customs procedures within the government of Mozambique are extremely long and complicated and even within MISAU several different departments are involved in this process. As a result, consignments of materials often remain in customs

for several months before they are received at the national MISAU warehouse.

The team visited the national MISAU warehouse where all hospital equipment and supplies are stored and shipped for the entire country. Incredibly, the warehouse has only four employees to handle all stocking functions for the health care needs of the entire country. These employees state that they are overwhelmed. This appears to be a gross understatement.

For the P/O sector, components for orthopedic devices are stored in one small area. Although some stock was visible, several of the provincial centers visited noted that they had been waiting up to six months for supplies. In one center, they stated that they had not received crutches for two years!

The management of stock at the warehouse and the coordination with logistics and supplies departments (Directorate for Administration and Management of Ministry of Health, Logistics of Ministry of Health, Technical Department of Logistics, and National Center for Supplies of Ministry of Health) within the MISAU are inefficient. During the grant agreement, POWER occasionally used the services of an independent contractor or other NGO to distribute supplies. On more than one occasion, in order to get supplies moving at all, POWER offered to pay the costs of shipping supplies to the provinces through an independent contractor. Unfortunately, the SMFR/MISAU declined and the provincial workshop went without necessary orthopedic supplies and materials.

Conclusions and Recommendations

The situation with regard to P/O services in Mozambique clearly suggests that the MISAU cannot sustain P/O program activities in such a way that the services can meet the needs of the country's population. Difficulties include poor staff performance, an inefficient system

for supplying materials to the workshops, the lack of a cost recovery system, poor to satisfactory quality prostheses produced, lack of proper communication between the different ministry departments, and no established standard of quality with regard to the fit of prostheses and the delivery of services in general. Since the SMFR-MISAU assumed direct responsibility for P/O services in 1999, the capacity for delivering prostheses in the nine orthopedic centers is about 2.5 times (150 percent) lower than the available capacity (451 prostheses delivered versus a capacity to deliver 1,056 per year) and the combined output of prostheses and orthoses dropped by 24 percent. Moreover, the following findings and recommendations are made.

1. Quality of P/O Supplies and Services

Patient accessibility to P/O services is poor, and when services are available, they have not generally been of acceptable quality. Although finances and materials have affected in the quality and quantity of services, a number of other factors such as staff motivation, adequate and appropriate management, training and technical assistance, and selection of technology have also played a decisive part.

The projects in Manjacaze and Quelimane are good examples of the effect of such other factors. The JLC-MRCS project in Manjacaze (Gaza province) is independent from the MISAU and sufficiently funded. Facilities are new and expansive. However, the quality of devices produced at this site was not any better than those seen at the other centers. On the other hand, in the Quelimane orthopedic workshop, part of the MISAU system, the conditions were poor, equipment limited, and supplies sporadic, but the few prostheses provided to amputees were of decent quality. This success was in great part due to the dedication of the staff; the management provided by the workshop manager, Arlindo Setavane; and the oversight given by the hospital director, Dr. Elena F. Mula Chong.

2. Local Production of Orthopedic Components in Maputo

Local production of components in Maputo has been fraught with problems. The system, as it stands now, is neither efficient nor effective and should be changed. The fabrication process involves extremely technical issues and high expenditures. This process should not be run as simply ancillary to an orthopedic workshop.

The 20-year-long experience of the ICRC, as a pioneer in this field, has proven (with the exception of production of crutches) that locally produced components are not the best approach in P/O programs. The ICRC found that the programs failed because they were not sustainable in quality, quantity, and in cost as compared to the more affordable, centrally fabricated imported components available today. As such, the ICRC has chosen to outsource all production of components for prosthetics, orthotics, and wheelchairs. ICRC has found that it is more efficient and effective to concentrate solely on the already difficult objective of developing P/O appliances.

The team recommends that the Maputo center stop fabricating components. Instead, serious consideration should be given to accessing and using the ICRC/Coppet components. In order to best be informed, a cost/benefit analysis should be made comparing the importation of the ICRC/Coppet components with in-country production. In assessing in-country production, it should be anticipated that any local production would be outsourced to a private facility and not done with the SMFR/MISAU system.

3. POWER's Proposal for a Not-for-Profit NGO Managing P/O Services in Mozambique

The initiative proposed by POWER for an independent NGO or institution to manage P/O services for disabled people enjoys wide and varied support and should be

explored further. The challenge, however, will be great. In the team debriefing with the vice-minister of Health, the government of Mozambique expressed optimism that the minister himself would welcome such an initiative.

Since POWER has already worked out an alliance with ADEMO (local association of the disabled) and created the Council for Action on Disability (CAD), there are a number of different options that POWER could explore. Three options were discussed with the vice-minister of Health and the evaluation team. There are still many outstanding issues and agreements to be made before engaging. For example, there is the issue of how to deal with staff and donated equipment belonging to the MISAU centers. How will this be resolved? What if the recommendation was to sell excess equipment? Could this be done? Other outstanding matters include what type of agreement to create with one (ADEMO) or many local partners and what method to use to build sustainability into the programs.

POWER should not have more than two partners or too many different types of activities associated with this project, at least until it has made solid roots. If POWER expands this initiative too broadly it will implode with management and administrative problems and will create a structure that is difficult to control.

4. Conditions for Sustainability of Future Programs (as proposed in the in-country debriefing)

The following four principles determine the potential sustainability of any project:

1. Patient accessibility to P/O services

How:

- Refund part or all of the costs of transportation and accommodation for poor disabled
- Use available local transportation and accommodation possibilities (pension

family, church, shelters, etc.) and do not try to create these services within the same P/O activities

Who:

- Find/Develop an agreement with NGOs, private sources, or insurance companies

2. *Existence of cost recovery and income-generating mechanisms*

How:

- Establish real cost calculations of all products supplied and/or services (physiotherapy)
- Include small profit (10 percent) and contingencies (9 percent) (to be made by external financial audit)
- Making sell prices available for private clients and for outsource donors or insurance companies

Who:

- Provide services free for disabled war victims and poor disabled, but the costs for these services must be reimbursed by NGOs or donors or by small government participation

3. *Staff performance under qualification and motivation*

How:

- Improve salaries for qualified and committed staff
- Provide advantages for staff transportation, training, or other possibilities
- Improve working conditions and environment (clean and attractive set up of facilities)

Who:

- Implementing agency (POWER) with NGO and donors support

4. *Quality of P/O supplies and services*

How:

- Provide choice and satisfaction to all disabled (poor and other)
- Do not produce components locally but purchase the most affordable imported quality products (possible deals

with manufacturers, suppliers, and international agencies or donors)

- Establish a database listing information on disabled people and collect relevant information for donors

- Follow up and survey patients serviced

Who:

- The implementing agency

Three Options for Future POWER/MISAU Collaboration

Based on ICRC's work in Ethiopia and elsewhere in Africa the following three options should be considered with regard to collaboration between POWER and the MISAU:

1. P/O services under an independent structure

This structure might be an institution or NGO (CAD). It would have a board, a chairman, and representatives from different agencies (ADEMO, Private VIP, MRCS, associations, MISAU, MMCAS, etc.). The board would appoint a director and administrator for the orthopedic center. In the orthopedic center, the person in charge, the chief, should be a Category 1 prosthetist/orthotist. This person would be in charge not only of services, but also of quality assurance/control in all respective departments. All P/O activities and services should contain a cost-recovery element and an income-generation mechanism based on real cost calculations. The Ministry of Defence, insurance companies, NGO, or other donors would reimburse the real costs to the center for P/O services.

CAD → Board → P/O Center: Director/Administrator
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2. P/O services remain under the responsibility of the MISAU but with full autonomy

Under this option, the center has its own board (chairman and representatives of MISAU, MMCAS, MRCS, and others). The orthopedic center has a director and administrator appointed by the board.

The MISAU will guarantee national standards and a minimum salary to the staff and all P/O activities. Services provided must contain cost recovery and income-generation elements sufficient, at least, to cover salaries and maintenance. The Ministry of Defence, insurance companies, NGO, or other donors would reimburse the real costs to the center for P/O services.

MISAU → P/O Center Board: Director/Administrator
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3. P/O services are entirely under the commercial private sector

This option could be developed in addition to or in combination with options 1 and 2. This option should not be excluded as it offers particular advantages, especially for difficult cases. MISAU is encouraged to permit and support the private sector's participation in the delivery of P/O services.

In all cases, small units of P/O services should remain under the responsibility of MISAU hospitals for medical purpose. These P/O units should be attached to physiotherapy departments and be limited to delivering small orthopedic appliances, such as temporary prostheses.

Appendix A – Vice-Minister of Health's Debriefing on the Assessment of the POWER/Mozambique Program

1. Context of the Visit (Leahy War Victims Fund [LWVF])

- a. Began in 1989. It is a program within USAID that provides a dedicated source of financial and technical assistance for civilian victims of war. "Victims" are persons who suffer from mobility related injuries, including those injured by land-mines and those who suffer from polio as a result of interrupted immunization campaigns.
- b. LWVF supports programs that provide for the improved mobility of people with disabilities by providing accessible, appropriate orthoprosthetic services. Focus is on quality, availability, accessibility, and sustainability. The Fund also supports rehabilitation-related services such as orthopedic surgery and physiotherapy and works to improve the social and economic integration of people with disabilities.
- c. In the last 12 years, the LWVF has provided more than \$70 million in more than 16 countries.

2. The LWVF and Rehabilitation in Mozambique

- a. Mozambique was one of the first countries supported under the LWVF. The program of assistance began in

1989 through support to the ICRC. In addition to providing support to the ICRC, the Fund has provided support to Handicap International (HI), Save the Children (for the construction of the transit centers in Maputo and Beira), and POWER. The total LWVF investment in the rehabilitation sector in Mozambique is approximately \$10.2 million.

- b. The POWER program in Mozambique began in 1996. In collaboration with the ministry, it was decided that POWER would assist four centers formerly supported by the ICRC. Namely, Maputo, Beira, Quelimane, and Nampula.
- c. As a result of work done by Handicap International to centralize services and recommendations by a USAID team, the activities were fully handed over to the Ministry of Health in 1998/1999. Since that time, within its partnership with the Ministry of Health, POWER has played only a cursory advisory role and provided financial assistance for the manufacture of orthoprosthetic components.
- d. The current partnership between POWER and the Ministry of Health (and other partners) ends at the end of the year. With the end of the program

close at hand, this assessment was devised to (1) evaluate project impact since 1998; (2) help develop a close-out and sustainability plan; (3) determine what assistance, if any, the LWVF could/should provide in the future for rehabilitation in Mozambique; and (4) suggest/recommend possible options for such an assistance package, if determined appropriate.

3. Assessment Team and Itinerary

- a. The team consisted of the following individuals:
 - i. Health economist from the U.K., looking at feasibility of public/private sector involvement
 - ii. Joe Ubiedo, CPO and ICRC Technical Director.
 - iii. Rob Horvath, LWVF
 - iv. Donna Carpenter, USAID/Mozambique
 - v. Max Denu, POWER
 - vi. Francisco Baptista, Head of SMFR
 - vii. Representative, with PAI at the MMCAS
- b. The team visited the following sites:
 - i. Maputo Orthopedic Center and general hospital
 - ii. Manjance Orthopedic Center, supported by Mozambique Red Cross
 - iii. Inhambane Orthopedic Center and general hospital, formerly supported by Handicap International. Also visited the MMCAS transit center.
 - iv. Beira Orthopedic Center and general hospital (and MMCAS transit center)
 - v. Quelimane Orthopedic Center and general hospital (and MMCAS transit center)
 - vi. Also met with Dr. Candido, Dr. Mengele, and Dr. Tomo (deputy director of the Dept. of Planning and Cooperation)

4. Starting point: Miller/Whitson and the status of activities in 1997/98

- a. Country moved from emergency/humanitarian relief to development
- b. Recommendations were that the MOH assume responsibility for services. This has been done and the MOH currently pays all recurring cost. Finances come from within the hospital's budgets. POWER (donor) pays only the costs of materials. In a sense, the program has reached a level of financial sustainability. However, as findings indicate there is little or no managerial and/or technical sustainability in most centers.
- c. The centralization of services has led to a large decline in both quality and quantity of services.

5. General Findings. Joe provide more details depending on Vice-Minister's wishes.

- a. Materials purchased and/or fabricated with outside resources are not getting to the centers. Sometimes centers wait more than six months from time of order. In one center, no crutches were available for almost two years.
- b. With the exception of one center (Quelimane), the quality of the devices produced was poor to very bad. The lack of materials had an affect on the quantity of services. However, quality issues were more directly related to staff, despite seemingly adequate skill levels and the existence of supervision.
- c. Although supervision and oversight visits were made, the visits and subsequent reports have had little or no effect on service delivery.
- d. Hospitals take little or no interest in the delivery of quality services. There are many higher priority issues. Staff problems/issues are not addressed. Maintenance is not done. Existing space is in-

adequate and often what does exist is reallocated for departments.

- e. Many trained staff members have departed. Those at the centers work halfheartedly.
- f. Work and service delivery environment is unappealing and depressing.
- g. Production had declined by more than 40 percent.
- h. Demand for services has declined, as much to do with poor service as with accessibility.

6. Options

- a. Components
 - i. Continue to manufacture in country – quality and quantity produced are inadequate. Maputo center should not continue to manufacture and deliver services. They are unable to do this effectively.
 - ii. Purchase/import – Coppet or others
 - iii. Need to conduct a full cost analysis
 - iv. Comment on Manjacaze (and HI approach); supposedly “local” components. In reality, they import as much as any other center.
- b. Service Delivery – regardless of delivery mechanism, LWVF can and will

only support quality services that are delivered in reasonable quantity.

- i. Services remain totally integrated within the hospital and MOH systems. From centers visited, only Quelimane would be eligible for LWVF assistance.
- ii. Orthopedic center managed by separate board but still within MOH perview.
- iii. Management contract outsourced to NGO/association/foundation.
- iv. Privatization.

7. Next Steps

- a. Decision taken on possible options. May be more than one option.
- b. If new option, bring team back to develop detailed business and implementation plan. Initial visit of one to two weeks, followed by individual visits.
- c. Selection of implementation site and development of phase-in plan. May take up to six months.
 - i. Includes negotiation of roles and responsibilities with all players, financial commitments, exit plan should be built in from the beginning, etc.

Appendix B – Assessment of POWER's Program and Feasibility Study on Charitable Not-for-Profit Organization Managing P/O Services

Term of reference for Orthoprosthetic Technical Evaluation

Purpose: *Evaluate POWER's accomplishments under the two cooperative agreements funded by USAID.*

Provide recommendations on how to ensure sustainability of prosthetics services in Mozambique after the end of USAID assistance in December 2001.

I. Responsibilities

- a. The CPO technical expert will work in coordination with the team
- b. The CPO technical expert will collect the technical information described below.
- c. The CPO technical expert will present to the team a technical report, which shall include the final evaluation results and recommendations.

2. Assessment of current situation

- a. Production statistics
 - i. Capacity
 - ii. Actual
 - iii. Changes with handback to MOH
 - iv. Reasons
- b. Human resources issues
 - i. In-country capacity
 - ii. Motivation, career path, salary issues
- c. Service delivery issues
 - i. Patient awareness of service availability

- ii. Patient access: transit centres, transport
- iii. Patient satisfaction
- iv. Service quality
- v. Costs
- d. Production, appropriate technology, and technical quality issues
- e. MOH preferences
 - i. History (ICRC and HI)
 - ii. Polyvalent technology (proposed by MOH)
 - iii. Current technology used (manufacture of components and appliances)
- f. Implications of patient satisfaction
 - i. Comments on product offered by MISAU (ADEMO, ADEMIMO, etc.)
 - ii. Comments on service the delivery
- g. Implications for sustainability
 - i. Local production of components
 - ii. New products to be locally developed

- iii. Local production vs. importation of products
 - h. Volume
 - i. Production capacity and real production
 - ii. Need for the future
 - i. Logistics and supplies management
 - i. Current system in place/ MISAU's system
 - ii. Control of supplies consumption (central, provincial level)
 - j. Supervision, monitoring and evaluation
 - i. Central and Provincial levels
 - ii. Implementation of Recommendation
- 3. Proposals for the future**
- a. Potential models per Miller and Whitson
- i. Workshop to serve production and repair of medical equipment for entire hospital system
 - ii. Turn workshop over to private sector
 - iii. Retain within MOH
 - iv. Orthoprosthetics Implementing Agency
 - v. Foundation
- b. Other possible models in Mozambique and elsewhere
 - i. Advantages and disadvantages
- 4. Recommendations**
- a. The recommendations will cover the above-mentioned sections and will reflect an independent technical judgment.

Appendix C – Persons Contacted

MMCAS

- Duarte Joaquim, National Director
- Arthur Nhantumbo
- Cristina Matsinhe, PAI-MMCAS

MISAU

- Dr. Aida Libombo, Vice-Minister of Health
- Dr. Candido, Deputy National Director of Health (DNSA) and Head of Medical Assistance (DAM)
- Dr. Menguele, DAM Dept.
- Francisco Baptista, Head of SMFR-MISAU
- Dr. Jorge Fernando M. Tomo, Deputy National Director, Directorate of Planning and Co-operation

USAID

- David W. Hess, Deputy Director
- Donna Carpenter, Special Projects Coordinator

Mozambican Red Cross Society

- Texeira Fernanda, General Secretary

Maputo Central Hospital

- Dr. Langa, head of Orthopaedic Department
- Carlos Passe, head of orthopaedic workshop

ADEMO

- Farida Gulamo, General Secretary of ADEMO

Handicap International France

- Nicolas Bordet, Director
- Cristina Vera

Beira (Province)

- Dr. Americo Assane, Hospital Director of Beira
- Antonia S. P. Charre, Director DPMMCAS
- Moises Pedro Vilanculos, Head of orthopaedic centre

Inhambane (Province)

- Dr. Celia Gonçalves, Director DPS
- Dr. Ana Paula, Hospital Director
- Atanazio Pitore, Director DPMMCAS
- Ricardo Romeu, Head of orthopaedic workshop

Manjacaze (Province)

- Luis Sautiane, Head of orthopaedic center and staff.
- Jeronimo Ntimane, Administrator

Quelimane (Province)

- Dr. Helena Fernando Mula Chong, Hospital Director
- Joana Simiao, Director DPMMCAS
- Aarlindo Setavane, Head of orthopaedic workshop

Appendix D – Evaluation Schedule

Date	Time	Action
04/10/01	8:30 pm	Arrival Joe Ubiedo in Maputo
04/11/01	8:30 am	Meeting POWER office with Max Deneu and Malcolm Murray
	10:00 am	Meeting SMFR office with Francisco Baptista and Malcolm Murray
	11:00 am	Visit of the CRIM (Children Project in Malanghalene, Maputo)
	2:30 pm	Meeting with Teixeira Fernanda, MRCS office
04/12/01	8:00 am	Visit of the orthopaedic center of Maputo Hospital
	10:00 am	Meeting with Francisco Baptista
	1:00 pm	Meeting with Duarte Joaquim and Cristina Matsinhe, MMCAS office
	4:00 pm	Meeting with H.I.
04/13/01	8:00 am	Discussions with Max Deneu and Malcolm Murray, POWER office
	12:00 am	Lunch with Donna Carpenter USAID, Max Deneu and Malcolm Murray
04/14/01		Arrival of Rob Horvath in Maputo, USAID
04/15/01		Day off
04/16/01	8:00 am	Briefing meeting POWER office with the team
04/16/01	11:30 am	Meeting with Dr Candido and Dr Menguele, at MISAU office
	2:00 pm	Meeting with team POWER office
04/17/01	6:00 am	Departure to Manjacase by road
	10:30 am	Visit of the JLC-MRCS orthopaedic center
	7:30 pm	Arrival in Maputo
04/18/01	8:30 am	Meeting at orthopaedic center of Maputo Hospital
	1:00 pm	Evaluation visit of the orthopaedic center, Maputo Hospital

continued

Date	Time	Action
	2:00 pm	Continuation of meeting with Carlos Passa, Head of orthopaedic center
	4:00 pm	POWER office
04/19/01	8:00 am	Meeting with David W. Hess and Donna Carpenter, USAID office
	12:30 pm	Meeting with Francisco Baptista at SMFR office
	4:30 pm	POWER office
04/20/01	8:00 am	Flight to Inhambane
	9:30 am	Meeting with Celia Gonçalves, DPS, and visit of the orthopaedic workshop and physiotherapy at hospital of Inhambane
	2:00 pm	Meeting with Director at office of DPMMCAS and visit of transit center of Inhambane
	6:00 pm	Arrival in Maputo
04/21/01		Day off
04/22/01	2:00 pm	Departure to Beira by air
	5:00 pm	arrival to Beira
04/23/01	7:30 am	Visit of the orthopaedic center and physiotherapy at Beira hospital
	2:00 pm	Meeting with Antonia Charre, DPMMCAS, office
	2:30 pm	Visit of transit center in Beira
	4:00 pm	Meeting with Dr Americo Assan, Director of Beira Hospital
04/24/01	7:00 am	Departure to Quelimane
	9:30 am	Visit of the orthopaedic workshop in Quelimane
	11:00 am	Meeting with Helena F. Mula Chong, Director of Quelimane Hospital
	2:30 pm	Visit of the transit center in Quelimane
	4:00 pm	Meeting with Johana Simao, Director of DPS in Quelimane
	4:30 pm	Meeting at orthopaedic workshop

continued

Date	Time	Action
	10:30 pm	Arrival in Maputo
04/25/01	9:00 am	Meeting with Donna Carpenter, USAID office
	10:00 am	Visit of the national warehouse of the MISAU
	11:00 am	Visit of the transit center in Maputo
	2:00 pm	Meeting with Dr. Langa, Maputo hospital
	3:00 pm	Meeting with Dr Jorge Fernando, Deputy Director of Cupertino and Plan of MISAU
04/26/01	11:30 am	Meeting with Dr Menguele, MISAU office
	3:00 pm	Meeting with Dr Aida Libombo, Vice Minister of MISAU