

# Telemedicine in Majuro Hospital, Marshall Islands

KAMAL J. GUNAWARDANE\*

## Abstract

Since March 1998 up to June 2000, telemedicine activities in Marshall Islands have mainly been for Referrals to Tripler Army Medical Center (TAMC) in Hawaii. The activities are based on a computer which has the Internet connection and accessories including a digital camera, flatbed scanner with a transparency adapter, color printer, a video printer, ophthalmoscope, otoscope and a video Lens, all of which were donated by Project Akamai in Hawaii. Two sessions of training were conducted by representatives from Akamai Project and from PBMA at the very beginning of the establishment of the unit, to all levels of Health Care Providers in Ministry of Health in Majuro. The computer and Internet facility is available 24 hours. Since March 1998 to June 2000, there had been 144 telemedicine consultations to TAMC. Out of a total of 326 off-island referrals for the same period, approximately 80 patients have been sent to TAMC using the PIHCP/Telemedicine program. This accounts for approximately 25% of total off-island referrals. This represents a significant reduction in cost. In addition to cost reduction the telemedicine unit most important impact is on the health providers, especially the physicians working at Majuro Hospital. Availability of medical information through Internet has helped them to feel less isolated from the constantly changing field of medical science.

## Introduction

The Republic of Marshall Islands is an archipelago in the Central North Pacific Ocean, 2270 miles south east to Hawaii. The capital, Majuro accommodates nearly half of the

total population of about 60,000. Marshall Islands is a freely associated country with USA. The Health care is mainly provided through Majuro Hospital, which is a primary care facility with limited Secondary care. Referral of patients for secondary and tertiary care is a necessity and Hospitals in Hawaii and Philippines have been in use at a tremendous cost to the Health care system. Tripler Army Medical Center (TAMC) in Honolulu, Hawaii had been among the leading centers to which patients from Majuro Hospital are referred. Pacific Islands Health Care Project (PIHCP) is a program designed by TAMC to facilitate these referrals. Patients for treatment are accepted by this program depending on Educational value for the graduate students and post graduate trainees at TAMC at no cost to the freely associated Pacific Island Nations. Until March 1998, TAMC and Majuro Hospital communicated for patient referral, using regular telephone conversations and fax communications between the physicians.

The telemedicine unit in Majuro Hospital was established on the 15<sup>th</sup> of March 1998. The equipment was donated through Akamai Project, coordinated by TAMC and Pacific Basin Medical Association (PBMA). Necessary Office space and support was provided by the Ministry of Health in Marshall Islands. The unit has the capability of connecting with the Web Site for the PIHCP at the TAMC.

The equipment available was:

- Desktop computer,
- Digital Camera,
- Zip Drive and Zip disks,
- Color Printer,
- Otoscope,
- Ophthalmoscope,
- Video Camera,
- Video Printer,
- Flatbed Scanner with a Transparency Adapter.

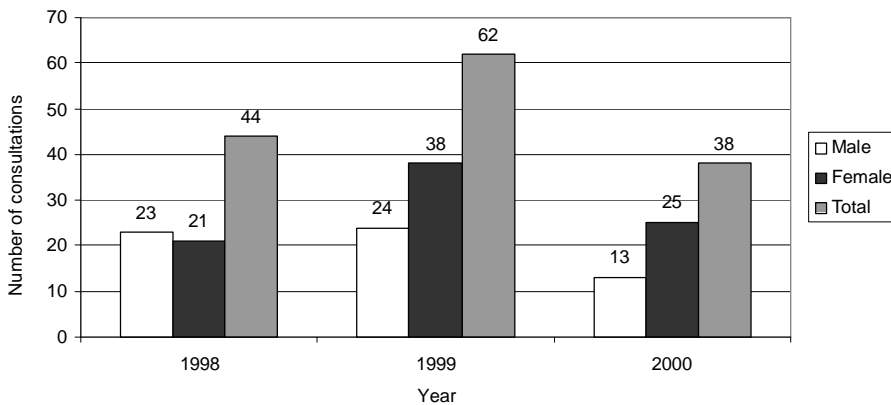
## Training

Two sessions of training were conducted by representatives from Akamai Project and from PBMA at the very beginning of the establishment of the unit. The majority of the health workers including physicians was found to have had no experience in computer use and the training sessions concentrated on basic skill development. However over the last two and half years every member in the physician staff was able to use a computer. Word process-

---

\*Staff Surgeon, Tele-Medicine co-ordinator, Majuro Hospital, Marshall Islands, Ministry of Health and Environment, P.O. Box 16, Majuro, MH96960, Marshall Islands. Ph: 692 625 3355 – Fax: 692 625 4543/3432 – E-mail: mipamohe@ntanmar.com

Figure 1. Telemedicine consultations

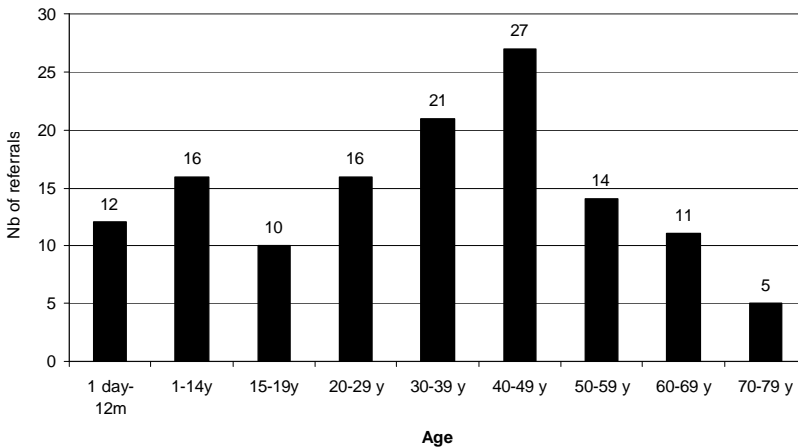


ing, search in the web, accessing the TAMC web page, etc are done by almost every member in the staff whereas the use of Scanner, Digital camera to upload and download images are still not universally used by every member of the physician staff. Non-physician staff including Hospital administration, nursing staff, are also using the telemedicine computer. Due to the high demand for the use of the computer, an additional computer is established specially for word processing and the processing and editing of digital images.

### Report on referrals using Telemedicine

Since March 1998 up to June 2000 there had been 144 consultations to TAMC through the use of telemedicine. 58% of referrals are female patients and 42% are males. See Figure 1.

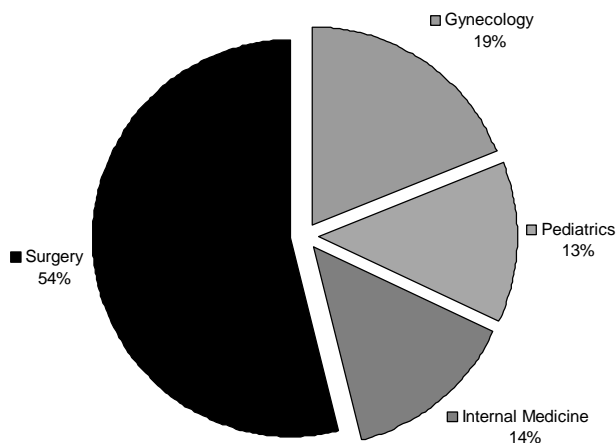
Figure 2. Age distribution of consultations



### Age distribution of consultations

Ages ranging from neonates of 8 days to 75 years old patients have been referred using the web site. However the majority of patients are between ages 30 and 49 years (33.3%). 19.4% of all cases are below the age of 15 years. 18% of all cases are between 15 to 29 years and 20.8% of all were between 50 and 79 years of age. See Figure 2.

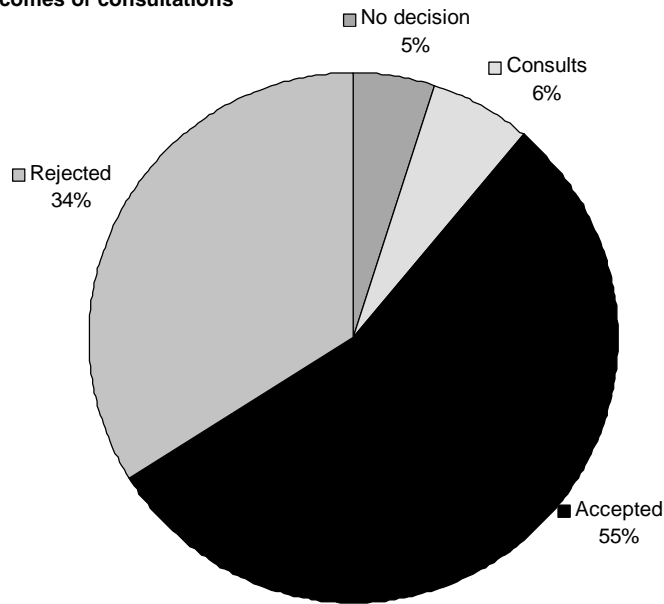
Figure 3. Distribution of referrals on disease category



### Distribution of consultations on disease category

79 cases (54%) are surgical-related illnesses. This includes General Surgery, Orthopedic Surgery, Urology, Otolaryngology, Pediatric Surgery, Neuro Surgery and Plastic Surgery. Nearly 1/4<sup>th</sup> of the surgical referrals are orthopedic diseases. 20 cases (14%) are Internal Medicine related illnesses that include Cardiology, Pulmonology and Neurology. 18 (13%) are non-surgical Pediatric related ill-

**Figure 4. Outcomes of consultations**



nesses and 27 (19%) are Gynecological related illnesses. See Figure 3.

**Outcome of consultations**

55% of the referrals have been accepted for treatment at TAMC, whereas 34% of them were not accepted for treatment. These referrals had been made mainly because the facilities available for diagnosis and further management are not available locally. Those 34% of non-accepted cases by TAMC had been sent to other centers either in Hawaii or Philippines. 6% of the referrals were done for the purpose of consultation only. These patients have been treated using locally available diagnostic methods and medications combined with the valuable expert advise and opinions from consultants at TAMC. See Figure 4.

**The impact of telemedicine on off-island referrals**

Out of a total of 326 off-island referrals since March 1998 up to the end of June 2000, approximately 80 patients have been sent to TAMC using the PIHCP/Telemedicine program. This accounts for approximately 25% of total off-island referrals for the period from Majuro Hospital. One can safely assume that this number representing 1/4<sup>th</sup> of the total referrals have saved a large sum of medical bills to Marshall Islands off island referral funds. In addition to this the communication bills for patient referrals have substantially reduced too. On average the monthly bill for the Internet account is 500.00 US \$. Unfortunately Internet services in Marshall Islands cost higher than many other nations in the region. 80 US \$ of monthly rental fee plus a 3.00 US \$ fee for every hour of Internet connection had been charged until August 2000. The rental fee has come down to 40.00 US \$

a month since August 2000 but the hourly fee remains the same.

In addition to cost reduction for the health system the establishment of the telemedicine unit has its most important impact is on the health providers especially the physicians working at Majuro Hospital. Until the establishment of the telemedicine unit, only professional communication in relation to patient care was done using the telephone. Availability of medical information through Internet has helped the physicians to feel less isolated from the constantly changing field of medical science. Even though the unit is basic in relation to vastly advanced telemedicine applications elsewhere, the value of its presence is immeasurable for the practitioners in a primary care setting like in Majuro Hospital.

**References**

Available from the author on request.