

The role of low cost communications in health in the redevelopment of the indigenous physician workforce among selected jurisdictions of the US-associated Pacific Islands

GREGORY DEVER*

Abstract

Low cost communications in health are key to the strategic redevelopment of the indigenous physician workforce among select countries of the U.S-Associated Pacific Islands. In conducting the Pacific Basin Medical Officers Training Program (PBMOTP) from 1986-1996, the University of Hawaii established five key strategic objectives to train and support physician graduates from the Freely Associated States of the Federated States of Micronesia and the Republics of the Marshall Islands and Palau. These objectives were to: conduct a basic medical education program which graduated 70 physicians; promote regional Internship training programs; assist in establishing formal postgraduate training opportunities; reestablish a regional physician's professional organization; and promote both regional and local continuing medical education activities. Inherent in the PBMOTP training program was familiarising students with hands on research methodologies, use of computers and information systems, and the processes of "store and forward" distant medical consulting. This paper documents the regional development of expanded access to medical information and distance medical communications technology and processes, including CD_Rom, Epiinfo, Picasso phone, E-mail, and Website based consult and

*Director, Bureau of Clinical Services, Ministry of Health, Republic of Palau; Coordinator, Pacific Basin Medical Association; Co-coordinator, Western Pacific HealthNet. Former Director, Pacific Basin Medical Officers Training Program. gdever@palaunet.com

Medical information search. Recently, email and Internet processes have promoted access to and the use of low cost communications in health thereby further reducing professional isolation among the new physician workforce in Micronesia.

Introduction

Among the Freely Associated States (FAS) of Micronesia in the Western Pacific low cost communications in health is a key element to reestablishing and sustaining an isolated indigenous physician workforce who are spread across five time zones. The FAS countries - formerly jurisdictions of the United Nations U.S. Trust Territory of the Pacific Islands - comprise of the current independent nations of the Federated States of Micronesia (FSM) and the separate Republics of the Marshall Islands (RMI) and Palau (ROP). The FAS countries are part of the U.S-Associated Pacific Islands (US-

API) that also include the U.S. flag territories of Guam, the Commonwealth of the Northern Mariana Islands, and American Samoa.

Over an eleven-year period (1987-1996) 62 new Micronesian physicians from these FAS countries were trained by the University of Hawaii at the John A. Burns School of Medicine's

Pacific Basin Medical Officers Training Program (PBMOTP) in Pohnpei State - one of the four states of the FSM. The purpose of this U.S. federally funded effort was to address the regional physician shortage and, as quickly as possible, place all these physicians back working in their respective countries^{1,2}. To achieve this goal JABSOM implemented five strategic objectives to re-establish the local physician workforce and sow the seeds for its sustainability. These were:

1. Implement and Conduct a Basic Medical Education Program for Physicians
2. Re-establish Regional In-Country Physician Internship Training
3. Promote Formal Postgraduate Training
4. Create Regional and Local Medical Associations
5. Develop a Process for Continuing Medical Education

**.. these new technologies would
 1) benefit regional patients through quick, low cost, and user friendly distance medical communications in health, 2) promote medical learning and continuing education for the regional health workforce, and 3) be key to organizing isolated groups of physicians...**

DISTANCE EDUCATION IN THE PACIFIC

Improved regional access to communications in health and

program as Health Assistants (mid-level practitioners) as graduate physicians. Possible the program tried to connect resources between community versus hospital-based. It became the first physicians to graduate from any medical school in the Pacific. Its graduates were women and female physicians for the PBMOTP was established about 1975 for the expatriates. Now 75% are local physicians. During the development of an innovative medical program provided direct medical services to patients and communities, research, and, as part of its curriculum, implemented hands-on health

PBMOTP is the *Pacific Health Dialog* journal of health and clinical medicine. The traditional process of publishing in the print media, the *PHD* is a part of regional indigenous works.

Also incorporated into the curriculum were learning activities which included computer-based activities, simple data bases for self-learning, utilizing CDROM media, and learning how to use email. One of the indispensable learning and teaching tools was the Picasso Phone, which was developed at TAMC's Akamai Project in 1994. At TAMC staff distributed the Picasso Phone to PBMOTP and taught PBMOTP practitioners how to use them for consulting and learning. The phone was attached to a video camera and transmitted freeze frame video pictures of electrocardiograms and transmit to the Picasso Phone. PBMOTP staff began to transmit both patient and staff slides to and from rural jurisdictions. Transmissions of x-rays by the Picasso Phone from Kosrae State to an emergency off island clinic through the Picasso Phone by TAMC staff began in earnest to improve the process with TAMC.

The process was marvelous. With the help of the Phones, weekly Grand Teach-

ing sessions (in a career ladder fashion the program trained clinically certified students as they progressed with ex-

Telemedicine

The PBMOTP was fortunate that during its planning and inception two major initiatives were ongoing in the Western Pacific: 1) dramatically improved access to communications technologies and 2) two complimentary U.S.-federally funded medical graduate education and telemedicine programs at Tripler Army Medical Center in Honolulu.

Communications in the Pacific: During the last two decades of the 20th century among the capital and commercial centers of the FAS countries, there has developed increasingly improved access to better satellite communications technologies which have included improved telephone and fax and, eventually, email and Internet access. With these regional innovations, PBMOTP students and staff joined other isolated regional practitioners and began to tentatively then more earnestly explore how these new technologies would 1) benefit regional patients through quick, low cost, and user friendly distance medical communications in health, 2) promote medical learning and continuing education for the regional health workforce, and 3) be key to organizing isolated groups of physicians and other health care personnel into a more definable professional community with view to drawing this community closer together.

Distance Medical Consulting and Medical Referral: Two programs which directly benefited the PBMOTP and now support its graduates are based at Tripler Army Medical Center (TAMC) in Honolulu. They are the Pacific Island Health Care Program (PIHCP) and the Akamai Project (3). The PIHCP supports graduate medical education at TAMC by bringing to TAMC teaching medical and surgical cases from the U.S.-API. Patients are screened by local medical referral committees and a formal medical consult is made to the PIHCP. If accepted as a teaching case, all medical and travel costs associated with that case are generously covered by the program. The Akamai Project is TAMC's telemedicine effort to provide distance medical consulting for the region through an Internet-based web site. It is now an integral part of the PIHCP process, as now all medical consult/referral requests to the PIHCP must go through the Akamai Internet-based store and forward process. The Akamai project has standardized the medical consult/referral process and dramatically improved organized and equitable access to the PIHCP for the participating US-API jurisdictions.

Basic medical education and distance communications in health

Before its planned closing in 1996, the PBMOTP trained 70 Micronesian and American Samoan physicians. It utilized problem based learning and introduced early clinical training into the academic scheme (50% classroom / 50% super-

vised patient care). In a career ladder fashion the program trained clinically certified students as they progressed with expanded competence through the program. After one year, licensed Medical Assistants (after one year), licensed Medical Officers (after three years), and then licensed Physicians (after five years). As much as possible, the program attained parity in both time and resources with community-oriented primary health care training. Many of its students began their training from their jurisdictions to graduate in 30 years. Forty-six percent of its graduates included the first ever-local graduates of the FSM and the RMI. Before the PBMOTP, 75% of the regional physicians were expatriates. More of the region's physicians are now local. In its short life and in the context of the educational process, the PBMOTP provided a model for educational and public health service to patients and communities. It conducted community-based research and developed a Community Health curriculum, implemented a health care reform^{1,2}.

One of the rich legacies of the PBMOTP is the *Pacific Health Dialog* - a journal of community health and clinical medicine for the Pacific. Through its monthly publication of formal communications in health and clinical medicine, it has encouraged the development of a professional community of investigators and published their

Computer Literacy in Health: Two programs in the PBMOTP curriculum were computer-based. The first familiarized students with various computer applications in health including mastering of word processing, directed research projects (Epi-Info), and the use of medical libraries, and after 1995 learning to use the Internet technology, which became an indispensable communications tool was the Picasso Phone. It was introduced to the program by TAMC in 1994^{3,4}. Donated to TAMC by AT&T, the Picasso Phone and two Picasso Phones to the PBMOTP curriculum. TAMC faculty, students, and other practitioners used the Phones for local and distance medical consulting and learning activities. The Phones when attached to a VCR would capture and store freeze frame video pictures of patients, X-rays, and electrocardiograms. These were transferred via telephone to another jurisdiction. PBMOTP students and staff then began to use the Phones for information and video lecture sessions. The use of Picasso Phones at the Pohnpei clinic teaching sites. Through the use of Picasso Phones to the PBMOTP curriculum, one hour away by jet prevented the transfer of a trauma patient. Through the use of the Picasso Phone process PBMOTP students and staff began to participate in the telemedicine program.

As an educational tool the Picasso Phone and over local telephone li-

ing Rounds held at the PBMOTP campus in Pohnpei's capitol of Kolonia were transmitted to remote clinics on Pohnpei where PBMOTP faculty and students lived and worked as part of their Community Health activities. Although in a rural setting on a remote Pacific Island, faculty and staff stayed connected with the main stream educational process of the campus. In turn these rural PBMOTP clinics also had the capacity to make formal medical consultations by forwarding freeze frame video pictures of patients to Pohnpei State Hospital which was the main in-patient teaching site for the program. Occasionally, students from the peripheral clinics transmitted case study presentations to their classmates at the main campus. In demonstration activities utilizing the Phone, PBMOTP staff lectured clinicians in Hawaii (re Hansens disease) and Alaska (Otitis Media) and participated electronically at regional health meetings in New Caledonia⁵.

Although cumbersome and sometimes expensive to use because of high long distance telephone rates, Picasso to Picasso Phone communications demonstrated to PBMOTP students the potential for intra-island, regional, and international communications in health. Through the Akamai Project's encouragement, the use of the Picasso Phone process in Micronesia set the stage for the later enthusiastic use by PBMOTP graduates of low cost Internet-based store and forward communications in health. Now in Palau PBMOTP graduates not only communicate by Internet to the PIHCP in Honolulu but are also participating in computer to computer communications in health between rural clinics and Belau National Hospital in Palau's capital center of Koror.

Physician internship and postgraduate training

In 1992 the PBMOTP celebrated the graduation of its charter class. As it was politically compelling that the graduates return immediately to their home islands because of the shortage of local physicians, it was necessary to establish a Regional Physician Internship Training Program (PIHDA) to monitor and certify local Internship Training. The Micronesia Medical Council was established which was formally part of the Pacific Island Health Officers Association - the formal body of the Ministers, Secretaries, and Directors of Health from the U.S.-API. Monitoring and examining these new physician graduates who live across five time zones proved to be a daunting experience. To date 58 of 62 the Interns have successfully passed their local Internships.

In order for the PBMOTP to be a success, it was necessary to develop the next-educational-step access for graduates to formal postgraduate medical training. In the early 1990's there was a dearth of opportunities for Pacific physicians to access appropriate postgraduate medical training programs in the Pacific. In 1992 the University of Hawaii went into formal relationship with the Fiji Ministry of Health to assist in the World Health Organization-supported efforts to de-

velop the Fiji School of Medicine as a postgraduate medical training site for the Pacific Islands. In 1995 the World Health Organisation (WHO) convened the Pacific Ministerial Health Meeting from which generated the Yanuca Island Declaration that promoted health and protection for Pacific island environments and endorsed the establishment of the Fiji School of Medicine as a formal postgraduate training site for the Pacific. That same year the John A. Burns School of Medicine was awarded a three-year \$US500,000 seed grant from the U.S. Department of Interior to assist in establishing the Postgraduate Training Center at the Fiji School of Medicine. In this way JABSOM-PBMOTP, along with other Pacific partners and donor organizations, played an active role in contributing to the establishment of postgraduate medical educational programs at the Fiji School of Medicine thus assuring that PBMOTP graduates and physicians throughout all the Pacific would have access to appropriate specialty training after their basic medical education and Internships.

Of the 62 Micronesian graduates from the program, eleven (17%) have completed or are currently matriculating in postgraduate medical studies at the Fiji School of Medicine in Diploma and Masters Degree programs in Anesthesia, Medicine, Obstetrics, Pediatrics, Rural Health, and Surgery. An additional physician from Palau is completing a Diploma program in Mental Health at the University of Auckland School of Medicine. The number of these Micronesian postgraduate doctors is more than the total number of FAS Micronesian physicians that have matriculated in any formal postgraduate medical training programs in the last 50 years. Currently there are discussions ongoing between the Republic of Palau and the University of Auckland to establish "in-country" Family Practice Residency Training for Micronesian physicians.

Medical associations and access to continuing medical education

In 1995 the *Pacific Basin Medical Association* was established⁶. It replaced the previous *Micronesia Medical Association*, which became defunct about 20 years previous because most of its membership had either retired or died. Now there were enough new regional physicians to create an association which would 1) provide a network for medical practitioners to promote high standards of medical care, 2) encourage continuing medical education activities, and 3) support the formation of local medical associations (i.e., *Belau Medical Society* and Medical Associations in Yap, Chuuk, Pohnpei, and Kosrae States of the FSM, and RMI and American Samoa). To promote these objectives and the development of regional indigenous investigators, the PBMA embraced the *Pacific Health Dialog* as its formal medical journal. To date the PBMA has conducted five annual meetings the last being in Palau co-hosted by the Belau Medical Society on "Disaster Management and Injury Awareness". In 1995 it was clear that in order for the PBMA to

become a more cohesive professional organization and promote regional continuing education, a better Pacific-wide communications network would be needed.

Island email and the internet

Regional Email: Email and Internet access came to Micronesia in the mid-1990's and has enabled isolated regional physicians scattered throughout the Western Pacific to take the steps necessary to become a credible regional professional community. Email access has been invaluable for promoting not only inter-island communications in health but has helped to shape, better define, and bind the regional physician community. After the 5th PBMA conference in February 2000, the PBMA President initiated an email listserv for PBMA members utilizing a commercial E-Groups process. The goal is to bring the physician community closer together.

Distance Medical Consulting: With the advent of regional Internet access, the Akamai/PIHCP at TAMC has worked closely with the PBMA to develop a web-based Internet process for store and forward medical consultations and medical referrals⁷. The Akamai Project staff, as part of a research activity to test appropriate equipment and technology for computer-based distant communications in health for the islands, contracted the PBMA to distribute and monitor computer equipment, software, digital cameras and copiers, and to test their applicability for regional use. The PBMA in turn gave the equipment to its local affiliates (i.e. *Belau Medical Society*, etc.) to manage locally and coordinated hands on training activities in the principles of Internet use for store and forward medical consultation and equipment use. The Akamai staff generously and quickly incorporated regional physician comments on how to make the website and process more user friendly. Local Micronesian physicians through a standardized and password guarded process would enter a secure web platform on the Internet, submit medical consultations of their patients and include attached digital photos, both still and motion, of patients, x-rays, CAT scans, etc. to the PIHCP physician gatekeeper at TAMC. The physician gatekeeper is the Director of the PIHCP and has traveled, consulted, and taught in Micronesia for a decade. He reviews all consults and directs them to the most appropriate physician(s) for review. Busy TAMC specialist physicians can then enter the Akamai/PIHCP Internet platform at their leisure from their office or home computers and provide timely medical consultation. Digital attachments such as CAT scans and echocardiograms can also be read by a TAMC radiologist. Turn around time on the Akamai/PIHCP website for the medical consult submission to response by the TAMC physician specialist is usually within 24-48 hours. When the completed response has been posted on the website, the Micronesia physician automatically receives an email reminding him/her to check the Akamai/PIHCP website.

In fiscal 1999 Micronesian and American Samoan physicians submitted via the Internet 308 patient consults to TAMC's PIHCP⁸. Almost 69% of these medical consultations came from Palau (82), Chuuk State-FSM (72), and the RMI (59). Overall consults outnumbered referrals about 3 to 1. For Palau, the heaviest user of the Akamai/PIHCP process, 43 patients were referred to TAMC representing a cost saving to the Republic of \$US672,000. So far in FY2000, 907 consults have been generated by physicians from the U.S.-Associated Pacific Islands - 2.9 times the number of 1999 consults. Again Palau, Chuuk State, and Majuro physicians were the heaviest users of this consult/referral process.

In a timely manner, through a low-cost and user friendly process, isolated Micronesian physicians - many of whom are PBMOTP graduates from countries with per capita incomes less than \$US2000/year - are making critical patient inquiries utilizing the Internet and receiving quality specialist physician responses to their questions.

The Western Pacific HealthNet: In 1995 the PBMA established the Western Pacific HealthNet (WPHNet) to encourage and coordinate regional communications in health for distance medical consulting and distance medical learning⁹⁻¹⁰. The WPHNet is a loose federation of users (Pacific Island physicians) and providers (Hawaii, Guam, Fiji) and currently includes over 25 members. Regional providers include TAMC's Akamai/PIHCP, the John A. Burns School of Medicine, the Fiji School of Medicine, the Honolulu Medical Library, the RFK Library on Guam, and medical centers in Hawaii and Guam. Through the Fiji School of Medicine's Telemedicine Department other South Pacific countries have joined WPHNet. The clinically based WPHNet complements and participates in the public health surveillance network - PACNET - established also in 1995 by the Secretariat of the Pacific Community.

Most recently the University of Hawaii's PeaceSat system has implemented a real time video link to Palau which will make face to face medical consulting and learning affordable. Still underutilized this PeaceSat opportunity holds exciting promise for regional physicians.

Continuing Medical Education and Self Learning: One of the PBMA goals is to promote regional and local CME development. Since 1995 the PBMA has sponsored five annual conferences with the view to strengthen the capacity of local medical associations and promote the development of a regional physicians community. Local weekly or monthly CME efforts among the FAS countries are developmental and improving. Select countries have linked verifiable CME certification with physician re-licensure.

Distance Medical Learning: Improving Internet access has encouraged local physicians to utilize various Internet-based medical resources and search engines such as those available through the U.S. National Library of Medicine

(NLM) in Maryland in order to seek up to date medical journal articles. To encourage this the PBMA has developed a pilot project with the RFK Library at the University of Guam - a member of the NLM system - to provide full text medical articles for PBMA members. Members search the NLM Internet site for articles and then can instruct the NLM to download full text articles to the RFK Library on Guam. The RFK Library then emails these articles to the requesting PBMA members in Micronesia.

Underdeveloped is the opportunity for local physicians to participate in interactive distance learning activities provided weekly on the web such as TAMC's Grand Rounds and Tumor Board utilizing NetMeeting and other "whiteboard" platforms. As stated above, the new PeaceSat video link into Palau may become a model for regional distance learning

establish and sustain a new physician workforce among the Freely Associated States countries of the Western Pacific. These initiatives have included innovations in regional medical education, improved regional access to email/Internet technologies, and the regional proliferation of programs, associations, and networks promoting better communications in health.

Dramatic strides have been made to lessen the professional isolation of these new doctors and to bind them into a more cohesive and organized professional community.

Acknowledgments

Thanks to Dr. Donald Person, Director, PIHCP/TAMC, Dr. Scott Norton, Craig Floro, Robert Whitton and the Akamai

use.

Regional nursing programs are ahead of the physicians in providing distance learning opportunities (11). The University of Guam School of Nursing has become a sentinel leader in this area.

Currently the Republic of Palau is exploring with the University of Auckland School of Medicine how to establish a Family Practice Residency Program that will rely on distance learning programs to provide Diploma and Masters Degree courses to physicians in Micronesia. This may also become a model for distance Diploma/Masters Degree opportunities in the area of public health and other health care fields.

2000 and beyond

In 1998 the Institute of Medicine (IOM) published "Pacific Partnerships for Health - Charting a Course for the 21st Century". One of its objectives was to "develop a strategic plan to address the problems and inadequacies, and reinforce the successes, in health services" in the US-API. Its general recommendations included "use of distance-based learning, telemedicine, and electronic data libraries" and the recommendation to "provide postgraduate and continuing medical education programs" for the regional health workforce. To accomplish this the University of Washington School of Medicine has been contracted by the U.S. Government to promote regional CME. In July on Guam major medical and public health educational stakeholders for the region (WHO, JABSOM, Fiji School of Medicine, University of Auckland, Secretariat of the Pacific Community) met with regional health leaders to assist the University of Washington in developing a credible CME master plan to follow-up on the IOM Report recommendations. Clearly this plan must also assist the regional workforce in further developing low cost communications in health.

Three major initiatives have intersected in a complimentary fashion in the last decade of the 20th century to help re-

staff for the regional telemedicine center. The PIHCP, PIHCP, and Akamai Project were/are U.S. programs whose legislation was introduced by U.S. Senator Daniel Inouye of Hawaii. Terence Rogers, former Dean, John A. Medicine, who had the vision for a new Pa-

References

1. Institute of Medicine. *Pacific Partners: Charting a New Course*. J.C. Feasley and Washington, D.C., National Academy Press, 1998.
2. Dever G, Finau SA, Hunton R. The Pacific regional model: introducing the process of *Health Dialog*, 1997; 4(1):177-190.
3. Norton SA, Floro C, Bice SD, Dever G, et al. Micronesia. *Telemedicine Journal*, 1996
4. Allen A, Dever G. Telemedicine in *Poh Today*, 1997;5(1):6-7.
5. Malani J, Dever G. Telemedicine demonstration in the Western Pacific. *Journal of Telemedicine* 1997; 3(Supplement1): 43-46.
6. Yano V. The PBMA and the redevelopment of physician workforce in select U.S. associations - we're back! *Pacific Health Dialog*, 1997
7. Yano V, Finau SA, Dever G, et al. The PBMA in the Pacific: the first steps. *Pacific Health Dialog*, 1997;4(1):82-85.
8. From the Statistics section of the Akamai Project/Island Health Care Program Internet website, 2000.
9. Yano V. Western Pacific HealthNet - the first steps. *Pacific Health Dialog*, 1997; 4(2):163-164.
10. Yano V, Pryor J, Malani J, et al. The Western Pacific HealthNet. *Telemedicine Journal*, 1998; 4(1): 90.
11. Fochtman M, Allen CB, Gurusamy R. Distance education for health workers in Micronesia. *Pacific Health Dialog*, 1997; 4(1):203-206.