

Cancer in the Republic of the Marshall Islands

Abstract: This study, funded by the National Cancer Institute, assessed cancer awareness and service needs in the Republic of the Marshall Islands (RMI). Findings suggest that cancer is the second-leading cause of death in the RMI and is, in part, a consequence of 12 years of nuclear testing in this region of the Pacific. However, cancer-related services are lacking. Assistance is needed to establish a national cancer registry, to increase public awareness about cancer and related risk factors, and to develop and implement a cancer prevention and screening program. **Key Words:** Medically underserved area, needs assessment, oncology services, Pacific Islanders, quality of health care

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chains known as Ralik (sunset) and Ratak (sunrise). The total land area is 70 square miles, and the country's Exclusive Economic Zone covers 750,000 square miles^{1,2}.

The RMI is divided into 24 municipalities, with Majuro, Ebeye, Wotje and Jaluit as major district centers. Majuro and Kwajalein are served by international airlines, and Air Marshall Islands has numerous flights between Majuro, Kwajalein and the outer islands, 23 of which have airstrips. Most outer islands do not have electricity or running water. Marshallese is the official language, although English is widely spoken. The average temperature is 81 degrees Fahrenheit, and average rainfall measures 12-15 inches per month^{1,2}.

Introduction

This paper presents findings from an assessment of cancer awareness and needs in the Republic of the Marshall Islands (RMI) and priorities for cancer infrastructure development in this jurisdiction. This study was funded by the Center to Reduce Cancer Health Disparities of the National Cancer Institute.

History, geography and population of the RMI

The RMI is an island nation located in the central Pacific, between 4° and 19° north latitude and between 160° and 175° east longitude. The country includes 5 coral islands and 29 coral atolls, including Kwajalein, the world's largest atoll. The atolls are themselves a collection of islands, and the RMI's 1,225 islands run in two parallel

Large numbers of European whalers and traders began visiting the Marshall Islands in the early 1800s. The first Protestant missionaries arrived in 1857. The islanders were annexed by Germany in 1885. Japan took control in 1914 and began extensive colonization. The United States (US) took control of the Marshall Islands in 1944 and remained in control until its independence in 1986. Between 1946 and 1958, the US detonated 67 nuclear weapons in the atolls of Bikini and Enewetak, with the total yield during the 12-year testing period of 107,000,000 tons of dynamite (the equivalent of 7,000 Hiroshima bombs). Radioactive material was absorbed from contaminated food and water, and increases in leukemia, breast cancer and thyroid cancer after radiation exposure have been well established, especially in individuals exposed during childhood³. The country won its independence in 1986 and became a member of the United Nations in 1991, however it maintains an association with the US through a Compact of Free Association. The Compact grants the RMI sovereignty in domestic, foreign, and economic affairs in return for granting the U.S. defense rights in the atolls. Kwajalein atoll is leased by the U.S. from the RMI and it has been a U.S. military installation since 1964. Since 1986, Compact payments have exceeded US \$1.0 billion, but loans from the Asian Development Bank also are significant⁴.

The 1999 census count of 50,840 is used by the RMI government as the best estimate of total number of Marshallese citizens residing in the RMI, nearly half of

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whom reside on Majuro atoll. More than 13,000 (26%) Marshallese citizens live in Kwajalein atoll, most of them on Ebeye Island, a 78-acre island. About 13,000 people live on Ebeye in squalid housing with substandard sanitation and inadequate water supply. About 1,300 people from Ebeye work on Kwajalein at the US Army missile range, which supports close to 12,000 military dependents^{1,5}. Although economically better off than most of the islands in the RMI, the Marshallese workers on the army base earn only about one-third of the salary that similarly qualified U.S. workers are paid. Overall, 67% of the RMI population lives in urban areas, an increase from 33% in 1958^{2,5}.

The population of the RMI is relatively young, and 41% of the population is under 15 years of age. The 1999 death rate was 4.9 per 1000 compared to 8.9 in 1988. Life expectancy at birth for both sexes rose to 67.49 years in 1999—up from 61.04 years in 1988^{5,6}.

Health care delivery in the RMI

The Ministry of Health is responsible for healthcare delivery served by two public hospitals, one in Majuro and one in Ebeye, for primary and preventive care. The majority of the physicians, nurses and laboratory staff in the two hospitals are not Marshallese, rather they are expatriate workers. The Majuro Hospital has 86 beds, an emergency room, laboratory and imaging services, a pharmacy, and an outpatient clinic. The Leiroj Kitlang Kabua Memorial Health Center on Ebeye is a federally funded community health center that opened in 1990. It has 40 beds, an emergency room, public health clinics, laboratory and imaging services, and a pharmacy.

The Kwajalein Atoll Health Care Bureau (KAHCB) is one of the five bureaus under the Ministry of Health in the RMI. KAHCB is headed by an assistant secretary and has 4 divisions. It provides health services not only to the residents of Kwajalein Atoll, but also to residents of the nearby atolls of Lae, Ujae, Wotho, Enewetak, and Lib. It employs 11 medical officers, a dental surgeon, 40 nursing staff, and about 25 other employees. The Public Health Department on Majuro employs 16 nurses and 8 health educators, and most participate in all prevention and education activities, ranging from immunization, STD prevention and tuberculosis (TB) prevention to high school education sessions. The Outer Island Health Care Services program sponsors 49 health centers staffed by Pacific Islander medical officers and local support staff. Additional public health services are provided by the Department of Reproductive Health.

Basic health services (including childhood vaccinations, access to antibiotics and Pap smears) are provided at minimal expense to all Marshallese citizens through the two hospitals and 49 health centers. More comprehensive health care services and coverage are available to Marshallese citizens enrolled or eligible for enrollment in the “177 Health Care Program” for radiation-affected people and their descendants from the atolls of Rongelap, Utrik, Bikini and Enewetak. In the absence of a centralized enrollment database, the number of Marshallese enrolled in the 177 Health Care Program is estimated at 8,000 to 14,000 by different sources. A US Department of Energy-sponsored screening and treatment program provides additional benefits and treatment for radiation-related illnesses to a current total of 207 Marshallese citizens considered most directly affected by radiation.

Related to this is the Nuclear Claims Tribunal (NCT), created in 1987 by the RMI government to adjudicate all claim submissions and to administer payments related to radiation-related injury and illness. The 177 clause in the Compact provides funding for the NCT. The first claims were paid in 1991, and a total of 36 explicitly defined malignancies and illnesses are eligible for compensation. Cervical cancer is excluded from the list as it is not considered radiation-related. Marshallese citizens who were alive or in-utero in the RMI in the period 1946-1958 and their first generation offspring are eligible for claim submission if they had onset of disease on or after 1951.

Patients in need of care that is not available in the RMI may be referred for out-of-country care. Each hospital has a Medical Referral Committee staffed by physicians and administrators that meets to discuss each patient being referred for off-island care. To contain costs, the current policy is to refer patients who are expected to have a 5-year survival rate of at least 50%, based on the information available at the time of the meeting (which may be limited due to lack of diagnostic and imaging tools). A total of 364 patients were referred out-of-country during the period March 1999-September 2000, mostly to facilities in Honolulu, Hawai'i and Manila in the Philippines.

When a patient is considered a good “teaching case,” free work-up and treatment may be available at Tripler Army Medical Center in Hawai'i, but this is an exception rather than the rule.

The RMI government's health expenditures in 1999 totaled \$12,612,906 (about \$248.00 per capita), which represents approximately 20% of the total government budget. That year, almost 25% of the health budget was spent on overseas medical care. To contain the rising

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costs of referrals, the government is considering stiffening the referral criteria.

Methods

The cancer needs assessment was conducted in the RMI in spring 2003 by residents and faculty affiliated with the Department of Family Practice and Community Medicine at the John A. Burn School of Medicine, University of Hawai'i.

The Office of the National Health Planner in the Ministry of Health (MOH) collects data on morbidity and mortality in the RMI, including cancer-related data. Mortality data are managed in an Epi-Info 6.0 database, and a summary of the data from the National Health Planner was obtained in hard copy format. There was consensus among key informants that death registration nears 100% in the RMI, with an occasional delay in reporting of up to several months for a death in the outer islands. Due to limited access to diagnostic tests and pathologists, most often the cause of death is not confirmed.

An extensive admission and discharge database (in Microsoft Excel) is available at Majuro Hospital, the major referral center within the RMI. Coding of disease in the database however, is inconsistent, and the data need cleaning and verification before any meaningful analysis can take place. The National Health Planner from the Ministry of Health (MOH) and Medical Records Supervisor from Majuro Hospital are trying to clean the data for analysis and trying to improve the quality of current and future data entry.

In the RMI, data related to cancer are not kept in a centralized cancer registry, but are documented in four unrelated datasets: official death certificates, the Majuro Hospital admissions and discharge database, the Nuclear Claims Tribunal (NCT) database, and the out-of-country referral logbook. Lack of reliable and accessible hospital admission data poses a limitation on estimating the number of people living with cancer in the RMI. As data from all four sources were provided in an anonymous format without a common identifier, the data could not be compiled into a single database of unduplicated cancer cases. In this report, data are presented on cancer cases tracked through the NCT, the out-of-country referral program, and death certificate diagnoses, rather than from the Majuro Hospital admission and discharge database, based on the assumption that the hospital database would include duplicate cases. NCT Personal Injury Awards Data were obtained as a hard copy report dated August 2000 and from a 1998 journal article by Palafox on site-

specific cancer incidence in the RMI³. Out-of-country referral data were provided in hard copy format by the Chief of Staff of Majuro Hospital.

Information on the description of services and perceived needs was obtained through key informant interviews with selected individuals and through a feedback session with Majuro Hospital physicians and public health staff. Needs were identified by these key informants as well, and these were organized in four categories: data; training; equipment and supplies; and services and programs. From these needs, a list of recommendations was developed by the authors. Needs were prioritized and preliminary planning was done by the Pacific Islander delegates of the Pacific Cancer Council in the Republic of the Marshall Islands in August 2003. These plans were further refined, and a strategic action plan was developed in November 2003 at a meeting in Pohnpei, FSM.

Findings: mortality and morbidity

Leading causes of death, 1998-2002

Based on death records, there were 213 deaths in the RMI in 2002. Cancer was the second-leading cause of death that year, after sepsis (Table 1). Of the 213 deaths reported in 2002, 68% occurred on Majuro, 19% on Kwajalein, and 13% on outer islands.

The top 5 causes of death for the five-year period 1996-2000 are shown in Table 2. The leading causes of death were diabetes and heart disease, followed by cancer, neonatal conditions, and accidents. Altogether, 624 individuals died from these 5 causes between 1996 and 2000. By gender, cancer was the second-leading cause

Table 1. Five leading causes of death in the RMI, 2002

Cause of death	N	(%)
Total deaths	213	(100%)
Sepsis	31	(14.6%)
Cancer	13	(6.1%)
Congestive heart failure	11	(5.2%)
Pneumonia	10	(4.7%)
Respiratory failure	10	(4.7%)

Source: Office of National Health Planner, RMI.

Table 2. Five leading causes of death in the RMI, by gender, 1996-2000

Cause of death	Male N (%)	Female N (%)	Total N (%)
Total deaths	364 (100)	260 (100)	624 (100)
Diabetes complications	104 (29)	84 (32)	188 (30)
Heart Disease	100 (27)	41 (16)	141 (22)
Cancers	57 (16)	72 (28)	129 (21)
Neonatal complications	52 (14)	51 (20)	103 (17)
Injuries, violence	51 (14)	12 (5)	63 (10)

Source: Office of National Health Planner, RMI.

Table 3. Cancer as primary or secondary cause of death, 2000-2002

Cancer site	Male	Female	Total	Percent
Lung	10	5	15	23.1
Cervix	-	11	11	16.9
Liver	5	2	7	10.8
Naso/oropharynx	5	0	5	7.7
Unknown primary	0	4	4	6.2
Breast	-	4	4	6.2
Uterine	-	3	3	4.6
Pancreas	2	0	2	3.1
Prostate	2	-	2	3.1
Gastric	1	1	2	3.1
Thyroid	0	2	2	3.1
Leukemia	1	0	1	1.5
Mediastinal	0	1	1	1.5
Urinary tract	0	1	1	1.5
Lymphoma	0	1	1	1.5
Bone	0	1	1	1.5
Colorectal	1	0	1	1.5
Kidney	1	0	1	1.5
Skin	1	0	1	1.5
Total	29	36	65	100.0

Source: Office of National Health Planner, RMI

of death in females, after diabetes. For males, cancer was the third-leading cause of death, following diabetes and heart diseases.

Cancer deaths, 2000-2002

To identify types of cancers that lead to death in the RMI, we examined death certificate data for the years 2000-2002. During this three-year period, 65 deaths were attributed to cancer, or an annual average of 21 cancer deaths. The leading causes of cancer death were lung cancer (23%), cervical cancer (17%), liver cancer (11%), cancer of the naso/oropharynx (8%), and breast cancer (6%) (Table 3).

The Ebye Health Center collected data on 13 cases of cancer in 2003, including 4 cases of cervical cancer, 3 cases of breast cancer, and 1 case each of lung, kidney, nasopharynx, soft palate, and thyroid cancer.

Cancer cases

Out-of-Country Referrals. Data on cases transferred to Honolulu and Manila hospitals for medical care were available for the 19-month period March 1999-September 2000. Out of 364 referrals, 62 (17%) were patients with cancer, suggesting an average of 39 out-of-country

Table 4. Out-of-country cancer referrals, March 1999-September 2000

	N (%)
Cancer cases referred for treatment (Total)	62 (100.0)
Cervical cancers	22 (35.5)
Lung cancer	8 (12.9)
Ovarian cancer	6 (9.7)
Thyroid cancer	6 (9.7)
Breast cancer	5 (8.1)
Prostate cancer	2 (3.2)
Urinary bladder cancer	2 (3.2)
Skin cancers	2 (3.2)
Laryngeal tumor	1 (1.6)
Retropharyngeal cancer	1 (1.6)
Oral cancer	1 (1.6)
Pituitary cancer	1 (1.6)
Brain tumor	1 (1.6)
Esophageal cancer	1 (1.6)
Chemo/radiation for unknown malignancy	3 (4.8)
Potential cancers referred for diagnosis	22 (100.0)
Epigastric mass	7 (31.8)
Pleural effusion	4 (18.1)
Hematuria and urinary frequency	3 (13.6)
Pelvic mass	2 (9.0)
Breast mass	2 (9.0)
Orbital mass	1 (4.5)
Bitemporal hemianopia	1 (4.5)
Neck mass	1 (4.5)
Lumbar region mass	1 (4.5)

Source: Majuro Hospital

referrals per year for proven malignancies. Cancers most often referred for out-of-country care were cervical cancers (36%), lung cancers (13%), ovarian cancers (10%), thyroid cancers (10%), and breast cancers (8%). Another 22 (6%) cases were referred for work up of potential cancers (Table 4).

Nuclear Claims Tribunal. By December 1996, a total of 470 individuals who had died with a diagnosis of cancer had been reported to the NCT. Complete information on site, age at diagnosis, and year of diagnosis was available on 411 (87%) of these cases. A total of 165 cases were counted with documentation supporting cancer that occurred in the 10 years period 1985-1994, averaging 17 cases per year. Common cancer sites in men were lung, liver, mouth, and prostate. Common cancer sites in women were cervix, breast, lung, and urinary tract.

The most recent NCT data available at the time of our site visit covered the 10 years period 1991 through 2000. During this time, the NCT had established 704 proven malignancies that occurred during this time. The most common cancers for which personal injury awards were granted by the NCT were lung cancer, thyroid cancer, breast cancer, lymphoma, ovarian cancer, and leukemia.

When interpreting the NCT data one needs to consider that not all Marshallese citizens are eligible for compensation, that cervical cancer is not one of the malignancies eligible for compensation, that not all cases of cancer may be reported to the NCT, that record keeping is underdeveloped, and that the population of the RMI grew explosively over the last few decades to the current number of 50,840. This suggests that the actual number of cancer cases is much higher than what is currently presented.

Findings: cancer-related services

Administration, planning and data

The RMI government has developed a *15-Year Strategic Plan 2001-2015* that includes health care planning. Despite the fact that cancer is a leading cause of death

in the RMI, it is not identified as a priority in the plan. The main health concern in the RMI according to key informants and RMI documents is diabetes mellitus. The reduction of cervical and breast cancer incidence, however, is specifically mentioned in two sections of the strategic plan. Other sections of the strategic plan include cancer prevention as by-products of increasing health education in schools, creating new health education materials, and reducing access to alcohol and tobacco. According to key informants, the most commonly recognized risk factors for cancer in the RMI are radiation, malnutrition (particular Vitamin A deficiency), smoking, alcohol use, high rates of sexually transmitted disease (STD), and a historically high prevalence of Hepatitis B infection.

The *15-Year Strategic Plan 2001-2015* was developed with the aid of a consultant from the Asian Development Bank. However, the RMI government currently has no access to an epidemiologist or biostatistician who can help track their progress against the plan. There is no evidence of additional funding, development of infrastructure, or specific training programs for health and medical personnel related to cancer prevention, education, diagnosis, treatment or management.

Health data are collected and interpreted by the office of the National Health Planner (MOH) and this office is staffed by six full-time employees—the National Health

Table 5. Cancer related personal injury awards Aug 1991-Aug 2000

Malignancy	N	(%)
Total cancers	704	(100.0)
Lung cancer	166	(23.6)
Thyroid cancers	119	(16.9)
Breast cancers	76	(10.8)
Lymphoma	50	(7.1)
Ovarian cancer	49	(6.9)
Leukemia	44	(6.3)
Stomach cancer	31	(4.4)
Liver cancer	30	(4.3)
Colon cancer	20	(2.8)
Pharyngeal cancers	20	(2.8)
Pancreatic cancer	19	(2.7)
Meningioma	13	(1.8)
Rectal cancer	12	(1.7)
Brain cancer	11	(1.6)
Kidney cancer	9	(1.3)
Urinary tract cancer	7	(<1)
Esophageal cancer	6	(<1)
Cancer of the small intestine	6	(<1)
Salivary gland malignancy	5	(<1)
Multiple myeloma	4	(<1)
Bone cancer	3	(<1)
Bile duct cancer	3	(<1)
Non-melanoma skin cancer	1	(<1)

Source: Nuclear Claims Tribunal, RMI

Planner, the Director for Vital Statistics, a computer programmer, a network administrator, and two technicians. At this time, cancer-related data are systematically collected from death certificates. A retrospective medical record review is performed if questions arise in interpreting the death certificate. Data are entered and managed using Epi-Info 6.0, a public-domain program produced by the Centers for Disease Control and Prevention (CDC). Although the National Health Planner would prefer to work with a more sophisticated database and analysis software, SAS software and training is too expensive at this time.

Information on cancer morbidity and cure is not routinely collected at this time, but admission and discharge data, including outpatient clinic data, are being collected at Majuro Hospital. A major challenge to gathering and interpreting data on cancer is the lack of diagnostic tools and personnel.

As a result, data about cancer (or suspected cancers) may be incomplete, making it difficult to classify a diagnosis. Key informants noted that more training in ICD coding also was needed.

As mentioned previously, the most extensive and complete cancer data source at this time may be the archives of the NCT, as the incentive to report cancer cases to the NCT is high for both living cancer patients and relatives of deceased patients. Marshallese citizens diagnosed outside the RMI are likely to file claims as well, whereas RMI hospital and death-record data usually are limited to residents. Disadvantages, however, are the exclusion of specific but frequently occurring cancers on the NCT awards list, such as cervical cancer, and, the absence of complete documentation on file for cases for which sufficient proof could not be submitted. Failure to submit such proof will often be secondary to limited access to diagnostic tests rather than to the absence of cancer.

Public health services

Cancer awareness, outreach and prevention activities are limited to breast and cervical cancer, and tobacco use.

Breast and Cervical Cancer Screening. The reproductive health nurses provide STD education and Pap smears in

the prenatal clinics and on regularly scheduled outer-islands trips (all inhabited islands are visited 2 to 4 times per year). On outer island trips, the health care team also promotes breast self exam and thyroid examination. It was estimated that in 1999 only 8% of all eligible women received Pap smears. Acceptability is increasing according to the reproductive health nurses, so that on recent trips, staff has run out of supplies. For women with abnormal Pap smears, follow-up with colposcopy and biopsy is provided. But not all abnormal results are tracked properly, and follow-up of outer island patients is sometimes an issue.

Cancer-related health care maintenance activities, such as breast exams, mammograms and fecal occult blood testing, are not routinely performed and mostly are limited to patients attending clinics with specific complaints. Thyroid exam is the most frequently performed screening exam, as RMI physicians have a high level of awareness about thyroid cancer, due to its increased incidence in the RMI because of radiation exposure from atomic testing.

Other public health efforts that impact cancer prevention include: 1) education on good nutrition and physical activity as part of diabetes mellitus prevention efforts; 2) STD prevention/education as part of the high school curriculum in at least 15% of schools; and 3) participation by public health nurses in health fairs and community events where diabetes and hypertension checks are performed and alcohol/smoking/STD education is provided. Most key informants felt that the Marshallese population is best reached through community meetings and events. They felt that televised messages also would be effective, but the government budget does not allow for televised infomercials.

Tobacco prevention. Tobacco prevention efforts are the responsibility of the public health nurses and health educators. Services focus on presentations in schools, at health fairs and community events, and on running ads in local papers and on the radio. Part of the government's *Strategic Plan 2001-2015* is a yearly check of stores selling tobacco to minors. Data from 1999 showed only 3% of stores were compliant with laws prohibiting these sales.

Medical services

Medical services related to the prevention, diagnosis, and treatment of cancer are provided by the two hospitals in the RMI, with Majuro Hospital being the main referral center. Cancer services available on the outer islands and atolls are minimal, and patients are transported by plane to Majuro for diagnosis and treatment. Services are provided by internists, surgeons, gynecologists, an urologist and an orthopedic surgeon.

None of the physicians have received specialized training in the diagnosis, treatment, or management of cancer. Cancer-specific consultations are not available in the RMI, but physicians may consult with specialists at the Tripler Army Medical Center (TAMC) through telemedicine facilities. Cancer clinical trials are not available in the RMI.

Diagnostics services that can be provided in the RMI include Pap smears, mammograms, fine-needle aspiration biopsies, tissue biopsies, colposcopy, upper endoscopy, and colonoscopy. There is no radiologist in the country, however, so mammograms must be sent off-island for interpretation. Also, at the time of the survey, the only mammogram machine on Majuro was out of order. There is no capacity to initiate chemotherapy or radiotherapy, but maintenance chemotherapy has been provided to patients in the past. Palliative care in the form of oxygen and narcotic analgesics is available in the two major hospitals, but morphine is not available on the outer islands due to a concern about potential abuse.

Laboratory and radiology services

The laboratory in Majuro Hospital is able to run an extensive panel of blood tests, some of which relate to cancer diagnosis and surveillance, including thyroid function tests, hormonal assays involved in pituitary or gonadal cancers, CA125 (for ovarian cancer), hepatitis B serology, prostate-specific antigen (PSA), and AFP (an indicator for risk of liver cancer). Ebeye Hospital Laboratory has an expatriated technician and two locally trained lab assistants. This lab can do only the most basic procedures, and most of the time, reagents and supplies are out of stock. Specimens that need to be sent out of the country include hepatitis C serology, CEA (for colon cancer), and all cytology and pathology specimens, including Pap smears, as there is no access to a pathologist within the RMI. The logistics of shipping the sample and tracking the results need streamlining, per multiple key informants. The biggest problem for the laboratory is interruption in the availability of reagents due to financial constraints and shipping issues.

Until recently, Pap smear materials and reading of smears were paid for by a CDC cervical cancer grant. Unfortunately, funding has ended, and cost containment poses a major barrier to obtaining readings for cytology and pathology samples at this time. Radiological studies are limited to x-rays and mammograms. There are no fluoroscopic unit, CT scanner or MRI scanner. In the absence of a radiologist, x-rays are read by the ordering physician, and mammograms are sent to a radiologist in Guam for interpretation.

Non-Governmental Organizations

The U.S. Peace Corps and its Australian and Japanese

Table 6. Action plan for the RMI's three cancer-related priority areas

Objectives	Activities
1. Establish national cancer registry	a) Secure equipment and software b) Hire .20 FTE staff to coordinate c) Train staff in maintaining registry (system & software)
2. Develop & implement a cancer prevention & screening program	a) Training of clinical staff b) Purchase supplies (Pap smear kits, slides, etc.)
3. Increase public awareness about cancer and related risk factors	Develop and produce public education materials

equivalents have volunteers stationed in the RMI, but they do not provide services related to cancer prevention and control.

Findings: cancer-related needs

Data needs

RMI data staff requested assistance in developing and maintaining a cancer registry. They also wanted training in epidemiology, biostatistics, and SAS software so that they could better analyze cancer data and write reports. Training in ICD-10 (International Classification of Diseases, 10th revision) coding was recommended for data staff, medical records personnel, and physicians.

Personnel and training needs

Personnel. Physicians and laboratory staff wanted better access to pathologists and radiologists to improve diagnostic services. Public health staff wanted additional personnel to coordinate cancer services, to conduct outreach and awareness, and to maintain a cancer registry.

Training. Physicians requested training in screening for breast, cervical, colon, thyroid and prostate cancers; in initiating and maintaining chemotherapy; and in palliative care and pain management. Public health staff requested training in cancer risk, cancer prevention, and Pap smear techniques. They also wanted training in management and communication to improve their skills at persuading women to get Pap smears and to follow-up on abnormal findings. Laboratory staff wanted training in routine and new tests useful in diagnosing cancer. Pharmacy staff wanted training in chemotherapy.

Needed equipment and supplies

Physicians saw a need for a CT scanner that could help them establish a cancer diagnosis and stage patients

locally. This could save money by preventing some of the out-of-country referrals by accurately diagnosing those patients with widely metastatic disease who are not candidates for out-of-country referral. They wanted endoscopy equipment, in particular a colonoscope and a bronchoscope, and requested a steady supply of materials and supplies needed to perform diagnostic tests. Computers with internet access to digital libraries and journal searches also are needed.

Public health personnel requested videos, posters, handouts, and other educational materials, along with a continuous inventory of supplies for performing Pap smears and fecal occult blood tests. Laboratory staff wanted access to funds to pay for pathology services locally or off-island. The pharmacy wanted modifications to its facility so it could prepare chemotherapy. Laboratory staff wanted a continuous supply of routine and new reagents so it could perform diagnostic tests at all times and, potentially, expand laboratory services to include newer tests. Facility improvements might be needed to increase the lab's capacity to store specimens.

Needed program and services

Given that cancer is a leading cause of death in the RMI, there is a need to develop a comprehensive and coordinated system of services to raise awareness about, prevent, detect, and treat cancer. As part of this system of services, there is a need for a national cancer coordinator who will be responsible for assuring that cancer-related services are comprehensive, coordinated, and effective.

Recommendations by the assessment team

Based on the findings of this report, the assessment team offered four recommendations for improving cancer-related services in the RMI.

- *Recommendation 1.* Provide education and awareness

to the RMI government and population about the prevalence of cancer.

- *Recommendation 2.* Provide education and awareness to the population on cancer risk, cancer prevention, and the benefits of early detection and treatment.
- *Recommendation 3.* Develop and implement an early detection screening program for all cancers in the context of improving health care maintenance, especially for cancers with high cure and survival rates.
- *Recommendation 4.* Improve capability of providing diagnostic and treatment services for cancer, both through training and expanded infrastructure.

Prioritizing and setting objectives

Needs were prioritized and preliminary planning was done by the Pacific Islander delegates of the Cancer Council of the Pacific Islands in the Republic of the Marshall Islands in August 2003. These plans were further refined, and a strategic action plan was developed in November 2003 at a meeting in Pohnpei, FSM. This group designated three priority areas:

- *Priority 1:* Establish a national cancer registry.
- *Priority 2:* Develop and implement a cancer prevention and screening program.
- *Priority 3:* Increase public awareness about cancer and related risk factors.

The group also developed specific objectives for each priority area. A summary of a one-year action plan for the RMI, which was shared with the National Cancer Institute, is shown in Table 6.

Conclusions

Cancer is a leading cause of death in the RMI. Assistance is needed to strengthen and expand existing cancer-related services. Key informants recommended establish-

ing a national cancer registry; developing and implementing a cancer prevention and screening program; and increasing public awareness about cancer and related risk factors.

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O le vaivai o le fe'e.

The seeming weakness of the octopus.

Used when referring to a small but influential village or family.

Samoan proverb