

Cancer in Chuuk State, Federated States of Micronesia

Abstract: The purpose of this study, funded by the National Cancer Institute, was to document the state of cancer awareness and services in Chuuk State, Federated States of Micronesia (FSM) and to begin to identify the need for cancer-care services. Findings suggest that cancer is the third-leading cause of death in Chuuk, yet cancer-related awareness, prevention, detection, and treatment services are limited. A number of needs were identified, and an action plan was developed based on five priority areas: 1) establishing a cancer registry; 2) improving ICD coding skills and knowledge; 3) increasing public awareness about cancer; 4) establishing an office dedicated to cancer; and 5) increasing screening of high-risk individuals. **Key Words:** Medically underserved area, cancer needs assessment, oncology services, Pacific Islanders, Micronesia, quality of health care, health services research.

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Introduction

This paper presents findings from an assessment of cancer awareness and needs in Chuuk State, Federated States of Micronesia (FSM) and priorities for cancer infrastructure development in this jurisdiction. Funded by the Center to Reduce Cancer Health Disparities of the National Cancer Institute in the United States, this work represents one of the first efforts to conduct a comprehensive assessment and to identify and prioritize cancer infrastructure needs in this jurisdiction.

Geography, history, and population of Chuuk State

Chuuk is one of four geographically separate states that comprise the FSM. The FSM includes approximately 607 islands in the Western Pacific, which are grouped into four states that lie between 1°S and 14°N latitude and between 135°E and 166°E longitude —Yap, Chuuk, Kosrae, and Pohnpei. The nation's islands vary from large, high mountainous islands of volcanic origin to small coral

atolls. Although the islands are situated across a large expanse of ocean, the FSM has a combined total land area of only 271 square miles.

Chuuk experienced four major periods of foreign contact: 1) Spanish exploration (16th- 19th centuries); 2) whaling by England, Germany, Russia, Japan and the United States (U.S.) between 1830 to 1860, when island men were kidnapped and sold as slaves; 3) Spanish and German settlements in Chuuk, beginning in 1860 when Spain exercised political control and Germany pursued economic interests in the copra trade; and 4) the introduction of Christianity in 1879 with the arrival of missionaries. Spanish control ended in 1898, when Spain sold its Micronesian holdings to Germany for \$4.5 million. Japanese occupation and control in Chuuk replaced the Germans in 1914, resulting in a de-facto population of 40,000 Japanese military in Chuuk, then called Truk. Thirty years later, in 1944, the Japanese were ousted after the surprise U.S. invasion, and Chuuk became a Trust Territory of the United States in 1946, following World War II. In 1979, Chuuk, Kosrae, Yap and Pohnpei ratified a constitution that established the Federated States of Micronesia (FSM). A 15-year Compact of Free Association was established between the U.S. and FSM, designating the responsibility of domestic and foreign affairs to FSM and the responsibility of defense and security against foreign invaders to the U.S. One condition of the Compact is that FSM will never grant military access to any nation other than the U.S. and, in return, the U.S. will provide economic and technical assistance.

The total resident population of the FSM is 107,008, of which 50.1% (53,595) live on Chuuk, the most populous state¹. Chuuk has the youngest population of all the FSM states, with a median age of 18.5 years. By age groups, there are 28,780 (53.7%) children and adolescents 19 years of age and under; 8,834 (16.5%) young adults between 20-29 years of age; 5,996 (11.2%) people between 30-39 years; 4,798 (9.0%) between 40-49 years; 2,410 (4.5%) between 50-59 years; 1,552 (2.9%) between 60-69; and 1,225 (2.3%) people 70 years and older. The 2000 Preliminary Census enumerated 27,158 (50.7%) males and 26,437 (49.3%) females. Males outnumber

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females for each age group up until the 35-39 year age group when the ratio reverses and females outnumber males in each of the older age groups¹.

The State of Chuuk consists of 15 high volcanic islands in the Chuuk Lagoon and 14 outlying atolls and low islands. These outlying atolls contain approximately 290 islands, but only 24 inhabited. There are three geographic aspects to Chuuk: the administrative center of the state, which is on the island of Weno (formerly Moen) within Chuuk Lagoon; the other 14 islands of the Chuuk Lagoon; and the islands of the outlying atolls, including the Mortlock Islands, the Hall Islands, and the Western Islands. Chuuk Lagoon has a total land area of 39 square miles, and the lagoon itself has a total surface area of 822 square miles and is surrounded by 140 miles of coral reef, making it the second largest atoll in the world^{2,3}. Of Chuuk's total population, 78% reside on one of the 15 lagoon islands and, of these, 32% reside on Weno Island, the administrative center. The remaining 22% of the population lives on the Mortlock Islands (12%), the Hall Islands or Western Islands (10%).

Because of the vast expanse of water between islands, travel within the State of Chuuk is challenging. Within the lagoon, travel by motorboat from Weno to any of the other islands will take from 5 minutes to 45 minutes. Access to the outer islands is by cargo ship, and it may take up to twenty hours to sail to some of the more remote islands that comprise Chuuk State. Distance between islands and transportation limitations restrict the ability to provide equitable health care resources and result in reduced access to care for many Chuuk residents.

Health care delivery in Chuuk State

The Chuuk Department of Health (DOH) operates the Chuuk State Hospital on Weno and community health dispensaries (78 in all) on all the islands except Weno. The Chuuk State Hospital has inpatient units, an operating room, a surgical ward, labor and delivery, a maternity ward, a pediatrics service, physiotherapy, a laboratory, radiology, and an outpatient department. The Chuuk State Hospital employs 21 physicians and 109 nurses. Of the nurses, 52 are registered nurses (including four certified nurse midwives and three nurse anesthetists) and 57 are practical nurses. The laboratory has a total of 12 personnel of which ten are assigned to the Chuuk State Hospital and two are assigned to the Public Health Department.

The Chuuk DOH is responsible for providing public health services in remote areas of the state. Healthcare services include treatment of common diseases like diarrhea, viral flu, musculoskeletal problems, headaches, etc. Dispensaries are staffed by health assistants who consult with physicians at Chuuk State Hospital using single, sideband radios. When necessary, patients are transported by boats or small prop planes, depending on the location, as there are only three small airstrips. Twenty-one of the outer-island dispensaries are staffed by two Health Assistants each, and three dispensaries have only one Health Assistant. Two of the larger dispensaries also are staffed by nurses. In the lagoon, more dispensaries are available depending on the population size. Healthcare is also provided by local healers and midwives who are either certified by hospital nurse midwives or trained traditionally. Health services are largely government subsidized, and co-payments by patients are based on their ability to pay.

Chuuk State does not [yet] have a cancer registry ... Thus, data related to cancer cases were collated from three unrelated data sources: death certificates; the computerized admission-and-discharge data system at the Chuuk State Hospital; and documentation from the off-island referral program.

The DOH Division of Public Health has a total of 40 employees, of which nine are in administration, twelve are with the Maternal and Child Health Program, nine are with the Immunization Program, four are with the Family Planning Program, three are with the Tuberculosis and Leprosy Program, four are with the HIV/AIDS Program, and one is with the Non-Communicable Diseases Program.

Cases that cannot be treated in Chuuk State may be referred to the Medical Referral Committee (MRC), which reviews and approves physicians' requests to transfer patients to facilities outside of Chuuk for medical treatment. The MRC is composed of the Chief of Staff (MRC Chairperson) and staff physicians. MRC referral costs were previously subsidized by the government, but reductions of Compact funds have ended this practice. MRC approval is needed for insured patients who seek off-island health care. No log is kept of referral requests that are denied, but key informants reported that the MRC typically denies cases in which costs of treatment will be high and treatment benefit will be low, such as liver failure, end-stage renal disease, and cirrhosis of the liver. There are two or three out-of-country referrals quarterly (every 3 months). Patients approved for off-island care are usually sent to Tripler Army Medical Center in Hawai'i, Guam, and the Philippines. Tripler Medical Army Center (TMAC) has the Pacific Medical Referral program that accepts and covers the costs of patients that meet its criteria.

Method

The cancer needs assessment was conducted in Chuuk in January 2003 by staff from Papa Ola Lōkahi and the Department of Family Practice and Community Medicine, John A. Burn School of Medicine, University of Hawai'i.

Data on morbidity and mortality in the State of Chuuk is collected and compiled by the Office of Health Statistics within the Chuuk State Department of Health. This office publishes the top 10 leading causes of deaths. For this report, we aggregated data from reports from 1995 through 2001. Death certificate data for the three years of 2000-2002 were examined for accuracy and reliability, and a total of 51 cancer deaths were recorded during this time. Because Chuuk does not have a pathologist and because diagnostic resources are limited, cause of death is not always confirmed. In fact, for patients that die on outer islands, physicians must use their clinical judgment to determine cause of death based on available clinical documentation of signs and symptoms.

Chuuk State does not have a cancer registry, but is currently planning to establish one with support from the National Cancer Institute. Thus, data related to cancer cases were collated from three unrelated data sources: death certificates; the computerized admission-and-discharge data system at the Chuuk State Hospital; and documentation from the off-island referral program. Off-island referral information is documented in two manual logbooks, one logbook for all off-island medical referrals and another for follow-up of all referred and accepted cancer cases sent to Tripler Army Medical Center in Hawai'i. The most complete data available were obtained from the follow-up logbook for the year 2001. There were very few cases recorded in 2000, and the 2002 data had not been confirmed at the time of the site visit. There are a total of 44 cases documented in the referral follow-up logbook for the year 2001.

The Chuuk State Hospital admissions-and-discharge data system includes discharge summaries for hospitalized patients, and data on cancer cases were provided by the State Health statistician. However several key informants cautioned that not all cases were included in the database because not all medical records are returned to the medical records office for coding. Based on available data, however, we secured a listing of 43 patients with ICD-10 (International Classification of Diseases, 10th revision) codes related to cancer for the years 2000-2002. For this report, cancer cases identified through the three data sources were compiled and the duplicates removed.

Information about the health care system and cancer-related services in Chuuk was obtained through key

informant interviews with 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 in August 2003 by the Pacific Islander delegates of the Cancer Council of the Pacific Islands, a newly formed council focused on cancer prevention and control in the U.S.- associated Pacific. These plans were further refined, and a strategic action plan was developed in November 2003 in Pohnpei, FSM.

Findings: morbidity and mortality

Leading causes of death, 1995-2001

During 1995-2001, there were a total of 1,441 deaths in Chuuk with an average overall mortality rate of 384.1/100,000 population. During this period, the leading cause of death was heart disease, accounting for 12.3% of deaths, followed by diabetes mellitus (10.5%), and cancer (7.7%). Almost 70% of deaths occurred in males. Leading causes of death among men were heart disease (20.1%), diabetes (12%), hypertension (11.3%), and cancer (10%). Among women, the leading cause of death was diabetes (22.4%), followed by cancer (13.6%), and heart disease (12.3%).

Table 1. Leading causes of death in Chuuk State, 1995-2001

Cause of death	N	(%)
Heart disease	177	(12.3)
Diabetes mellitus	152	(10.5)
Cancer	111	(7.7)
Hypertension	100	(6.9)
Influenza/pneumonia	82	(5.7)
Asthma/chronic obstructive pulmonary disease	72	(5.0)
Prematurity/perinatal deaths	32	(2.2)
Accidents	54	(3.7)
Stroke	49	(3.4)
Malnutrition	42	(2.9)
All other deaths	570	(39.6)
Total deaths	1,441	(100.0)

Source: Office of Health Statistics, Department of Health, State of Chuuk, FSM

Causes of cancer death, 2000-2002

Of the 51 cancer deaths for years 2000 - 2002, the leading cause of death was due to lung cancer (27.5%), followed by cervical cancer (7.8%), stomach cancer (7.8%) and uterine cancer (7.8%). There were 33 male cancer deaths, with 36.7% attributed to lung cancer, 12.1% to prostate cancer, and 12.1% to stomach cancer (not shown in the table). Of the 18 female cancer deaths, 22.2% were from cervical cancer, 22.2% to uterine cancer, and 16.7% to breast cancer. No cases of colon cancer were

observed during this time period.

Table 2. Percent of cancer deaths, State of Chuuk, 2000-2002

Cancer death from	N	(%)
Lung	14	(27.5)
Cervical	4	(7.8)
Stomach	4	(7.8)
Uterus	4	(7.8)
Prostate	4	(7.8)
Head/neck	3	(5.9)
CNS	3	(5.9)
Breast	3	(5.9)
Bone	2	(3.9)
Naso/oropharynx	2	(3.9)
Other	6	(11.8)
Unknown	2	(3.9)
Total deaths	51	(100.0)

Source: Office of Health Statistics,
Department of Health, State of Chuuk, FSM

Cancer cases, 2000-2002

In all, 113 unduplicated cases of cancer were identified for the three-year time period, 2000-2002. The most common type of cancer was lung cancer (15%), followed by thyroid cancer (8%), cancer of the central nervous system (8%), cervical cancer (7.1%), head and neck cancers (7.1%), uterine/endometrial cancer (6.2%), and breast can-

Table 3. Cancer cases by type of cancer, Chuuk, 2000-2002

Cancer cases	N	(%)
Lung	17	(15.0)
Thyroid	9	(8.0)
Central nervous system	9	(8.0)
Cervical	8	(7.1)
Head and neck	8	(7.1)
Uterine/endometrial	7	(6.2)
Breast	7	(6.2)
Liver	6	(5.3)
Ovary	6	(5.3)
Prostate	6	(5.3)
Gastric	5	(4.4)
Soft tissue sarcoma	5	(4.4)
Lymphoma	3	(2.6)
Leukemia	3	(2.6)
Kidney	3	(2.6)
Unspecified	3	(2.6)
Pancreas	2	(1.8)
Retinoblastoma	2	(1.8)
Skin	1	(<1)
Testicular	1	(<1)
Bladder	1	(<1)
Gallbladder	1	(<1)
Total cancer cases	113	(100.0)

Source: Office of Health Statistics,
Department of Health, State of Chuuk, FSM

cer (6.2%). Among the 17 cases of lung cancer, 15 were in males, and eight cases were in individuals 59 years of age or younger. Of the nine thyroid cancer cases, six were female and three were male. Of the six total liver cancers, five cases were male and one case was female. All five of the gastric cancer cases were male.

During 2002, a total of 15 cancer patients were referred to and treated at Tripler Army Medical Center in Hawai'i. Of these, eight patients were treated for thyroid cancer, three for cervical cancer, two for breast cancer, and two for uterine myoma. The number of cancer cases that were referred but not accepted for off-island care was not documented.

Findings: cancer-related services

Administration, planning, and data

The most recent Chuuk State Health Plan was developed for the years 1995-2000. Although cancer is the third-leading cause of death, it has not been identified as a priority in the state health agenda. There is no evidence of additional funding for education, prevention, screening, or treatment programs related to cancer.

The DOH Office of Health Statistics is headed by the Health Statistician, and staff includes three data technicians and seven data clerks. This office is responsible for maintaining data related to the death certificates, hospital admissions and discharges, and outpatient care. The Health Statistician noted that the quality of cancer-related data suffers due to inconsistency among physicians in the diagnosis and staging of cancers in medical records and death certificates. Without specific diagnoses, the data technicians have a difficult time assigning ICD-10 codes.

Public health services

There are very limited personnel in Chuuk devoted to activities related specifically for cancer education, prevention, or clinical services. Cancer awareness, outreach, and prevention services are provided by other DOH staff and are primarily focused on breast cancer, cervical cancer, and tobacco prevention.

Breast and Cervical Cancer Screening. Maternal and Child Health and the Family Planning Programs' staff provide breast and cervical cancer awareness, education, outreach, and prevention services on a limited basis. Pap smears are performed in the antenatal, postpartum, family planning, and gynecology clinics. It is estimated that approximately 500 Pap smears are done each year, reaching less than 5% of the 12,400 women over 20 years of age who are eligible for such screening. For women with abnormal Pap smear tests, follow-up services with colposcopy or

cervical biopsies are provided. During 2001, approximately 25 cervical biopsies were performed; tissue was analyzed by a private laboratory in Hawai'i and paid for by Chuuk's Family Planning Program. One physician and two health educators provide outreach services to the outer islands and villages approximately four times a year. During these visits, staff teach about breast and cervical cancer, but do not perform Pap smears. Instead, women are advised to come to a clinic for testing. Breast examinations are performed by physicians as part of the physical examination provided to women who attend the clinics; however, clinical breast examinations are not consistently performed by all physicians. Education and screening are also conducted through the Sexually Transmitted Disease program.

Tobacco Prevention. The Substance Abuse and Mental Health Division has a total of 21 personnel of which one, the Tobacco Educator, is devoted to tobacco awareness, education, and prevention activities. The Tobacco Educator is assisted by four health educators in the community who provide tobacco prevention education services as part of a substance abuse prevention program at schools, youth groups, and churches. Other tobacco prevention services include a monthly radio public service announcement and participation in the FSM National Smoke-Out Day. The Tobacco Prevention Program, in collaboration with the Chuuk Department of Public Safety, monitors local stores for their compliance with the FSM regulation that forbids sales of tobacco to minors. These compliance checks are conducted twice a year, during which time underage teenagers go to stores and attempt to purchase tobacco products. In a 2002 compliance check, youth visited 100 stores, of which 65% of them were non-compliant with the regulation. The Substance Abuse and Mental Health Department also staffs the Tobacco Prevention and Control Committee, which meets monthly. The committee is composed of priests, pastors, health workers, community members and the Director of Youth Affairs.

Medical services

Medical services related to the diagnosis and treatment of cancer are provided primarily by two surgeons, two obstetrician/gynecologists, and two internists. None of the physicians have received specialized training in the diagnosis, treatment, and management of cancer and cancer patients. No nurses in Chuuk have received specialized training in nursing oncology. Services related to diagnosing cancer include biopsies and aspirations, upper gastro-intestinal (GI) studies, ultrasound, and

fluoroscopic studies. Many cancer surgeries can be performed on Chuuk. Chemotherapy that is initiated off-island (usually at TAMC) can be maintained and, in the past, maintenance chemotherapy has been provided to individuals with thyroid, cervical, and breast cancers. Chuuk does not have radiation therapy services, and cancer patients do not have access to clinical trials on Chuuk. Telemedicine consultation with TAMC through a store-and-forward telecommunication system was initiated in 1997; however, the computer has not been operational for the past year. It was noted by all the physicians that the majority of patients with cancer are identified in the late stages when the patient is symptomatic. No hospice or pain management services were available for these late stage patients, and no physicians or nurses have had specialized training in hospice, palliative care, or end-of-life care.

Laboratory and Radiology Services

Services provided by the laboratory include complete blood counts (without differential white cell count), urinalysis, Hepatitis B screening, and HIV screening. Prostate-specific antigen (PSA) and stool occult blood screenings are not available. The laboratory had the capability of

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performing 37 different tests for chemistry; however, because the analyzer has been dysfunctional for the past 3 years and due to lack of reagents, none of the tests were being performed at the time of this assessment. At the hospital, WBC counts and hematocrits are done manu-

ally. Pap smears and cervical biopsies are sent to a laboratory in Hawai'i for analysis, and is paid for through a contract with the FSM Government's Maternal and Child Health and the Family Planning programs. All other biopsies samples are sent to Honolulu, Hawai'i. According to key informants, the results sometimes take one to three months to be returned and limited resources, mislabeling, or damage to specimens result in some samples never being returned. Radiology services are limited to an x-ray unit and a fluoroscopic unit. There is no mammography unit in Chuuk.

Non-Governmental Organizations

In Chuuk, there is only one non-governmental organization that consistently provides services in the community—The Chuuk Women's Advisory Council (CWAC). Organized in 1989, CWAC is an umbrella organization of 39 chapters of women's church groups, community groups, and organizations with a total of approximately 400 members organized to address women's health issues. Currently, CWAC is focusing on a community-based diabe-

Table 4. Action plan for Chuuk’s five cancer-related priority areas

Objectives	Activities
1. Establish cancer registry to improve coordination of data collection	a. Dedicate and train a staff member for cancer data processing only b. Purchase equipment and train in programs to maintain registry
2. Improve ICD coding skills & knowledge	Provide ICD coding training for data clerk and cancer doctors
3. Increase public awareness about cancer	Develop & air cancer-related PSAs on local radio
4. Establish an office dedicated to cancer	Appoint a cancer coordinator
5. Increase screening of high risk individuals	a. Identify individuals at high risk for cancer b. Conduct screening of high-risk individuals using colposcopy, prostate needle biopsy, Pap smear and other tests.

tes education project that sponsors nutrition education and physical exercise for women in the villages and communities of the lagoon islands. Plans are underway to use the same network to teach breast self-examination to women in the villages, assisted by an educational shower card from ‘Imi Hale- Native Hawaiian Cancer Network in Hawai‘i that has been translated into the Chuukese language.

National and international organizations

Prior to the formation of the Cancer Council of the Pacific Islands (CCPI) in 2002, none of the physicians belonged to any national or international organizations that are related specifically to cancer education, networks, or resources. Chuuk now has two representatives on the CCPI, which was formed with the support of the Center to Reduce Cancer Health Disparities, National Cancer Institute.

Findings: cancer-related needs

Data needs

Data staff requested assistance in developing and maintaining a cancer registry. They also requested training in ICD-10 coding, analyzing and interpreting cancer data, and writing summary reports related to cancer.

Personnel and training needs

Personnel. No new personnel were requested, but it was recommended that existing staff members be assigned to coordinate cancer-related education and services development.

Training. Physicians identified a number of training needs. They requested training in the evaluation of prostate cancer (using digital rectal examination, ultrasound, and biopsy), colorectal cancer (using flexible sigmoidoscopy and colonoscopy), gastric cancer (using endoscopy), and breast cancer (using mammography, ultrasound, and fine needle aspiration biopsy). Related to cancer treatment, they wanted training in maintaining chemotherapy, treating childhood leukemia, managing pain, and providing terminal care. They also wanted more information on palliative medicine, hospice, and complementary healing.

Hospital nurses wanted training on cancer prevention, specialized nursing care for cancer patients, and terminal and palliative care. Public health nurses wanted to learn how to teach breast self-examination. All nurses requested on-site, hands-on training. Public health staff requested training on cancer risk factors, cancer education and outreach, cancer risk, and principles of screening and detection. They also felt that physicians and public health nurses should be trained in how to perform clinical breast examinations and Pap smears.

Needed equipment and supplies

Key informants expressed needs for equipment and supplies. The physicians requested diagnostic equipment, including a flexible sigmoidoscope, a colonoscope, an endoscope, a rhinolaryngoscope, and ultrasound equipment for evaluating breast and prostate abnormalities. Laboratory staff expressed a need for a Coulter Counter, a chemistry analyzer, an immunoassay analyzer, as well as reagents to perform the analyses.

Needed program and services

Given that cancer is the third-leading cause of death in Chuuk State, there is a need to develop a comprehensive and coordinated system of educational, preventive, screening, and treatment services related to cancer. As part of this system of services, there is a need for a State 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 Chuuk.

- *Recommendation 1:* Increase public awareness about

cancer risk, prevention, and the benefits of early detection and treatment.

- *Recommendation 2:* Educate government and community leaders on the need for resources to address the problems of morbidity and mortality due to cancer.
- *Recommendation 3:* Develop and implement an early detection screening program for all cancers.
- *Recommendation 4:* Improve laboratory services, especially biopsy services.

Prioritizing and setting objectives

Needs were prioritized and preliminary planning was done by the delegates from Chuuk to the Cancer Council of the Pacific Islands in August 2003. These plans were further refined, and a strategic action plan was developed in November 2003, identifying five priority areas:

- *Priority 1:* Establish a cancer registry.
- *Priority 2:* Improve ICD coding skills and knowledge.
- *Priority 3:* Increase public awareness about cancer.
- *Priority 4:* Establish an office dedicated to cancer.
- *Priority 5:* Increase screening of high risk individuals.

The group also developed specific objectives for each priority area. A summary of a one-year action plan for Chuuk was shared with the Center to Reduce Cancer Health Disparities, National Cancer Institute (Table 4).

Conclusions

Cancer is the third-leading cause of death on Chuuk, yet few cancer-related services exist. Priority needs include: establishing a cancer registry; improving ICD coding skills and knowledge; increasing public awareness about cancer; establishing an office dedicated to cancer; and increasing screening of high risk individuals.

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'Ike i ke au nui me ke au iki.

Knows the big currents and the little currents.

Is very well versed.

Hawaiian proverb