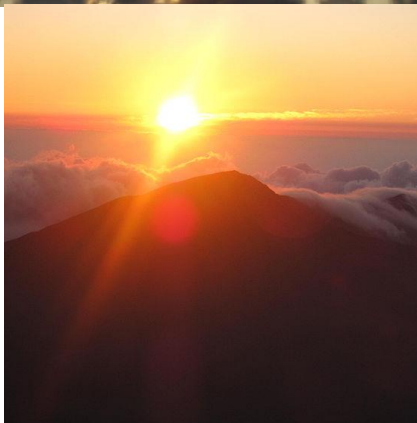
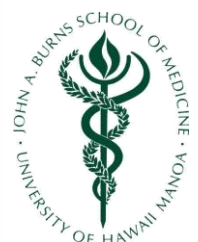


*Cancer in the
US Affiliated Pacific Islands
2007-2012*

**Pacific Regional
Central Cancer Registry**
Cancer Council of the Pacific Islands
May 2015



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Photos Courtesy of Tricia Torris

Foreword

Hafa Adai, Alii, Talofa, Kaselehlie, Ran annim, Lotu Wo, Mogethin, Iakwe, and Aloha!

In response to the lack of systematic and accurate collection of cancer data in the region, the US Affiliated Pacific Island (USAPI) Pacific Regional Central Cancer Registry (PRCCR) was conceived and initiated through the Cancer Council of the Pacific Islands (CCPI) in 2003.

The primary tasks and responsibilities of the Pacific Regional Central Cancer Registry are:

- To develop cancer registries where the data is controlled and owned by each individual jurisdiction and to ensure the data are useful for local program planning and evaluation as well as monitoring local cancer trends over time
- To develop the systems and policies which insure proper identification, reporting and recording of all cancers in each USAPI jurisdiction
- To develop the capacity and infrastructure for each of the USAPI jurisdiction to manage the rigorous data collection and entry required of a cancer registry
- To develop a cancer registration system that is sophisticated, yet flexible and sustainable, i.e. takes into account the relative case load of cancers in each USAPI, the availability of trained personnel and the local ability to support such a system
- To link the individual USAPI cancer registries, comprehensive cancer control efforts, related non-communicable disease (NCD) efforts and public health system strengthening efforts in a manner which allows for economies of scale, standardized reporting and “speaking with one voice” for the USAPI

A regional cancer registry assessment was completed in 2005-2006, funded through the USAPI Regional Comprehensive Cancer Control planning cooperative agreement. The recommendations were vetted through the CCPI and ultimately approved by Pacific Island Health Officers Association (PIHOA), which is the USAPI regional health policy body comprised of the Senior Health Official in each USAPI jurisdiction. The University of Hawaii, John A. Burns School of Medicine, Department of Family Medicine and Community Health was designated the bonafide agent on behalf of the ten USAPI jurisdictions to plan and implement the Centers for Disease Control (CDC) National Program of Cancer Registries (NPCR) in the USAPI starting in July 2007. The majority of USAPI jurisdictions began reporting 2007 data to the CDC NPCR in December 2009 via the Pacific Regional Central Cancer Registry. The Cancer Council of the Pacific Islands, as the Advisory Board to the PRCCR, has included data items within the cancer registry database to capture additional information on prevention, screening and other NCD risk factors. By doing so, the USAPI will be able to better monitor cancer burden and some health system responses to the current epidemic of NCDs which plague the USAPI.

On behalf of the CCPI and the Pacific Cancer Programs team and partners, I hope the information presented is useful to enhance understanding of the cancer burden in the USAPI and opportunities for partnering toward sustained improvements.

Lee Buenconsejo-Lum, MD, FAAFP, Principal Investigator

Background - USAPI

The US-Affiliated Pacific Islands (USAPI) consists of three Flag Territories, and three Freely Associated States (FAS). The Flag Territories are the Territories of American Samoa and Guam and the Commonwealth of the Northern Mariana Islands (CNMI). The Freely Associated States include the Federated States of Micronesia (FSM) which consists of Yap, Pohnpei, Kosrae, Chuuk; the Republic of the Marshall Islands (RMI), and the Republic of Palau (also known as Palau). The population of the USAPI is approximately 450,000 people with 182,000 of the inhabitants living in the FAS. Each of the USAPI has unique cultures, histories and languages. The economic, health and political development of each jurisdiction of the USAPI are not similar. The expanse of the entire region is almost twice that of the continental US and crosses 5 time zones.

Significant health disparities exist between the populations of U.S. mainland and the USAPI jurisdictions due to multiple complex factors, including historical, social, cultural, environmental and economic. Health disparities also exist within the Pacific Islands themselves, most notably between populations living on the 'main' or central island and those living in the 'outer' islands far from any 'urban' area. Rapid westernization has adversely affected many of the social, cultural, and environmental structures and practices that traditionally protected and supported good health in the USAPI. One of the most significant areas of impact due to the westernization of the Pacific cultures is the rapid adoption of unhealthy practices and behaviors such as tobacco and alcohol use, reduction in daily physical activity and an increase in the consumption of non-local foods with little nutritional value. As a result, the incidence and prevalence of all non-communicable diseases have risen exponentially in the Pacific in just the fifteen years. Cancer mortality is now the second most common cause of death in nearly all USAPI jurisdictions. Due to constrained economic conditions in the FAS, increasing numbers of FAS citizens are out-migrating to Hawaii, Guam and throughout the U.S. This adds to the complexity of cancer registration.

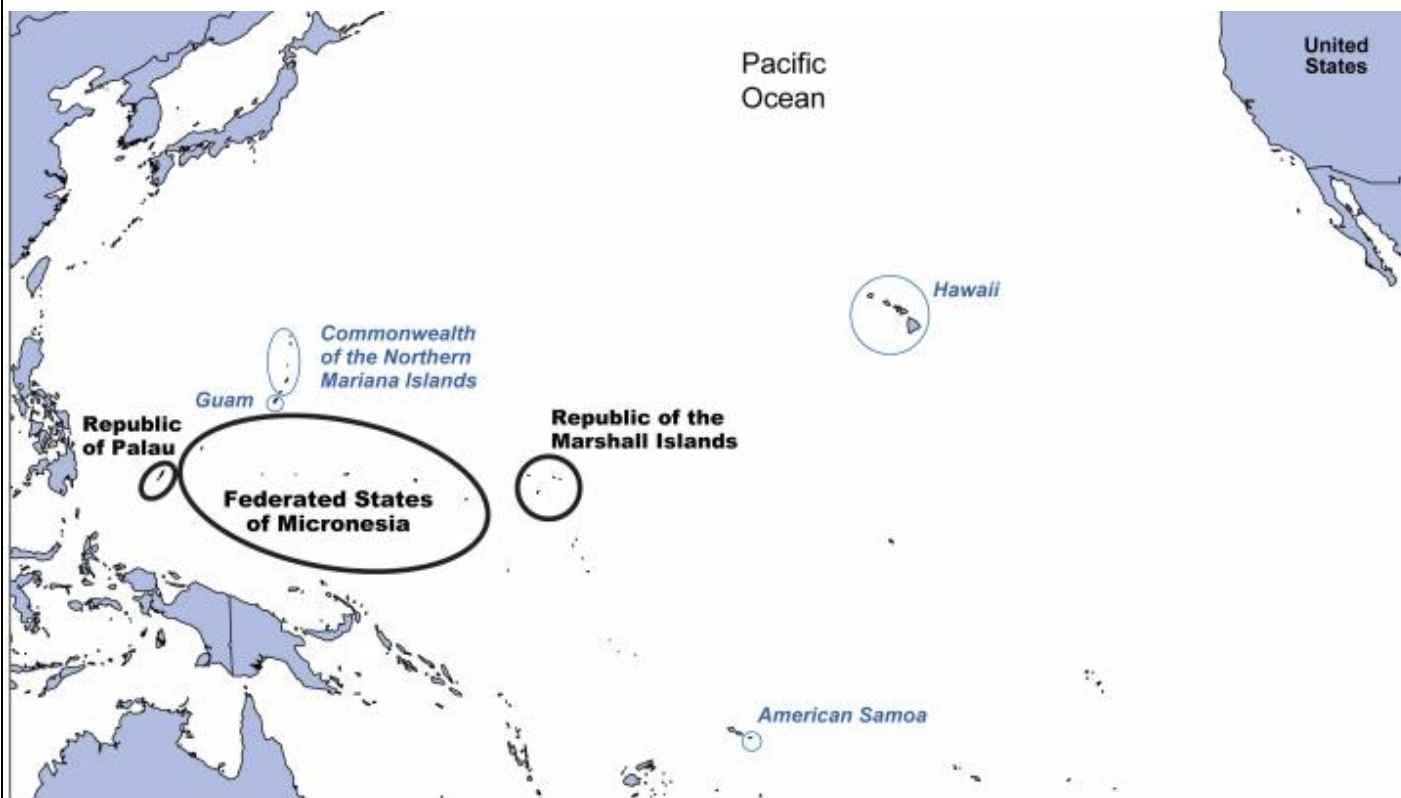


Table of Contents

Acknowledgments	1
Foreword.....	2
Background - USAPI	3
Table of Contents.....	4
Cancer in the US Affiliated Pacific Islands (USAPI) — An Overview	6
Health System Capacity to prevent, screen, diagnose or treat cancer in the USAPI	6
What is Cancer?	6
Can Cancer Be Prevented?	7
What is Cancer Stage or Staging?.....	7
What are Cancer Incidence & Mortality Rates?.....	11
Cancer in the USAPI: Major Sites	18
Breast (Female) Cancer	18
Cervical (uterine cervix) Cancer.....	22
Colon & Rectum Cancer	25
Human Papillomavirus (HPV) Associated Cancers	28
Liver Cancer	29
Lung & Bronchus Cancer.....	32
Leukemia.....	33
Oral Cavity and Pharyngeal Cancer.....	35
Thyroid Cancer	38
Top 10 Cancer Sites by Jurisdiction	40
American Samoa.....	40
Commonwealth of the Northern Mariana Islands	43
Federated States of Micronesia	46
Guam	51
Republic of the Marshall Islands	54
Republic of Palau	57
Appendix.....	60
Final Page.....	61

Tables

Table 1 Cancer Incidence Counts and Annual Incidence Rates USAPI in comparison to HI and U.S. 2007-2012	9
Table 2 Top 13 Cancer Cases, Crude and Age-standardized rates for age over 20 – USAPI 2007-2012	10
Table 3 Top 13 Cancer Incidence Counts, proportional distribution and ranking, USAPI 2007-2012.....	12
Table 4 Ten Leading Cancer Sites by Sex & proportional distribution, USAPI	13
Table 5 Crude and age-standardized rates of female Breast Cancer	21
Table 6 Cervical cancer in the USAPI, in comparison to U.S. and World rates.....	23
Table 7 Crude and age-standardized rates of Colon & Rectum	26
Table 8 Crude rates of HPV-associated Anal and Oral Cavity & Pharynx cancers	28
Table 9 Crude and age-standardized rates of Liver	31
Table 10 Crude and age-standardized rates of Lung & Bronchus	33
Table 11 Crude and age-standardized rates of Leukemia	35
Table 12 Crude and age-standardized rates of Oral Cavity and Pharynx Cancer	37
Table 13 Crude and age-standardized rates of Thyroid Cancer	39
Table 14 American Samoa: Incident Cancer Cases 2007-2012.....	41
Table 15 Commonwealth of the Northern Mariana Islands: Incident Cancer Cases 2007-2012	44
Table 16 FSM (all States): Incident Cancer Cases 2007-2012	47
Table 17 Chuuk: Incident Cancer Cases 2007-2012.....	49
Table 18 Kosrae: Incident Cancer Cases 2007-2012.....	49
Table 19 Pohnpei: Incident Cancer Cases 2007-2012.....	50
Table 20 Yap: Incident Cancer Cases 2007-2012	50
Table 21 Guam: Incident Cancer Cases 2007-2012	52
Table 22 Republic of the Marshall Islands: Incident Cancer Cases 2007-2012	55
Table 23 Republic of Palau Incident Cancer Cases 2007-2012	58
Table 24 Selected indicators, programs and services impacting CCC efforts in the USAPI	60

Figures

Figure 1 Percent distribution of Top 13 Incident Cancers, USAPI 2007-2012	12
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Cancer in the US Affiliated Pacific Islands (USAPI) — An Overview

Health System Capacity to prevent, screen, diagnose or treat cancer in the USAPI

Health systems vary widely throughout the USAPI. In the RMI, FSM, Palau and CNMI, one organization manages both the preventive (public health) and curative (acute care / hospital) care, including care provided in the remote outer islands. CNMI also has increasing privatization, with several health insurers and private providers. American Samoa has a separate Department of Health and hospital, as does Guam. Guam is the most similar to the U.S., with most of the population receiving care in the private sector. U.S. Federal funding comprises the bulk of dedicated funds for health services. These are augmented by local funds and, in the FAS, by aid from other donor countries. The per capita health expenditures in the USAPI ranges from slightly over \$1,000 to about \$150 per person per year for all preventive and curative health services. In contrast, the U.S. per capita health expenditures exceeds \$8,000. The disparity in monetary resources is not the only driver of generally poor rates of screening, limited diagnostic and treatment capability. Geography and cultural issues also play a tremendous role. With limited health workforce capacity and limited health budgets, cancer patients fortunate enough to be diagnosed in earlier stages may be referred off-island for more definitive treatment. Too often, however, cancer is diagnosed late. While there are no limitations by cancer in off-island referrals, several jurisdictions must disallow off-island referrals if the predicted 5-year survival for cancer is less than 50%. Other jurisdictions do not have off-island referral budgets, leaving patients to scrape together resources for treatment elsewhere, away from family and the familiarity of home. Others simply accept the “death sentence” and remain on their home islands to die.

Collaborative efforts through multiple regional, U.S. Federal and International partnerships have been working closely with the USAPI to strengthen their health systems since 2002. CDC-funded Comprehensive Cancer Control programs – partnerships between community, health and other sectors – have been in existence since 2004. These partnerships have resulted in some improvements in community awareness and screening. Much more work remains to close the tremendous cancer health disparities gaps in these USAPI communities and populations.

What is Cancer?

Cancer is a group of diseases characterized by uncontrolled growth and spread of abnormal cells. If the spread is not controlled, it can result in death. Cancer is caused by both external factors (tobacco, radiation, infectious organisms and chemicals) and internal factors (problems with the genes, hormones, or immune conditions). These causal factors may act together or in sequence to initiate or promote development of cancer cells or carcinogenesis. The development of most cancers requires multiple steps that occur over many years. Certain types of cancer can be prevented by reducing exposure to tobacco and other factors that promote this process. Cervical cancer can be prevented through vaccination and screening. Other potential cancers can be detected before cells turn into full-blown cancer or at an early stage, when the

disease is most treatable. Cancer is treated by surgery, radiation, chemotherapy, hormones, and immunotherapy, but only if those resources are available to the patient.

Adapted from: "Global Cancer Facts & Figures 2007"

Can Cancer Be Prevented?

A large proportion of cancers could be prevented. All cancers caused by cigarette smoking and heavy use of alcohol could be prevented completely. The American Cancer Society estimates that in 2013 about 174,100 cancer deaths will be caused by tobacco use. The World Cancer Research Fund estimates that about one-quarter to one-third of the new cancer cases expected to occur in the U.S. in 2013 will be related to overweight or obesity, physical inactivity, and poor nutrition, and thus could also be prevented. Certain cancers are related to infectious agents, such as human papillomavirus (HPV), hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), *Helicobacter pylori* (*H. pylori*) and Epstein-Barr Virus (EBV); many of these cancers could be prevented through behavioral changes, vaccines, or antibiotics. Many of the more than 2 million skin cancers that are diagnosed annually could be prevented by protecting skin from excessive sun exposure and avoiding indoor tanning. In addition to preventing cancer through the avoidance of risk factors, regular screening tests that allow the detection and removal of precancerous growths can prevent cancers of the breast, cervix, colon, and rectum. A heightened awareness of changes in the breast or skin may also result in detection of these tumors at earlier stages. Cancer is quite common. In the U.S., it is estimated that half of men and one-third on women are at risk for developing cancer in their lifetimes. In resource limited settings, such as the USAPI, these risks may be higher and cancer is less likely to be detected early.

Adapted From: "American Cancer Society, Cancer Facts & Figures 2013"

What is Cancer Stage or Staging?

Staging describes the extent or spread of cancer at the time of diagnosis. Proper staging is essential in determining the choice of therapy and in assessing how well the patient will do and their chance of surviving the cancer (prognosis). A cancer's stage is based on the size or extent of the primary (main) tumor and whether it has spread to other areas of the body. A number of different staging systems are used to classify tumors. If cancer cells are present only in the layer of cells where they developed and have not spread, the stage is in situ. If cancer cells have grown beyond the original layer of tissue, the cancer is invasive and categorized as local, regional, or distant stage based on the extent of spread. Clinicians typically use the TNM cancer staging system, which assesses tumors in three ways: extent of the primary tumor (T), absence or presence of regional lymph node involvement (N), and absence or presence of distant metastases (M). Once the T, N, and M categories are determined, a stage of 0, I, II, III, or IV is assigned, with stage 0 being in situ, stage I being early, and stage IV being the most advanced disease. Some cancers have alternative staging systems (e.g., leukemia). Patients with advance stage cancers (III or IV, regional or metastatic) generally have a poor chance of cure and die early.

In situ indicates a tumor that is early or "non-invasive" cancer that is present only in the layer of cells in which it began. An in situ lesion can only be diagnosed by microscopic examination. This is the "best" stage of cancer to have.

Localized indicates a cancer that is limited to the organ in which it began, without evidence of spread. It can still be considered “localized” as long as there is no extension beyond the outer limits of the primary organ with no evidence of metastasis elsewhere within the body. Even with the limited resources in the USAPI, many localized cancers could be treated in-country.

Regional indicates a cancer that has spread beyond the original (primary) site to nearby lymph nodes or organs and tissues.

Distant indicates a cancer that has spread from the primary site to distant organs or distant lymph nodes or by implantation metastasis.

Unstaged or Unknown indicates there is a cancer, but insufficient information exists to determine the stage or extent of the disease at diagnosis.

Adapted From: “American Cancer Society, Cancer Facts & Figures 2013” and “Hawaii Cancer Facts & Figures 2010”



Table 1 Cancer Incidence Counts and Annual Incidence Rates USAPI in comparison to HI and U.S. 2007-2012

All Sites 2007-2012 over age 20	#cases (all USAPI)	Incidence rate per 100,000 Adult (>20yo) Hawaii (2005-09) USCS	Incidence Hawaii Adult Male Rate	Incidence Hawaii Adult Female Rate	Incidence rate per 100,000 US (2005-09) USCS	Incidence US Adult Male Rate	Incidence US Adult Female Rate	Age adjusted Incidence rate per 100,000 USAPI	Age adjusted Incidence USAPI Adult Male rate	Age adjusted Incidence USAPI Adult Female rate
All Sites	2999	443.4	504.3	401.6	474	549.6	417.7	201.3	236.5	174.7
Bones & Joints	13	0.7								
Brain & Other Nervous System	23	4.4	4.9	3.9				2.6	2.7	2.8
Breast*	405		1.1	125.1			122	47.9	^^	47.9
Cervix*	155		--	8.2			8	19.6	--	19.6
Colon & Rectum*	267	48.6	59.6	38.7	46.2	53.8	40.2	19.4	18.3	14.5
Esophagus	27	3.8	7	1.1	4.9	8.7	1.9	1.2	2.9	0.4
Gallbladder	21	1.05	1	1.1				1.7	1	2.3
Ill-defined & unspecified (unknown+misc)*	62	11.05	12.4	9.7				3.9	5	3.1
Kidney & Renal Pelvis	48	13.3	18.4	8.8	15.6	21.2	11.1	3.4	5.2	1.7
Larynx	24	2.4	4.6	0.5	3.9	6.8	1.5	1.7	3.1	0.3
Leukemia*	124	10.9	13.5	8.7	12.4	16	9.7	9.9	11.8	8.4
Liver*	187	10.7	16	5.9	6.6	10.2	3.4	10.9	17.4	4.4
Lung & Bronchus*	462	52.9	68.7	40.4	67.2	82.9	55.7	35.2	53.1	19.5
Nasopharynx*	76							4.1	5.9	2.3
Non-Hodgkin Lymphoma	41	16.5	20.9	13	19.3	23.2	16.2	2.7	2.7	2.6
Other Digestive	20							1.4	1.4	1.3
Ovary	54		--	11.1			12.5		--	5.8
Pancreas	51	12.05	13.2	10.9				3.4	5	2
Prostate*	310		128.4	--		151.4		59.1	59.1	--
Skin excl Basal & Squamous & Melanoma	19							1.3	2.3	0.7
Soft Tissue including heart	29							1.7	2.8	0.8
Stomach*	84	11.1	14.7	8.3	6.7	9.4	4.6	6.4	7.3	5.6
Thyroid*	116	14.1	6.5	21.9	11.8	5.9	17.5	5.9	2.4	9.6
Tobacco-related Oral Cavity & Pharynx*	89	12.5	18	6.7	10.9	16.4	6.2	5.2	7.8	2.7
Urinary Bladder	37	15.1	26.2	6.4	21.1	37.2	9.2	4.6	8	1.8
Uterus*	151		--	29.6			24.4	17.1	--	17.1

Incidence Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.

Invasive cases only; Counts are 5 year total from 2007 to 2012, rounded to the nearest whole and Rates are suppressed if fewer than 16 cases were reported in a specific category Suppression for Reliability (CDC National Program of Cancer Registries) http://www.cdc.gov/cancer/npcr/uscs/technical_notes/stat_methods/suppression.htm

*Top 13 cancer cases

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Table 2 Top 13 Cancer Cases, Crude and Age-standardized rates for age over 20 – USAPI 2007-2012 (All USAPI except Chuuk)

Sites	Male Cases -USAPI	Male Rate-crude	Male Rate Age-adjusted US Std	Male Rate World Std per 100,000	Female Cases - USAPI	Female Rate-crude	Female Rate Age-adjusted US Std	Female Rate World Std per 100,000	Total Cases-USAPI	Total Rate-crude	Total Rate-Age-adjusted US Std	Total Rate-World Std per 100,000
All Sites	1540	192.2	233.3	167.3	1417	183.3	173.2	133.0	2957	187.8	199.0	147.9
Breast	2				400	57.2	51.9	40.1				
Lung & Bronchus	322	44.4	55.7	39.7	130	18.7	21.3	15.1	452	31.7	37.5	26.9
Prostate	309	42.6	63.0	42.0								
Cervical Cancer, invasive					155	26.0	19.6	16.8				
Colon & Rectum	161	22.2	26.2	18.9	102	14.6	15.4	11.0	263	18.5	20.5	14.9
Liver	150	20.7	18.6	14.8	34	4.9	4.8	3.5	184	12.9	11.7	9.2
Uterus					150	21.4	18.5	14.9				
Leukemia	68	9.4	12.7	8.4	56	8.0	9.2	6.3	124	8.7	10.7	7.2
Thyroid	19	2.6	2.6	1.9	97	13.9	10.5	9.0	116	8.1	6.4	5.4
Tobacco-related Oral Cavity & Pharynx	67	9.2	8.4	6.6	21	3.0	2.8	2.1	88	6.2	5.6	4.4
Stomach	48	6.6	7.8	5.6	36	5.3	6.2	4.3	84	6.0	7.0	5.0
Nasopharynx	54	7.6	6.3	5.1	20	2.9	2.4	1.9	74	5.3	4.3	3.5
Ill-defined & unspecified (unknown+misc)	35	4.8	5.1	3.7	24	3.4	3.2	2.6	59	4.1	4.1	3.1

Invasive cases only; Counts are 6 year total from 2007 to 2012, rounded to the nearest whole and Rates are suppressed if fewer than 16 cases were reported in a specific category Suppression for Reliability (CDC National Program of Cancer Registries) http://www.cdc.gov/cancer/npcr/uscs/technical_notes/stat_methods/suppression.htm
Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

What are Cancer Incidence & Mortality Rates?

Cancer incidence rates are measures of the risk of being diagnosed with cancer among the general population, while mortality rates are measures of the risk of dying among the general population. Cancer rates in this document represent the number of new cases of cancer per 100,000 population (incidence). For example, if the state's average annual lung and bronchus cancer incidence rate among males is 70.0; that means for every 100,000 men in a given population approximately 70 new cases of lung and bronchus cancer are diagnosed each year. If the adult male population numbers 500,000, then approximately 350 new cases of lung and bronchus cancer are diagnosed among men each year (five times the number of cases diagnosed in a 100,000 population):

$$\begin{array}{ccc} 70 \text{ new cases diagnosed in one year} & = & 350 \text{ new cases diagnosed in one year} \\ 100,000 \text{ population} & & 500,000 \text{ population} \end{array}$$

A similar example can be used for an area smaller than the state or for specific race/ethnic groups. For example, if a county's adult male population numbers 50,000, then approximately 35 new cases of lung and bronchus cancer are diagnosed among men in the county each year (one-half the number of cases diagnosed in 100,000 population):

$$\begin{array}{ccc} 70 \text{ new cases diagnosed in one year} & = & 35 \text{ new cases diagnosed in one year} \\ 100,000 \text{ population} & & 50,000 \text{ population} \end{array}$$

Rates provide a useful way to compare the cancer burden irrespective of the actual population size. Rates can be used to compare demographic groups (males have higher lung cancer rates than females), racial/ethnic groups (Native Hawaiian females have higher breast cancer rates than other racial/ethnic groups), or geographic areas (the USAPI has higher cervical cancer rates than the United States).

Note that because of the small population size in most USAPI jurisdictions, as well as challenges with diagnosing cancer, some cancer types might only have a few cases reported in a 5-year period. To discourage misinterpretation of rates or counts that are unreliable because of the small number, incidence rates and counts are not shown in tables if the case counts are below 16. Crude rates are presented here and can be used internally by the jurisdiction to trend certain cancers over time.

Mortality rates depend on the incidence of the cancer, as well as the stage at diagnosis, survival, and treatment for the cancer type. Survival estimates reflect the risk of death among newly diagnosed cancer cases, while mortality rates reflect the risk of death among the general population. New screening programs, aimed at early detection and increased survival, tend to result in a greater number of new cancers being diagnosed (i.e., higher incidence rates) with little delay. However, as most people dying of cancer today were diagnosed several years ago, mortality rates and survival estimates take time to show the influence of new programs. **Because of present challenges with reporting and recording of deaths in the USAPI, mortality rates are not presented in this document.**

Adapted from: "Hawaii Cancer Facts & Figures 2010" and
Suppression for Reliability (CDC National Program of Cancer Registries)
http://www.cdc.gov/cancer/npcr/uscs/technical_notes/stat_methods/suppression.htm

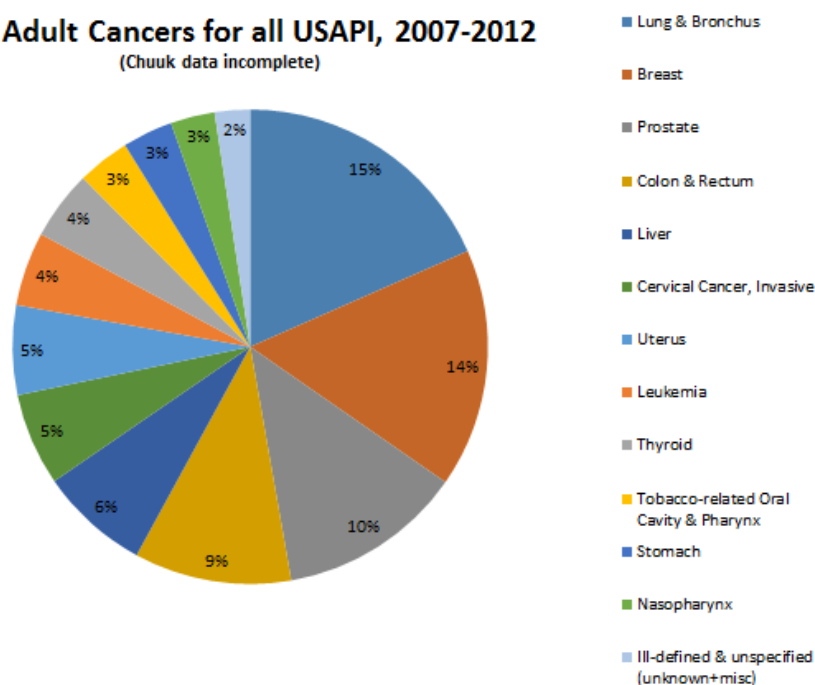
Table 3 Top 13 Cancer Incidence Counts, proportional distribution and ranking, USAPI 2007-2012

Top 13 Cancers for all USAPI	#cases	%	rank
Lung & Bronchus	452	15%	1
Breast	400	14%	2
Prostate	309	10%	3
Colon & Rectum	263	9%	4
Liver	184	6%	5
Cervical Cancer, Invasive	155	5%	6
Uterus	150	5%	7
Leukemia	124	4%	8
Thyroid	116	4%	9
Tobacco-related Oral Cavity & Pharynx	88	3%	10
Stomach	84	3%	11
Nasopharynx	74	3%	12
Ill-defined & unspecified (unknown+misc)	59	2%	13

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012 (Chuuk data incomplete)

Figure 1 Percent distribution of Top 13 Incident Cancers, USAPI 2007-2012

Top 13 Adult Cancers for all USAPI, 2007-2012
(Chuuk data incomplete)



Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Table 4 Ten Leading Cancer Sites by Sex & proportional distribution, USAPI per 100,000, ranked by rate adjusted to US and World Std pop (U.S. 2000 Standard Popn, World Standard Popn 2000-2025)

Male	Avg. Cases/Yr.	%	Female	Avg. Cases/Yr.	%
Lung & Bronchus	322	21%	Breast	400	28%
Prostate	309	20%	Cervical Cancer, invasive	157	11%
Colon & Rectum	161	10%	Uterus	150	11%
Liver	150	10%	Lung & Bronchus	130	9%
Leukemia	68	4%	Colon & Rectum	102	7%
Tobacco-related Oral Cavity & Pharynx	67	4%	Thyroid	97	7%
Nasopharynx	54	4%	Leukemia	56	4%
Stomach	48	3%	Ovary	52	4%
Kidney & Renal Pelvis	37	2%	Stomach	36	3%
Ill-defined & unspecified (unknown+misc)	35	2%	Liver	34	2%
All Sites	1540	100%	All Sites	1417	100%

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012



Summary Information about Major Cancer Sites

adapted from Hawaii Cancer Facts & Figures 2010

CANCER SITES	NON-MODIFIABLE RISK FACTORS	MODIFIABLE RISK FACTORS	RISK REDUCTION	EARLY DETECTION	SYMPTOMS	TREATMENT
Breast	Age (risk increases as one gets older); Gender (risk is higher in women); Race (risk slightly higher in Whites); Genetic risk factors; Family history; Personal history of breast cancer; Previous breast biopsy; previous breast radiation; Early menstruation; Late menopause	First child born after age 30; Oral contraceptive use; Hormone replacement therapy use; Alcohol consumption; Obesity; Physical activity	Having first child before age 30; Breast feeding child; Limit alcohol consumption; Maintain a healthy weight; Be physically active; Chemoprevention if women are considered high risk (tamoxifen and possibly raloxifene-raloxifene is not approved for risk reduction and should not be recommended outside of a clinical trial)	Mammograms; Clinical breast examinations; Breast self-examinations (optional)	New lump or mass; Swelling; Skin irritation or dimpling; Nipple pain or nipple turning inward; Redness or scaling of the nipple or breast skin; Breast discharge; Lump in the underarm area	Surgery (breast conserving therapy with radiation, or mastectomy with or without radiation); Plus chemotherapy and/or hormone therapy, depending on tumor size, spread to lymph nodes, and/or prognostic features
Cervix	Age (average age at diagnosis is 50 to 55); Family history	Human papillomavirus (HPV) infection from intercourse at an early age, unprotected sex, and many sexual partners; Cigarette smoking; Human immunodeficiency virus (HIV) infection; Chlamydia infection	Avoid early onset of sexual activity; Limit number of sexual partners; Avoid intercourse with individuals who have had multiple partners; Avoid cigarette smoking; Use condoms (to prevent HIV and chlamydia infection; condom use does not reliably prevent HPV infection)	Pap test (smear), visual inspection with acetic acid (VIA) or HPV DNA testing and pelvic examination	Unusual discharge from vagina other than monthly menstrual period; Bleeding after intercourse; Pain during intercourse	Surgery and/or radiation therapy; Plus chemotherapy for later stages
Colon and Rectum	Age (risk increases as one gets older); Family history; Ethnicity, namely Ashkenazi Jews; Race (highest incidence in African Americans); Personal history of colon cancer, intestinal polyps, or chronic inflammatory bowel disease	Diet from animal sources; Physical inactivity; Obesity; Smoking; Alcohol consumption; Vegetable and fruit consumption; Type II Diabetes	Maintain ideal body weight; Multivitamin with folate intake; Calcium supplement intake; Nonsteroidal anti-inflammatory drugs, like aspirin; Hormone replacement therapy (but side effect may outweigh benefit)	Fecal occult blood test (FOBT); Flexible sigmoidoscopy; Colonoscopy; Barium enema	Change in bowel habits; Feeling that bowel movement is necessary but no relief after doing so; Rectal bleeding or blood in stool; Cramping or abdominal pain; weakness or fatigue	Surgery; Plus radiation therapy and/or chemotherapy for later stages

Uterus (Corpus Uteri)	Age (risk increases as one gets older); Total length of menstrual span; History of infertility; Ovarian disease; Diabetes; Family history; Presence or personal history of breast or ovarian cancer; Early menstruation; Late menopause	History of having never given birth; Obesity; Tamoxifen use; Estrogen (but not combined hormone) replacement therapy; Diet high in animal fat	Having one or more children; Use of oral contraceptives; Maintain healthy weight; Control diabetes	No screening examinations available for women without symptoms who are at average risk for endometrial cancer; Women should report warning signs to health care professional	Unusual bleeding, spotting, or abnormal discharge, especially if after menopause; Pelvic pain or mass; Unexplained weight loss	Surgery; Plus radiation therapy, chemotherapy or hormone therapy for later stages
Thyroid	Age (80% of newly diagnosed thyroid cancer patients are under 65 years of age); Gender (risk is higher in females); Having a history of goiter (enlarged thyroid) or thyroid nodules; Family history of thyroid cancer; Genetics (people who test positive for an abnormal gene that causes a hereditary form of thyroid cancer)	Radiation exposure related to medical treatment during childhood; Radiation exposure as a result of radioactive fallout from atomic weapons testing and nuclear power plant accidents	Avoid unnecessary exposure to ionizing radiation, for children; Ensure adequate iodine intake; Be aware of your family history; Choose a healthy diet to achieve and maintain a healthy weight; Eat more vegetables, fruits and whole grains and eat less red and processed (e.g., bacon, sausage, luncheon meats, hot dogs) meats; Exercise regularly; Avoid smoking cigarettes; Avoid exposure to second hand smoke.	No screening test for the early detection of thyroid cancer in people without symptoms. If signs and symptoms are present, tests used in the evaluation of thyroid nodules include: blood tests to determine levels of hormones related to normal functions of the thyroid gland; Medical imaging techniques to determine the size and characteristics of the nodule and nearby lymph nodes; Biopsy to determine if the cells in the nodule are benign or malignant	Lump in the neck; Tight or full feeling in the neck; Difficulty breathing or swallowing; Hoarseness or swollen lymph nodes; Pain in the throat or neck that does not go away	Surgical removal of the thyroid gland (for people who test positive of an abnormal gene that causes a hereditary form of thyroid cancer); Radiation; sometimes Hormone therapy, depending on the cell type, tumor size and/or extent of the disease
Oral	Age (risk increases as one gets older);	Cigarette smoking; Smokeless or chewing tobacco; Cigars; chewing betel nut, Alcohol consumption; UV exposure for cancer of the lip; Vitamin A deficiency; Obesity; Human papilloma virus (HPV) infection	Avoid cigarette smoking; avoid betel nut chewing, Limit intake of alcoholic beverages; Avoid exposure to ultraviolet radiation for cancer of the lip; Eat five or more servings of fruits and vegetables per day; Avoid obesity	Regular dental checkups that include examination of the entire mouth; A cancer-related checkup where primary care physicians examine mouth and throat; Self-examinations and report signs and symptoms of diseases to health care professional, if present	Sore in the mouth that does not heal; Pain in the mouth that doesn't go away; A persistent lump or thickening in the cheek; Persistent white or red patch on the gums, tongue, tonsil or lining of the mouth; Sore throat or feeling that something is caught in the throat; Difficulty chewing or	Surgery and/or radiation therapy; Plus chemotherapy for later stages

					swallowing; Difficulty moving the jaw or tongue; Numbness of the tongue; Swelling of the jaw; Loosening of the teeth or pain around the teeth or jaw; Voice changes; A lump or mass in the neck; Unexplained weight loss	
Leukemia	Infection with HLTV-1 virus; Family history	Cigarette smoking; Exposure to benzene; High-dose radiation exposure; Inherited rare genetic diseases	Avoid cigarette smoking; Reduce exposure to benzene and radiation	No screening examinations available other than reporting signs and symptoms of disease to health care professional	Weakness; Fatigue; Reduced exercise tolerance; Weight loss; Fever; Bone pain; Sense of fullness in abdomen	Chemotherapy; Plus stem cell transplant depending on prognostic factors; Gleevec (imatinib mesylate) for treatment of chronic myeloid leukemia
Liver	People born between 1945-1965; Chronic infections with hepatitis B virus (HBV) and hepatitis C virus (HCV)	Obesity; Alcohol; Parasitic infections (schistosomiasis and liver flukes); Consumption of food contaminated with aflatoxin, a toxin produced by mold during the storage of agricultural products in a warm, humid environment	Screen high-risk persons (e.g., HCV-infected persons with cirrhosis) with ultrasound or blood tests; pregnant women are also recommended to be tested for HBV; Screening of donated blood, organs, and tissues; Adherence to infection control practices during medical, surgical, and dental procedures; Avoid Obesity; Limit alcohol consumption	No vaccine available against HCV, but treatments that can clear infection and halt liver disease progression is available; one- time HCV testing for all persons born from 1945 to 1965 in addition to routine testing for individuals at high risk (e.g., injection drug users); HBV vaccinations for all infants at birth, for all children under 18 years of age who were not vaccinated at birth and for adults in high-risk groups (e.g., health care workers and those younger than 60 years who have been diagnosed with diabetes)	Abdominal pain and/or swelling; Weight loss; Weakness; Loss of appetite; Jaundice (a yellowish discoloration of the skin and eyes); Fever; Enlargement of the liver	Surgery (for patients with sufficient healthy liver tissue); Liver transplantation; Patients whose tumors cannot be surgically removed may choose Ablation (tumor destruction) or embolization, a procedure that cuts off blood flow to the tumor; Drug therapy (i.e. Sorafenib or Nexavar) for patients who are not candidates for surgery
Lung and Bronchus	Personal and family history	Cigarette smoking; Secondhand smoke exposure; Asbestos exposure; Occupational exposure to some	Avoid smoking; Avoid secondhand smoke; Avoid occupational exposure to asbestos and other chemicals by using workplace safety	No widespread screening recommendations for low risk patients. Annual screening with low-dose CT (computed tomography)	A cough that does not go away; Chest pain often aggravated by deep breathing; Hoarseness; Weight loss and loss of	Non-small cell: Surgery; Plus radiation therapy and/or chemotherapy for later stages Small cell: Chemotherapy; Plus

chemicals; Diet; Radon exposure

precautions; Eat five or more servings of fruits and vegetables per day; Get home checked for radon

scanning is recommended for adults ages 55 to 80 years who have a 30 pack-year smoking history and currently smoke or quit within the past 15 years.

appetite; Bloody or rust-colored sputum; Shortness of breath; Recurring infections such as bronchitis and pneumonia; New onset of wheezing

radiation therapy and sometimes surgery, depending on prognostic factors

Cancer in the USAPI: Major Sites

Breast (Female) Cancer

Signs and symptoms: Breast cancer typically produces no symptoms when the tumor is small and most treatable. Therefore, it is important for women to follow recommended screening guidelines to detect breast cancer at an early stage. Larger tumors may become evident as a breast mass, which is often painless. Less common symptoms include persistent changes to the breast, such as thickening, swelling, distortion, tenderness, skin irritation, redness, scaling, or nipple abnormalities, such as ulceration, retraction, or spontaneous discharge. Breast pain is more likely to be caused by benign conditions and is not a common early symptom of breast cancer.

Risk factors: Besides being female, increasing age is the most important risk factor for breast cancer. Potentially modifiable risk factors include weight gain after age 18, being overweight or obese (for postmenopausal breast cancer), and use of menopausal hormone therapy (combined estrogen and progestin), physical inactivity, and alcohol consumption. Medical findings that predict higher risk include high breast tissue density (a mammographic measure of the amount of glandular tissue relative to fatty tissue), high bone mineral density (women with low density are at increased risk for osteoporosis), and biopsy-confirmed hyperplasia (overgrowth of cells), especially atypical hyperplasia (overgrowth of abnormal cells). High-dose radiation to the chest for cancer treatment also increases risk. Reproductive factors that increase risk include a long menstrual history (menstrual periods that

start early and/or end later in life), recent use of oral contraceptives, never having children, and having one's first child after age 30.

Risk is also increased by a family history of breast cancer, particularly having one or more first-degree relatives with breast cancer (though most women with breast cancer do not have a family history of the disease). Inherited mutations (alterations) in breast cancer susceptibility genes account for approximately 5%-10% of all female breast cancers and an estimated 4%-40% of all male breast cancers, but are very rare in the general population (much less than 1%). Most of these mutations are located in BRCA1 and BRCA2 genes, although mutations in other known genes have also been identified. Individuals with a strong family history of breast and certain other cancers, such as ovarian and colon cancer, should consider counseling to determine if genetic testing is appropriate. Prevention measures may be possible for individuals with breast cancer susceptibility mutations. In BRCA1 and BRCA2 mutation carriers, studies suggest that prophylactic removal of the ovaries and/or breasts decreases the risk of breast cancer considerably, though not all women who choose this surgery would have developed breast cancer. Women who consider prophylactic surgery should undergo counseling before reaching a decision.

There is limited, but accumulating evidence that long-term, heavy smoking increases the risk of breast cancer, particularly among women who began smoking at an early age. The International

Agency for Research on Cancer has concluded that there is limited evidence that shift work, particularly at night, is also associated with an increased risk of breast cancer.

Modifiable factors that are associated with a lower risk of breast cancer include breastfeeding, moderate or vigorous physical activity, and maintaining a healthy body weight. Two medications, tamoxifen and raloxifene, have been approved to reduce breast cancer risk in women at high risk. Raloxifene appears to have a lower risk of certain side effects, such as uterine cancer and blood clots; however, it is only approved for use in postmenopausal women.

Early detection: Breast cancer screening for women at average risk includes clinical breast exam and mammography. Mammography can often detect breast cancer at an early stage, when treatment is more effective and a cure is more likely. Numerous studies have shown that early detection with mammography saves lives and increases treatment options. Steady declines in breast cancer mortality among women since 1989 have been attributed to a combination of early detection and improvements in treatment. Mammography is a very accurate screening tool for women at both average and increased risk; however, like any medical test, it is not perfect. Mammography will detect most, but not all, breast cancers in women without symptoms, and the

sensitivity of the test is lower for women with dense breasts. However, newer technologies have shown promising developments for women with dense breast tissue. Digital mammography has improved sensitivity for women with dense breasts. In addition, the Food and Drug Administration recently approved the use of several ultrasound technologies that could be used in addition to standard mammography for women with dense breast tissue. Although the majority of women with an abnormal mammogram do not have cancer, all suspicious lesions that cannot be resolved with additional imaging should be biopsied for a definitive diagnosis. Annual screening using magnetic resonance imaging (MRI) in addition to mammography is recommended for women at high lifetime risk of breast cancer starting at age 30. Concerted efforts should be made to improve access to health care and to encourage all women 50 and older to receive regular mammograms.

Certain jurisdictions in the USAPI do not have mammography at all. The other jurisdictions have limitations in their ability to screen most of the eligible female population because of funding and personnel issues.

Adapted From: American Cancer Society, Cancer Facts & Figures 2013

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Breast	Mammography	62.50%	37.50%	8
	Ultrasound	87.50%	12.50%	8
	Clinical Breast Exam (CBE)	100.00%	0.00%	8
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Breast	87.50%	37.50%	Only on Guam	11
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Breast	Mammography	• 'Various barriers such as cultural, language, lack of education, discomfort, lack of knowledge • “Women’s concerns with shame, religion, and morality in their health-seeking behavior. ”“Chamorro woman, seeking gynecological care can have negative symbolic connotations thereby creating a sense of shame or mamahlao, in the woman.” (Rosario, A.M. (2010). Meeting Chamorro Women’s Health Care Needs: Examining the Cultural Impact of Mamahlao on Gynecological Screening. Pacific Health Dialog. 81-90) • Inadequate public transportation system • Not enough funds to reach ideal targets • Not enough access • “Always moving resident...” • Some populations have very patriarchal family structures: No buy-in from father/ family head equates to poor health seeking behaviors. • Personal denial/ Denial behaviors/ Personal fears • Cost of screenings and follow up • Perceptions of medical providers • Cost of maintaining equipment and having supplies available at all times to run the mammogram machine; personnel not available locally to certify or service machines when needed		
	Ultrasound	• Limited • limited trained staff/old machines		
	Clinical Breast Exam (CBE)	• not consistently performed or documented		
OFF-island referral options available				
Site	Yes		No	Total Responses
Breast	100.00%		0.00%	8
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit		No Cost Limit	Total Responses
Breast	100.00%		0.00%	7

Note: All jurisdictions answered the survey except Chuuk and Pohnpei.

Source: Pacific Regional Central Cancer Registry Screening, Diagnosis and Treatment Survey, December 2013

Table 5 Crude and age-standardized rates of female Breast Cancer

	Cases	Crude	US Std	World Std
USAPI	405	52.4	47.9	37.1
USAPI except Chuuk	400	57.2	51.9	40.1
Guam	285	95.3	77.8	60.1
Yap	9	44.2		
American Samoa	30	33.5	30.4	24.2
Ppohnpei	17	29.6	27.8	22.6
Kosrae	2	19.3		
Republic of the Marshall Islands	22	27.4	24.0	21.4
Palau	11	28.1		
Commonwealth of the Northern Mariana Islands	24	23.4	18.2	15.5
Chuuk	5	6.8		
United States*		136.6*	121.9*	92.9^
World^		47.9		43.3

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

* U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014



~ Pacific Regional Central Cancer Registry ~

Cervical (uterine cervix) Cancer

Of all cancers, cervical cancer is the most amenable to prevention and early detection through screening. Cervical cancers are caused by certain types of Human papillomaviruses (HPV). HPVs are a group of more than 100 related viruses. Approximately 40 HPV types can be transmitted to the genitals through sexual contact. Cervical HPV infections are very common and most infections go away on their own after a short time. However, in some women, HPV can develop into a longer lasting infection. Persistent infection with certain types of HPV increases the risk of cervical cancer. HPV is the primary cause of cervical cancer and also contributes to the development of cancers of the anus, vulva, vagina, penis, oral cavity, and pharynx. HPV also causes genital warts.

In recent years, major advances have been made toward the **prevention** of cervical cancer with the availability of HPV vaccines. Since 2006, two vaccines against HPV have been approved by the U.S. Food and Drug Administration. Gardasil® protects against cervical, vaginal, and vulvar cancers caused by HPV 16 and 18. It also protects against genital warts caused by HPV 6 and 11. Gardasil® is approved for use in females and males aged 9 to 26.

Cervarix® protects against cervical cancers caused by HPV 16 and 18 and is approved for use in females aged 10 to 25. Both vaccines are given as a series of three shots administered over a 6-month period.

Cervical cancer can also be prevented or found early through **regular screening**. Although the great majority of cervical cancer screening in the U.S. is done by Pap smears (which can detect cell

changes on the cervix that might become cervical cancer), the World Health Organization (WHO) recommends other types of cervical cancer screening methods if Pap smears are not widely available or able to be performed with high quality. Even women who have been vaccinated against HPV need to have regular screening in order to detect precancers caused by HPV types not covered in the vaccine.

Recent studies have demonstrated that visual inspection with acetic acid (VIA) is an alternative, sensitive screening method. It is cheap and non-invasive, and can be done in a low level health facility like a health center or dispensary, which is common in some USAPI jurisdictions. More importantly, VIA provides instant results, and those eligible for treatment can receive treatment of the precancerous lesions using cryotherapy on the same day in the same health facility. This “see and treat” method ensures adherence to treatment soon after diagnosis, hence reducing the number of women lost to follow-up. Both the FSM and the RMI have adopted VIA as their core method of cervical cancer screening. Pap tests, funded by various U.S. health agencies, are also still done in both countries and the rest of the USAPI.

HPV DNA testing is another method of screening and used in some countries around the world. HPV DNA testing combined with VIA to determine eligibility for cryotherapy, would be a preferred method of providing cervical cancer screening to the entire population, while targeting limited resources to the women at highest risk of developing cervical cancer. Efforts in the USAPI are ongoing to determine the feasibility, cost-effectiveness and sustainability of these non-Pap smear based methods of screening.

Adapted from American Cancer Society, Cancer Facts and Figures 2013, WHO Prevention of cervical cancer through screening using visual inspection with acetic acid (VIA) and treatment with cryotherapy, and 2013 WHO Guidelines for screening and treatment of precancerous lesions for cervical cancer prevention

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Cervix	Cytology (Pap) conventional	100%	0%	9
	Cytology, liquid based	22%	88%	9
	Visual Inspection with Acetic Acid	33%	67%	9
	HPV DNA testing	0%	100%	9
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Cervix	100%	22%	Only on Guam	9
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Cervix	Cytology	Cost, Cultural & provider barriers, transportation, lost to follow-up, Quality Assurance, no on-island cytopathology except RMI		
	VIA	FSM/RMI: geography, enough personnel to perform cryo, tank/gas procurement		
	HPV DNA	cost; only available through BCCEDP program (50% using as co-testing in women 30+)		
OFF-island referral options available				
Site	Yes	No	Total Responses	
Cervix	100.00%	0.00%	9	
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit	No Cost Limit	Total Responses	
Cervix	100.00%	0.00%	9	

Note: All jurisdictions answered the CC program survey

Source: Evaluating the Costs and Impact of new and emerging technologies in the US Affiliated Pacific Island (USAPI) jurisdictions: Cervical Cancer Screening and Prevention. Cooperative Agreement 5 U58 DP000779 CDC Division of Cancer Prevention and Control, National Center for Chronic Disease Prevention and Health Promotion

Table 6 Cervical cancer in the USAPI, in comparison to U.S. and World rates

	Crude	US Std	World Std	Adv: Early stage
Republic of the Marshall Islands*	68.4	70.0	57.9	2.7
Pohnpei, FSM*	50.5	40.5	36.3	12.0
WHO "Less developed regions"^	23.5		25.7	
WHO Pan-American region^	22.9		22.2	
World^	21.5		22.0	
USAPI*	26.0	19.6	16.8	2.1
WHO Western Pacific Region^	15.0		14.4	
Guam*	15.4	11.4	9.7	1.7
WHO Northern America^	8.9		8.3	
USA- Hispanic women**		14.4		
United States**		9.9		
Eastern Africa	35.3		49.8	

*Pacific Regional Central Cancer Registry data 2007-2012, excludes cases/popn data from CNMI & Chuuk

^Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014

** Annual Report to the Nation Status of Cancer, 1975-2009, featuring the burden and trends in HPV-associated cancers and HPV vaccination coverage levels. J Natl Cancer Inst. 2013 Feb 6; 105(3): 175-201

Crude and age-standardized rates of female Cervical Cancer per 100,000 are ranked by rate, in comparison to U.S. and selected regions around the world. Note that the RMI incidence rate, adjusted to the World standard population, is higher than Eastern Africa. According to the Globocan 2008 data, Eastern Africa was the region with the highest rates of cervical cancer in the world.

With the advent of the CDC Comprehensive Cancer Control funding in 2004, significant increases in public health awareness, health promotion and outreach have occurred throughout the USAPI. Additional CDC funding to the University of Hawaii, through the Racial and Ethnic Approaches to Community Health U.S. Pacific Center of Excellence in the Elimination of Disparities in breast and cervical cancer in the USAPI (2007-2012) also contributed to capacity building for cervical cancer screening. As of 2015, it is too early to tell if the extraordinarily high rates of cervical cancer seen in the USAPI are due to screening bias (i.e., the USAPI is detecting more cancer because they have significantly increased the amount of screening) or if the data truly reflects a very high burden of disease. Regardless, the current economic, societal and emotional costs of so many women dying from cervical cancer is tremendous. The rightmost column in Table 6 reflects the ratio of cervical cancers diagnosed at advance (Stage 2 or higher) versus early stage (Stage 1). Whereas all USAPI jurisdictions have the capacity to treat pre-cancer and Stage 1 cancer of the cervix, less than 30% have the capacity to treat Stage 2 or higher in their own country. In the RMI, more than half of the women were diagnosed at late stages. All cervical cancers in Pohnpei were diagnosed at late stage. Most of these women (80% or more) died within one year of diagnosis.

All USAPI jurisdictions have prioritized improving cervical cancer screening rates and are approaching this issue through health provider trainings, community outreach, adoption of more resource-appropriate screening methods (VIA in FSM and RMI) and strengthening of monitoring and quality assurance programs. There is great interest in participating in demonstration projects of HPV DNA testing and VIA.

Colon & Rectum Cancer

Signs and symptoms: Early stage colorectal cancer does not typically have symptoms; therefore, screening is usually necessary to detect this cancer in its early stages. Symptoms of advanced disease may include rectal bleeding, blood in the stool, and a change in bowel habits, cramping pain in the lower abdomen, decreased appetite, or weight loss. In some cases, blood loss from the cancer leads to anemia (low red blood cells), causing symptoms such as weakness and excessive fatigue. Timely evaluation of symptoms consistent with colorectal cancer in adults younger than age 50 is especially important due to the increase in colorectal cancer incidence in this age group in recent years.

Risk factors: The risk of colorectal cancer increases with age; 90% of cases are diagnosed in individuals 50 years of age and older. Modifiable factors associated with increased risk include obesity, physical inactivity, a diet high in red or processed meat, alcohol consumption, long-term smoking, and possibly very low intake of fruits and vegetables. Hereditary and medical factors that increase risk include a personal or family history of colorectal cancer and/or polyps, a personal history of chronic inflammatory bowel disease, and certain inherited genetic conditions (e.g., Lynch syndrome, also known as hereditary non-polyposis colorectal cancer, and familial adenomatous polyposis [FAP]). Studies have also found that individuals with type 2 diabetes are at higher risk of colorectal cancer.

Consumption of milk and calcium and higher blood levels of vitamin D appear to decrease colorectal cancer risk. Regular use of nonsteroidal anti-inflammatory drugs, such as aspirin, also reduces risk. However, these drugs are not recommended for the prevention of colorectal cancer among individuals at average risk because they can have serious adverse health effects. Study results are mixed about the association between menopausal hormone therapy and colorectal cancer.

Early detection: Beginning at age 50, men and women who are at average risk for developing colorectal cancer should begin screening. Screening can detect and allow for the removal of colorectal polyps that might have become cancerous, as well as detect cancer at an early stage, when treatment may be less extensive and more successful. In 2008, the American Cancer Society collaborated with several other organizations to release updated colorectal cancer screening guidelines. These joint guidelines emphasize cancer prevention and draw a distinction between colorectal screening tests that primarily detect cancer and those that can detect both cancer and precancerous polyps. There are a number of recommended screening options in the U.S. In contrast, in the USAPI screening with fecal occult blood testing is the most used (although very low numbers of patients are screened), because equipment, trained health providers and/or capacity to analyze colon polyps are severely limited in most USAPI. Very few jurisdictions have colonoscopy.

Adapted from: American Cancer Society, Cancer Facts and Figures 2013

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Colorectal	Sigmoidoscopy	85.71%	14.29%	7
	Colonoscopy	50.00%	50.00%	8
	Fecal Occult Blood			
	Test	87.50%	12.50%	8
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Colorectal	60.00%	40.00%	Only on Guam	6
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Colorectal	Sigmoidoscopy	Lack of physicians who are trained to perform procedure		
	Colonoscopy	- Lack of physicians who are trained to perform procedure - Colonoscope not functioning - colonoscopy devices will be available soon		
	Fecal Occult Blood Test	The sensitive test is not available		
OFF-island referral options available				
Question	Yes	No	Total Responses	
Colorectal	100.00%	0.00%	8	
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit	No Cost Limit	Total Responses	
Colorectal	100.00%	0.00%	7	

Note: All jurisdictions answered the survey except Chuuk and Pohnpei.

Source: Pacific Regional Central Cancer Registry Screening, Diagnosis and Treatment Survey, December 2013

Table 7 Crude and age-standardized rates of Colon & Rectum per 100,000 over age 20, ranked by rate adjusted to World Std pop (U.S. 2000 Standard Population, World Standard Population 2000-2025)

	Cases	Crude	US Std	World Std
USAPI	271	17.2	19.4	14.0
Guam	216	35.4	32.2	23.9
Palau	12	13.9		
Yap	4	10.3		
American Samoa	13	7.3		
Republic of the Marshall Islands	9	5.5		
Pohnpei	5	4.4		
Kosrae	1			
United States*		47.4	44.8	
World^		19.3		17.2

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

* U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013.

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014



Human Papillomavirus (HPV) Associated Cancers

Although the total numbers of non-cervical HPV-associated cancers are small, the PRCCR is tracking HPV-related disease in relation to the implementation of the HPV vaccination programs. The Flag Territories are able to purchase vaccines through both the Vaccines for Children (VFC), as well as the 317 programs. The FAS are only eligible to purchase through the 317 programs. HPV vaccination started in 2008 in the CNMI and in most of the other jurisdictions in 2009. Chuuk started in 2010 and American Samoa in 2012. As the vaccine costs remain quite high, only limited numbers can be ordered. Target age ranges for vaccination of girls vary between the 9-18 year old range, with decisions based on many factors, including teen pregnancy rate (suggesting higher rates of early initiation of sexual activity and HPV risk), accessibility to the target population (high school vs. middle school vs. elementary schools), geography & timing of the boat trips to the outer islands and cooperation with the Departments or Ministries of Education. HPV vaccination is primarily school based, but public health clinics and community health centers also offer the vaccine. Some jurisdictions have been able to achieve more than 80% coverage of their target populations. Given the current inability to provide cervical cancer screening to more than 80% of their populations, HPV vaccination is a critical prevention measure. The numerous improvements in health systems and health workforce needed to provide cervical cancer screening to >80% of the population will take time.

Table 8 Crude rates of HPV-associated Anal and Oral Cavity & Pharynx cancers per 100,000 over age 20, ranked by rate adjusted to World Std pop (U.S. 2000 Standard Population, World Standard Population 2000-2025)

All USAPI	Cases	Crude	US Std	World Std
Cervical cancer	160	26.8	20.2	17.4
OC&P	21	3.5	3.1	2.6
Anus /Rectum	5			
Penis	4			
Vagina & vulva	1			
USAPI Total				

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Liver Cancer

Signs and symptoms: Common symptoms include abdominal pain and/or swelling, weight loss, weakness, loss of appetite, jaundice (a yellowish discoloration of the skin and eyes), and fever. Enlargement of the liver is the most common physical sign.

Risk factors: In the US and other western countries, alcohol-related cirrhosis, and possibly nonalcoholic fatty liver disease associated with obesity, account for the majority of liver cancer cases. Chronic infections with hepatitis B virus (HBV) and hepatitis C virus (HCV) are associated with less than half of liver cancer cases in the US, although they are the major risk factors for the disease worldwide, including the USAPI. In the US, rates of HCC are higher in immigrants from areas where HBV is endemic, such as China, Southeast Asia, and sub-Saharan Africa. Although the USAPI population is comparatively small in the U.S., HBV is considered endemic in the USAPI. A vaccine that protects against HBV has been available since 1982. The HBV vaccination is recommended for all infants at birth; for all children under 18 years of age who were not vaccinated at birth; for adults in high-risk groups (e.g., health care workers and those younger than 60 years who have been diagnosed with diabetes). It is also recommended that all pregnant women be tested for HBV. These policies hold true in the USAPI, although some jurisdictions with widely dispersed geography and many small outer islands have

suboptimal rates of infant HBV vaccination.

There is no vaccine available against HCV, but there are treatments that can clear infection and halt liver disease progression. It is estimated that persons who were born between 1945 and 1965 account for about three-fourths of HCV-infected individuals and HCV-related deaths in the US. Therefore, the CDC now recommends one-time HCV testing for all persons born from 1945 to 1965 in addition to routine testing for individuals at high risk (e.g., injection drug users). Infected individuals can receive treatment that may reduce their risk of liver cancer and counseling to reduce the risk of HCV transmission to others. However, the medication is not widely available throughout the USAPI. Other preventive measures for HCV infection include screening of donated blood, organs, and tissues; adherence to infection control practices during medical, surgical, and dental procedures; and needle-exchange programs for injecting drug users.

Early detection: Screening for liver cancer has not been proven to improve survival. Nonetheless, many doctors in the US screen high-risk persons (e.g., HBV or HCV-infected persons with cirrhosis) with ultrasound or blood tests.

Adapted from: American Cancer Society, Cancer Facts and Figures 2013

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Liver	AFP Blood test	75.00%	25.00%	8
	Ultrasound	100.00%	0.00%	7
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Liver	0.00%	100.00%	Only on Guam	3
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Liver	AFP Blood test	- Blood is drawn on-island, however, the specimen is then sent to Hawaii for the test to be run and read (some jurisdictions). The lab staff receives the results within 10 days after the specimen was sent. - Specialized test that is done off-island.		
	Ultrasound	limited staff to perform and read; limited equipment		
OFF-island referral options available				
Site	Yes		No	Total Responses
Liver	100.00%		0.00%	8
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit		No Cost Limit	Total Responses
Liver	85.71%		14.29%	7

Note: All jurisdictions answered the survey except Chuuk and Pohnpei.

Source: Pacific Regional Central Cancer Registry Screening, Diagnosis and Treatment Survey, December 2013

Table 9 Crude and age-standardized rates of Liver per 100,000 over age 20, ranked by rate adjusted to World Std pop (U.S. 2000 Standard Population, World Standard Population 2000-2025)

	Cases	Crude	US Std	World Std
USAPI	187	11.9	10.9	8.6
Guam	109	17.9	14.8	11.7
Republic of the Marshall Islands	19	11.6	14.4	12.0
Palau	23	26.6	22.0	17.6
Pohnpei	12	10.4		
Yap	11	28.2		
Chuuk	3	2		
American Samoa	3	1.7		
Kosrae	2	9.9		
CNMI	5	2.4		
United States*		7.5	6.9	
World^		9.6		6.1

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

* U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013.

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014



Lung & Bronchus Cancer

Signs and symptoms: Symptoms may include persistent cough, sputum streaked with blood, chest pain, voice change, and recurrent pneumonia or bronchitis.

Risk factors: Cigarette smoking is by far the most important risk factor for lung cancer; risk increases with both quantity and duration of smoking. In most USAPI jurisdictions, 23-26% of youth report any tobacco use or are current users. In the FSM 37% of youth have used tobacco. In Palau, 50% of youth report any tobacco use. Adult current smokers range from 20-32% of their population. Cigar and pipe smoking also increase risk. Exposure to radon gas released from soil and building materials is estimated to be the second leading cause of lung cancer in Europe and North America.

Other risk factors include occupational or environmental exposure to secondhand smoke, asbestos (particularly among smokers), certain metals (chromium, cadmium, arsenic), some organic chemicals, radiation, air pollution, diesel exhaust, and paint. Additional occupational exposures that increase lung cancer risk include rubber manufacturing, paving, roofing, and chimney sweeping. Risk is also probably increased among people with a medical history of tuberculosis. Genetic susceptibility plays a contributing role in the development of lung cancer, especially in those who develop the disease at a young age.

Early detection: As of December 2013, the U.S. Preventive Services Task Force (USPSTF) recommends annual screening for lung cancer with low-dose computed tomography in high-risk adults. This is defined as adults ages 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery. Other than these high risk patients, there is no evidence to support screening in the general, low-risk populations. Potential risks associated with screening, including the high rate of false positive results, cumulative radiation exposure from multiple CT scans, and unnecessary lung biopsy and surgery, are important considerations.

Of note, there is no CT capability in the RMI or any of the FSM States. Chest x-rays are widely available, but are not effective screening methods. If patients have symptoms, chest x-rays are the mainstay of diagnosis. Bronchoscopy is only available in a few jurisdictions.

Adapted from: American Cancer Society, Cancer Facts and Figures 2013

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Lung & Bronchus	CT Scan	62.50%	37.50%	8
	Chest X-ray	100.00%	0.00%	8
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Lung & Bronchus	0.00%	100.00%	only on Guam	3
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Lung & Bronchus	CT Scan	trained personnel to read and to perform are limited staff to do procedures		
	Chest X-ray			
OFF-island referral options available				
Question	Yes		No	Total Responses
Lung & Bronchus	100.00%		0.00%	8
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit		No Cost Limit	Total Responses
Lung & Bronchus	85.71%		14.29%	7

Note: All jurisdictions answered the survey except Chuuk and Pohnpei.

Source: Pacific Regional Central Cancer Registry Screening, Diagnosis and Treatment Survey, December 2013

Table 10 Crude and age-standardized rates of Lung & Bronchus per 100,000 over age 20, ranked by rate adjusted to World Std pop (U.S. 2000 Standard Population, World Standard Population 2000-2025)

	Cases	Crude	US Std	World Std
USAPI Total	462	29.3	35.2	25.3
Guam	339	55.6	54.1	38.7
Yap	15	38.4	36.1	31.7
Kosrae	7	33.5		
Palau	26	30.1	30.0	23.0
Republic of the Marshall Islands	29	17.8	32.1	23.6
Pohnpei	16	13.9	18.0	12.9
CNMI	16	7.6	10.3	7.7
Chuuk	10	6.7		
American Samoa	4	2.2		
United States*		69.8	66.0	
World^		25.9		23.1

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

* U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013.

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014

Leukemia

Signs and symptoms: Symptoms may include fatigue, paleness, weight loss, repeated infections, fever, bruising easily, and nose-bleeds or other hemorrhages. In acute leukemia, these signs can appear suddenly. Chronic leukemia typically progresses slowly with few symptoms and is often diagnosed during routine blood tests. Patients with CLL may experience swollen lymph nodes or pain in the upper left abdomen due to an enlarged spleen.

Risk factors: Exposure to ionizing radiation increases risk of several types of leukemia (excluding CLL). Medical radiation, such as that used in cancer treatment, is a substantial source of radiation exposure. Leukemia may also occur as a side effect of chemotherapy. Children with Down syndrome and certain other genetic abnormalities are at increased risk of leukemia. Recent studies suggest that obesity increases risk of leukemia.

Family history is one of the strongest risk factors for CLL. Cigarette smoking is a risk factor for AML, and there is limited evidence that parental smoking and maternal exposure to paint increases the risk of childhood leukemia. Exposure to certain chemicals, such as formaldehyde and benzene (a component in cigarette smoke and gasoline that has become more regulated due to its carcinogenicity), also increases risk of AML. Infection with human T-cell leukemia virus type I (HTLV-I) can cause a rare type of leukemia called adult T-cell Leukemia/lymphoma. The prevalence of HTLV-I infection is geographically localized and is most common in southern Japan and the Caribbean; infected individuals in the US tend to be descendants or immigrants from endemic regions.

Early detection: Leukemia can be difficult to diagnose early because symptoms often resemble those of other, less serious conditions. When a physician does suspect leukemia, diagnosis can be made using blood tests and a bone marrow biopsy.

Treatment: Chemotherapy is the most effective method of treating leukemia. Various anticancer drugs are used, either in combination or as single agents. Some drugs are very effective because they target the genetic abnormality that is the hallmark of CML. People diagnosed with CLL that is not progressing or causing symptoms may not require treatment. Recent clinical trials have shown that adults with AML who are treated with twice the conventional dose of daunorubicin experience higher and more rapid rates of remission. Antibiotics and transfusions of blood components are used as supportive treatments. With the exception of Guam, the USAPI does not have the capacity to initiate chemotherapy. In some areas, patients who receive their first course of treatment elsewhere can then return to their home jurisdiction to receive maintenance chemotherapy.

Survival: Survival rates vary substantially by leukemia type – and access to treatment -- ranging from a 5-year relative survival of 25% for patients diagnosed with AML to 82% for those with CLL. Advances in treatment have resulted in a dramatic improvement in survival over the past three decades for most types of leukemia.

Adapted from: American Cancer Society, Cancer Facts and Figures 2013

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Leukemia	Bone marrow biopsy	25.00%	75.00%	8
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Leukemia	0.00%	100.00%	only on Guam	3
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Leukemia	Bone marrow biopsy	- Lack of resources and trained individuals to perform screening test - The equipment needed to perform the biopsy is not readily available on-island. - Limited staff to perform and read/supplies.		
OFF-island referral options available				
Site	Yes		No	Total Responses
Leukemia	100.00%		0.00%	8
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit		No Cost Limit	Total Responses
Leukemia	100.00%		0.00%	7

Note: All jurisdictions answered the survey except Chuuk and Pohnpei.

Source: Pacific Regional Central Cancer Registry Screening, Diagnosis and Treatment Survey, December 2013

Table 11 Crude and age-standardized rates of Leukemia per 100,000 over age 20, ranked by rate adjusted to World Std pop (U.S. 2000 Standard Population, World Standard Population 2000-2025)

	Cases	Crude	US Std	World Std
USAPI Total	124	7.9	9.9	6.7
Guam	96	15.7	16.8	11.2
Republic of the Marshall Islands	11	6.7		
Kosrae	5	23.9		
Pohnpei	4	3.5		
CNMI	3	1.4		
Palau	4	4.6		
American Samoa				
United States*				
World^		13.3	12.8	

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

* U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013.

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014

Oral Cavity and Pharyngeal Cancer

Signs and symptoms: Symptoms may include a sore in the throat or mouth that bleeds easily and does not heal, a persistent red or white patch or a lump or thickening in the throat or mouth, ear pain, a neck mass, or coughing up blood. Difficulties in chewing, swallowing, or moving the tongue or jaws are often late symptoms.

Risk factors: Known risk factors include all forms of smoked and smokeless tobacco products, chewing *areca catechu* (betel nut) with or without tobacco, and excessive consumption of alcohol. Betel nut is the fourth most common habit worldwide (after tobacco, alcohol and caffeine) and chewing is practiced by many children and adults in Palau and Yap and by many adults in Guam, CNMI, Chuuk and Pohnpei. Betel nut use is increasing in the RMI. Many studies have reported a synergism between smoking and alcohol use, resulting in a more than 30-fold increased risk for individuals who both smoke and drink heavily. HPV infection is associated with cancers of the tonsil, base of tongue, and some

other sites within the oropharynx and is believed to be transmitted through sexual contact.

Early detection: Cancer can affect any part of the oral cavity, including the lip, tongue, mouth, and throat. Through visual inspection, dentists and primary care physicians can often detect premalignant abnormalities and cancer at an early stage, when treatment is both less extensive and more successful.

Treatment: Radiation therapy and surgery, separately or in combination, are standard treatments; chemotherapy is added for advanced disease. Few USAPI jurisdictions have the surgical capacity to treat advanced stages of head and neck cancers.

Survival: For all stages combined, about 84% of persons with oral cavity and pharynx cancer survive 1 year after diagnosis. The 5-year and 10-year relative survival rates are 62% and 51%, respectively, based on US data..

Adapted from: American Cancer Society, Cancer Facts and Figures 2013 and

Paulino, Y., *Areca (Betel) Nut Chewing Practices in Micronesian Populations*. Hawaii Journal of Public Health, 2011. 3(1): p. 19-29

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Oral & Pharynx	Oral Screening	87.50%	12.50%	8
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Oral & Pharynx	33.33%	66.67%	Only on Guam	4
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Oral & Pharynx	Oral Screening	not done consistently by doctors; done by dentists in USAPI with high betel nut use. No widespread screening programs		
OFF-island referral options available				
Site	Yes		No	Total Responses
Oral & Pharynx	100.00%		0.00%	8
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit		No Cost Limit	Total Responses
Oral & Pharynx	100.00%		0.00%	7

Note: All jurisdictions answered the survey except Chuuk and Pohnpei.

Table 12 Crude and age-standardized rates of Oral Cavity and Pharynx Cancer per 100,000 over age 20, ranked by rate adjusted to World Std pop (U.S. 2000 Standard Population, World Standard Population 2000-2025)

	Cases	Crude	US Std	World Std
USAPI Total	147	11.2	9.6	7.7
Guam	71	14.0	11.6	9.0
Yap	21	64.6	42.8	38.4
Republic of the Marshall Islands	20	14.7	12.6	11.7
Pohnpei	16	16.7	12.0	10.9
Palau	8	11.1		
CNMI	5	2.8		
American Samoa	3			
Chuuk	2			
Kosrae	1			
United States*		11.9	11.0	
World^		4.3		4.0
Papua New Guinea^		14.0		25.0

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2011

* U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute

^ Crude and age-standardized rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014



Color variation of the betel nut fruit².



Unripe and ripe nuts¹³.



Components of a betel quid including *Piper betle* (leaf), tobacco, and slaked lime¹⁴.

Photos from a May 2012 presentation to the CCPI by Dr. Yvette Paulino, University of Guam

Thyroid Cancer

Signs and symptoms: The most common symptom of thyroid cancer is a lump in the neck that is noticed by a patient or felt by a health care provider during a clinical exam. Other symptoms include a tight or full feeling in the neck, difficulty breathing or swallowing, hoarseness or swollen lymph nodes, and pain in the throat or neck that does not go away. Although most lumps in the thyroid gland are not cancerous, individuals who notice an abnormality should seek timely medical attention.

Risk factors: Risk factors for thyroid cancer include being female, having a history of goiter (enlarged thyroid) or thyroid nodules, a family history of thyroid cancer, and radiation exposure related to medical treatment during childhood. Radiation exposure as a result of radioactive fallout from nuclear weapons testing and nuclear power plant accidents, such as in the Republic of the Marshall Islands, has also been linked to increased risk of thyroid cancer, especially in children. Certain rare genetic syndromes also increase risk. People who test positive for an abnormal gene that causes a hereditary form of thyroid cancer can decrease the risk of developing the disease with surgical removal of the thyroid gland. Unlike most other adult cancers, for which older age increases risk, 80% of newly diagnosed thyroid cancer patients are under 65 years of age.

Early detection: At present, there is no screening test recommended for the early detection of thyroid cancer in people without symptoms. However, because symptoms usually develop early, most thyroid cancers (68%) are diagnosed at an early stage. Tests used in the evaluation of thyroid nodules include: blood tests to determine levels of hormones related to normal functions of the thyroid gland; radiology imaging techniques to

determine the size and characteristics of the nodule and nearby lymph nodes; and biopsy to determine if the cells in the nodule are benign or malignant.

Treatment: Most thyroid cancers are highly curable, though about 5% of cases (medullary and anaplastic) are more aggressive and more likely to spread to other organs. Treatment depends on the cell type, tumor size, and extent of the disease. The first choice of treatment is surgery in nearly all cases. Total or partial removal of the thyroid gland (thyroidectomy), with or without lymph node removal, is recommended for most patients. Treatment with radioactive iodine (I-131) after surgery to destroy any remaining thyroid tissue may be recommended for more advanced disease. Hormone therapy is given after thyroidectomy to replace hormones normally produced by the thyroid gland and to prevent the body from making thyroid-stimulating hormone, decreasing the likelihood of recurrence.

Survival: The 5-year relative survival rate for all thyroid cancer patients is 98%. However, survival varies by stage, age at diagnosis, and disease subtype. The 5-year survival rate approaches 100% for localized disease, is 97% for regional stage disease, and 54% for distant stage disease. For all stages combined, survival is highest for patients younger than 45 years of age (almost 100%), and progressively decreases to 83% for those 75 or older.

Adapted from: American Cancer Society, Cancer Facts and Figures 2013

Available Screening Method ON-island				
Type of Cancer	Medium	Yes	No	Total Responses
Thyroid	Nuclear medicine scan	12.50%	87.50%	8
	Ultrasound	75.00%	25.00%	8
ON-Island Treatment Options Available				
Site	Surgery	Chemotherapy	Radiation	Total Responses
Thyroid	85.71%	28.57%	only on Guam	9
Barriers to the available Screening Method ON-island				
Type of Cancer	Medium	Comment/s:		
Thyroid	Nuclear medicine scan	Not available in most USAPI		
	Ultrasound	limited availability of equipment or personnel in most USAPI		
OFF-island referral options available				
Site	Yes		No	Total Responses
Thyroid	100.00%		0.00%	8
Available OFF-island referral option with cost limit per type of cancer				
Type of Cancer	Yes Cost Limit		No Cost Limit	Total Responses
Thyroid	100.00%		0.00%	7

Note: All jurisdictions answered the survey except Chuuk and Pohnpei.

Source: Pacific Regional Central Cancer Registry Screening, Diagnosis and Treatment Survey, December 2013

Table 13 Crude and age-standardized rates of Thyroid Cancer per 100,000 over age 20, ranked by rate adjusted to World Std pop (U.S. 2000 Standard Population, World Standard Population 2000-2025)

	Cases	Crude	US Std	World Std
USAPI Total	116	7.4	5.9	4.9
Guam	96	15.7	11.7	9.9
Palau	8	9.3		
Pohnpei	4			
Yap	3			
American Samoa	2			
Republic of the Marshall Islands	2			
United States*		12.8	12.5	
World^		4.2		4.0

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

* U.S. Cancer Statistics Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2013.

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014

Top 10 Cancer Sites by Jurisdiction

American Samoa

American Samoa	
Political status with U.S.A.	Territory
Total Population	54,719
Land surface area (sq. km)	199
Coastline (sq. km)	116
Public transportation	Yes
4-year University or College	
2-year College	1
Hospitals	1
Regularly occurring continuing education program for physicians or nurses	Physicians
Health expenditures per capita	\$500
Cancer ranking in all-cause mortality	2 nd
Age Structure	0-14 years: 25.2% (male 6,809/female 7,005) 15-24 years: 20.9% (male 5,657/female 5,760) 25-54 years: 41.5% (male 11,662/female 11,028) 55-64 years: 7.7% (male 2,096/female 2,134) 65 years and over: 4.7% (male 1,189/female 1,379)
Birth Rate	22.84 births/1,000 population
Death Rate	4.62 deaths/1,000 population
Life Expectancy	total population: 74.68 years country comparison to the world: 106 male: 71.73 years female: 77.8 years (2013 est.)

AMERICAN SAMOA PROGRAM OR SERVICE	
CANCER SCREENING	
BCCEDP	X
Mammography	X
Pap Smears	X
On-island processing of pap smears	
Cervical cancer screening using VIA	
Colorectal cancer screening (FOBT)	X
Prostate cancer screening	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
On-island histopathology	X some
General Radiologist	X
General surgeon	X
OB-Gyn	X
Surgical subspecialists	X
Oncologist	
On-island chemotherapy	
On-island radiation therapy	
Off-island referral to Philippines for diagnosis / treatment	
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand for diagnosis / treatment	X
Off-island referral to U.S. Mainland for diagnosis / treatment	X

Table 14 American Samoa: Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for AS	Cases	Crude	US Std	World Std
All Sites	143	80.0	81.9	61.8
Breast	30	33.5	30.4	24.2
Uterus	29	32.3	28.1	23.1
Colorectal	13	7.3		
Cervical Cancer, invasive	10	11.2		
Stomach	9	5.0		
Prostate	7	7.9		
Ovary	5	5.6		
Ill-defined & unspecified (unknown+misc)	5	2.8		
Lung & Bronchus	4	2.2		
Liver	3	1.7		

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2012 are shown in the table above. Breast and Uterine cancer are the top two cancers diagnosed in American Samoa. As mammography services are occasionally limited – and there was a time period where little mammography was performed – there may be some under-reporting of breast cancer cases. Because of limitations in screening and diagnosis, other cancers may be underreported. We have included crude incidence rates for the top 10 cancers in American Samoa. This number can be used by health officials to look at trends in cancer diagnosis over time. This number can be used as one measure of health system improvements in detecting cancer cases.

Treatment options vary by cancer, but in general are limited to early stage cancers. Surgeons are available on-island to manage most early cancers requiring resection. As there is almost no budget for off-island referral (for diagnostic confirmation, advanced staging techniques or advanced treatment), the clinicians must decide on how much treatment can be safely provided on island. The availability of maintenance chemotherapy is limited. No radiation therapy, brachytherapy or hormonal therapy options exist. Patient who are able to go off-island for care usually do so at their own expense (some patients have Medicare) and seek care in Honolulu, New Zealand or the US mainland.

Provision of hospital-based and home-based palliative care services is in early stages of development. Efforts to train staff and family caregivers are ongoing. There has been increased efforts over the past 4 years to increase provider awareness and education and improve the system's capacity to provide palliative care to those patients with advanced cancers.

The American Samoa Cancer Registry serves an important public health function. Data on cancers in American Samoa residents are collected so that the Territory's health system can make informed decisions about areas to focus precious resources. Certain types of cancers are able to be detected earlier than others (screened), so information on those types of cancers can be used to help improve resources to screening programs, guide outreach activities and policy change. The American Samoa Cancer Registry responds to data requests from local high school and college students, NCD Coalition members, Cancer Coalition, BCCP program, Department of Health Quality Assurance officer, and local physicians. The most common types of data requests include types of cancers, what proportion of cancer contribute to death in American Samoa, survival rates for specific cancers, and percent of patients who seek treatment off-island. Cancer registry data is used by policy makers, public health programs, community coalitions and local researchers. The cancer data has influenced decision-making in screening recommendations and awareness efforts and has lent support for significant Territory-wide policy changes related to Tobacco, Breast Cancer Screening and support for patients with cancer.

The American Samoa Cancer registry works with the American Samoa Comprehensive Cancer Control Program and Community Cancer Coalition to create fact sheets which are available for public distribution and can be downloaded online. Data includes incidence and mortality counts and trends seen in the years covered in the registry database. Other information for the fact sheets are compiled from NCD partners from within the Department of Health and the Department of Education.

Commonwealth of the Northern Mariana Islands

CNMI	
Political status with U.S.A.	Commonwealth
Total Population	51,170
Land surface area (sq. km)	477
Coastline (sq. km)	1,482
Public transportation	Yes
4-year University or College	
2-year College	1
Hospitals	1
Regularly occurring continuing education program for physicians or nurses	Yes
Health expenditures per capita	\$519
Cancer ranking in all-cause mortality	2 nd
Age Structure	0-14 years: 26% (male 6,970/female 6,333) 15-24 years: 14.9% (male 4,133/female 3,471) 25-54 years: 45.5% (male 9,906/female 13,396) 55-64 years: 9.3% (male 2,592/female 2,187) 65 years and over: 4.3% (male 1,033/female 1,149)
Birth Rate	19.6 births/1,000 population
Death Rate	3.52 deaths/1,000 population
Life Expectancy	total population: 77.45 years country comparison to the world: 67 male: 74.8 years female: 80.26 years

CNMI PROGRAM OR SERVICE	
CANCER SCREENING	
BCCEDP	X
Mammography	X
Pap Smears	X
On-island processing of pap smears	
Cervical cancer screening using VIA	
Colorectal cancer screening (FOBT)	X
Prostate cancer screening	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	
On-island histopathology	
General Radiologist	
General surgeon	X
OB-Gyn	X

Surgical subspecialists	X
Oncologist	
CANCER DIAGNOSIS AND TREATMENT	
On-island chemotherapy	X (maintenance)
On-island radiation therapy	
Off-island referral to Philippines for diagnosis / treatment	X
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand for diagnosis / treatment	
Off-island referral to U.S. Mainland for diagnosis / treatment	X

Table 15 Commonwealth of the Northern Mariana Islands: Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for CNMI	Cases	Crude	US Std	World Std
All Sites	99	46.8	44.9	37.1
Breast	24	24.3	18.8	15.9
Lung & Bronchus	16	7.6	10.3	7.7
Prostate	9	8.3		
Colon & Rectum	7	3.3		
HPV-associated OC&P	6	2.8		
Liver	5	2.4		
Stomach	3	1.4		
Leukemia	3	1.4		
Cervical Cancer, invasive	2			

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2012 are shown in the table above. Breast cancer is currently the cancer most diagnosed in CNMI, however many cancer cases are yet to be entered and reported to the cancer registry, so the numbers presented here are lower than expected based on prior assessments. Because of limitations in screening and diagnosis, other cancers may be underreported. We have included crude incidence rates for the top 10 cancers CNMI. This number can be used by health officials to look at trends in cancer diagnosis over time. This number can be used as one measure of health system improvements in detecting cancer cases.

Treatment options vary by cancer, but in general are limited to early stage cancers. Surgeons are available on-island to manage most early cancers requiring resection. As there is limited budget for off-island referral (for diagnostic confirmation, advanced staging techniques or advanced treatment), the clinicians must decide on how much treatment can be safely provided on island. The availability of maintenance chemotherapy is limited. No radiation therapy, brachytherapy or hormonal therapy options exist. Patient who are able to go off-island for care usually do so at their own expense (some patients have Medicare) and seek care in

Honolulu, Guam or the US mainland.

Provision of hospital-based and home-based palliative care services is in early stages of development. Efforts to train staff and family caregivers are ongoing. There has been increased efforts over the past 4 years to increase provider awareness and education and improve the system's capacity to provide palliative care to those patients with advanced cancers.

The CNMI Cancer Registry serves an important public health function. Data on cancers in CNMI residents are collected so that the Territory's health system can make informed decisions about areas to focus precious resources. Certain types of cancers are able to be detected earlier than others (screened), so information on those types of cancers can be used to help improve resources to screening programs, guide outreach activities and policy change. The cancer registry responds to data requests from local high school and college students, NCD Coalition members, Cancer Coalition, BCCP program, Department of Health Quality Assurance officer, and local physicians. The most common types of data requests include types of cancers, what proportion of cancer contribute to death, survival rates for specific cancers, and percent of patients who seek treatment off-island. Cancer registry data is used by policy makers, public health programs, community coalitions and local researchers. The cancer data has influenced decision-making in screening recommendations and awareness efforts and has lent support for significant policy changes related to palliative care and tobacco control.

Federated States of Micronesia

The Federated States of Micronesia is a constitutional federation of four states: Chuuk, Kosrae, Pohnpei and Yap, with the capital located in Palikir, Pohnpei.

FSM	
Political status with U.S.A.	Freely Associated
Total Population	106,104
Land surface area (sq. km)	702
Coastline (sq. km)	6,112
Public transportation	None
4-year University or College	
2-year College	X
Hospitals	5 (1 private in Pohnpei)
Regularly occurring continuing education program for physicians or nurses	Building CE programs
Health expenditures per capita	\$147
Cancer ranking in all-cause mortality	5 th
Age Structure	0-14 years: 32.4% (male 17,478/female 16,915) 15-24 years: 20.4% (male 10,933/female 10,715) 25-54 years: 37.6% (male 19,370/female 20,551) 55-64 years: 6.3% (male 3,374/female 3,360) 65 years and over: 3.2% (male 1,500/female 1,908)
Birth Rate	21.44 births/1,000 population
Death Rate	4.27 deaths/1,000 population
Life Expectancy	total population: 72.07 years country comparison to the world: 136 male: 70.09 years female: 74.16 years (2013 est.)

FSM PROGRAM OR SERVICE				
CANCER SCREENING				
	Chuuk	Kosrae	Pohnpei	Yap
BCCEDP				
Mammography				
Pap Smears	X	X	X	X
On-island processing of pap smears				
Cervical cancer screening using VIA	X		X	X
Colorectal cancer screening (FOBT)			X	X
Prostate cancer screening			X	X
CANCER DIAGNOSIS AND TREATMENT				
Pathologist				
On-island histopathology				
General Radiologist				
General surgeon	X	X	X	X
OB-Gyn		X	X	X
Surgical subspecialists				
Oncologist				
On-island chemotherapy (maintenance only)			X	X
On-island radiation therapy				
Off-island referral to Philippines for diagnosis / treatment	X	X	X	X
Off-island referral to Hawaii for diagnosis / treatment	X	X	X	X
Off-island referral to New Zealand for diagnosis / treatment				
Off-island referral to U.S. Mainland for diagnosis / treatment				

Table 16 FSM (all States): Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for FSM	Cases	Crude	US Std	World Std
All Sites	325	103.8	102.1	82.9
Lung & Bronchus	48	14.8	16.6	13.2
Cervical Cancer, invasive	37	22.8	18.2	16.0
Breast	34	21.0	18.0	15.0
Tobacco-related Oral Cavity & Pharynx	31	9.6	7.0	6.4
Liver	28	8.6	7.6	6.5
Uterus	18	5.5	6.1	4.9
Prostate	17	5.2	9.7	5.9
Colon & Rectum	14	4.3		
Nasopharynx	11	3.4		
Ill-defined & unspecified (unknown+misc)	10	3.1		
Leukemia	10	3.1		

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2012 are shown in the table above and, by State, on the next pages. Lung, breast and cervical cancer are currently the cancers most diagnosed in the FSM, however many cancer cases are yet to be entered and reported to the cancer registry from Chuuk State, so the number presented here are lower than expected based on prior assessments. Because of limitations in screening and diagnosis, other cancers may be underreported. We have included crude incidence rates for the top 10 cancers. This number can be used by health officials to look at trends in cancer diagnosis over time. This number can be used as one measure of health system improvements in detecting cancer cases. Pohnpei has cervical cancer cases 4 times as high as the U.S. rates and Yap has the highest rates of oral cancer in the world.

Treatment options vary by cancer, but in general are limited to early stage cancers. One or two surgeons are available on-island to manage most early cancers requiring resection. As there is limited budget for off-island referral (for diagnostic confirmation, advanced staging techniques or advanced treatment), the clinicians must decide on how much treatment can be safely provided on island. The availability of maintenance chemotherapy is limited. No radiation therapy, brachytherapy or hormonal therapy options exist. Off-island referrals to the Philippines is considered only for those patients diagnosed early, where their 5-year survival rate is expected to be more than 50%.

Provision of hospital-based and home-based palliative care services is in early stages of development. Efforts to train staff and family caregivers are ongoing. There has been increased efforts over the past 4 years to increase provider awareness and education and improve the system's capacity to provide palliative care to those patients with advanced cancers.

The Cancer Registries in the FSM serve an important public health function. Data on cancers are collected so that the health system can make informed decisions about areas to focus precious resources. Certain types of cancers are able to be detected earlier than others (screened), so information on those types of cancers can be used to help improve resources to screening programs, guide outreach activities and policy change. The cancer registry responds to data requests from NCD Coalition members, Cancer Coalition, Department of Health Quality Assurance officer, and local physicians. The most common types of data requests include types of cancers, what proportion of cancer contribute to death, survival rates for specific cancers, and percent of patients who seek treatment off-island. Cancer registry data is used by policy makers, public health programs, and community coalitions. The cancer data has influenced decision-making in screening recommendations and awareness efforts and has lent support for significant policy changes related to National Guidelines for Breast and Cervical Cancer, Tobacco and betel nut control.

Table 17 Chuuk: Incident Cancer Cases 2007-2012 [data incomplete]

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for Chuuk	Cases	Crude	US Std	World Std
All Sites	42	28.1	28.2	22.4
Lung & Bronchus	10	6.7		
Breast	5	6.8		
Colon & Rectum	4	2.7		
Cervical Cancer, invasive	3	4.1		
Ill-defined & unspecified (unknown+misc)	3	2.0		
Liver	3	2.0		
Pancreas	3	2.0		
Nasopharynx	2			
Ovary	2			

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Table 18 Kosrae: Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for Kosrae	Cases	Crude	US Std	World Std
All Sites	25	119.7	93.7	79.6
Lung & Bronchus	7	33.5		
Leukemia	5	23.9		
Breast	2	29.0		
Liver	2	9.9		
Stomach				
Non-Hodgkin Lymphoma				
Colon & Rectum				
Tobacco-related oral cavity & pharynx				
Pancreas				

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Table 19 Pohnpei: Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for Pohnpei	Cases	Crude	US Std	World Std
All Sites	149	129.7	136.4	108.0
Cervical Cancer, invasive	29	50.5	40.5	36.3
Breast	18	31.3	31.9	24.7
Lung & Bronchus	16	13.9	18.0	12.9
Liver	12	10.4		
Uterus	10	17.4		
Nasopharynx	9	7.8		
Tobacco-related oral cavity & pharynx	9	7.8		
Prostate	7	12.2		
Colon & Rectum	5	4.4		
Stomach	4	3.5		

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Table 20 Yap: Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for YAP	Cases	Crude	US Std	World Std
All Sites	109	279.4	237.4	197.4
Tobacco-related oral cavity & pharynx	20	51.3	34.1	30.7
Lung & Bronchus	15	38.4		
Liver	11	28.2		
Prostate	9	48.1		
Breast	9	44.2		
Uterus	7	34.4		
Larynx	7	17.9		
Cervical Cancer, invasive	5	24.6		
Ill-defined & unspecified (unknown+misc)	4	10.3		
Colon & Rectum	4	10.3		

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Guam

Guam	
Political status with U.S.A.	Unincorporated Territory
Total Population	160,378
Land surface area (sq. km)	541
Coastline (sq. km)	125
Public transportation	Yes
4-year University or College	1
2-year College	1
Hospitals	2 (second one to open in 2015)
Regularly occurring continuing education program for physicians or nurses	Both; hospital and PHN
Health expenditures per capita	\$1,032
Cancer ranking in all-cause mortality	2 nd
Age Structure	0-14 years: 26.4% (male 21,806/female 20,480) 15-24 years: 16.9% (male 13,961/female 13,156) 25-54 years: 39.5% (male 32,312/female 30,962) 55-64 years: 9.1% (male 7,325/female 7,273) 65 years and over: 8.2% (male 5,950/female 7,153)
Birth Rate	17.23 births/1,000 population
Death Rate	4.95 deaths/1,000 population
Life Expectancy	total population: 78.66 years country comparison to the world: 50 male: 75.62 years female: 81.89 years

GUAM PROGRAM OR SERVICE	
CANCER SCREENING	
BCCEDP	X
Mammography	X
Pap Smears	X
On-island processing of pap smears	
Cervical cancer screening using VIA	
Colorectal cancer screening (FOBT)	X
Prostate cancer screening	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
On-island histopathology	X
General Radiologist	X
General surgeon	X
OB-Gyn	X

Surgical subspecialists	X
Oncologist	4 - 7
CANCER DIAGNOSIS AND TREATMENT	
On-island chemotherapy	3
On-island radiation therapy	2
Off-island referral to Philippines for diagnosis / treatment	X
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand for diagnosis / treatment	
Off-island referral to U.S. Mainland for diagnosis / treatment	X

Table 21 Guam: Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for Guam	Cases	Crude	US Std	World Std
All Sites	1982	325.0	296.3	219.6
Lung & Bronchus	339	55.6	54.1	38.7
Breast	286	95.6	78.0	60.3
Prostate	250	80.5	91.8	62.4
Colon & Rectum	212	34.8	31.6	23.4
Liver	109	17.9	14.8	11.7
Leukemia	96	15.7	16.8	11.2
Thyroid	96	15.7	11.7	9.9
Uterus	81	27.1	20.6	17.0
Stomach	50	8.4	8.6	5.9
Nasopharynx	48	7.9	6.2	4.9
Cervical Cancer, invasive	46	15.4	11.4	9.7

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2012 are shown in the table above. Please also refer to the Guam Cancer Facts and Figures 2008-2012, available on the Department of Health website.

2008-2012: <https://drive.google.com/folderview?id=0B9-YZDTXKUXCU05IWUEtMFJqazQ&usp=sharing>

Breast, lung and prostate cancers are most diagnosed in the Guam, Because of limitations in screening, other cancers may be underreported. We have included crude incidence rates for the top 10 cancers. This number can be used by health officials to look at trends in cancer diagnosis over time. This number can be used as one measure of health system improvements in detecting cancer cases.

Guam is the only USAPI jurisdiction with radiation oncology available, several medical oncologists as well as

several obstetrician-gynecologists and other surgical subspecialists. Treatment options vary by cancer, but in general the most common cancers can be treated on Guam. Chemotherapy and radiation therapy are available. Brachytherapy or hormonal therapy options exist in limited amounts. Off-island referrals to the Philippines do occur commonly.

Provision of hospital-based and home-based palliative care services is in early stages of development. Guam has the only hospice program in the entire USAPI. Efforts to train staff and family caregivers are ongoing. There has been increased efforts over the past 4 years to increase provider awareness and education and improve the system's capacity to provide palliative care to those patients with advanced cancers.

The Guam Cancer Registry serves an important public health function. Additionally, Guam has the only 4-year University in the USAPI. The University of Guam Cancer Research Center works in partnership with the University of Hawaii Cancer Center. Data on cancers are collected so that the health system can make informed decisions about areas to focus precious resources. Certain types of cancers are able to be detected earlier than others (screened), so information on those types of cancers can be used to help improve resources to screening programs, guide outreach activities and policy change. The cancer registry responds to data requests from NCD Coalition members, Cancer Coalition, Department of Health Quality Assurance officer, local physicians, researchers and policy makers. The most common types of data requests include types of cancers, what proportion of cancer contribute to death, survival rates for specific cancers. Cancer registry data is used by policy makers, public health programs, community coalitions and local researchers. The cancer data has influenced decision-making in numerous policy areas.

Republic of the Marshall Islands

RMI	
Political status with U.S.A.	Freely Associated
Total Population	69,747
Land surface area (sq. km)	181
Coastline (sq. km)	376
Public transportation	None
4-year University or College	
2-year College	X
Hospitals	1
Regularly occurring continuing education program for physicians or nurses	Both
Health expenditures per capita	\$255
Cancer ranking in all-cause mortality	3 rd
Age Structure	0-14 years: 37.2% (male 13,227/female 12,730) 15-24 years: 17.5% (male 6,222/female 5,997) 25-54 years: 36.5% (male 12,931/female 12,499) 55-64 years: 5.5% (male 2,014/female 1,852) 65 years and over: 3.3% (male 1,111/female 1,164)
Birth Rate	27.21 births/1,000 population
Death Rate	4.27 deaths/1,000 population
Life Expectancy	total population: 72.31 years country comparison to the world: 134 male: 70.18 years female: 74.55 years

RMI PROGRAM OR SERVICE	
CANCER SCREENING	
BCCEDP	
Mammography	
Pap Smears	X
On-island processing of pap smears	X
Cervical cancer screening using VIA	X- starting 2014
Colorectal cancer screening (FOBT)	X
Prostate cancer screening	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
On-island histopathology	X
General Radiologist	

General surgeon	X
OB-Gyn	X
Surgical subspecialists	X
Oncologist	
CANCER DIAGNOSIS AND TREATMENT	
On-island chemotherapy	
On-island radiation therapy	
Off-island referral to Philippines for diagnosis / treatment	X
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand for diagnosis / treatment	
Off-island referral to U.S. Mainland for diagnosis / treatment	

Table 22 Republic of the Marshall Islands: Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for RMI	Cases	Crude	US Std	World Std
All Sites	282	172.9	218.6	171.4
Cervical Cancer, invasive	55	68.4	70.0	57.9
Lung & Bronchus	29	17.8	32.1	23.6
Breast	22	28.6	25.0	22.2
Liver	19	11.6	14.4	12.0
Nasopharynx	14	8.6		
Ill-defined & unspecified (unknown+misc)	13	8.0		
Prostate	11	13.3		
Non-Hodgkin Lymphoma	11	6.7		
Leukemia	11	6.7		
uterus	10	12.4		
Colorectal	9	5.5		

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2012 are shown in the table above. Cervical, lung and, breast cancers are most diagnosed in the RMI. Because of limitations in screening and diagnosis, other cancers may be underreported. We have included crude incidence rates for the top 10 cancers. This number can be used by health officials to look at trends in cancer diagnosis over time. This number can be used as one measure of health system improvements in detecting cancer cases. RMI has the highest rates of cervical cancer in the world.

Treatment options vary by cancer, but in general are limited to early stage cancers. One or two surgeons are available on-island to manage most early cancers requiring resection. As there is limited budget for off-island referral (for diagnostic confirmation, advanced staging techniques or advanced treatment), the clinicians must decide on how much treatment can be safely provided on island. The availability of maintenance chemotherapy is limited. No radiation therapy, brachytherapy or hormonal therapy options exist. Off-island referrals to the Philippines is considered only for those patients diagnosed early, where their 5-year survival rate is expected to be more than 50%.

Provision of hospital-based and home-based palliative care services is in early stages of development. Efforts to train staff and family caregivers are ongoing. There has been increased efforts over the past 4 years to increase provider awareness and education and improve the system's capacity to provide palliative care to those patients with advanced cancers.

The RMI Cancer Registry serves an important public health function. Data on cancers are collected so that the health system can make informed decisions about areas to focus precious resources. Certain types of cancers are able to be detected earlier than others (screened), so information on those types of cancers can be used to help improve resources to screening programs, guide outreach activities and policy change. The cancer registry responds to data requests from NCD Coalition members, Cancer Coalition, Department of Health Quality Assurance officer, and local physicians. The most common types of data requests include types of cancers, what proportion of cancer contribute to death, survival rates for specific cancers, and percent of patients who seek treatment off-island. Cancer registry data is used by policy makers, public health programs, and community coalitions. The cancer data has influenced decision-making in screening recommendations and awareness efforts and has lent support for significant policy changes related to National Guidelines for Screening of Breast, Cervical and Colorectal Cancer.

Republic of Palau

Palau	
Political status with U.S.A.	Freely Associated
Total Population	17,501
Land surface area (sq. km)	458
Coastline (sq. km)	1,519
Public transportation	None
4-year University or College	
2-year College	X
Hospitals	1
Regularly occurring continuing education program for physicians or nurses	Both
Health expenditures per capita	\$315
Cancer ranking in all-cause mortality	2 nd
Age Structure	0-14 years: 20.2% (male 1,845/female 1,687) 15-24 years: 14.6% (male 1,354/female 1,203) 25-54 years: 48.2% (male 4,582/female 3,848) 55-64 years: 10.4% (male 961/female 866) 65 years and over: 6.6% (male 475/female 680)
Birth Rate	13.1 births/1,000 population
Death Rate	11 deaths/1,000 population
Life Expectancy	total population: 66.05 years country comparison to the world: 133 male: 57.6 years female: 74.5 years

PALAU PROGRAM OR SERVICE	
CANCER SCREENING	
BCCEDP	X
Mammography	X
Pap Smears	X
On-island processing of pap smears	
Cervical cancer screening using VIA	
Colorectal cancer screening (FOBT)	X
Prostate cancer screening	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	
On-island histopathology	
General Radiologist	
General surgeon	X

OB-Gyn	X
Surgical subspecialists	
Oncologist	
CANCER DIAGNOSIS AND TREATMENT	
On-island chemotherapy	
On-island radiation therapy	
Off-island referral to Philippines for diagnosis / treatment	X
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand for diagnosis / treatment	
Off-island referral to U.S. Mainland for diagnosis / treatment	

Table 23 Republic of Palau Incident Cancer Cases 2007-2012

Caveat: There are missing cases due to a variety of historical barriers as well as lack of resources for diagnosis & staging. Updates will be calculated annually after each data submission to CDC

Top 10 for Palau	Cases	Crude	US Std	World Std
All Sites	168	194.4	191.2	146.9
Lung & Bronchus	26	30.1	30.0	23.0
Liver	23	26.6	22.0	17.6
Prostate	16	33.9	41.1	31.0
Colon & Rectum	12	13.9		
Tobacco-related oral cavity & pharynx	12	13.9		
Breast	11	28.1		
Cervical Cancer, invasive	10	25.5		
Uterus	9	23.0		
Stomach	8	9.3		
Thyroid	8	9.3		

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2012

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2012 are shown in the table above. Lung, liver and prostate cancers are most diagnosed in the Republic of Palau. Because of limitations in screening and diagnosis, other cancers may be underreported. We have included crude incidence rates for the top 10 cancers. This number can be used by health officials to look at trends in cancer diagnosis over time. This number can be used as one measure of health system improvements in detecting cancer cases. Palau's liver cancer rates are twice as high as the U.S.

Treatment options vary by cancer, but in general are limited to early stage cancers. A few surgeons and obstetrician-gynecologists are available on-island to manage most early cancers requiring resection. As there is limited budget for off-island referral (for diagnostic confirmation, advanced staging techniques or advanced treatment), the clinicians must decide on how much treatment can be safely provided on island. The availability of maintenance chemotherapy is limited. No radiation therapy, brachytherapy or hormonal therapy options exist. Off-island referrals to the Philippines is considered only for those patients

diagnosed at early stages.

Provision of hospital-based and home-based palliative care services is in early stages of development. Efforts to train staff and family caregivers are ongoing, including a Family Caregiver Course developed by the University of Hawaii and now routinely offered through the Palau Community College. There has been increased efforts over the past 4 years to increase provider awareness and education and improve the system's capacity to provide palliative care to those patients with advanced cancers.

The Palau Cancer Registry serves an important public health function. Data on cancers are collected so that the health system can make informed decisions about areas to focus precious resources. Certain types of cancers are able to be detected earlier than others (screened), so information on those types of cancers can be used to help improve resources to screening programs, guide outreach activities and policy change. The cancer registry responds to data requests from NCD Coalition members and partners, Cancer Coalition, Ministry of Health Quality Assurance officer, and local physicians. The most common types of data requests include types of cancers, what proportion of cancer contribute to death, survival rates for specific cancers, and percent of patients who seek treatment off-island. Cancer registry data is used by policy makers, public health programs, and community coalitions. The cancer data has influenced decision-making in screening recommendations and awareness efforts, as well as in major transformations in the Ministry of Health over the past 6 years.

Appendix

Table 24 Selected indicators, programs and services impacting CCC efforts in the USAPI

	American Samoa	CNMI	Guam	FSM	Palau	RMI
Political status with U.S.A.	Territory	Common-wealth	Territory	Freely Associated	Freely Associated	Freely Associated
Total Population	54,719	51,170	160,378	106,104	21,108	69,747
Land surface area (sq. km)	199	477	541	702	458	181
Coastline (sq. km)	116	1,482	125	6,112	1,519	376
Public transportation	Yes	Yes	Yes	None	None	None
4-year University or College			X			
2-year College	X	X	X	X	X	X
Hospitals	1	1	1 (2 by 2015)	5 (1 private in PNI)	1	1
Health expenditures per capita	\$500	\$519	\$1,032	\$147	\$315	\$255
Age Structure	0-14 years: 25.2% (male 6,809/female 7,005) 15-24 years: 20.9% (male 5,657/female 5,760) 25-54 years: 41.5% (male 11,662/female 11,028) 55-64 years: 7.7% (male 2,096/female 2,134) 65 years and over: 4.7% (male 1,189/female 1,379)	0-14 years: 26% (male 6,970/female 6,333) 15-24 years: 14.9% (male 4,133/female 3,471) 25-54 years: 45.5% (male 9,906/female 13,396) 55-64 years: 9.3% (male 2,592/female 2,187) 65 years and over: 4.3% (male 1,033/female 1,149)	0-14 years: 26.4% (male 21,806/female 20,480) 15-24 years: 16.9% (male 13,961/female 13,156) 25-54 years: 39.5% (male 32,312/female 30,962) 55-64 years: 9.1% (male 7,325/female 7,273) 65 years and over: 8.2% (male 5,950/female 7,153)	0-14 years: 32.4% (male 17,478/female 16,915) 15-24 years: 20.4% (male 10,933/female 10,715) 25-54 years: 37.6% (male 19,370/female 20,551) 55-64 years: 6.3% (male 3,374/female 3,360) 65 years and over: 3.2% (male 1,500/female 1,908)	0-14 years: 20.7% (male 2,250/female 2,110) 15-24 years: 17.6% (male 1,849/female 1,875) 25-54 years: 46.6% (male 5,981/female 3,854) 55-64 years: 8.3% (male 615/female 1,129) 65 years and over: 6.8% (male 407/female 1,038)	0-14 years: 37.2% (male 13,227/female 12,730) 15-24 years: 17.5% (male 6,222/female 5,997) 25-54 years: 36.5% (male 12,931/female 12,499) 55-64 years: 5.5% (male 2,014/female 1,852) 65 years and over: 3.3% (male 1,111/female 1,164)
Birth Rate	22.84 births/1,000 population	19.6 births/1,000 population	17.23 births/1,000 population	21.44 births/1,000 population	10.9 births/1,000 population	27.21 births/1,000 population
Death Rate	4.62 deaths/1,000 population	3.52 deaths/1,000 population	4.95 deaths/1,000 population	4.27 deaths/1,000 population	7.86 deaths/1,000 population	4.27 deaths/1,000 population
Life Expectancy	total population: 74.68 years country comparison to the world: 106 male: 71.73 years female: 77.8 years (2013 est.)	total population: 77.45 years country comparison to the world: 67 male: 74.8 years female: 80.26 years (2013 est.)	total population: 78.66 years country comparison to the world: 50 male: 75.62 years female: 81.89 years (2013 est.)	total population: 72.07 years country comparison to the world: 136 male: 70.09 years female: 74.16 years (2013 est.)	total population: 72.33 years country comparison to the world: 133 male: 69.17 years female: 75.68 years (2013 est.)	total population: 72.31 years country comparison to the world: 134 male: 70.18 years female: 74.55 years (2013 est.)

	American Samoa	CNMI	Guam	FSM	Palau	RMI
CDC Breast and Cervical Cancer Early Detection Program	X	X	X		X	
Mammography	X	X	X		X	X
Pap Smears	X	X	X	X	X	X
On-island processing of pap smears						X
Cervical cancer screening using VIA				X		X
Colorectal cancer screening (FOBT)	X	X	X	X (Yap)	X	X
Prostate cancer screening	X	X	X	X (Yap)	X	X
CANCER DIAGNOSIS AND TREATMENT						
Pathologist	X		X			X
On-island histopathology	X some		X			X
General Radiologist	X		X			
General surgeon	X	X	X	X	X	X
OB-Gyn	X	X	X	X		X
Surgical subspecialists	X	X	X			X
Oncologist			4 - 7			
	American Samoa	CNMI	Guam	FSM	Palau	RMI
On-island chemotherapy		X (maintenance)	X	X (Yap)		
On-island radiation therapy			X			
Off-island referral to Philippines for diagnosis / treatment		X	X	X	X	X
Off-island referral to Hawaii for diagnosis / treatment	X	X	X	X		
Off-island referral to New Zealand for diagnosis / treatment	X					



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