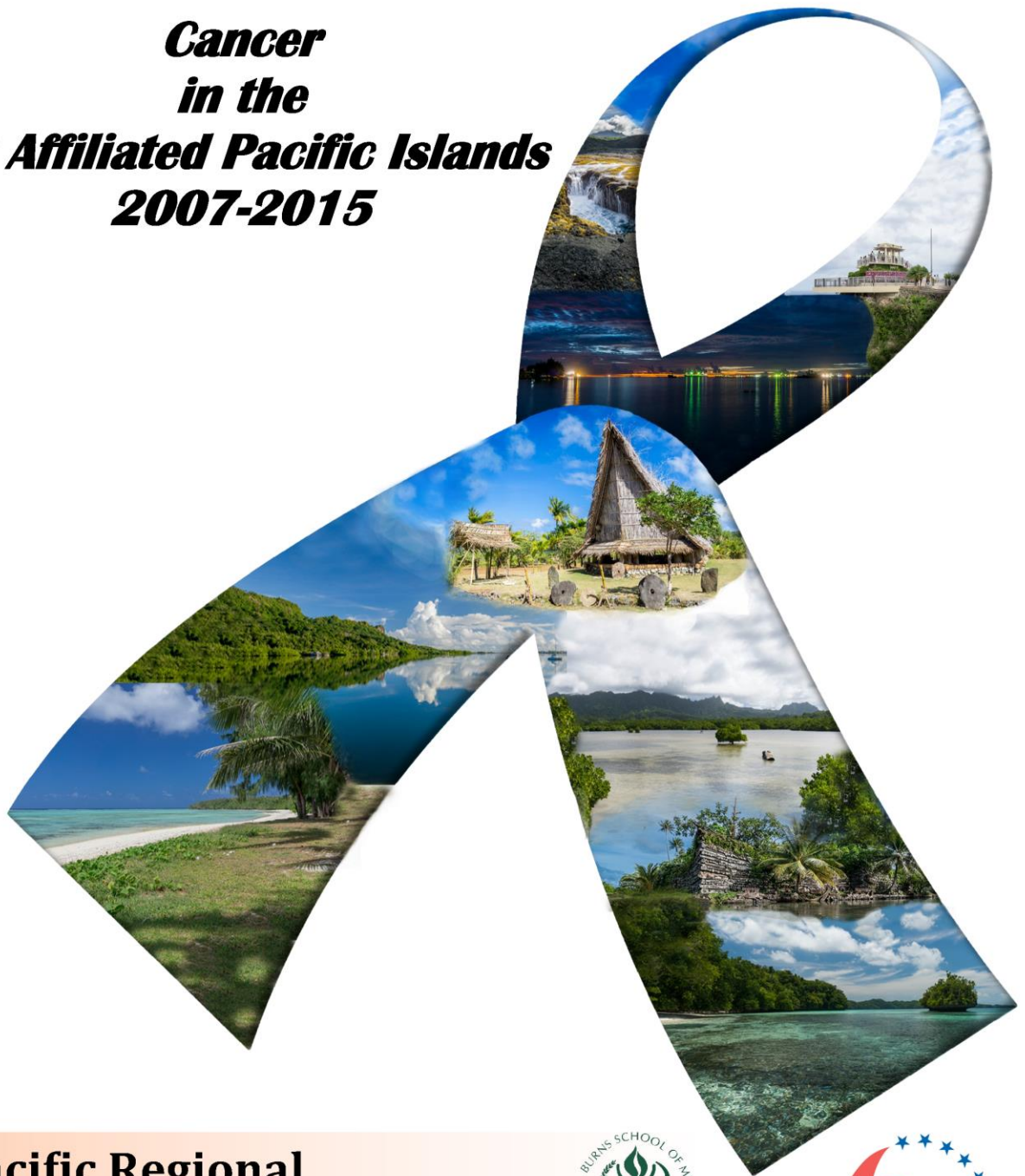


***Cancer  
in the  
US Affiliated Pacific Islands  
2007-2015***



**Pacific Regional  
Central Cancer Registry**

December, 2019



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Photos: courtesy of Janos Baksa

# Foreword

***Hafa Adai, Alii, Talofa, Kaselehlie, Ran anim, Lotu Wo, Mogethin, lakwe, 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 ensure 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 monitor better 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.

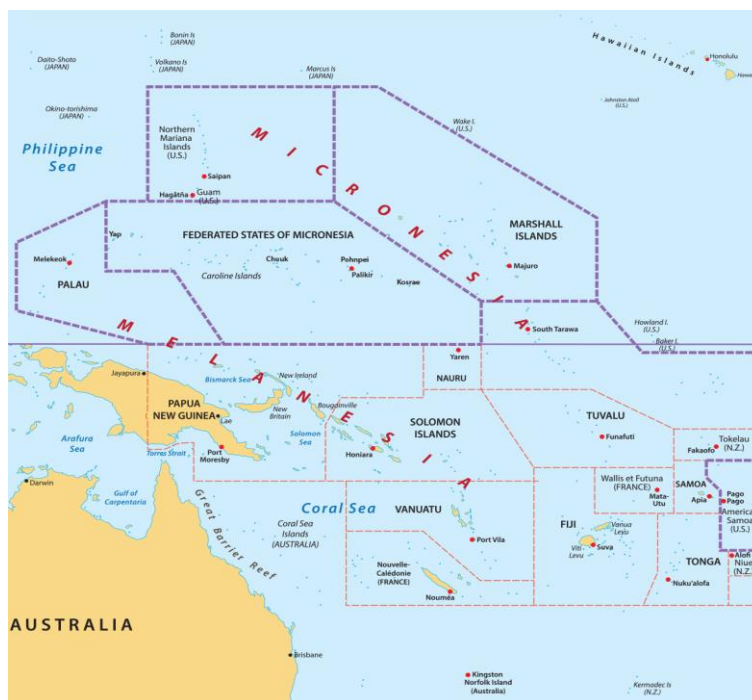
Lee Buenconsejo-Lum, MD, FAAFP, Principal Investigator

# 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.

Image 1 Map of the U.S. Affiliated Pacific Islands<sup>1</sup>



<sup>1</sup> COPYRIGHT: [HTTPS://WWW.123RF.COM/PROFILE\\_LESNIIEWSKI](https://www.123rf.com/profile_LESNIIEWSKI)

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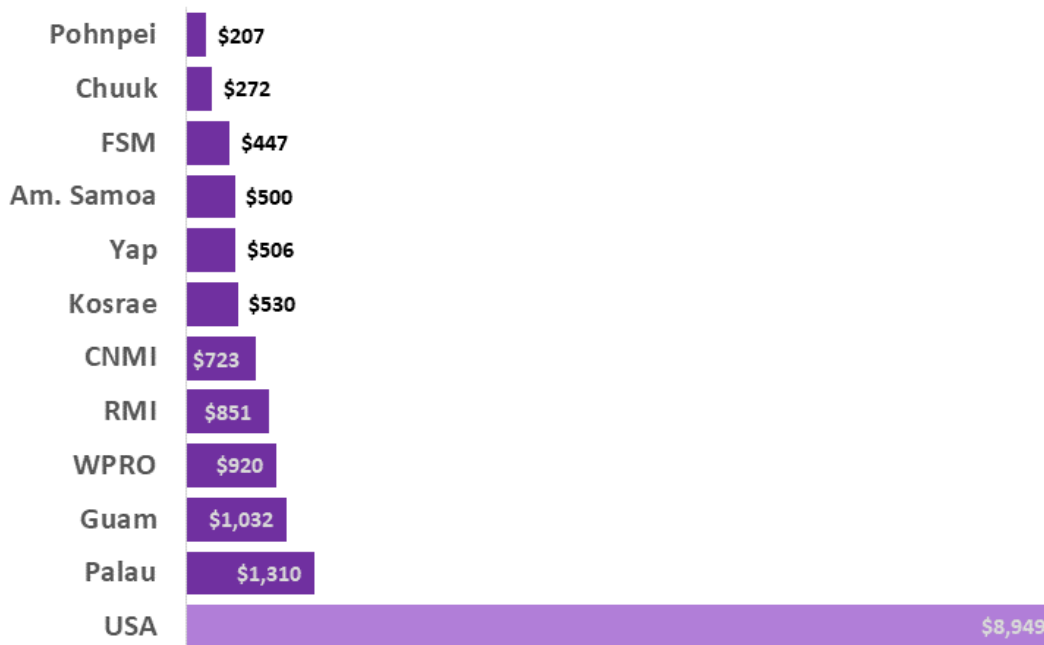
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# Cancer in the US Affiliated Pacific Islands (USAPI) — An Overview

## 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 \$207 per person per year for all preventive and curative health services. In contrast, the U.S. per capita health expenditures exceeds \$8,949.

**USAPI Per Capita Total Expenditure on Health**  
(in Purchasing Power Parity (PPP) terms, International \$ for FSM, RMI, PW, AS, GU)  
(in unadjusted USD for CNMI, USA and Palau)



WHO Global Health Expenditure Database 2016 (FM, MH, PW); WHO Country Profiles 2011 (AS, GU (2000))  
CNMI \$39M FY2009 budget /53,883 popn (2010) in USD not adjusted; OECD Databank (USA)

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. Although the reason for many cancers, particularly those that occur during childhood, remains unknown, established cancer causes include lifestyle (external) factors, such as tobacco use and excess body weight, and non-modifiable (internal) factors, such as inherited genetic mutations, hormones, and immune conditions. These risk factors may act simultaneously or in sequence to initiate and/or promote cancer growth. Ten or more years often pass between exposure to external factors and detectable cancer.

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<sup>2</sup>.

### **Can Cancer Be Prevented?**

A large proportion of cancers could be prevented including all cancers caused by tobacco use and heavy alcohol consumption. The American Cancer Society estimates that in 2017, about 190,500 of the estimated 600,920 cancer deaths in the US will be caused by cigarette smoking. The World Cancer Research Fund estimates that about 20% of cancer cases diagnosed in the US are caused by a combination of excess body weight, physical inactivity, excess alcohol consumption, and poor nutrition, and thus could also be prevented. Focusing on diet alone, a recent study concludes, that suboptimal diet in the US can be associated with 5.2% of all new cancer cases<sup>3</sup>.

Certain cancers caused by infectious agents, such as human papillomavirus (HPV), hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) and *Helicobacter pylori* (*H.pylori*), could be prevented through behavioral changes, vaccination, or treatment of the infection. Many of the more than 5 million skin cancer cases that are diagnosed annually could be prevented by protecting skin from excessive sun exposure and not using indoor tanning devices.

In addition to preventing cancer through the avoidance of risk factors, regular screening tests that allow the detection

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<sup>2</sup> Adapted from: “Global Cancer Facts & Figures 2007 and 2013”

<sup>3</sup> A suboptimal diet can be responsible for 5.2% of new cancer cases, as a recent U.S. study shows - Fang Fang Zhang, Frederick Cudhea, Zhilei Shan, Dominique S Michaud, Fumiaki Imamura, Heesun Eom, Mengyuan Ruan, Colin D Rehm, Junxiu Liu, Mengxi Du, David Kim, Lauren Lizewski, Parke Wilde, Dariush Mozaffarian, Preventable Cancer Burden Associated with Poor Diet in the United States, JNCI Cancer Spectrum, , pkz034, <https://doi.org/10.1093/jncics/pkz034>



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<sup>4</sup>.

### **What is Cancer Stage or Staging?**

Staging describes the extent or spread of cancer at the time of diagnosis. Proper staging is essential in optimizing therapy and assessing prognosis. A cancer's stage is based on the size or extent of the primary (main) tumor and whether it has spread to nearby lymph nodes or other areas of the body. A number of different staging systems are used to classify cancer. A system of summary staging is used for descriptive and statistical analysis of tumor registry data and is particularly useful for looking at trends over time. According to this system, 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 penetrated beyond the original layer of tissue, the cancer has become invasive and is categorized as local, regional, or distant based on the extent of spread.

Clinicians mainly use a different staging system, called TNM. The TNM system assesses cancer growth and spread in 3 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 (e.g., lymphoma) have alternative staging systems. As the biology of cancer has become better understood, additional tumor-specific features have been incorporated into treatment plans and/or staging for some cancers. 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<sup>5</sup>.

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<sup>4</sup> Adapted From: “American Cancer Society, Cancer Facts & Figures 2017\*\*

<sup>5</sup> Adapted From: “American Cancer Society, Cancer Facts & Figures 2017” and “Hawaii Cancer Facts & Figures 2010”

Table 1 Annual Adult Cancer Incidence Rates: 2007-2015 USAPI in comparison to U.S<sup>6</sup>.

All Sites 2007-2015 over age 20	#cases (all USAPI)	Age adjusted Incidence rate per 100,000 USAPI	Age adjusted Incidence USAPI Adult Male rate	Age adjusted Incidence USAPI Adult Female rate	Incidence rate per 100,000 US (2011-15) USCS	Incidence US Adult Male Rate(2011-15)	Incidence US Adult Female Rate(2011-15)	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive within 5 yrs of diagnosis
<b>All Sites</b>	<b>4663</b>	<b>206.2</b>	<b>233.2</b>	<b>187.0</b>	<b>449.0</b>	<b>494.0</b>	<b>419.0</b>	<b>1968</b>	<b>42%</b>	<b>58%</b>
Bones & Joints	21	0.8	1.3	0.4	-	-	-	11	52%	48%
Brain & Other Nervous System	35	1.3	1.7	0.8	6.6	8.0	6.6	21	60%	40%
Breast	651	-	-	50.8	-	-	124.7	109	17%	83%
Cervix	262	-	-	16.8	-	-	7.5	100	38%	62%
Colon & Rectum	409	18.9	23.6	14.8	39.2	45.1	34.3	119	29%	71%
Esophagus	43	2.0	3.8	0.3	4.6	8.0	2.0	29	67%	33%
Gallbladder	28	1.4	1.0	1.7	1.1	0.8	1.4	23	82%	18%
HPV-associated OC&P	35	1.5	3.0	0.2	-	-	-	17	49%	51%
Ill-defined & unspecified (unknown+misc)	94	4.2	5.2	3.3	-	-	-	63	67%	33%
Kidney & Renal Pelvis	64	3.2	4.3	2.1	16.4	22.1	11.4	18	28%	72%
Larynx	39	1.6	2.9	3.4	6.0	1.0	3.4	23	59%	41%
Leukemia	166	8.3	9.9	14.0	17.7	11.0	14.0	78	47%	53%
Liver	280	10.8	16.7	8.1	12.0	4.0	8.1	226	81%	19%

<sup>6</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; Incidence Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population; Chuuk data incomplete; ^^Data not presented for fewer than 16 cases in the 5 year period; -- No Cases Invasive cases only; Counts are 8 year total from 2007 to 2015, rounded to the nearest whole and Rates are suppressed if fewer than 16 cases were reported in a specific category;

<b>CONTINUED</b>										
<b>All Sites 2007-2015 over age 20</b>	<b>#cases (all USAPI)</b>	<b>Age adjusted Incidence rate per 100,000 USAPI</b>	<b>Age adjusted Incidence USAPI Adult Male rate</b>	<b>Age adjusted Incidence USAPI Adult Female rate</b>	<b>Incidence rate per 100,000 US (2011-15) USCS</b>	<b>Incidence US Adult Male Rate(2011-15)</b>	<b>Incidence US Adult Female Rate(2011-15)</b>	<b># dead within 5 yrs of diagnosis</b>	<b>% dead within 5 yrs of diagnosis</b>	<b>% alive within 5 yrs of diagnosis</b>
<b>Lung &amp; Bronchus</b>	708	36.3	52.7	21.9	60.2	70.8	52.2	531	75%	25%
<b>Nasopharynx</b>	103	3.7	5.4	2.0	0.5	0.8	0.3	46	45%	55%
<b>Non-Hodgkin Lymphoma</b>	65	2.9	3.0	2.8	18.9	22.8	15.6	34	52%	48%
<b>Other Digestive</b>	19	0.9	0.7	1.0	0.5	0.5	0.4	15	79%	21%
<b>Other Respiratory</b>	18	0.6	0.8	0.4	-	-		7	39%	61%
<b>Ovary</b>	89	-	-	6.3	-	-	11.3	48	54%	46%
<b>Pancreas</b>	81	3.9	4.5	3.1	12.7	14.4	11.1	66	81%	19%
<b>Penis</b>	23	-	1.6	-	-		-	5	22%	78%
<b>Prostate</b>	454	-	57.3	-	-	109.5	-	77	17%	83%
<b>Skin excl Basal &amp; Squamous &amp; Melanoma</b>	35	1.8	2.6	1.0	21.3	27.3	16.8	11	31%	69%
<b>Soft Tissue including Heart</b>	46	2.0	2.6	1.4	3.3	3.9	2.8	11	24%	76%
<b>Stomach</b>	123	6.0	7.1	5.1	7.0	9.0	5.0	73	59%	41%
<b>Thyroid</b>	158	5.3	1.9	8.7	14.5	7.0	21.4	13	8%	92%
<b>Tobacco-related Oral Cavity &amp; Pharynx</b>	178	6.4	9.5	3.3	12.0	17.6	6.0	72	40%	60%
<b>Urinary Bladder</b>	53	3.1	5.0	1.5	20.3	35.4	9.0	28	53%	47%
<b>Uterus</b>	283	-	-	21.3	-	-	26.2	54	19%	81%

Table 2 Top 13 cancers - Crude and age-standardized rates for age over 20 - All USAPI 2007-2015 except Chuuk<sup>7</sup>

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
<b>All Sites</b>	<b>2268</b>	<b>208.5</b>	<b>243.5</b>	<b>176.3</b>	<b>2265</b>	<b>215.9</b>	<b>200.4</b>	<b>155.0</b>	<b>4533</b>	<b>212.2</b>	<b>218.4</b>	<b>163.6</b>
<b>Lung &amp; Bronchus</b>	464	42.6	54.1	38.3	215	20.5	23.7	16.8	679	31.8	38.0	27.1
<b>Breast</b>	-	-	-	-	630	60.1	54.5	42.4	-	-	-	-
<b>Prostate</b>	449	41.3	60.5	40.7	-	-	-	-	-	-	-	-
<b>Colon &amp; Rectum</b>	239	22.0	24.9	18.4	162	15.4	15.8	11.5	401	18.8	20.1	14.9
<b>Liver</b>	209	19.2	17.2	13.8	55	5.2	5.1	3.9	264	12.4	11.5	8.9
<b>Uterus</b>	-	-	-	-	279	26.6	23.0	18.6	-	-	-	-
<b>Cervical Cancer, invasive</b>	-	-	-	-	255	24.3	17.8	15.4	-	-	-	-
<b>Leukemia</b>	87	8.0	10.4	7.1	75	7.1	7.6	5.5	162	7.6	8.9	6.2
<b>Tobacco-related Oral Cavity &amp; Pharynx</b>	134	12.3	10.2	8.4	42	4.0	3.5	2.8	176	8.2	6.9	5.6
<b>Thyroid</b>	25	2.3	2.1	1.6	132	12.6	9.4	8.2	157	7.3	5.7	4.8
<b>Stomach</b>	68	6.3	7.1	5.1	49	4.7	5.4	3.8	117	5.5	6.3	4.4
<b>Nasopharynx</b>	69	6.3	5.6	4.4	28	2.7	2.2	1.7	97	4.5	3.8	3.1
<b>Ill-defined &amp; unspecified (unknown+misc)</b>	49	4.5	4.9	3.5	37	3.5	3.3	2.7	86	4.1	4.0	3.1

<sup>7</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015

## 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):

*70 new cases diagnosed in one year for a population of 100,000*  
IS THE SAME AS  
*350 new cases diagnosed in one year for a population of 500,000*

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):

*70 new cases diagnosed in one year for a population of 100,000*  
IS THE SAME AS  
*35 new cases diagnosed in one year for a population of 50,000*

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<sup>8</sup>.**

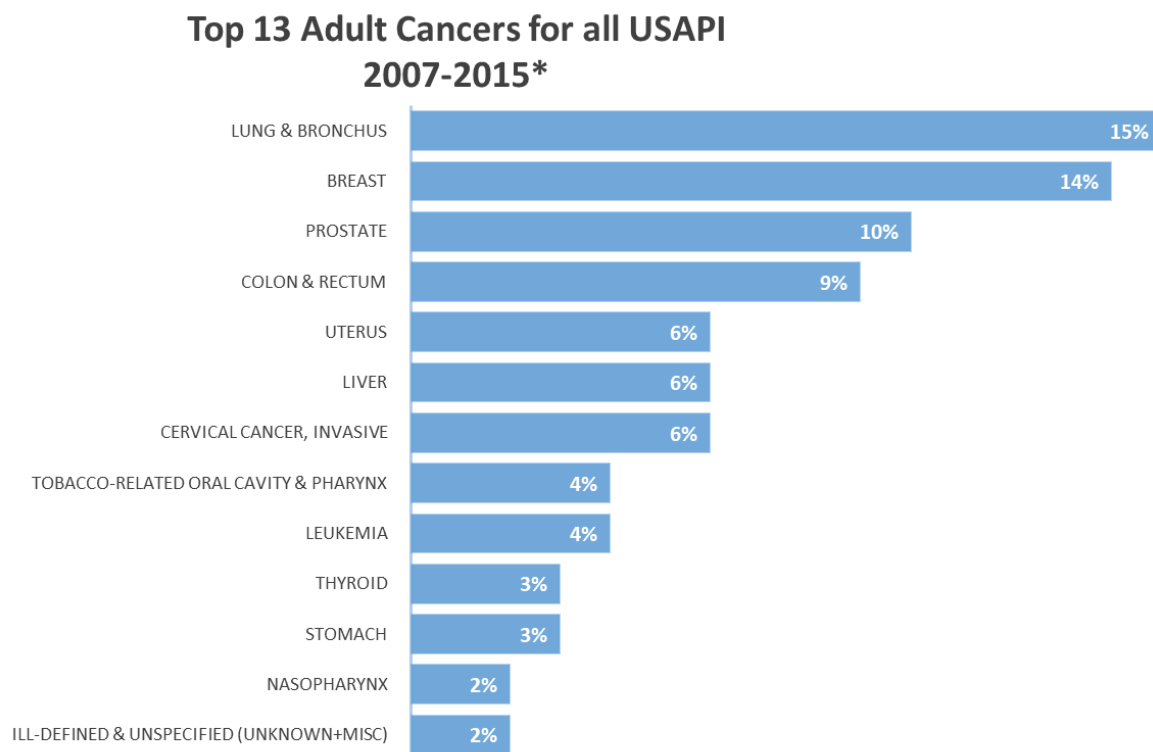
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<sup>8</sup> Adapted from: "Hawaii Cancer Facts & Figures 2010" and Suppression for Reliability (CDC National Program of Cancer Registries)  
[http://www.cdc.gov/cancer/npcr/uscs/technical\\_notes/stat\\_methods/suppression.htm](http://www.cdc.gov/cancer/npcr/uscs/technical_notes/stat_methods/suppression.htm)

Table 3 Top 13 Adult Incident Cancer Counts, Proportional Distribution and Rank, 2007-2015 (except Chuuk)<sup>9</sup>

Top 13 Cancers for all USAPI	#cases	%	rank
Lung & Bronchus	679	15%	1
Breast	637	14%	2
Prostate	449	10%	3
Colon & Rectum	401	9%	4
Uterus	279	6%	5
Liver	264	6%	6
Cervical Cancer, invasive	255	6%	7
Tobacco-related Oral Cavity & Pharynx	176	4%	8
Leukemia	162	4%	9
Thyroid	157	3%	10
Stomach	117	3%	11
Nasopharynx	97	2%	12
Ill-defined & unspecified (unknown+misc)	87	2%	13

Figure 1 Percent distribution of Top 13 Incident Cancers, USAPI 2007-2015 (except Chuuk)<sup>10</sup>



<sup>9</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015(Chuuk and American Samoa data incomplete)

<sup>10</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \* Chuuk and American Samoa data incomplete

Table 4 Top Ten Leading Cancers 2007-2015 Sites by Sex & Percentages, USAPI

Male		Cases	%		Female		Cases	%
All Sites		<b>2344</b>	<b>100%</b>		All Sites		<b>2318</b>	<b>100%</b>
Lung & Bronchus		490	21%		Breast		644	21%
Prostate		454	19%		Uterus		283	20%
Colon & Rectum		244	10%		Cervical Cancer, invasive		262	11%
Liver		222	9%		Lung & Bronchus		218	10%
Tobacco-related Oral Cavity & Pharynx		135	6%		Colon & Rectum		165	6%
Leukemia		90	4%		Thyroid		133	4%
Nasopharynx		74	3%		Ovary		89	3%
Stomach		71	3%		Leukemia		76	3%
Ill-defined & unspecified (unknown+misc)		53	2%		Liver		58	2%
Pancreas		52	2%		Stomach		52	2%



## 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
<b>Breast</b>	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 Immunotherapy may be appropriate in some cases.
<b>Cervix</b>	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 the 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 a monthly menstrual period; Bleeding after intercourse; Pain during intercourse	Surgery and/or radiation therapy; Plus chemotherapy for later stages
<b>Colon and Rectum</b>	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 the 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
	Age (risk increases as one gets older); Total length of	History of having never given birth; Obesity;	Having one or more children; Use of oral contraceptives;	No screening examinations available for women without	Unusual bleeding, spotting, or abnormal discharge,	Surgery; Plus radiation therapy, chemotherapy



<b>Uterus (Corpus Uteri)</b>	menstrual span; History of infertility; Ovarian disease; Diabetes; Family history; Presence or personal history of breast or ovarian cancer; Early menstruation; Late menopause	Tamoxifen use; Estrogen (but not combined hormone) replacement therapy; Diet high in animal fat	Maintain a healthy weight; Control diabetes	symptoms who are at average risk for endometrial cancer; Women should report warning signs to health care professional	especially if after menopause; Pelvic pain or mass; Unexplained weight loss	or hormone therapy for later stages
<b>Thyroid</b>	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
<b>Oral</b>	Age (risk increases as one gets older);	Cigarette smoking; Smokeless or chewing tobacco; Cigars; <b>chewing betel nut</b> , 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 an 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 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	Surgery and/or radiation therapy; Plus chemotherapy for later stages

<b>Leukemia</b>	Infection with HTLV-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 Immunotherapy may be appropriate in some cases.
<b>Liver</b>	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
<b>Lung and Bronchus</b>	Personal and family history	Cigarette smoking; Secondhand smoke exposure; Asbestos exposure; Occupational exposure to some chemicals; Diet; Radon exposure	Avoid smoking; Avoid secondhand smoke; Avoid occupational exposure to asbestos and other chemicals by using workplace safety precautions; Eat five or more servings of fruits and vegetables per day; Get home checked for radon	No widespread screening recommendations for low-risk patients. Annual screening with low-dose CT (computed tomography) 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.	A cough that does not go away; Chest pain often aggravated by deep breathing; Hoarseness; Weight loss and loss of appetite; Bloody or rust-colored sputum; Shortness of breath; Recurring infections such as bronchitis and pneumonia; New onset of wheezing	<b>Non-small cell:</b> Surgery; Plus radiation therapy and/or chemotherapy for later stages <b>Small cell:</b> Chemotherapy; Plus radiation therapy and sometimes surgery, depending on prognostic factors Immunotherapy may be appropriate in some cases.

# Cancer in the USAPI: Major Sites

## Breast (Female) Cancer

**Signs and symptoms:** Signs and symptoms: The most common symptom of breast cancer is a lump or mass in the breast. Less common symptoms include other persistent changes to the breast, such as thickening, swelling, distortion, tenderness, skin irritation, redness, scaliness, and nipple abnormalities or spontaneous nipple discharge.

**Risk factors:** Many breast cancer risk factors influence lifetime exposure of breast tissue to hormones.

Potentially modifiable factors associated with increased breast cancer risk include weight gain after the age of 18 and/or being overweight or obese (for postmenopausal breast cancer), postmenopausal hormone use (combined estrogen and progestin), physical inactivity, and alcohol consumption. In addition, recent research suggests that long-term, heavy smoking may also increase breast cancer risk, particularly among women who start smoking before their first pregnancy. Shift work, particularly at night (i.e., that disrupts sleep patterns), may be associated with an increased risk.

Non-modifiable factors associated with increased breast cancer risk include older age; a personal or family history of breast or ovarian cancer; inherited mutations (genetic alterations) in BRCA1, BRCA2, or other breast cancer susceptibility genes; certain benign breast conditions (such as atypical hyperplasia); a history of ductal or lobular carcinoma in situ; high-dose radiation to the chest at a young age (e.g., for treatment of conditions such as lymphoma); high breast tissue density (the amount of glandular tissue relative to fatty tissue measured on a mammogram); and type 2 diabetes (independent of obesity). 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, having one's first child after age 30, and high natural levels of sex hormones.

Factors associated with a decreased risk include breastfeeding for at least one year, regular moderate or vigorous physical activity, and maintaining 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 but is only approved for use in postmenopausal women. Another type of medication, aromatase inhibitors, have recently been shown also to help prevent breast cancer.

**Early detection:** Mammography is a low-dose x-ray procedure used to detect breast cancer at an early stage. Numerous studies have shown that early detection with mammography helps save lives. However, like any screening tool, mammography is not perfect. For example, it can miss cancer (false negative), possibly more often in women with very dense breasts. A mammogram can also appear abnormal in the absence of cancer (false positive). Among the 1 in 10 women who have an abnormal mammogram, most (95%) do not have cancer. Mammography also detects some invasive cancers and in situ lesions (e.g., ductal carcinoma in situ [DCIS]) that would never have caused harm, resulting in overdiagnoses and overtreatment. For women

at average risk of breast cancer, recently updated American Cancer Society screening guidelines recommend that those 40 to 44 years of age have the option to begin annual mammography; those 45 to 54 should undergo annual mammography; and those 55 years of age and older may transition to biennial mammography or continue annual mammography. Women should continue mammography as long as overall health is good and life expectancy is 10



or more years. For some women at high risk of breast cancer, annual magnetic resonance imaging (MRI) is recommended in addition to mammography, typically 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<sup>11</sup>.

ON-Island Treatment Options Available <sup>12</sup>			
Site	Surgery	Chemotherapy	Radiation
Breast	100%	22%	Only on Guam

Table 5 Crude and age-standardized rates of Female Breast Cancer in the USAPI 2007 – 2015<sup>13</sup>

Breast Cancer	Cases	Crude	US Std	World Std	dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis
USAPI Total	<b>644</b>	<b>55.5</b>	<b>50.8</b>	<b>39.6</b>	<b>107</b>	<b>17%</b>
USAPI except Chuuk	630	60.1	54.5	42.4	97	15%
Guam	435	96.9	79.1	61.4	43	10%
CNMI	52	33.7	27.6	22.3	3	6%
American Samoa	48	35.7	29.7	24.5	16	33%
Republic of the Marshall Islands	37	30.7	27.9	25.0	10	27%
Pohnpei State, FSM	27	31.3	33.7	25.7	16	59%
Republic of Palau	16	27.2	23.5	19.2	3	19%
Chuuk State, FSM	14	12.6	10.5	9.2	10	71%
Yap State, FSM	11	36.0	25.7	22.6	4	36%
Kosrae State, FSM	4	25.8	18.7	16.1	2	50%
United States*	-	136.6*	124.7*	46.3^	-	-
World^	-	47.9	-	43.3	-	-

<sup>11</sup> Adapted From: American Cancer Society, Cancer Facts & Figures 2017

<sup>12</sup> Source: Cancer Council of the Pacific Island internal meeting discussions 2013 – 2019

<sup>13</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; Guam, CNMI, American Samoa and Palau have CDC funded NBCCEDP programs. Note FSM has NO MAMMOGRAPHY services available; \* U.S. Cancer Statistics

Working Group. United States Cancer Statistics: 1999–2010 Incidence and Mortality Web-based Report. Atlanta: U.S. DHHS, CDC and NCI National Cancer Institute; ^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2018; (U.S. 2000 Standard Popn, World Standard Popn 2000-2025); ~ per 100,000 over age 20, ranked by rate adj to World Std pop

## 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.

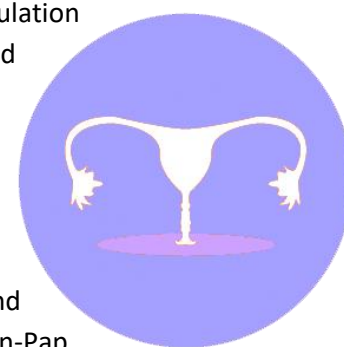
In recent years, major advances have been made toward the **prevention** of cervical cancer with the availability of HPV vaccines. Since 2006, two vaccines against HPV have been approved by the U.S. Food and Drug Administration. However, since 2016, only Gardasil has been available in the United States. The Gardasil-9<sup>®</sup> protects against cervical, vaginal, and vulvar cancers caused by HPV 16, 18, 31, 33, 45, 52 and 58. It also protects against genital warts caused by HPV 6 and 11. Gardasil-9<sup>®</sup> is approved for use in females and males aged 9 to 45, and recommended to start at age 11 and 12 for boys and girls but may be given as early as 9 year of age. The Gardasil-9 vaccine can be given in two doses, 6-12 months apart IF both are completed before age 15. Otherwise, 3 doses are required for better protection.

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<sup>14</sup>.



<sup>14</sup> 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

ON-Island Treatment Options Available <sup>15</sup>			
Site	Surgery	Chemotherapy	Radiation
Cervix	100%	22%	Only on Guam

Table 6 Crude and age-standardized incidence rates of female Cervical Cancer per 100,000, ranked by rate adjusted to World Std pop<sup>16</sup>

Cervical Cancer	Crude	US Std	World Std
<b>Republic of the Marshall Islands*</b>	83.0	75.3	64.0
<b>WHO Southern Africa^</b>	-	-	43.1
<b>Pohnpei, FSM*</b>	44.1	33.7	30.3
<b>WHO Melanesia^</b>	-	-	27.7
<b>WHO World^</b>	-	-	13.1
<b>USAPI*</b>	22.6	16.8	14.5
<b>WHO Southeastern Asia^</b>	-	-	17.2
<b>Guam*</b>	14.0	10.3	8.8
<b>WHO Northern America^</b>	-	-	6.4
<b>US - Hispanic women**</b>	-	9.6	-
<b>United States**</b>	-	7.5	-

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 in the Southern Africa Region. 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. The current economic, societal and emotional costs of so many women dying from cervical cancer is tremendous. 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, almost half of the women were diagnosed at late stages. Over 70% of cervical cancers in Pohnpei were diagnosed at a late stage. Only 55% of these women in Pohnpei, FSM are alive within 5 years of the diagnosis. All USAPI jurisdictions have prioritized improving cervical cancer screening rates and are approaching this issue through health provider training, community outreach, adoption of more resource-appropriate screening methods (VIA in FSM and RMI) and strengthening of monitoring and quality assurance programs.

<sup>15</sup> Source: Cancer Council of the Pacific Island internal meeting discussions 2013 - 2019

<sup>16</sup> \*Pacific Regional Central Cancer Registry data 2007-2015 (unpublished), excludes cases/popn data for Chuuk, 2007-2013 cases only for Am Samoa; ^Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2018; \*\* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.; (U.S. 2000 Standard Popn, World Standard Popn 2000-2025); ~ per 100,000, ranked by rate adj to World Std pop

## Colon & Rectum Cancer

**Signs and symptoms:** Early stage colorectal cancer typically does not have symptoms, which is why screening is usually necessary to detect this cancer early. Symptoms may include rectal bleeding, blood in the stool, a change in bowel habits or stool shape (e.g., narrower than usual), the feeling that the bowel is not completely empty, cramping pain in the lower abdomen, decreased appetite, or weight loss. In some cases, blood loss from cancer leads to anemia (low number of red blood cells), causing symptoms such as weakness and fatigue. Timely evaluation of these symptoms is essential for adults of all ages.

**Risk factors:** Modifiable factors that increase risk include obesity, physical inactivity, long-term smoking, high consumption of red or processed meat, low calcium intake, moderate to heavy alcohol consumption, and very low intake of fruits and vegetables (processed meat was classified as a carcinogen by the International Agency for Research on Cancer in 2016 based on its consistent association with colorectal cancer). Consumption of whole-grain fiber reduces risk. Hereditary and medical factors that increase risk include a personal or family history of colorectal cancer and/or polyps, certain inherited genetic conditions (e.g., Lynch syndrome, also known as hereditary nonpolyposis colorectal cancer [HNPCC], and familial adenomatous polyposis [FAP]), a personal history of chronic inflammatory bowel disease (e.g., ulcerative colitis or Crohn disease), and type 2 diabetes.

Regular long-term use of nonsteroidal anti-inflammatory drugs, such as aspirin, reduces risk, but these drugs can have serious adverse health effects, such as stomach bleeding. The American Cancer Society has not made recommendations about the use of these drugs for cancer prevention. However, based on a review of aspirin's overall harms and benefits, the US Preventive Services Task Force, a government-appointed expert panel, recommends daily, low-dose aspirin for prevention of

cardiovascular disease and colorectal cancer for certain individuals in their 50s and 60s who are at higher risk for cardiovascular disease. Decisions about aspirin use should be discussed with a health care provider.

**Early detection:** Beginning at the age of 50, men and women who are at average risk for developing colorectal cancer should begin screening. Screening can prevent colorectal cancer through the detection and removal of precancerous growths, as well as detect cancer at an early stage, when treatment is usually less extensive and more successful. There are a number of recommended screening options that differ in terms of how well they detect precancerous lesions; how often they should be performed; whether bowel preparation is required; potential harms; and cost.

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<sup>17</sup>.



<sup>17</sup> Adapted From: American Cancer Society, Cancer Facts & Figures 2017

<b>ON-Island Treatment Options Available<sup>18</sup></b>			
Site	Surgery	Chemotherapy	Radiation
Colorectal	60.00%	22.00%	Only on Guam

Table 7 Crude and age-standardized rates of Colon & Rectum Cancer<sup>19</sup>

Colon Cancer	Cases	Crude	US Std	World Std	% dead within 5 yrs of diagnosis	% alive within 5 yrs of diagnosed with late-stage
<b>USAPI Total</b>	<b>409</b>	<b>17.3</b>	<b>18.9</b>	<b>14.0</b>	<b>119</b>	<b>71%</b>
<b>GUAM</b>	303	33.1	29.7	33.3	76	75%
<b>CNMI</b>	33	10.4	11.3	8.9	9	73%
<b>American Samoa*</b>	18	6.7	8.2	5.7	4	78%
<b>Republic of the Palau</b>	17	13.1	14.1	10.6	7	59%
<b>Republic of the Marshall Islands</b>	16	6.5	10.0	7.0	6	63%
<b>Pohnpei State, FSM</b>	7	4.1	-	-	5	29%
<b>Yap State, FSM</b>	6	10.3	-	-	3	50%
<b>United States - NPCR**</b>	-	-	39.2	-	-	-
<b>World^</b>	-	24.2	-	19.7	-	-

<sup>18</sup> Source: Cancer Council of the Pacific Island internal meeting discussions 2013 - 2019

<sup>19</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \*American Samoa with incomplete reporting for 2014 & 2015;\*\* 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 2018; ~ per 100,000 over age 20, ranked by rate adjusted to World Standard population



## 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 90% 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 and Pharynx(OC&P) Cancer<sup>20</sup>

All USAPI	Cases	Crude	US Std	World Std
USAPI Total	<b>346</b>	<b>14.7</b>	<b>11.8</b>	<b>9.9</b>
<b>Cervical cancer</b>	262	22.6	16.8	14.5
<b>OC&amp;P</b>	35	1.5	1.5	1.2
<b>Penis</b>	23	1.9	1.6	1.4
<b>Vagina &amp; vulva</b>	14	1.2	-	-
<b>Anus /Rectum</b>	12	0.5	-	-



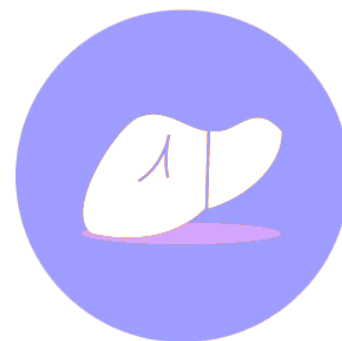
<sup>20</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; (U.S. 2000 Standard Population, World Standard Population 2000-2025); ~ per 100,000 over age 20, ranked by rate adjusted to World Standard population

## 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:** The most important risk factors for liver cancer in the US are chronic infection with hepatitis B virus (HBV) and/or hepatitis C virus (HCV), heavy alcohol consumption, obesity, diabetes, tobacco smoking, and certain rare genetic disorders, such as hemochromatosis. 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. There is no vaccine available to prevent HCV infection, although new combination antiviral therapies can often clear the infection and substantially reduce cancer risk among those already infected. The Centers for Disease Control and Prevention (CDC) recommends one-time HCV testing for everyone born from 1945 to 1965 because people born in these years account for about three-fourths of HCV-infected individuals in the US. Preventive measures for HCV infection include screening of donated blood, organs, and tissues; adherence to infection control practices during medical and dental procedures; needle-exchange programs for injection drug users, and practicing safe sex. 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<sup>21</sup>.



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<sup>21</sup> Adapted from: American Cancer Society, Cancer Facts and Figures 2017

ON-Island Treatment Options Available <sup>22</sup>			
Site	Surgery	Chemotherapy	Radiation
Liver	0.00%	22%	Only on Guam

Table 9 Crude and age-standardized rates of Liver Cancer<sup>23</sup>

Liver Cancer	Cases	Crude	US Std	World Std	dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis
USAPI Total	<b>280</b>	<b>11.9</b>	<b>10.8</b>	<b>8.6</b>	<b>226</b>	<b>81%</b>
<b>Guam</b>	147	16.1	13.0	10.4	109	74%
<b>Republic of the Palau</b>	34	26.2	23.6	18.3	34	100%
<b>Republic of the Marshall Islands</b>	26	10.6	12.1	10.2	25	96%
<b>Pohnpei State, FSM</b>	17	9.9	10.7	8.3	15	88%
<b>Yap State, FSM</b>	19	32.5	25.4	22.4	19	100%
<b>CNMI</b>	16	5	6.1	4.8	7	44%
<b>Chuuk State, FSM</b>	16	7.1	6	5.4	13	81%
<b>American Samoa</b>	3	1.1	-	-	2	67%
<b>Kosrae State, FSM</b>	2	6.4	-	-	2	100%
<b>United States - NPCR*</b>	-	-	8.1	-	-	-
<b>World^</b>	-	11.0	-	9.3	-	-

<sup>22</sup> Source: Cancer Council of the Pacific Island internal meeting discussions 2013 - 2019

<sup>23</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015); U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.; ^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2018 (U.S. 2000 Standard Population, World Standard Population 2000-2025); ~ per 100,000 over age 20, ranked by rate adjusted to World Standard population

## Lung & Bronchus Cancer

**Signs and symptoms:** Symptoms do not usually occur until the cancer is advanced, and may include persistent cough, sputum streaked with blood, chest pain, voice change, worsening shortness of breath, 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, and diesel exhaust. Additional occupational exposures that increase risk include rubber manufacturing, paving, roofing, painting, and chimney sweeping. Risk is also probably increased among people with a history of tuberculosis. Genetic susceptibility plays a role in the development of lung cancer, especially in those who develop the disease at a young age.

**Early detection:** Screening with low-dose spiral computed tomography (LDCT) has been shown to reduce lung cancer mortality by about 20% compared to standard chest x-ray among adults with at least a 30 pack-year smoking history who were current smokers or had quit within 15 years. The American Cancer Society guidelines for the early detection of lung cancer endorse a process of informed and shared decision making between clinicians who have access to high-

volume, high-quality lung cancer screening programs and current or former smokers (quit within 15 years) who are 55 to 74 years of age, in good health, and have at least a 30 pack-year history of smoking. The decision-making discussion should include a description of the benefits, uncertainties, and harms associated with lung cancer screening. The US Preventive Services Task Force has issued similar guidelines.

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<sup>24</sup>.



<sup>24</sup> Adapted from: American Cancer Society, Cancer Facts, and Figures 2017

Available Screening Method ON-island <sup>25</sup>			
Type of Cancer	Medium	Yes	No
Lung & Bronchus	16-slice CT Scanner	American Samoa, CNMI, Guam, Palau	FSM, RMI
	Chest X-ray	All	N/R
ON-Island Treatment Options Available			
Site	Surgery	Chemotherapy	Radiation
Lung & Bronchus	0.00%	22%	only on Guam

Table 10 Crude and age-standardized rates of Lung & Bronchus Cancer<sup>26</sup>

Lung and Bronchus	Cases	Crude	US Std	World Std	dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis
USAPI Total	<b>708</b>	<b>30.0</b>	<b>36.3</b>	<b>26.0</b>	<b>531</b>	<b>75%</b>
<b>Guam</b>	504	55.1	54.2	38.5	349	69%
<b>Republic of the Marshall Islands</b>	46	18.8	36.2	26.0	38	83%
<b>Republic of the Palau</b>	38	29.3	30.5	23.3	36	95%
<b>CNMI</b>	32	10.1	16.4	11.6	18	56%
<b>Pohnpei State, FSM</b>	29	16.8	18.9	15.4	28	97%
<b>Chuuk State, FSM</b>	29	12.9	15.5	12.5	27	93%
<b>Yap State, FSM</b>	15	25.6	-	-	14	93%
<b>Kosrae State, FSM</b>	7	22.3	-	-	7	100%
<b>American Samoa</b>	6	2.2	-	-	6	100%
<b>United States - NPCR*</b>	-	-	60.2	-	-	-
<b>World^</b>	-	27.4	-	22.5	-	-

<sup>25</sup> Source: Cancer Council of the Pacific Island internal meeting discussions 2013 - 2019

<sup>26</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015); U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.; ^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2018 (U.S. 2000 Standard Population, World Standard Population 2000-2025); ~ per 100,000 over age 20, ranked by rate adjusted to World Standard population

## Leukemia

**Signs and symptoms:** Symptoms may include fatigue, paleness, weight loss, repeated infections, fever, bleeding or bruising easily, bone or joint pain, and swelling in the lymph nodes or abdomen. In acute leukemia, these signs can appear suddenly because it is a fast-growing cancer. Chronic leukemia typically progresses slowly with few symptoms and is often diagnosed during routine blood tests.

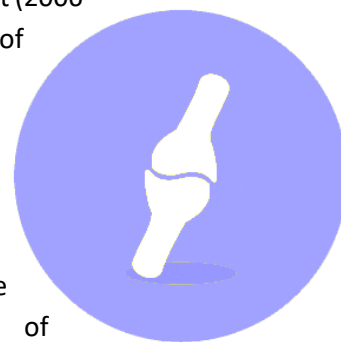
**Risk factors:** Exposure to ionizing radiation increases the risk of most types of leukemia. Medical radiation, such as that used in cancer treatment, is one of the most common sources of radiation exposure. The risk of leukemia is also increased in patients treated with chemotherapy and in children with Down syndrome and certain other genetic abnormalities. Some occupational exposures increase risk, such as the rubber- manufacturing industry. Some risk factors are most closely associated with specific types of leukemia. For example, family history is a strong risk factor for CLL. Cigarette smoking is a risk factor for AML in adults, and there is accumulating evidence that parental smoking before and after childbirth may also increase leukemia risk in children. There is limited evidence that maternal exposure to paint fumes also increases the risk of childhood leukemia. Exposure to certain chemicals, such as formaldehyde and benzene, increases the risk of myeloid leukemia. Infection with human T-cell leukemia virus type I (HTLV-I) can cause a rare type of leukemia called adult T-cell leukemia/lymphoma. HTLV-I infection is most common in southern Japan and the Caribbean, and infected individuals in the US tend to be immigrants (or their descendants) from these regions. Studies suggest that obesity may increase the risk of some leukemia subtypes.

**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 used to treat most acute leukemias. Various anticancer drugs are used, either in combination or as single agents. Several targeted drugs (e.g., imatinib) are effective for treating CML because they attack cells with the Philadelphia chromosome, the genetic abnormality that is the hallmark of CML. Some of these drugs are also used to treat a type of ALL involving a similar genetic defect. People diagnosed with CLL that is not progressing or causing symptoms may not require treatment. For patients who do require treatment, promising new targeted drugs have changed how CLL is treated in recent years. Certain types of leukemia may be treated with high-dose chemotherapy followed by stem cell transplantation under appropriate conditions. Newer experimental treatments that boost the body's immune system, such as chimeric antigen receptor (CAR) T-cell therapy, have recently shown much promise, even against some hard-to-treat leukemias. 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 subtype, ranging from a current (2006-2012) 5-year relative survival of 27% for patients diagnosed with AML to 83% 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<sup>27</sup>.



<sup>27</sup> Adapted from: American Cancer Society, Cancer Facts and Figures 2017

<b>ON-Island Treatment Options Available<sup>28</sup></b>			
Site	Surgery	Chemotherapy	Radiation
Leukemia	0.00%	22.00%	only on Guam

Table 11 Crude and age-standardized rates of Leukemia<sup>29</sup>

Leukemia	Cases	Crude	US Std	World Std
<b>USAPI Total</b>	<b>166</b>	<b>7.0</b>	<b>8.3</b>	<b>5.8</b>
<b>Guam</b>	111	12.1	12.7	8.6
<b>Republic of the Marshall Islands</b>	15	6.1	-	-
<b>CNMI</b>	11	4.1	-	-
<b>POHNPEI</b>	9	5.2	-	-
<b>Republic of the Palau</b>	8	6.2	-	-
<b>KOSRAE</b>	6	19.2	-	-
<b>United States - NPCR*</b>	-	-	17.0	-
<b>World^</b>	-	5.7	-	5.2

<sup>28</sup> Source: Cancer Council of the Pacific Island internal meeting discussions 2013 - 2019

<sup>29</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015); U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), June 2018.; ^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2018 (U.S. 2000 Standard Population, World Standard Population 2000-2025); ~ per 100,000 over age 20, ranked by rate adjusted to World World Standard population

## Oral Cavity and Pharyngeal Cancer

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

**Risk factors:** Known risk factors include tobacco use in any form (smoked and smokeless), 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 of the mouth and throat, believed to be transmitted through sexual contact, also increases risk.

**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. Some of the USAPI with high utilization of betel nut use are considering screening programs.

**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:** The 5-year relative survival rate for cancers of the oral cavity and pharynx combined is 66% for whites and 47% for blacks. About one-third (30%) of cases are diagnosed at a local stage, for which 5-year survival is 83% and 79%, respectively<sup>30</sup>.



Color variation of the betel nut fruit<sup>2</sup>.



Unripe and ripe nuts<sup>13</sup>.



Components of a betel quid including *Piper betle* (leaf), tobacco, and slaked lime<sup>14</sup>.

31

<sup>30</sup> Adapted from: American Cancer Society, Cancer Facts and Figures 2017 and Paulino, Y., Areca (Betel) Nut Chewing Practices in Micronesian Populations. Hawaii Journal of Public Health, 2011. 3(1): p. 19-29

<sup>31</sup> Photos from a May 2012 presentation to the CCPI by Dr. Yvette Paulino, University of Guam



Table 12 Crude rates of Oral Cavity and Pharyngeal Cancer<sup>32</sup>

Oral Cavity and Pharyngeal Cancer	Cases	Crude	US Std	World Std
USAPI Total	<b>178</b>	<b>7.5</b>	<b>6.4</b>	<b>5.2</b>
<b>Guam</b>	50	5.5	4.6	3.5
<b>Yap State, FSM</b>	34	58.1	44.2	38.6
<b>POHNPEI</b>	32	18.6	14.3	12.7
<b>CNMI</b>	25	7.9	5.6	5.0
<b>Republic of the Palau</b>	20	15.4	14.0	10.5
<b>Republic of the Marshall Islands</b>	9	3.7	-	-
<b>American Samoa</b>	3	-	-	-
<b>KOSRAE</b>	3	-	-	-
<b>CHUUK</b>	2	-	-	-
<b>United States - USCS*</b>	-	-	12.0	-
<b>World^</b>	-	4.6	-	4

<sup>32</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015); U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.; ^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2018 (U.S. 2000 Standard Population, World Standard Population 2000-2025); ~ per 100,000 over age 20 ranked by rate adj to World Std pop

## 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. Many thyroid cancers are diagnosed incidentally in people without symptoms because an abnormality is seen on an imaging test. Although most lumps in the thyroid gland are not cancerous, individuals who notice an abnormality should seek timely medical attention.

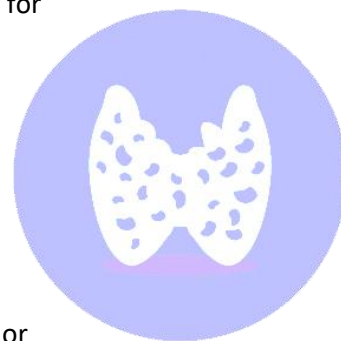
**Risk factors:** Risk factors include being female, having a history of goiter (enlarged thyroid) or thyroid nodules, a family history of thyroid cancer, and radiation exposure early in life (e.g., as a result of medical treatment). People who test positive for a mutation in a gene called RET, which causes a hereditary form of thyroid cancer (familial medullary thyroid carcinoma), can lower their risk of developing the disease by having the thyroid gland surgically removed. Certain rare genetic syndromes, such as familial adenomatous polyposis (FAP), also increase risk. The International Agency for Research on Cancer recently concluded that obesity slightly increases risk. 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, but about 5% (medullary and anaplastic thyroid cancers) are more aggressive and more likely to spread to other organs. Treatment depends on the cell type, tumor size, and extent of disease. The first choice of treatment is usually surgery to partially or totally remove the thyroid gland (thyroidectomy) and sometimes nearby lymph nodes. Treatment with radioactive iodine (1-131) after complete thyroidectomy to destroy any remaining thyroid tissue may be recommended for large tumors or when cancer has spread outside the thyroid. Thyroid hormone replacement therapy is given after thyroidectomy to replace hormones normally made by the thyroid gland and to prevent the body from making thyroid-stimulating hormone, decreasing the likelihood of recurrence. For some types of advanced thyroid cancer, targeted drugs can be used to help shrink or slow tumor growth.

**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 and progressively decreases to 83% for those 75 or older<sup>33</sup>.



<sup>33</sup> Adapted from: American Cancer Society, Cancer Facts, and Figures 2017

<b>ON-Island Treatment Options Available<sup>34</sup></b>			
Site	Surgery	Chemotherapy	Radiation
Thyroid	100%	23%	only on Guam

Table 13 Crude and age-standardized rates of Thyroid Cancer<sup>35</sup>

Thyroid Cancer	Cases	Crude	US Std	World Std
USAPI Total	<b>158</b>	<b>6.7</b>	<b>5.3</b>	<b>4.5</b>
<b>Guam</b>	122	13.3	9.7	8.4
<b>Republic of the Palau</b>	10	7.7	-	-
<b>Republic of the Marshall Islands</b>	8	3.3	-	-
<b>POHNPEI</b>	8	4.6	-	-
<b>Yap State, FSM</b>	3	-	-	-
<b>American Samoa</b>	2	-	-	-
<b>United States - NPCR*</b>	-	-	15	-
<b>World<sup>^</sup></b>	-	7.4	-	6.7

<sup>34</sup> Source: Cancer Council of the Pacific Island internal meeting discussions 2013 – 2019

<sup>35</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015); U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), June 2018.; <sup>^</sup> Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2018 (U.S. 2000 Standard Population, World Standard Population 2000-2025); ~ per 100,000 over age 20, ranked by rate adjusted to World World Standard population

## Prostate Cancer

**Signs and symptoms:** Early prostate cancer usually has no symptoms. With more advanced disease, men may experience weak or interrupted urine flow, difficulty starting or stopping urine flow; the need to urinate frequently, especially at night; blood in the urine; or pain or burning with urination. Advanced prostate cancer commonly spreads to the bones, which can cause pain in the hips, spine, ribs, or other areas.

**Risk factors:** The only well-established risk factors for prostate cancer are increasing age, African ancestry, a family history of the disease, and certain inherited genetic conditions. Black men in the US and Caribbean men of African descent have the highest documented prostate cancer incidence rates in the world. Genetic studies suggest that strong familial predisposition may be responsible for 5%-10% of prostate cancers. Inherited conditions associated with increased risk include Lynch syndrome and BRCA1 and BRCA2 mutations. Smoking may increase the risk of fatal prostate cancer.

**Prevention:** The chemoprevention of prostate cancer is an active area of research. Two drugs of interest, finasteride, and dutasteride, reduce the amount of certain male hormones in the body and are approved to treat the symptoms of benign prostatic hyperplasia. Although these drugs also seem to reduce prostate cancer risk, neither is approved for the prevention of prostate cancer because the benefits have not been shown to outweigh the harms, such as side effects like erectile dysfunction and decreased sexual drive.

**Early detection:** There is controversy in recommending routine prostate cancer screening for men at average risk because of concerns about the high rate of overdiagnosis (detecting disease that would never have caused symptoms), along with the significant potential for serious side effects associated with prostate cancer treatment. The American Cancer Society recommends that beginning at age 50, men who are at average risk of prostate cancer and have a life expectancy of at least 10 years have a

conversation with their healthcare provider about the benefits and limitations of PSA testing and make an informed decision about whether to be tested based on their personal values and preferences. Men at high risk of developing prostate cancer (black men or those with a close relative diagnosed with prostate cancer before the age of 65) should have this discussion beginning at age 45, and men at even higher risk (those with several close relatives diagnosed at an early age) should have this discussion beginning at age 40. Diagnosis requires an invasive transrectal prostate biopsy, which is not widely available in the USAPI.

**Treatment:** Treatment options vary depending on age, stage, and grade of cancer, as well as other medical conditions and patient values and preferences. Careful observation (called active surveillance) instead of immediate treatment is appropriate for many patients, particularly those diagnosed at an early stage, men with less aggressive tumors, and older men. Treatment options include surgery, external beam radiation, or radioactive seed implants (brachytherapy). Hormonal therapy may be used along with surgery or radiation in more advanced cases. Treatment often impacts a man's quality of life due to side effects or complications, such as urinary and erectile difficulties, which may be temporary or long term. Current research is exploring new biologic markers for prostate cancer in order to improve the distinction between indolent and aggressive disease to minimize unnecessary treatment.

Disease that has spread to distant sites is treated with hormonal therapy, chemotherapy, radiation therapy, and / or other treatments. Hormone treatment may control the advanced prostate cancer for long periods of time by shrinking the size or limiting the growth of the cancer, thus helping to relieve pain and other symptoms.

Chemotherapy is often used if hormone treatments are no longer effective, although recent studies have shown



that adding chemotherapy to initial hormone therapy may lengthen survival. An option for some men with advanced prostate cancer that is no longer responding to hormones is a cancer vaccine designed to stimulate the patient's immune system to specifically attack prostate cancer cells. Newer forms of hormone therapy have been shown to be beneficial for the treatment of metastatic disease that is resistant to initial hormone therapy and/ or chemotherapy. Other types of drugs can be used to treat

prostate cancer that has spread to the bones.

**Survival:** The majority (92%) of prostate cancers are discovered at a local or regional stage, for which the 5-year relative survival rate approaches 100%. The 5-year survival for distant-stage disease is 29%. Ten- and 15-year survival rates for prostate cancer are 98% and 96%, respectively<sup>36</sup>.

Table 14 Prostate Cancer in the USAPI 2007 – 2015<sup>37</sup>

Prostate Cancer	Cases	Crude	US Std	World Std	dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis
USAPI Total	<b>454</b>	<b>37.8</b>	<b>57.3</b>	<b>38.4</b>	<b>77</b>	<b>17%</b>
<b>Guam</b>	362	77.7	88.5	60.3	45	12%
<b>Republic of the Palau</b>	19	30.2	41.2	29.0	7	37%
<b>CNMI</b>	17	11.7	15.6	12.2	2	12%
<b>Republic of the Marshall Islands</b>	12	9.7	-	-	5	42%
<b>Pohnpei State, FSM</b>	12	13.9	-	-	5	42%
<b>Yap State, FSM</b>	12	42.7	-	-	5	42%
<b>American Samoa</b>	7	5.2	-	-	2	29%
<b>United States - NPCR*</b>	-	-	109.5	-	-	-

<sup>36</sup> Adapted from: American Cancer Society, Cancer Facts, and Figures 2017

<sup>37</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015); U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and

National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.; ^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2012, IARC -19.2.2014; (U.S. 2000 Standard Popn, World Standard Popn 2000-2025); ~ per 100,000 over age 20, ranked by rate adj to World Std pop

# Top 10 Cancer Sites by Jurisdiction

## American Samoa

American Samoa <sup>38</sup>	
Political status with U.S.A.	Territory
Total Population	57,400
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, Nurses, Project ECHO
Health expenditures per capita	\$500
Age Structure	0-14 years: 35% (male 10,438/female 9,644) 15-24 years: 18.3% (male 5,334/female 5,198) 25-54 years: 36.2% (male 10,379/female 10,405) 55-64 years: 6.4% (male 1,827/female 1,831) 65 years and over: 4.1% (male 1,134/female 1,210)
Birth Rate	19.6 births/1,000 population (2017 Est)
Death Rate	5.9 deaths/1,000 population (2017 Est.)
Life Expectancy	total population: 76 years

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
Fecal Immunochemical Test (FIT)	-
Prostate cancer screening	X
Colonoscopy	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
On-island histopathology	X some
General Radiologist	X
General surgeon	X
OB-Gyn	X

<sup>38</sup> Source: US Census data, 2010; WHO Health Information and Intelligence Platform 2015; CIA – The World Factbook

Surgical subspecialists	X
Oncologist	-
On-island chemotherapy	X
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

Table 15 American Samoa: Incident Cancer Cases 2007-2015<sup>39</sup>

Top 10 for Am Samoa	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>212</b>	<b>79.1</b>	<b>78.4</b>	<b>59.9</b>	<b>449.0</b>	<b>67%</b>	<b>6%</b>	<b>90%</b>
<b>Uterus</b>	55	40.9	35.4	29.5	26.2	85%	4%	92%
<b>Breast</b>	48	35.7	29.7	24.5	124.7	67%	13%	79%
<b>Colon &amp; Rectum</b>	18	6.7	8.2	5.7	39.2	78%	11%	89%
<b>Stomach</b>	11	4.1	-	-	7.0	36%	0%	91%
<b>Cervical Cancer, invasive</b>	11	8.2	-	-	7.5	64%	0%	100%
<b>Ovary</b>	9	6.7	-	-	11.3	56%	0%	78%
<b>Prostate</b>	7	5.2	-	-	109.5	71%	0%	100%
<b>Lung &amp; Bronchus</b>	6	2.2	-	-	60.2	0%	17%	83%
<b>Ill-defined &amp; unspecified (unknown+misc)</b>	6	2.2	-	-	-	67%	0%	100%
<b>Non-Hodgkin Lymphoma</b>	4	1.5	-	-	18.9	50%	0%	100%

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2015 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. A 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.

<sup>39</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 212 total cancer cases for age over 20 and 3 leukemia (2y, 6y, 16y), 1 liver (4y), 1 bone (12y), 1 ovary (17 y), 1 ill-defined (18y), 1 thyroid(19y); \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.

Provision of hospital-based and home-based palliative care services is in the early stages of development. Efforts to train staff and family caregivers are ongoing. There have 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 policymakers, 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 <sup>40</sup>	
Political status with U.S.A.	Commonwealth
Total Population	52,300
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, Project ECHO
Health expenditures per capita	\$723
Age Structure	0-14 years: 26.7% (male 7,192/female 6,746) 15-24 years: 12.8% (male 3,419/female 3,297) 25-54 years: 49.9% (male 13,279/female 12,810) 55-64 years: 7.7% (male 2,251/female 1,783) 65 years and over: 2.9% (male 811/female 709)
Birth Rate	15 births/1,000 population (2017 Est)
Death Rate	4.8 deaths/1,000 population (2017 Est)
Life Expectancy	total population: 77 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
Fecal Immunochemical Test (FIT)	X
Prostate cancer screening	X
Colonoscopy	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
On-island histopathology	
General Radiologist	*(only radiology techs)
General surgeon	X
OB-Gyn	X

<sup>40</sup> Source: US Census data, 2010; WHO Health Information and Intelligence Platform 2015; CIA – The World Factbook

Surgical subspecialists	X
Oncologist	X
<b>CANCER DIAGNOSIS AND TREATMENT</b>	
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	-

Table 16 Commonwealth of the Northern Mariana Islands: Incident Cancer Cases 2007-2015<sup>41</sup>

Top 10 for CNMI	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>325</b>	<b>102.4</b>	<b>116.7</b>	<b>89.8</b>	<b>449.0</b>	<b>66%</b>	<b>13%</b>	<b>72%</b>
<b>Breast</b>	54	33.7	27.6	22.3	124.7	93%	9%	74%
<b>Colon &amp; Rectum</b>	33	10.4	11.3	8.9	39.2	73%	21%	58%
<b>Lung &amp; Bronchus</b>	32	10.1	16.4	11.6	60.2	44%	9%	91%
<b>Uterus</b>	28	18.2	18.5	15.9	26.2	68%	14%	68%
<b>Tobacco-related Oral Cavity &amp; Pharynx</b>	25	7.9	5.6	5.0	12.0	92%	2%	68%
<b>Prostate</b>	21	12.9	15.8	12.7	109.5	90%	29%	42%
<b>Liver</b>	16	5	6.1	4.8	8.1	56%	0%	87%
<b>Cervical Cancer, invasive</b>	16	10.4	9.3	7.2	7.5	88%	13%	68%
<b>Leukemia</b>	11	3.5	-	-	14.0	27%	0%	100%
<b>Stomach</b>	10	3.2	-	-	7.0	70%	0%	70%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2015 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 a 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. A 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.

<sup>41</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 325 total cancer cases for age over 20 and 1 childhood penis (18y), 1 Thyroid (16y), 1 Brain(13y), 1 leukemia(15y); \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.

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 have 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 policymakers, 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 <sup>42</sup>	
Political status with U.S.A.	Freely Associated
Total Population	102,116
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, Project ECHO
Health expenditures per capita	\$447
Age Structure	0-14 years: 35.7% (male 18,696/female 17,772) 15-24 years: 20.6% (male 10,983/female 10,082) 25-54 years: 34.6% (male 17,695/female 17,636) 55-64 years: 5.7% (male 3,017/female 2,834) 65 years and over: 3.3% (male 1,409/female 1,990)
Birth Rate	2.5 births/1,000 population
Death Rate	0.6 deaths/1,000 population
Life Expectancy	Total population: 70 years

FSM PROGRAM OR SERVICE				
CANCER SCREENING				
	Chuuk	Kosrae	Pohnpei	Yap
BCCEDP	-	-	-	-
Mammography	-	-	-	-
Pap Smears	X	X	X	X
On-island processing of pap smears	-	-	X (Telepathology)	-
Cervical cancer screening using VIA	X	X	X	X
Colorectal cancer screening (FOBT)		X	X	X
Fecal Immunochemical Test (FIT)	-	-	-	-
Prostate cancer screening	-	-	X	X
Colonoscopy	X	X	X	X
CANCER DIAGNOSIS AND TREATMENT				
Pathologist	-	-	-	-
On-island histopathology	-	-	-	-

<sup>42</sup> \* Source: WHO statistical Profile, 2013; WHO Health Information and Intelligence Platform 2015

General Radiologist	-	-	-	-
General surgeon	X	X	X	X
OB-Gyn	X	X	X	X
Surgical subspecialists	-	-	-	-
Oncologist	-	-	-	-
On-island chemotherapy (maintenance only)	-	-	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	-	-	-	-

Table 17 FSM (all States): Incident Cancer Cases 2007-2015<sup>43</sup>

Top 10 for FSM	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>578</b>	<b>118.7</b>	<b>120.6</b>	<b>96.9</b>	<b>449.0</b>	<b>33%</b>	<b>15%</b>	<b>82%</b>
<b>Lung &amp; Bronchus</b>	80	16.4	18.2	14.9	60.2	5%	8%	91%
<b>Tobacco-related Oral Cavity &amp; Pharynx</b>	71	14.6	12.1	10.7	12.0	56%	32%	63%
<b>Cervical Cancer, invasive</b>	59	24.3	19.1	16.8	7.5	51%	14%	78%
<b>Breast</b>	58	23.0	20.7	17.0	124.7	45%	19%	76%
<b>Liver</b>	54	11.1	10.3	8.6	8.1	9%	11%	89%
<b>Uterus</b>	35	14.4	14.4	11.7	26.2	63%	9%	91%
<b>Prostate</b>	30	12.3	26.3	16.6	109.5	47%	23%	77%
<b>Colon &amp; Rectum</b>	22	4.5	5.5	4.0	39.2	23%	5%	95%
<b>Leukemia</b>	20	4.1	3.8	3.1	14	10%	5%	95%
<b>Stomach</b>	19	3.9	4.7	3.6	7.0	5%	11%	84%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2015 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.

<sup>43</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 578 total cancer cases for age over 20, 2 childhood leukemia, 2 child bone (14y&15y), 1 child ovary (16 y), 1 child brain, 1 Eye & Orbit, 2 child non-hodgkin lymphoma (4y,15y), 1 other endocrine (5y), 1 testis (4y), 1 Tobacco-related OC&P, 1 lung & bronchus (19y), 2 leukemia(11y,17y), 1 Ill-defined & unspecified; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.

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 a 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 have 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 policymakers, 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 18 Chuuk: Incident Cancer Cases 2007-2015<sup>44</sup>

Top 10 for Chuuk	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>129</b>	<b>57.4</b>	<b>64.9</b>	<b>50.6</b>	<b>449.0</b>	<b>19%</b>	<b>9%</b>	<b>91%</b>
<b>Lung &amp; Bronchus</b>	29	12.9	15.5	12.5	60.2	7%	10%	90%
<b>Liver</b>	16	7.1	6.0	5.4	8.1	19%	0%	100%
<b>Breast</b>	14	12.6	-	-	124.7	29%	7%	93%
<b>Colon &amp; Rectum</b>	8	3.6	-	-	39.2	0%	0%	100%
<b>Ill-defined &amp; unspecified (unknown+misc)</b>	7	3.1	-	-	-	0%	0%	100%
<b>Cervical Cancer, invasive</b>	7	6.3	-	-	7.5	43%	29%	71%
<b>Stomach</b>	6	2.7	-	-	7.0	0%	17%	83%
<b>Nasopharynx</b>	6	2.7	-	-	0.5	33%	17%	83%
<b>Prostate</b>	5	4.4	-	-	109.5	0%	0%	100%
<b>Leukemia</b>	4	1.8	-	-	14.0	0%	0%	100%

<sup>44</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 129 total cancer cases for age over 20 and 1 childhood leukemia (11y), 1 Lung(19y), 1Soft Tissue(13y), 1 Brain(18y) and 1 Other Endocrine(5y), 1 Ill-defined & unspecified(1yr); \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), June 2018.

Table 19 Kosrae: Incident Cancer Cases 2007-2015<sup>45</sup>

Top 10 for Kosrae	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	<b>43</b>	<b>137.3</b>	<b>121.3</b>	<b>95.1</b>	<b>449.0</b>	<b>9%</b>	<b>12%</b>	<b>88%</b>
Lung & Bronchus	7	22.3	-	-	60.2	0%	14%	86%
Leukemia	6	19.2	-	-	14.0	0%	0%	100%
Cervical Cancer, invasive	4	25.8	-	-	7.5	25%	0%	100%
Breast	4	25.8	-	-	124.7	50%	0%	100%
Tobacco-related Oral Cavity & Pharynx	3	9.6	-	-	12.0	0%	0%	100%
Ovary	3	19.3	-	-	11.3	0%	0%	100%
Liver	2	6.4	-	-	8.1	0%	50%	50%
Stomach	2	6.4	-	-	7.0	0%	50%	50%
Non-Hodgkin Lymphoma	2	6.4	-	-	18.9	0%	50%	50%
Uterus	2	12.9	-	-	26.2	50%	50%	50%

Table 20 Pohnpei: Incident Cancer Cases 2007-2015<sup>46</sup>

Top 10 for PNI	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	<b>253</b>	<b>146.8</b>	<b>150.2</b>	<b>121.1</b>	<b>449.0</b>	<b>36%</b>	<b>13%</b>	<b>83%</b>
Cervical Cancer, invasive	38	44.1	33.7	30.3	7.5	55%	13%	74%
Tobacco-related Oral Cavity & Pharynx	32	18.6	14.3	12.7	12.0	44%	31%	63%
Lung & Bronchus	29	16.8	18.9	15.4	60.2	3%	0%	97%
Breast	28	31.3	33.7	25.7	124.7	43%	21%	68%
Uterus	19	22.0	25.8	19.7	26.2	53%	11%	89%
Liver	17	9.9	10.7	8.3	8.1	12%	6%	94%
Prostate	12	13.9	23.7	16.3	109.5	58%	25%	75%
Stomach	10	5.8	-	-	7.0	0%	0%	90%
Nasopharynx	9	5.2	-	-	0.5	22%	0%	100%
Leukemia	9	5.2	-	-	39.2	22%	0%	100%

<sup>45</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 43 total cancer cases for over age 20 and 1 childhood bones and joints (15y); \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.

<sup>46</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015

2007-2015: 253 total cancer cases for age over 20 and 1 childhood bones & joints (14y), 3 child Non-Hodgkin Lymphoma (4y,12y, 15y), 1 Leukemia (17y), 1 Tobacco-related OC&P (17y), 1 child testis (4y)

\* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.

Table 21 Yap: Incident Cancer Cases 2007-2015<sup>47</sup>

Top 10 for YAP	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>153</b>	<b>261.5</b>	<b>224.9</b>	<b>186.4</b>	<b>449.0</b>	<b>46%</b>	<b>26%</b>	<b>73%</b>
<b>Tobacco-related Oral Cavity &amp; Pharynx</b>	34	58.1	44.2	38.6	12.0	71%	35%	62%
<b>Liver</b>	19	32.5	25.4	22.4	8.1	0%	21%	79%
<b>Lung &amp; Bronchus</b>	15	25.6	-	-	60.2	7%	13%	87%
<b>Breast</b>	12	36.0	-	-	124.7	67%	33%	67%
<b>Prostate</b>	12	42.7	-	-	109.5	58%	33%	67%
<b>Cervical Cancer, invasive</b>	10	32.7	-	-	7.5	50%	10%	90%
<b>Uterus</b>	10	32.7	-	-	26.2	90%	0%	100%
<b>Larynx</b>	7	12.0	-	-	3.0	0%	29%	71%
<b>Colon &amp; Rectum</b>	6	10.3	-	-	39.2	50%	17%	83%

<sup>47</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 129 total cancer cases for age over 20 and 1 child eye & orbit (1y), 1 child ovary (16y); \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), June 2018.



## Guam

Guam <sup>48</sup>	
Political status with U.S.A.	Unincorporated Territory
Total Population	161,700
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
Regularly occurring continuing education program for physicians or nurses	Both; hospital and PHN, Project ECHO
Health expenditures per capita	\$1,032
Age Structure	0-14 years: 27.2% (male 22,642/female 21,313) 15-24 years: 16.8% (male 14,354/female 12,825) 25-54 years: 40.4% (male 33,550/female 31,827) 55-64 years: 8.8% (male 7,110/female 7,174) 65 years and over: 6.7% (male 5,083/female 5,822)
Birth Rate	19.7 births/1,000 population (2017 Est)
Death Rate	6 deaths/1,000 population (2017 Est)
Life Expectancy	total population: 79 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
Fecal Immunochemical Test (FIT)	X
Prostate cancer screening	X
Colonoscopy	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
On-island histopathology	X
General Radiologist	X
General surgeon	X
OB-Gyn	X
Surgical subspecialists	X
Oncologist	X

<sup>48</sup> Source: US Census data, 2010; WHO Country profiles 2011; WHO Health Information and Intelligence Platform 2015; CIA – The World Factbook

CANCER DIAGNOSIS AND TREATMENT	
On-island chemotherapy	X
On-island radiation therapy	X
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	-

Table 22 Guam: Incident Cancer Cases 2007-2015<sup>49</sup>

Top 10 for Guam	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>2858</b>	<b>312.5</b>	<b>284.4</b>	<b>211.5</b>	<b>449</b>	<b>65%</b>	<b>24%</b>	<b>73%</b>
<b>Lung &amp; Bronchus</b>	504	55.1	54.2	38.5	60.2	31%	9%	89%
<b>Breast</b>	437	96.9	79.1	61.4	124.7	90%	34%	64%
<b>Prostate</b>	362	77.7	88.5	60.3	109.5	88%	52%	47%
<b>Colon &amp; Rectum</b>	303	33.1	29.7	22.3	39.2	75%	18%	75%
<b>Liver</b>	147	16.1	13.0	10.4	8.1	26%	12%	85%
<b>Uterus</b>	125	27.9	21.8	17.6	26.2	88%	37%	56%
<b>Thyroid</b>	122	13.3	9.7	8.4	14.5	94%	37%	61%
<b>Leukemia</b>	111	12.1	12.7	8.6	14.0	70%	0%	100%
<b>Stomach</b>	67	7.3	7.3	5.1	7.0	51%	10%	90%
<b>Cervical Cancer, invasive</b>	63	14.0	10.3	8.8	7.5	73%	16%	73%
<b>Nasopharynx</b>	59	6.5	5.0	4.0	0.5	69%	7%	93%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2015 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-YZDTXKUXCU05IWUEtMFJgqzQ&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.

<sup>49</sup> 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; Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 2555 total cancer cases for age over 20 and 13 childhood leukemia, 1 child Brain (4 y), 2 Bones & Joints, 1 child breast (14y), 1 child colon & rectum (17y), 1 child ill defined, 3 Kidney & Renal Pelvis, 3 child non-hodgkin lymphoma, 1 child other digestive, 1 Other Endocrine(17y), 1 Soft Tissue, 1 penis, 1 small intestine, 1 thyroid, 1 urinary bladder, 1 ovary, 1 testis, 1 other respiratory; \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; www.cdc.gov/cancer/dataviz, June 2018.

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 have 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 policymakers. 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 policymakers, 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 <sup>50</sup>	
Political status with U.S.A.	Freely Associated
Total Population	53,952
Land surface area (sq. km)	181
Coastline (sq. km)	376
Public transportation	None
4-year University or College	None
2-year College	X
Hospitals	1
Regularly occurring continuing education program for physicians or nurses	Both, Project ECHO
Health expenditures per capita	\$651
Age Structure	0-14 years: 39.9% (male 11,186/female 10,367) 15-24 years: 18.5% (male 5,112/female 4,864) 25-54 years: 34.6% (male 9,382/female 9,287) 55-64 years: 4.9% (male 1,419/female 1,250) 65 years and over: 2% (male 540/female 545)
Birth Rate (live births)	1.4 births/1,000 population
Death Rate	0.3 deaths/1,000 population
Life Expectancy	total population: 70 years

RMI PROGRAM OR SERVICE	
CANCER SCREENING	
BCCEDP	X
Mammography	X (Majuro)
Pap Smears	X
On-island processing of pap smears	-
Cervical cancer screening using VIA	X
Colorectal cancer screening (FOBT)	X
Fecal Immunochemical Test (FIT)	-
Prostate cancer screening	X
Colonoscopy	X (Ebeye)
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	-
On-island histopathology	-
General Radiologist	X (Ebeye)
General surgeon	X
OB-Gyn	X
Surgical subspecialists	X
Oncologist	-
CANCER DIAGNOSIS AND TREATMENT	
On-island chemotherapy	-

<sup>50</sup> Source: WHO statistical Profile, 2013; WHO World Health Statistics 2015; WHO Health Information and Intelligence Platform 2015

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	-

Table 23 Republic of the Marshall Islands: Incident Cancer Cases 2007-2015<sup>51</sup>

Top 10 for RMI	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>438</b>	<b>179.0</b>	<b>213.1</b>	<b>169.8</b>	<b>449.0</b>	<b>43%</b>	<b>18%</b>	<b>69%</b>
<b>Cervical Cancer, invasive</b>	100	83.0	75.3	64.0	7.5	60%	30%	49%
<b>Lung &amp; Bronchus</b>	46	18.8	36.2	26	60.2	4%	2%	87%
<b>Breast</b>	38	30.7	27.9	25.0	124.7	71%	26%	61%
<b>Liver</b>	26	10.6	12.1	10.2	8.1	4%	19%	69%
<b>Uterus</b>	21	17.4	21.4	17.8	26.2	81%	52%	29%
<b>Nasopharynx</b>	18	7.4	7.7	6.3	0.5	28%	0%	100%
<b>Colon &amp; Rectum</b>	16	6.5	10	7	39.2	62%	25%	62%
<b>Ill-defined &amp; unspecified (unknown+misc)</b>	16	6.5	9.4	7.1	-	19%	0%	100%
<b>Leukemia</b>	15	6.1	-	-	14.0	20%	0%	100%
<b>Non-Hodgkin Lymphoma</b>	15	6.1	-	-	18.9	40%	7%	93%
<b>Ovary</b>	15	12.4	-	-	11.3	27%	0%	80%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2015 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 a 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 have 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

<sup>51</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 438 total cancer cases for age over 20 and 8 childhood leukemia, 2 child liver (1y, 4y), 2 child bone (14y, 15y), 2 child ovary (10y, 19 y), 2 child brain(6y, 16y), 3 child Non-Hodgkin Lymphoma, 1 soft tissue ,1 Other Respiratory, 2 testis(1y,3y); \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), June 2018.

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 policymakers, 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

<b>Palau<sup>52</sup></b>	
Political status with U.S.A.	Freely Associated
Total Population	20,918
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, Project ECHO
Health expenditures per capita	\$1,310
Age Structure	0-14 years: 20.5% (male 2,201/female 2,085) 15-24 years: 16.4% (male 1,701/female 1,730) 25-54 years: 48.5% (male 5,803/female 4,342) 55-64 years: 8.8% (male 966/female 876) 65 years and over: 5.8% (male 525/female 689)
Birth Rate (live births)	0.3 births/1,000 population
Death Rate	0.1 deaths/1,000 population
Life Expectancy	total population: 73 years

<b>PALAU PROGRAM OR SERVICE</b>	
<b>CANCER SCREENING</b>	
BCCEDP	X
Mammography	X
Pap Smears	X
On-island processing of pap smears	-
Cervical cancer screening using VIA	-
Colorectal cancer screening (FOBT)	X
Fecal Immunochemical Test (FIT)	-
Prostate cancer screening	X
Colonoscopy	X
<b>CANCER DIAGNOSIS AND TREATMENT</b>	
Pathologist	-
On-island histopathology	-
General Radiologist	-
General surgeon	X
OB-Gyn	X
Surgical subspecialists	-

<sup>52</sup> Source: WHO statistical Profile, 2013; WHO World Health Statistics 2015; WHO Health Information and Intelligence Platform 2015

Oncologist	-
<b>CANCER DIAGNOSIS AND TREATMENT</b>	
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	-

Table 24 Republic of Palau: Incident Cancer Cases 2007-2015<sup>53</sup>

Top 10 for Palau	Cases	Crude	US Std	World Std	Incidence rate US*	% alive within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
<b>All Sites</b>	<b>250</b>	<b>192.8</b>	<b>185.2</b>	<b>143.5</b>	<b>449.0</b>	<b>36%</b>	<b>8%</b>	<b>87%</b>
<b>Lung &amp; Bronchus</b>	38	29.3	30.5	23.3	60.2	5%	5%	92%
<b>Liver</b>	34	26.2	23.6	18.3	8.1	0%	6%	91%
<b>Prostate</b>	22	31.0	41.8	30.2	109.5	68%	9%	82%
<b>Tobacco-related Oral Cavity &amp; Pharynx</b>	20	15.4	14.0	10.5	12.0	55%	15%	80%
<b>Uterus</b>	19	32.3	26.0	20.1	26.2	74%	16%	84%
<b>Colon &amp; Rectum</b>	17	13.1	14.1	10.6	39.2	59%	12%	76%
<b>Breast</b>	16	27.2	23.5	19.2	124.7	81%	6%	94%
<b>Cervical Cancer, invasive</b>	13	22.1	-	-	7.5	38%	8%	92%
<b>Thyroid</b>	10	7.7	-	-	14.5	70%	10%	80%
<b>Stomach</b>	10	7.7	-	-	7.0	20%	10%	80%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2015 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 a 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 have been increased efforts over the past 4 years

<sup>53</sup> Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2015; 2007-2015: 250 total cancer cases for age over 20 and 1 childhood leukemia (7y) and 1 child brain (10y); \* U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on November 2017 submission data (1999-2015): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; [www.cdc.gov/cancer/dataviz](http://www.cdc.gov/cancer/dataviz), June 2018.



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 policymakers, 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 9 years.

# Appendix

Table 25 Selected indicators, programs and services impacting Comprehensive Cancer Control 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	57,400	52,300	161,700	102,116	20,918	53,952
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	2 (1 private GRMC)	5 (1 private in PNI)	1	1
Health expenditures per capita	\$500	\$723	\$1,032	\$447	\$1,310	\$851
Age Structure	0-14 years: 35% (male 10,438/female 9,644) 15-24 years: 18.3% (male 5,334/female 5,198) 25-54 years: 36.2% (male 10,379/female 10,405) 55-64 years: 6.4% (male 1,827/female 1,831) 65 years and over: 4.1% (male 1,134/female 1,210)	0-14 years: 26.7% (male 7,192/female 6,746) 15-24 years: 12.8% (male 3,419/female 3,297) 25-54 years: 49.9% (male 13,279/female 12,810) 55-64 years: 7.7% (male 2,251/female 1,783) 65 years and over: 2.9% (male 811/female 709)	0-14 years: 27.2% (male 22,642/female 21,313) 15-24 years: 16.8% (male 14,354/female 12,8255) 25-54 years: 40.4% (male 33,550/female 31,827) 55-64 years: 8.8% (male 7,110/female 7,174) 65 years and over: 6.7% (male 5,083/female 5,822)	0-14 years: 35.7% (male 18,696/female 17,772) 15-24 years: 20.6% (male 10,983/female 10,082) 25-54 years: 34.6% (male 17,695/female 17,636) 55-64 years: 5.7% (male 3,017/female 2,834) 65 years and over: 3.3% (male 1,409/female 1,990)	0-14 years: 20.5% (male 2,201/female 2,085) 15-24 years: 16.4% (male 1,701/female 1,730) 25-54 years: 48.5% (male 5,803/female 4,342) 55-64 years: 8.8% (male 966/female 876) 65 years and over: 5.8% (male 525/female 689)	0-14 years: 39.9% (male 11,186/female 10,367) 15-24 years: 18.5% (male 5,112/female 4,864) 25-54 years: 34.6% (male 9,382/female 9,287) 55-64 years: 4.9% (male 1,419/female 1,250) 65 years and over: 2% (male 540/female 545)
Birth Rate	19.6 births/1,000 population (2017 Est)	15 births/1,000 population (2017 Est)	19.7 births/1,000 population (2017 Est)	2.5 births/1,000 population	0.3 births/1,000 population	1.4 births/1,000 population
Death Rate	5.9 deaths/1,000 population (2017 Est.)	4.8 deaths/1,000 population (2017 Est)	6 deaths/1,000 population (2017 Est)	0.6 deaths/1,000 population	0.1 deaths/1,000 population	0.3 deaths/1,000 population
Life Expectancy	total population: 76 years	total population: 77 years	total population: 79 years	total population: 70 years	total population: 73 years	total population: 70 years country comparison to the world: <a href="#">134</a>

	American Samoa	CNMI	Guam	FSM	Palau	RMI
CDC Breast and Cervical Cancer Early Detection Program	X	X	X	-	X	X
Mammography	X	X	X	-	X	X (Majuro)
Pap Smears	X	X	X	X	X	X
On-island processing of pap smears	-	-	-	X(PNI – Telepathology)	-	-
Cervical cancer screening using VIA	-	-	-	X	-	X
Colorectal cancer screening (FOBT)	X	X	X	X (KSA,PNI,YAP)	X	X
Prostate cancer screening	X	X	X	X (PNI,YAP)	X	X
Colonoscopy	X	X	X	X	X	X (Ebeye)
<b>CANCER DIAGNOSIS AND TREATMENT</b>						
Pathologist	X	-	X	-	-	-
On-island histopathology	X some	X	X	-	-	-
General Radiologist	X	-	X	-	-	X (Ebeye)
General surgeon	X	X	X	X	X	X
OB-Gyn	X	X	X	X	X	X
Surgical subspecialists	X	X	X	-	-	X
Oncologist	-	-	X	-	-	-
	American Samoa	CNMI	Guam	FSM	Palau	RMI
On-island chemotherapy	X	X (maintenance)	X	X (maintenance, rare)	-	-
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	X	X
Off-island referral to New Zealand for diagnosis / treatment	X	-	-	-	-	-

# Final Page



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**CDC 1 NU58DP006269** Guam CCC/BCCEDP Programs

**CDC 1 NU58DP006336** RMI Comprehensive Cancer Control Program

**CDC 1 NU58DP006289** Palau CCC/BCCEDP Programs

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