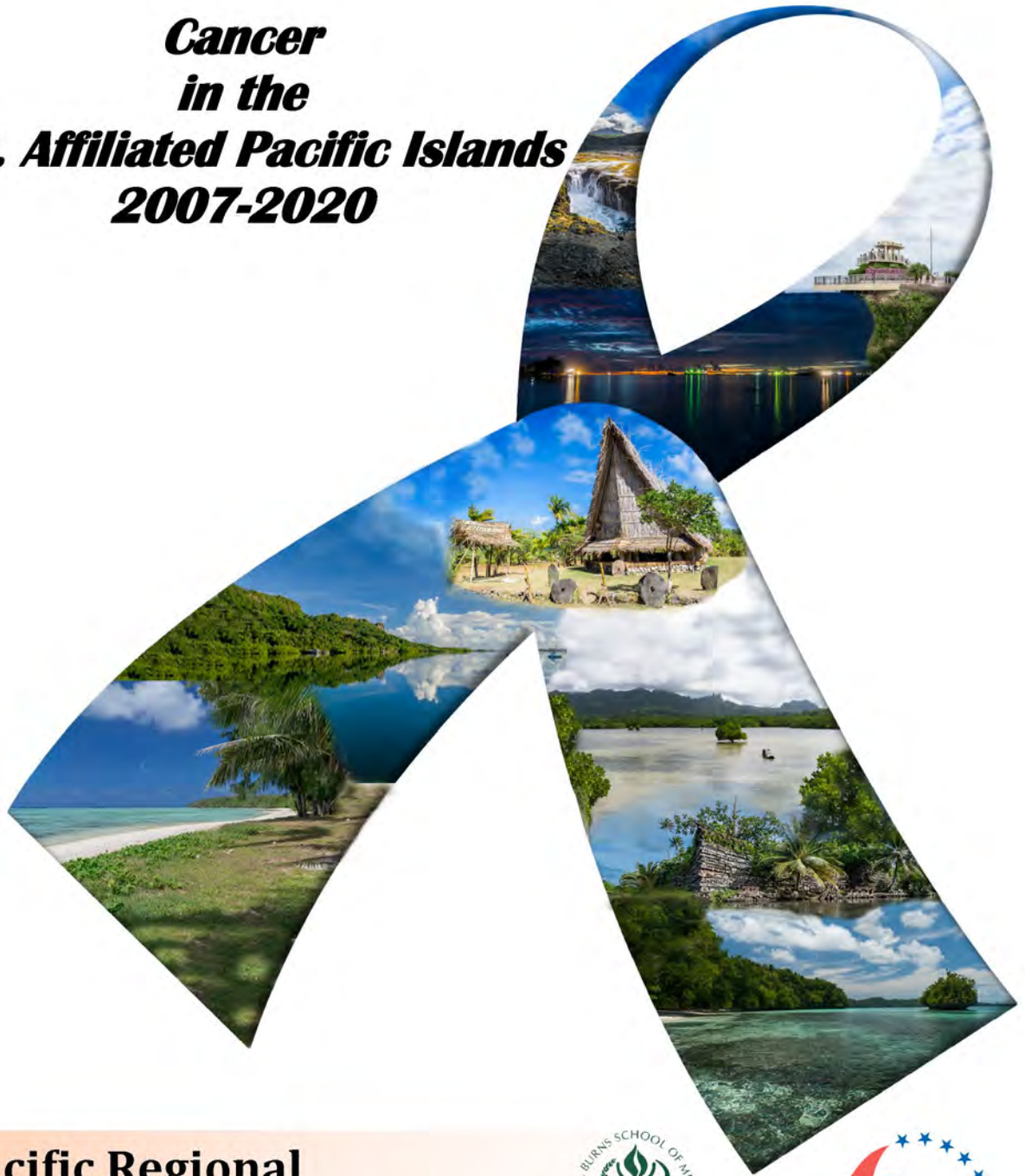


***Cancer
in the
U.S. Affiliated Pacific Islands
2007-2020***



**Pacific Regional
Central Cancer Registry**

April, 2023



Acknowledgments

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Foreword

Hafa Adai, Alii, Talofa, Kaselehlie, Ran anim, Lenwo, Mogethin, lakwe, and Aloha!

In response to the lack of systematic and accurate collection of cancer data in the region, the U.S. 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 jurisdictions 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., take 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 that allows for economies of scale, standardized reporting and “speaking with one voice” for the USAPI

Specific goals of the PRCCR for the 2022- 2027 5-year program cycle are:

- Improve timely collection and dissemination of high-quality data on all reportable incident cancer cases, utilizing improved data linkages to support data-driven decisions for the spectrum of cancer prevention and control.
- Improve each jurisdiction’s ability to meet National Program for Cancer Registries (NPCR) National Data Quality and Advanced National Data Quality standards for completeness.
- Increase data use and dissemination to support jurisdiction and regional chronic disease and other public health programs and maintain the current level of data use to implement collaborative, evidence-based interventions (EBIs) for cancer prevention (including HPV immunization), tobacco control, cervical cancer screening, colorectal cancer screening, survivorship, and health disparity/equity strategies. This includes targeted cancer screening for populations at increased risk.
- Improve use of the data, as well as quality control findings (especially related to timeliness and case completion), that supports improvement efforts in health information management/health system changes and vital statistics (mortality reporting and coding).
- Increase availability of culturally- and resource-appropriate training and educational resources to build a more agile workforce and processes to implement changing data items, schema, and standards.
- Partner and assist in cancer-related data modernization activities, and promote interoperability to increase timeliness and complete data reporting to selected jurisdiction(s) and the regional registry.

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 the 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 (JABSOM), 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 and Prevention (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 PRCCR. The CCPI, 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 that 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.

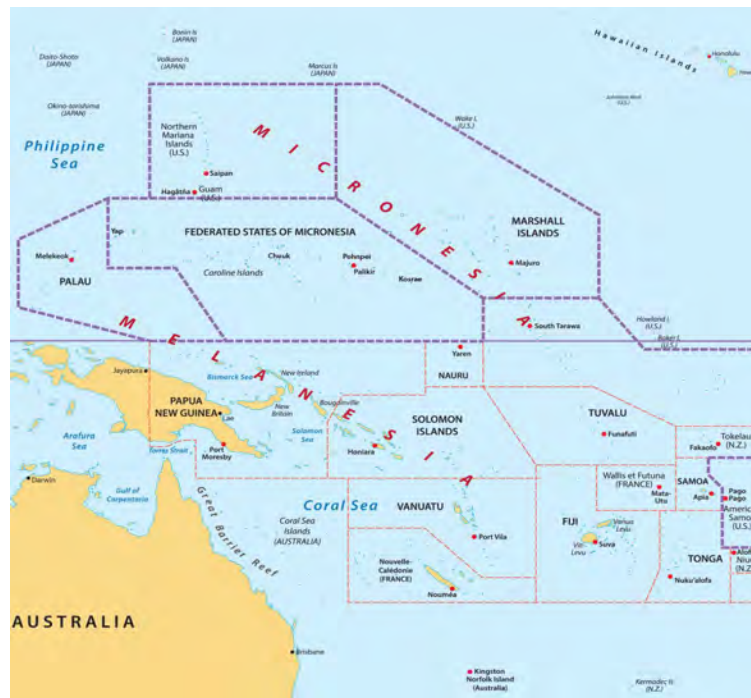
Lee Buenconsejo-Lum, MD, FAAFP, Interim Dean, UH JABSOM & PRCCR Principal Investigator

Background - USAPI

The U.S.-Affiliated Pacific Islands (USAPI) consists of three Flag Territories, and three Freely Associated States (FAS). The Flag Territories are the Territories of American Samoa (AS) and Guam (GU) and the Commonwealth of the Northern Mariana Islands (CNMI or MP). The Freely Associated States include the Federated States of Micronesia (FSM or FM), which consists of Yap, Pohnpei, Kosrae, Chuuk; the Republic of the Marshall Islands (RMI or MH), and the Republic of Palau (also known as Palau or PW). 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 is not similar. The expanse of the entire region is almost twice that of the continental U.S. and crosses five time zones.

Significant health disparities exist between the populations of the United States (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 (NCDs) have risen exponentially in the Pacific in just 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 Islands¹



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Cancer in the U.S. 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 (MH), FSM (FM), Palau (PW), and CNMI (MP), 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 (AS) has a separate Department of Health and hospital, as does Guam (GU). Guam is the most similar to the U.S., with most of the population receiving care in the private sector. There is also a second hospital in Guam and several outpatient radiation oncology centers (and Guam also hosts one U.S. Naval Hospital). In the USAPIs, the 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 range from around \$2,000 to about \$228 per person per year for all preventive and curative health services. In contrast, the U.S. per capita health expenditures exceed **\$10,624**.

USAPI Per Capita Total Expenditure on Health

(in Purchasing Power Parity (PPP) terms, International \$ for FSM, RMI, PW, AS, CNMI, GU, USA) (in unadjusted USD for FSM States and WPRO)



*Macrotrends.net online Database 2018 (USA, FM, MH, PW); †Audit Report in accordance with the uniform guidance 2019 (FSM States); ‡The Lancet 2016 article (American Samoa, CNMI, Guam); ¶WHO - WPRO Health expenditure Dashboard 2015 (WPRO)

The disparity in monetary resources is not the only driver of generally poor rates of screening, limited diagnostic, and treatment capability. Geography and cultural factors 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 type 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 (CCC) 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 the 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 patient³.

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 (ACS) states that - excluding non-melanoma skin cancer - at least 42% of newly diagnosed cancers in the U.S. – about 805,600 cases in 2022 – are potentially avoidable, including the 19% of cancers caused by smoking. The ACS also estimates that 18% of cancer cases are attributable to the combined effects of excess body weight, alcohol consumption, poor nutrition, and physical inactivity, and thus could also be prevented⁴.

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 by treating the infection. Many of the more than 5 million skin cancers diagnosed annually could be prevented by protecting skin from excessive sun exposure and not using indoor tanning devices.

Screening can help prevent colorectal and cervical cancers by detecting and removing precancers in the colon, rectum,

³ Adapted from: “Global Cancer Facts & Figures 2007 and 2013”

⁴ Adapted from: American Cancer Society “Cancer Facts & Figures 2022”

and uterine cervix. Screening can also detect these and some other cancers early, when treatment is often less intensive and more successful. Screening is known to reduce mortality for cancers of the breast, colon, rectum, cervix, lung (among people with a history of heavy smoking), and prostate. In addition, being aware of changes in the body (such as a new mole or lump under the skin) and bringing these to the attention of a health care professional can also result in the earlier detection of cancer. Cancer is quite common. In the U.S., it is estimated that 40% of men and 39% of 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 early⁵.

What is Cancer Stage or Staging?

Staging describes the extent or spread of cancer at the time of diagnosis, but also sometimes after treatment has begun. Proper staging is essential for optimizing therapy and assessing prognosis. For most cancers, stage is based on the size or extent of the primary tumor and whether the cancer has spread to nearby lymph nodes or other areas of the body. Several staging systems are used to classify cancer. This report uses a system of summary staging that is standard for descriptive and statistical analyses of population-based tumor registry data and is particularly useful for tracking trends over time. According to this system, if cancer is confined to the layer of cells where it began growing and has 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.

Another staging system that is used more often by clinicians is called TNM (tumor size, nodes involved, and presence of metastasis). TNM similarly assesses cancer growth and spread and assigns a stage from 0 (in situ) for the earliest stage up to I, II, III, or IV for more advanced disease. However, some cancers do not have a stage IV (e.g., testis) and others (e.g., lymphoma) have alternative staging systems. As the biology of cancer has become better understood, additional tumor-specific features have been incorporated into staging for some cancers. Patients with advanced-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 diagnosis⁶.

⁵ Adapted from: American Cancer Society “Cancer Facts & Figures 2022”

⁶ Adapted From: American Cancer Society “Cancer Facts & Figures 2021” and “Hawaii Cancer Facts & Figures 2010”

Table 1 Annual Adult Invasive Cancer Incidence Rates per 100,000 population: 2007-2020 USAPI in comparison to U.S.⁷

All Sites 2007-2020 over age 20	# of cases (all USAPI)	Incidence rate USAPI	Incidence Rate USAPI Adult Male	Incidence Rate USAPI Adult Female	Incidence rate (2015-19) U.S.	Incidence Rate (2015-19) U.S. Adult Male	Incidence Rate (2015-19) U.S. Adult Female	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive after 5 yrs of diagnosis
All Sites	7652	219.1	239.6	206.3	449.0	488.0	423.0	3233	42%	58%
Breast	1135	-	-	58.0	-	-	128.0	185	16%	84%
Lung & Bronchus	1110	36.7	52.2	23.2	56.0	64.0	50.0	827	75%	25%
Colon & Rectum	715	21.6	26.4	17.5	38.0	43.0	33.0	237	33%	67%
Prostate	686	-	55.1	-	-	110.0	-	121	18%	82%
Uterus	520	-	-	25.1	-	-	28.0	100	19%	81%
Liver	419	10.7	16.3	5.2	9.0	13.0	5.0	347	83%	17%
Cervical Cancer, invasive	409	-	-	16.7	-	-	7.8	164	40%	60%
Tobacco-related Oral Cavity & Pharynx	396	9.1	13.0	5.2	12.0	18.0	7.0	169	43%	57%
Leukemia	224	6.1	8.5	6.0	14.0	18.0	11.0	112	50%	50%
Thyroid	224	5.0	2.2	7.9	14.0	7.0	20.0	24	11%	89%
Stomach	193	6.0	7.3	4.9	6.0	9.0	5.0	119	62%	38%
Ill-defined & unspecified (unknown+misc)	153	4.7	5.2	4.2	-	-	-	108	71%	29%

⁷ USAPI Incidence Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population; Chuuk data incomplete; -- No Cases; Incidence Rates are suppressed if fewer than 16 cases were reported in a specific category, per CDC Suppression Rules; Source for USAPI data: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

CONTINUED All Sites 2007-2020 over age 20	# of cases (all USAPI)	Incidence rate USAPI	Incidence Rate USAPI Adult Male	Incidence Rate USAPI Adult Female	Incidence rate (2015-19) U.S.	Incidence Rate (2015-19) U.S. Adult Male	Incidence Rate (2015-19) U.S. Adult Female	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive after 5 yrs of diagnosis
Nasopharynx	150	3.5	5.1	2.0	0.5	0.8	0.3	64	43%	57%
Ovary	133	-	-	6.2	-	-	10.0	71	53%	47%
Pancreas	132	4.3	4.3	4.2	13.0	15.0	12.0	109	83%	17%
Non-Hodgkin Lymphoma	112	3.0	3.2	2.9	19.0	23.0	16.0	55	49%	51%
Kidney & Renal Pelvis	109	3.3	4.6	2.1	17.0	24.0	12.0	34	31%	69%
Skin excl Basal & Squamous & Melanoma	108	3.8	6.1	1.9	23.0	29.0	18.0	25	23%	77%
Urinary Bladder	94	3.4	5.5	1.7	19.0	34.0	8.0	47	50%	50%
HPV-associated OC&P	72	1.9	3.5	0.5	-	-	-	29	40%	60%
Esophagus	69	2.0	3.8	0.3	5.0	8.0	2.0	46	67%	33%
Larynx	66	1.8	3.4	0.3	3.0	5.0	1.0	35	53%	47%
Other Respiratory	65	1.7	2.1	1.3	-	-	-	39	60%	40%
Soft Tissue including Heart	63	1.8	2.5	1.2	3.3	3.9	5.0	21	33%	67%
Brain & Other Nervous System	52	1.2	1.4	1.1	4.0	5.0	4.0	31	60%	40%
Gallbladder	36	1.1	0.8	1.4	1.1	0.8	1.4	30	83%	17%
Testis	36	-	1.3	-	-	6.0	-	9	25%	75%
Bones & Joints	32	0.8	1.0	0.6	-	-	-	15	47%	53%
Other Digestive	17	0.6	-	-	0.5	0.5	0.4	11	65%	35%

Table 2 Top 13 Cancer Cases & Crude and age-standardized rates for age over 20 – USAPI 2007-2020⁸

Sites	Male Cases - USAPI	Male Crude Rate	Male ASR to U.S. Std	Male ASR to World Std	Female Cases - USAPI	Female Crude Rate	Female ASR to U.S. Std	Female ASR to World Std	Total Cases- USAPI	Total Crude Rate	Total ASR to U.S. Std	Total ASR to World Std
All Sites	3719	198.9	239.6	173.0	3931	217.9	206.3	129.8	7652	208.3	219.1	164.3
Breast	13	0.7	-	-	1121	62.1	58.0	45.1	1135	-	-	-
Lung & Bronchus	751	40.2	52.2	37.1	359	19.9	23.2	16.6	1110	30.2	36.7	26.4
Colon & Rectum	416	22.3	26.4	19.2	299	16.6	17.5	12.7	715	19.5	21.6	15.8
Prostate	686	36.7	55.1	37.0	-	15.5	16.1	11.7	686	-	-	-
Uterus	-	-	-	-	520	28.8	25.1	20.5	520	-	-	-
Liver	326	17.4	16.3	13	93	5.2	5.0	3.9	419	11.4	10.3	8.5
Cervical Cancer, invasive	-	-	-	-	409	22.7	16.7	14.6	409	-	-	-
Tobacco-related Oral Cavity & Pharynx	286	16.3	13.0	10.7	110	6.1	5.2	4.2	396	10.8	9.1	7.5
Leukemia	120	6.4	8.5	5.9	104	5.8	6.0	4.4	224	6.1	7.1	5.0
Thyroid	38	2.0	2.2	1.6	186	10.3	7.9	6.9	224	6.1	5.0	4.2
Stomach	113	6.0	7.3	5.2	80	4.4	4.9	3.5	193	5.3	6.0	4.3
Ill-defined & unspecified (unknown+misc)	80	4.3	5.2	3.6	72	4.0	4.2	3.2	153	4.2	4.7	3.4
Nasopharynx	107	5.7	5.1	4.1	43	2.4	2.0	1.6	150	4.1	3.5	2.8

⁸ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; All Adult USAPI 2007-2020; Top 13 Invasive Cancers- Crude and age-standardized rates (ASR), adjusted to both U.S. Standard Population and World Standard Population

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 U.S.).

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.

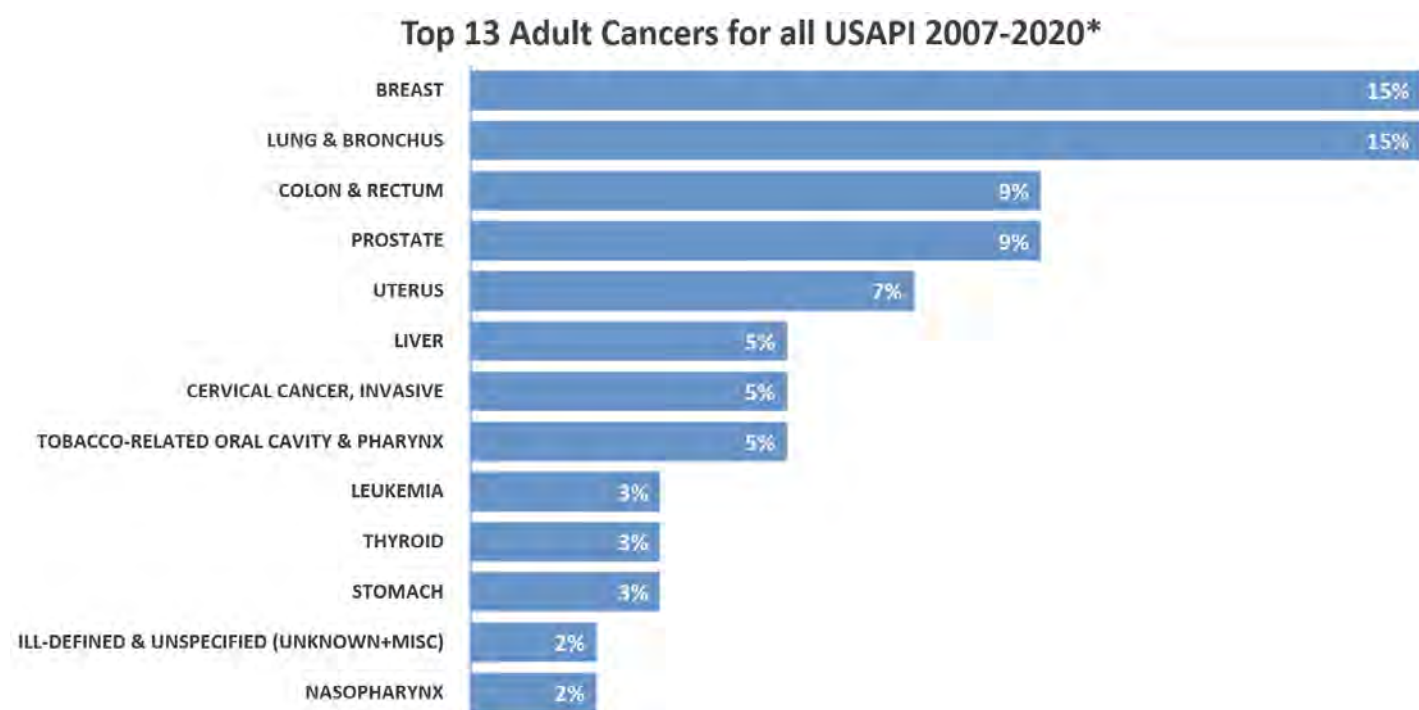
Mortality rates depend on the incidence of the cancer, as well as the stage at diagnosis, survival, and treatment for the cancer type. Survival estimates reflect the risk of death among newly diagnosed cancer cases, while mortality rates reflect the risk of death among the general population. New screening 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 document⁹.**

⁹ Adapted from: "Hawaii Cancer Facts & Figures 2010" and Suppression for Reliability (CDC National Program of Cancer Registries)
https://www.cdc.gov/cancer/uscs/technical_notes/stat_methods/suppression.htm

Table 3 Top 13 Adult Incident Cancer Counts, Proportional Distribution and Rank, all USAPI 2007-2020 cases¹⁰

Top 13 Cancers for all USAPI	Cases	%	rank
Breast	1135	15%	1
Lung & Bronchus	1110	15%	2
Colon & Rectum	715	9%	3
Prostate	686	9%	4
Uterus	520	7%	5
Liver	419	5%	6
Cervical Cancer, invasive	409	5%	7
Tobacco-related Oral Cavity & Pharynx	396	5%	8
Leukemia	224	3%	9
Thyroid	224	3%	10
Stomach	193	3%	11
Ill-defined & unspecified (unknown+misc)	153	2%	12
Nasopharynx	150	2%	13

Figure 1 Proportional Distribution of Top 13 Incident (New) Cancers, all USAPI 2007-2020¹¹



¹⁰ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; Breast cancer case numbers are based on female population only. Reported male breast cases: 1 American Samoa, 3 CNMI, 6 Guam, 1 Pohnpei-FSM, 1 RMI, 1 Yap-FSM

¹¹ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

Table 4 Top Ten Leading Cancer Sites for all USAPI 2007-2020 cases by Sex & Percentages¹²

Male				Female		
	Cases	%			Cases	%
All Sites	3719	100%		All Sites	3931	100%
Lung & Bronchus	751	20%		Breast	1121	29%
Prostate	686	18%		Uterus	520	13%
Colon & Rectum	416	11%		Cervical Cancer, invasive	409	10%
Liver	326	9%		Lung & Bronchus	359	9%
Tobacco-related Oral Cavity & Pharynx	286	8%		Colon & Rectum	299	8%
Leukemia	120	3%		Thyroid	186	5%
Stomach	113	3%		Ovary	133	3%
Nasopharynx	107	3%		Tobacco-related Oral Cavity & Pharynx	110	3%
Ill-defined & unspecified (unknown+misc)	80	2%		Leukemia	104	3%
Skin excl Basal & Squamous & Melanoma	78	2%		Liver	93	2%



¹² Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020;

Summary Information about Major Cancer Sites

adapted from Hawaii Cancer Facts & Figures 2010

CANCER SITES	NON-MODIFIABLE RISK FACTORS	MODIFIABLE RISK FACTORS	RISK REDUCTION	EARLY DETECTION	SYMPTOMS	TREATMENT
Breast	Age (risk increases as one gets older); Gender (risk is higher in women); Race (risk slightly higher in Whites); Genetic risk factors; Family history; Personal history of breast cancer; Previous breast biopsy; previous breast radiation; Early menstruation; Late menopause	First child born after age 30; Oral contraceptive use; Hormone replacement therapy use; Alcohol consumption; Obesity; Physical activity	Having first child before age 30; Breast feeding child; Limit alcohol consumption; Maintain a healthy weight; Be physically active; Chemoprevention if women are considered high risk (tamoxifen and possibly raloxifene-raloxifene is not approved for risk reduction and should not be recommended outside of a clinical trial)	Mammograms; Clinical breast examinations; Breast self-examinations (optional)	New lump or mass; Swelling; Skin irritation or dimpling; Nipple pain or the 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.
Cervix	Age (average age at diagnosis in the U.S. 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 the vagina other than a monthly menstrual period; Bleeding after intercourse; Pain during intercourse	Surgery and/or radiation therapy; Plus chemotherapy for later stages
Colon and Rectum	Age (risk increases as one gets older); Family history; Ethnicity, namely Ashkenazi Jews; Race (highest incidence in African Americans); Personal history of colon cancer, intestinal polyps, or chronic inflammatory bowel disease	Diet from animal sources; Physical inactivity; Obesity; Smoking; Alcohol consumption; low vegetable and/or 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)	Stool-Based Tests: high-sensitivity guaiac-based fecal occult blood test (HsFOBT); fecal immunochemical test (FIT); stool DNA test (sDNA-FIT); Flexible sigmoidoscopy; Colonoscopy; CT colonography	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

Summary Information about Major Cancer Sites

adapted from Hawaii Cancer Facts & Figures 2010

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

Summary Information about Major Cancer Sites

adapted from Hawaii Cancer Facts & Figures 2010

					pain around the teeth or jaw; Voice changes; A lump or mass in the neck; Unexplained weight loss	
Leukemia	Infection with Human T-cell lymphotropic virus type 1 (HLTV-1); 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 a healthcare professional	Weakness; Fatigue; Reduced exercise tolerance; Weight loss; Fever; Bone pain; Sense of fullness in the 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.
Liver	People born between 1945-1965; Chronic infections with hepatitis B virus (HBV) and hepatitis C virus (HCV)	Obesity; Alcohol; Parasitic infections (schistosomiasis and liver flukes); Consumption of food contaminated with aflatoxin, a toxin produced by mold during the storage of agricultural products in a warm, humid environment	Screen high-risk persons (e.g., HCV-infected persons with cirrhosis) with ultrasound or blood tests; pregnant women are also recommended to be tested for HBV; Screening of donated blood, organs, and tissues; Adherence to infection control practices during medical, surgical, and dental procedures; Avoid Obesity; Limit alcohol consumption	No vaccine available against HCV, but treatments that can clear infection and halt liver disease progression are 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 or immunotherapy for patients who are not candidates for surgery
Lung and Bronchus	Personal and family history; air pollution	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. The USPSTF recommends annual screening for lung cancer with low-dose computed tomography in adults aged 50 to 80 years who have a 20 pack-year smoking history and currently smoke or have 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	Non-small cell: Surgery; Plus radiation therapy and/or chemotherapy; targeted therapy or immunotherapy Small cell: Chemotherapy; Plus radiation therapy and sometimes surgery, depending on prognostic factors

Cancer in the USAPI: Major Sites

Breast (female) Cancer

Signs and symptoms: The most common signs/symptoms of breast cancer are a lump or mass in the breast; persistent changes to the breast, including skin thickening, breast swelling, or skin redness, and nipple abnormalities such as spontaneous discharge (especially if bloody), scaliness, or retraction (drawing back within itself). Early-stage breast cancer often causes no signs or symptoms, which is why screening is important.

Risk factors: Increasing age and being born female are the strongest risk factors for breast cancer. Potentially modifiable factors associated with increased risk among women include weight gain after the age of 18 and/or being overweight or obese (for postmenopausal breast cancer); menopausal hormone therapy (combined estrogen and progestin), previously referred to as hormone replacement therapy; alcohol consumption; and physical inactivity. Breastfeeding for at least one year decreases risk. Non-modifiable factors that increase risk include a personal or family history of breast cancer; certain benign breast conditions, such as atypical hyperplasia; a history of ductal carcinoma in situ (DCIS) or lobular carcinoma in situ (LCIS); high breast tissue density (the amount of glandular and connective tissue relative to fatty tissue measured on a mammogram); high-dose radiation to the chest before 30 years of age (e.g., for treatment of lymphoma); and inherited genetic mutations in breast cancer susceptibility genes (e.g., BRCA1 or BRCA2). BRCA1 or BRCA2 mutations are most common among people with a family history of breast, ovarian, and/or some other cancers. Reproductive and hormonal factors that increase risk include a long menstrual history (menstrual periods that start early and/or end late in life); not having children or having children after age 30; high natural levels of estrogen or testosterone; and recent use of hormonal contraceptives. Pilot research data from Pacific Islander women in Guam and the CNMI suggest that current models of breast cancer risk (i.e., the Gail model) may not fully capture other risk contributors in

Pacific Island populations. Additional research is ongoing with the University of Hawaii Cancer Center and the University of Guam Cancer Research Center to develop risk-stratification models more relevant to the USAPI.

Early detection: Early diagnosis reduces the risk of death from breast cancer and increases treatment options. Mammography is a low-dose x-ray procedure used to detect breast cancer before it becomes symptomatic. However, like any screening tool, mammography is not perfect. It can sometimes miss cancer (a false-negative result) or appear abnormal in the absence of cancer (a false-positive result); about 12% of women who are screened have abnormal results that require further testing, but only 4% of women with an abnormal mammogram have cancer. Follow-up testing may cause anxiety and additional costs (e.g., medical, transportation). Other potential harms of screening include detection and treatment of breast cancers and in situ lesions (e.g., DCIS) that would never have progressed or caused harm (i.e., overdiagnosis and overtreatment). Although radiation exposure from mammograms is cumulative over time, it does not meaningfully increase breast cancer risk. Women are encouraged to devise an individualized screening plan with their health care team based on personal preferences, family history, and a risk assessment. For women at average risk of developing breast cancer, the American Cancer Society recommends that those ages 45 to 54 years undergo annual mammography; those 55 and older either transition to biennial mammography or continue annual exams; and those 40 to 44 years of age have the option to begin annual mammography. In general, mammographic screening should continue while overall health is good and life expectancy is 10 or more years. For some women at high familial risk, annual breast magnetic resonance imaging (MRI) is recommended along with mammography, often starting at a younger age than the general population.

Some USAPI jurisdictions do not have mammography at all. In all USAPI jurisdictions, mammography is not as

accessible as in the U.S. because of funding and personnel issues¹³

Table 5 Mammogram Guidelines for Patients at Average Risk¹⁴

American Cancer Society	National Comprehensive Cancer Network	U.S. Preventive Services Task Force
Mammography		
Every year (if a women chooses to do so) ages 40-44 Every year ages 45-54 Every 2 years (or very year of a women chooses to do so) starting at age 55, for as long as a women is in good health	Every year starting at age 40, for as long as a woman is in good health	Informed decision-making with a health care provider ages 40-49 Every 2 years ages 50-74
Clinical Breast Exam		
Not recommended	Every 1-3 years ages 25-30 Every year starting at age 40	Not enough evidence to recommend for or against

Table 6 World Health Organization Recommendation on Mammography¹⁵

	Well Resourced Settings	Limited resource settings with strong health systems	Limited resource settings with weak health systems
Ages 40-49	In well-resourced settings, WHO suggests an organized, population-based screening program for women aged 40–49 years only if such program is conducted in the context of rigorous research and monitoring and evaluation, if the conditions for implementing an organized program specified in their guide are met and if shared decision-making strategies are implemented so that women’s decisions are consistent with their values and preferences. (Conditional recommendation based on moderate quality evidence)	In limited resource settings with weak or relatively strong health systems, WHO recommends against the implementation of population-based screening program for women aged 40–49 years. (Strong recommendation based on moderate quality evidence)	
Ages 50-69	WHO suggests organized, population-based mammography screening programs for women aged 50–69 years if the conditions for implementing an organized program specified in the WHO guide are met by the health-care system, and if shared decision making strategies are implemented so that women’s decisions are consistent with their values and preferences. (Strong recommendation based on moderate quality evidence). WHO suggests a screening interval of two years. (Conditional recommendation based on low quality evidence)	In limited resource settings with relatively strong health systems, WHO suggests considering an organized, population-based mammography screening program for women aged 50–69 years only if the conditions for implementing an organized program specified in the WHO guide are met by the health-care system, and if shared decision-making strategies are implemented so that women’s decisions are consistent with their values and preferences. (Conditional recommendation based on moderate quality evidence) WHO suggests a screening interval of two years. (Conditional recommendation based on low quality evidence)	In limited resource settings with weak health systems, where the majority of women with breast cancer are diagnosed in late stages and mammography screening is not cost-effective and feasible, early diagnosis of breast cancer through universal access of women with symptomatic lesions to prompt and effective diagnosis and treatment should be high on the public health agenda (WHO, 2013). Clinical breast examination, a low-cost screening method, seems to be a promising approach for these settings and could be implemented when the necessary evidence from ongoing studies becomes available.
Ages 70+	In well-resourced settings, WHO suggests an organized, population-based screening program for women aged 70–75 years only if such program is conducted in the context of rigorous research, if the conditions for implementing an organized program specified in the WHO guide are met by the health-care system, and shared decision-making strategies are implemented so that women’s decisions are consistent with their values and preferences. (Conditional recommendation based on low quality evidence)	In limited resource settings with weak or relatively strong health systems, WHO recommends against the implementation of population-based screening programmes for women aged 70–75 years. (Strong recommendation based on low quality evidence)	

¹³ Adapted From: American Cancer Society, Cancer Facts & Figures 2022

¹⁴ Sources: <https://www.komen.org/BreastCancer/Mammography.html>
<https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/breast-cancer-screening>
<https://www.acog.org/clinical/clinical-guidance/practice-bulletin/articles/2017/07/breast-cancer-risk-assessment-and-screening-in-average-risk-women>

<https://www.cancer.org/cancer/breast-cancer/screening-tests-and-early-detection/american-cancer-society-recommendations-for-the-early-detection-of-breast-cancer.html>

¹⁵ Sources: https://www.who.int/cancer/detection/breastcancer/en/http://apps.who.int/iris/bitstream/handle/10665/137339/9789241507936_en.g.pdf?sequence=1; Sankaranarayanan R et al. (2011). Clinical breast

ON-Island Treatment Options Available in the USAPI jurisdictions ¹⁶			
Site	Surgery	Chemotherapy	Radiation
Breast	100%	66%	Only on Guam

Table 7 Crude and Age-standardized rates of Female Breast Cancer per 100,000 over age 20, ranked by rate adjusted to world standard population 2007-2020¹⁷

Female Breast Cancer	Cases	Crude	U.S. Std	World Std	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive after 5 yrs of diagnosis	% alive after 5 yrs of diagnosed with Stage 3 and higher
USAPI Total**	1121	62.1	58.0	45.1	181	16%	84%	80%
USAPI except Chuuk	1100	67.4	62.2	48.4	169	15%	85%	81%
Guam	742	106.3	87.1	67.6	77	10%	90%	87%
FSM Total	100	26.5	25.5	20.1	52	52%	48%	44%
CNMI	100	41.7	38.1	31.2	7	7%	93%	92%
American Samoa	95	45.4	39.2	31.8	25	26%	74%	69%
Pohnpei State, FSM	51	38.0	41.6	31.8	26	51%	49%	44%
Republic of the Marshall Islands	46	24.5	24.7	21.1	13	28%	72%	77%
Republic of Palau	38	41.6	33.7	27.2	7	18%	82%	65%
Chuuk State, FSM	21	12.2	11.2	9.2	12	57%	43%	40%
Yap State, FSM	18	37.9	27.1	23.7	6	33%	67%	67%
Kosrae State, FSM	10	41.4	-	-	8	80%	20%	20%
U.S.*	-	-	128.0	-	-	-	-	-

examination: preliminary results from a randomized controlled trial in India. J Natl Cancer Inst. 103:1476–80.

¹⁶ Source: Cancer Council of the Pacific Islands internal meeting discussions 2013 – 2022

¹⁷ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020 except 2018 RMI cases; (U.S. 2000 Standard Popn, World Standard Popn 2000-2025); Note: American Samoa, CNMI, Guam, RMI and Palau have CDC funded NBCCEDP programs. Note FSM has NO MAMMOGRAPHY services available generally, Pohnpei has one private provider.

* Annual Report to the Nation on the Status of Cancer, Part I: National Cancer Statistics <https://doi.org/10.1093/jnci/djab131>

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2020, IARC - 2.27.2023

**Breast cancer rates are based on female population. Reported male breast cancer cases: American Samoa 1, CNMI 3, Guam 7, Pohnpei-FSM 1, RMI 1, Yap-FSM 1.

Cervical (Uterine Cervix) Cancer

Of all cancers, cervical cancer is the most amenable to prevention and early detection through vaccination and 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.

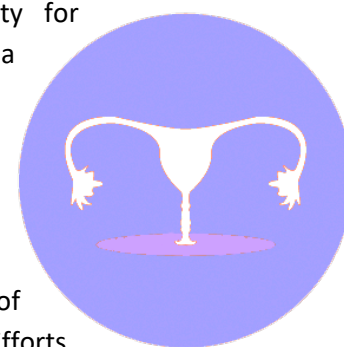
In recent years, major advances have been made toward the **prevention** of cervical cancer with the availability of HPV vaccines. Since 2006, two vaccines against HPV have been approved by the U.S. Food and Drug Administration. However, since 2016, only Gardasil has been available in the U.S. and the USAPI. The Gardasil-9[®] 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[®] 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 years 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 by 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 lower-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 or thermal ablation 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 in remote areas. Pap tests, funded by various U.S. health agencies, are also still done in both countries and the rest of the USAPI.

Primary HPV DNA testing is another method of screening and used in some countries around the world and will likely become the preferred screening test in the U.S. within the next 5 years. HPV DNA testing combined with VIA to determine eligibility for treatment would be a preferred method of providing cervical cancer screening to the entire population while targeting limited resources to the women at the 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 screening¹⁸.



¹⁸ Adapted from American Cancer Society, Cancer Facts and Figures 2021; WHO Prevention of cervical cancer through screening using visual inspection with acetic acid (VIA) and treatment with cryotherapy, and 2020 WHO technical guidance and specifications of medical devices for screening and treatment of precancerous lesions in the prevention of cervical cancer

Table 8 Cervical Cancer Screening Guidelines¹⁹

	Cytology (conventional and liquid-based)	Co-testing (cytology & HPV testing)	Primary hrHPV testing	
	Ages 21-65	Ages 30-65	Ages 30-65	Aged >65
U.S. Preventive Services Task Force (2018) – being updated	Every 3 years	Every 5 years	Every 5 years	Discontinue screening if no history of cervical change and negative prior screening within the past 10 years
American College of Obstetricians and Gynecologists (2018)	Pap test alone every 3 years. HPV testing alone can be considered for women aged 25 to 29, but Pap tests are preferred.	Pap test and an HPV test (co-testing) every 5 years.	HPV testing alone every 5 years.	Discontinue screening if no history of cervical change and negative prior screening within the past 10 years
American Cancer Society (2020) <i>As the US makes the transition to primary HPV testing, the use of cotesting or cytology alone for cervical cancer screening will not be included in future guidelines</i>	Ages 25-65	Ages 25-65	Ages 25-65	Discontinue screening if adequate negative prior screening within the past 10 years
	Every 3 years	Every 5 years	Every 5 years (preferred method)	

ON-Island Treatment Options Available in the USAPI jurisdictions ²⁰			
Site	Surgery	Chemotherapy	Radiation
Cervix	100%	66%	Only on Guam

¹⁹ Sources: https://apps.who.int/iris/bitstream/handle/10665/144785/9789241548953_eng.pdf?sequence=1
World Health Organization. Comprehensive Cervical Cancer Control: A guide to essential practice (2nd edition). Geneva, Switzerland: World Health Organization; 2014.

<https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/cervical-cancer-screening>

<https://www.acog.org/womens-health/faqs/cervical-cancer-screening>

<https://acsjournals.onlinelibrary.wiley.com/doi/full/10.3322/caac.21628>

²⁰ Source: Cancer Council of the Pacific Islands internal meeting discussions 2013 – 2020

Table 9 Crude and age-standardized rates of invasive Cervical Cancer psite (C530-C539), behavior code 3 per 100,000 over age 20 for all USAPI and percent alive after 5 years of diagnosis 2007-2020²¹

Cervical Cancer	Cases	Crude	U.S. Std	World Std	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive after 5 yrs of diagnosis	% alive after 5 yrs of diagnosed with Stage 3 and higher
USAPI Total	409	22.7	16.7	14.6	164	40%	60%	53%
USAPI - Exclude Chuuk	395	24.2	17.6	15.3	153	39%	61%	55%
Republic of the Marshall Islands	131	69.9	62.4	53.6	59	45%	55%	43%
FSM Total	109	28.8	23.2	20.1	59	54%	46%	40%
Guam	99	14.2	10.2	8.8	28	28%	72%	64%
Pohnpei State, FSM	69	51.4	41.2	35.9	31	45%	55%	49%
CNMI	34	14.2	11.4	9.6	6	18%	82%	81%
American Samoa	22	10.5	9.1	7.5	4	18%	82%	76%
Yap State, FSM	16	33.7	22.4	19.7	11	69%	31%	33%
Chuuk State, FSM	14	8.1	7.5	6.3	11	79%	21%	15%
Republic of Palau	14	15.3	10	9.2	8	57%	43%	38%
Kosrae State, FSM	10	41.4	-	-	6	60%	40%	38%
Hawaii**	-	-	6.9	-	-	-	-	-
U.S.**	-	-	8.0	-	-	-	-	-

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 are tremendous. Whereas all USAPI jurisdictions have the capacity to treat pre-cancer and Stage 1A cancer of the cervix, only a third

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 FSM as a whole were diagnosed at a late stage. Only 46% of these women in Micronesia 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.

²¹ Source: Pacific Regional Central Cancer Registry data 2007-2020

Incidence rates calculated using U.S. 2000 standard population and world standard population 2000-2025; incidence rates suppressed for N<16

**Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Table 10 Crude and Age-standardized Incidence Rates of Female Cervical Cancer per 100,000, ranked by rate adj to World Std pop 2007-2020²²

Cervical Cancer	Crude	U.S. Std	World Std
Republic of the Marshall Islands*	69.9	62.4	53.6
WHO Southern Africa^	-	-	34.5
Pohnpei, FSM*	51.4	41.2	35.9
WHO Melanesia^	-	-	26.9
WHO World^	-	-	13.0
USAPI*	22.7	16.7	14.6
WHO Southeastern Asia^	-	-	17.1
Guam*	14.2	10.2	8.8
WHO Northern America^	-	-	6.1
U.S. - Hispanic women**	-	9.6	-
U.S.**	-	7.8	-
Hawaii	-	7.3	-

The global burden of cervical cancer²³:

Cervical cancer is the fourth most common cancer among women globally, with an estimated 604,127 new cases in 2020²⁴. All countries are affected, but the incidence is higher in low- and middle-income countries. Age-standardized incidence rates vary from 40.1 per 100,000 women in the highest-risk countries to fewer than 6 per 100,000 women in the lowest-risk countries²⁵. Note that the RMI incidence rate, adjusted to the World standard population, is higher than in the Southern Africa Region.

Nearly 90% of the 311,000 deaths worldwide in 2018 occurred in low- and middle-income countries (Figure 3). Further, the proportion of women with cervical cancer who die from the disease is greater than 60% in many low- and middle-income countries, which is more than twice the proportion in many high-income countries, where it is as low as 30%²⁶.

The global burden of cervical cancer is projected to continue to increase, rising to 700,000 cases and 400,000 deaths in 2030, with analogous increases expected in future years²⁷. These rises represent a 21% increase in the number of cases and a 27% increase in the number of deaths over just the 12-year period from 2018. The vast majority of these increases will be in women in low- and middle-income countries, reflecting the severity of the global divide in cervical cancer morbidity and mortality.

²² (U.S. 2000 Standard Popn, World Standard Popn 2000-2025)

^Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2020, IARC - 2.27.2023

*Pacific Regional Central Cancer Registry data 2007-2020

** 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.

²³ Source: WHO Global Strategy to accelerate the elimination of cervical cancer as a public health problem <https://apps.who.int/iris/bitstream/handle/10665/336583/9789240014107-eng.pdf>

²⁴ Global Cancer Observatory. Estimated cancer incidence, mortality and prevalence worldwide in 2020: cervical cancer. International Agency for Research on Cancer, World Health Organization; 2020 (<https://gco.iarc.fr/today/data/factsheets/cancers/23-Cervix-uteri-fact-sheet.pdf>, accessed February 2023).

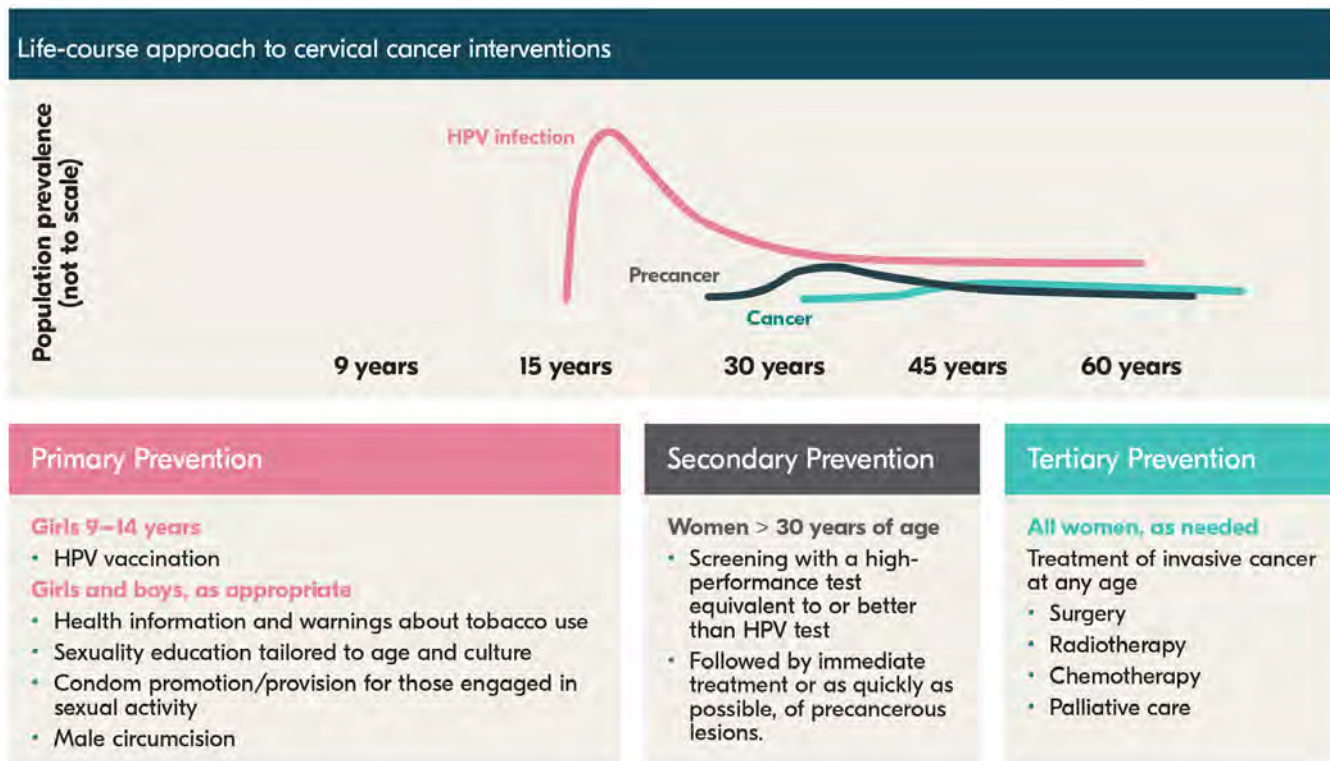
²⁵ Global Cancer Observatory. Estimated cancer incidence, mortality and prevalence worldwide in 2020: cervical cancer. International Agency for Research on Cancer, World Health Organization; 2020 (<https://gco.iarc.fr/today/data/factsheets/cancers/23-Cervix-uteri-fact-sheet.pdf>, accessed February 2023).

²⁶ Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: A Cancer Journal for Clinicians.2018;68(6):394–424. doi:10.3322/caac.21492.

²⁷ Global Cancer Observatory. Cancer tomorrow: a tool that predicts the future cancer incidence and mortality burden worldwide from the current estimates in 2018 up until 2040. International Agency for Research on Cancer, World Health Organization; 2018 (<http://gco.iarc.fr/tomorrow>, accessed 2 October 2020).

WHO’s global elimination strategy calls for governments to work with key partners, including the private sector and civil society, and for meaningful engagement with and empowerment of affected populations. Private sector efficiencies in management can be leveraged to improve workflow and output in the public sector. Civil society can advocate for accessible, affordable, acceptable health products and services and can increase awareness of cervical cancer prevention and control within their communities, especially those at high risk for the disease. Cervical cancer survivors can serve as advocates for educating women and girls about the benefits of vaccination, screening and treatment and for overcoming stigmatization. WHO recommends a life-course approach to a comprehensive strategy for cervical cancer elimination to ensure that lifetime benefits are maintained (Table 11).

Table 11 Life-course Approach to Cervical Cancer Interventions²⁸



²⁸ Source: WHO Global Strategy to accelerate the elimination of cervical cancer as a public health problem <https://apps.who.int/iris/bitstream/handle/10665/336583/9789240014107-eng.pdf>

Estimated age-standardized cervical cancer incidence, 2018

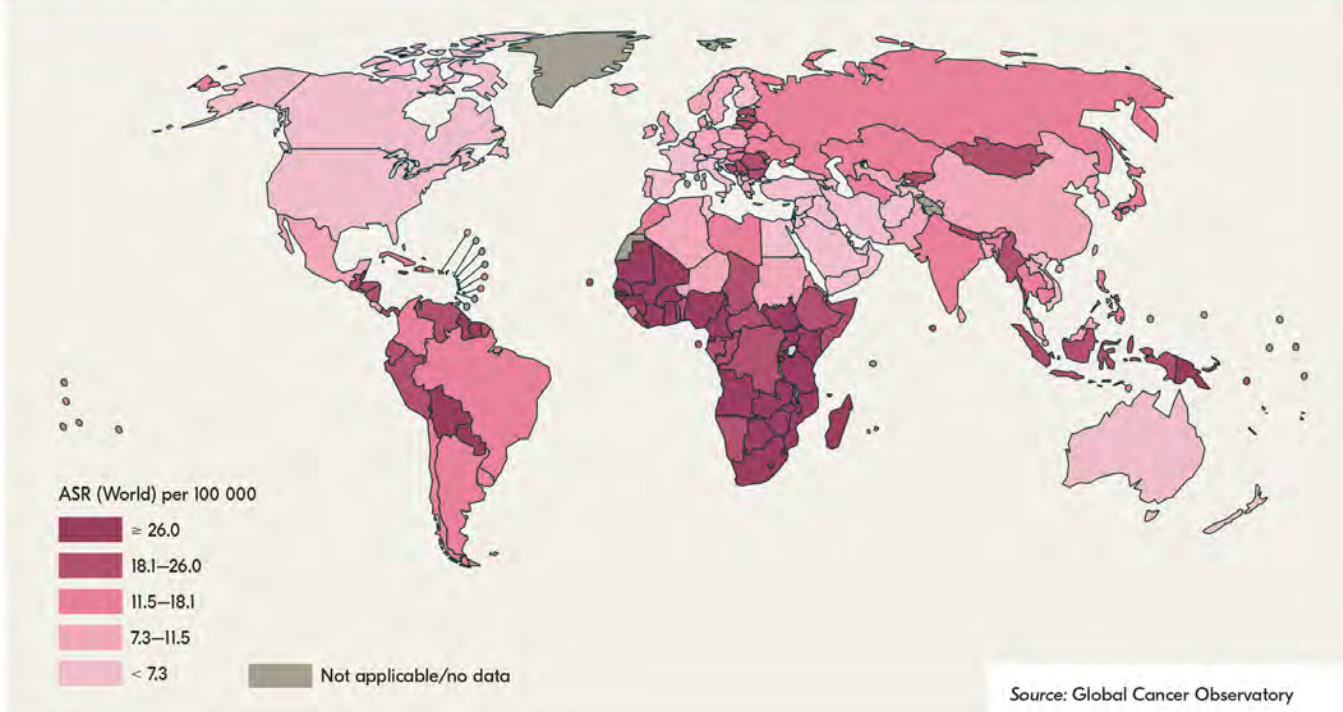


Figure 2 Estimated Age-standardized cervical cancer incidence, 2018 (WHO)

Estimated age-standardized cervical cancer mortality, 2018

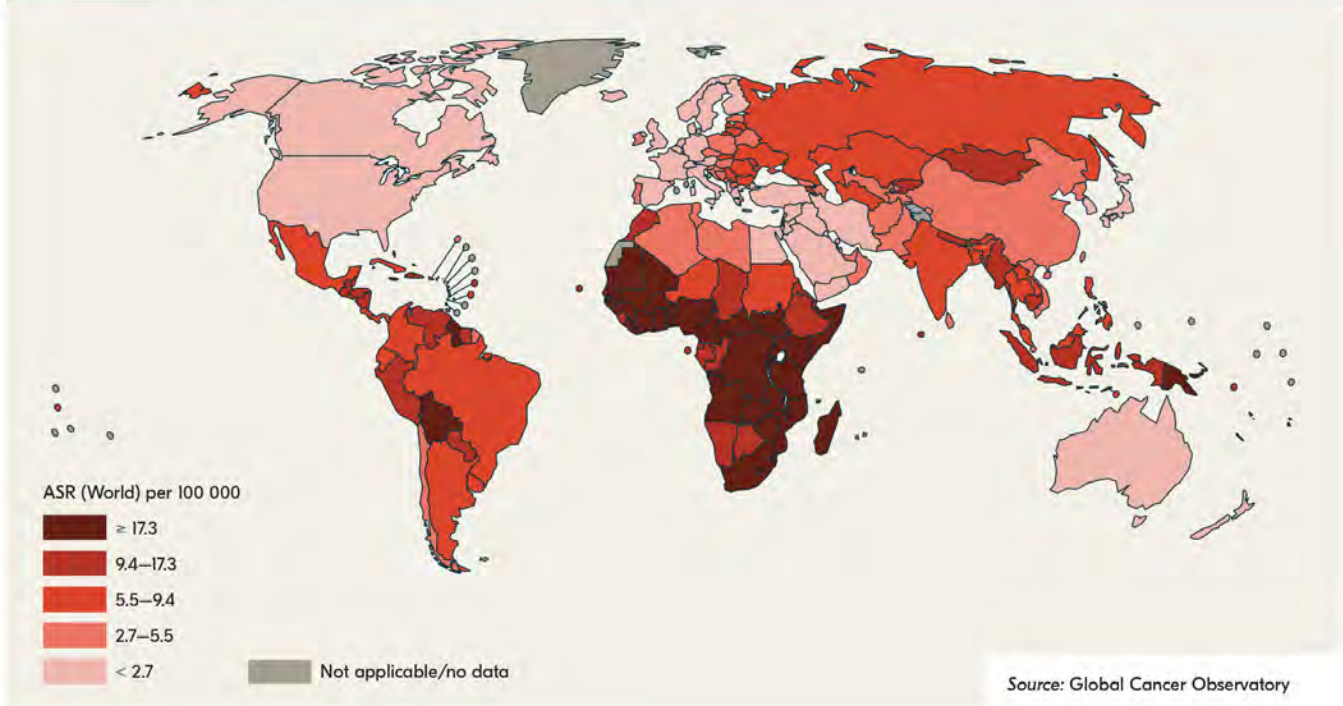


Figure 3 Estimated age-standardized cervical cancer mortality, 2018 (WHO)

Colon & Rectum Cancer

Signs and symptoms: The most common signs and symptoms are rectal bleeding, blood in the stool, changes in bowel habits (e.g., constipation or diarrhea) or stool shape (e.g., narrower than usual), the feeling that the bowel is not completely empty, abdominal cramping or pain, decreased appetite, and weight loss. In some cases, the cancer causes blood loss that is not noticeable but results in anemia (low red blood cell count) that may be detected on a blood test and/or symptoms such as weakness, fatigue, or shortness of breath. Increasing incidence of colorectal cancer in young individuals, who are often diagnosed with advanced disease, reinforces the need for timely evaluation of persistent symptoms in patients of all ages. Early-stage colorectal cancer typically does not cause symptoms, which is why screening according to patient risk is so important.

Risk factors: Much of the colorectal cancers (more, than 55% in the U.S.) are attributable to potentially modifiable risk factors, including excess body weight, physical inactivity, long-term smoking, high consumption of red or processed meat, low calcium intake, heavy alcohol consumption, and very low intake of fruits and vegetables and whole-grain fiber. Hereditary/genetic and medical factors that increase risk include a personal or family history of colorectal cancer or adenomatous polyps, certain inherited genetic syndromes (e.g., Lynch syndrome), a personal history of chronic inflammatory bowel disease (ulcerative colitis or Crohn's 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. Decision-making about aspirin use should involve a conversation with your health care provider.

Early detection: Screening can prevent colorectal cancer through the detection and removal of precancerous growths (polyps), as well as detect cancer at an early

stage, when treatment is usually less intensive and more successful. Regular adherence to screening with either stool testing (fecal immunochemical tests, highly sensitive guaiac-based tests, or a multi-target stool DNA test) or structural exams (e.g., colonoscopy or computed tomography colonography) results in a similar reduction in premature colorectal cancer death over a lifetime. The American Cancer Society and the U.S. Preventive Services Task Force recommend that individuals at average risk for colorectal cancer begin screening at age 45 years and continue through age 75 years, with more individualized decision making from ages 76 to 85 years based on health status/life expectancy, patient preferences, and prior screening history.

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 extremely low numbers of patients are screened), because equipment, trained health providers and/or capacity to analyze colon polyps are severely limited in most USAPI. Almost all USAPI jurisdictions have colonoscopy²⁹, which is used primarily for diagnosis.



²⁹ Adapted From: American Cancer Society, Cancer Facts & Figures 2022

Table 12 Colorectal Cancer Screening Guidelines³⁰

	Ages 45-49	Ages 50-75	Ages 76-85	Aged >85
U.S. Preventive Services Task Force	Recommends screening	Recommends screening	The USPSTF recommends that clinicians selectively offer screening	Should no longer get screened
American Cancer Society (2020)	Age 45 People at average risk* of colorectal cancer start regular screening.	Recommends screening	Ages 76-85 The decision to be screened should be based on a person's preferences, life expectancy, overall health, and prior screening history.	

Table 13 Crude and age-standardized rates of Colon & Rectum Cancer per 100,000 over age 20, ranked by rate adjusted to World standard pop 2007-2020³¹

Colon Cancer	Cases	Crude	U.S. Std	World Std	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive after 5 yrs of diagnosis	% alive after 5 yrs of diagnosed with Stage 3 and higher ³²
USAPI Total	715	19.5	21.6	15.8	237	33%	67%	64%
Guam	524	36.8	33.8	25.0	161	31%	69%	67%
CNMI	56	11.3	12.1	9.7	16	29%	71%	64%
American Samoa*	51	12.2	13.3	9.8	12	24%	76%	73%
Republic of Palau	21	10.4	11.3	8.4	10	48%	52%	38%
Republic of the Marshall Islands	22	5.8	9.0	6.1	11	50%	50%	50%
Pohnpei State, FSM	22	8.2	11.6	8.0	14	64%	36%	33%
Yap State, FSM	9	9.9	-	-	5	56%	44%	50%
U.S. - USCS**	-	-	38.0	-	-	-	-	-
World^	-	-	-	15.6	-	-	-	-

³⁰ For more information, and the definition of 'average risk' please visit: <https://www.cancer.org/cancer/colon-rectal-cancer/detection-diagnosis-staging/acs-recommendations.html>; <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/colorectal-cancer-screening>

³¹ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

** Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (2015-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2020, IARC 2.27.2023

³² Based on SEERSumStg2000 Code Definition for Stage: 0 In situ; 1 Localized only; 2 Regional by direct extension only; 3 Regional lymph nodes involved only; 4 Regional by BOTH direct extension AND lymph node involvement; 5 Regional, NOS (Not Otherwise Specified); 7 Distant site(s)/node(s) involved; 9 Unknown if extension or metastasis (unstaged, unknown, or unspecified) Death certificate only case

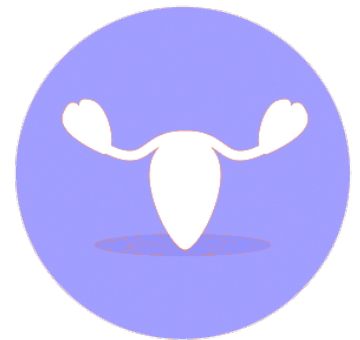
Human Papillomavirus (HPV) Associated Cancers

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 (U.S. Section 317 of the Public Health Service Act). 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 amounts 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 population (most are under 60%), 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 14 Crude rates of HPV - associated Anal and Oral Cavity and Pharynx (OC&P) Cancer per 100,000 over age 20, ranked by rate adjusted to World standard population 2007-2020³³

All USAPI	Cases	Crude	U.S. std	World std
USAPI Total	526	14.3	11.6	9.7
Cervical Cancer	409	22.7	16.7	14.6
OC&P	72	2.0	1.9	1.5
Vagina & Vulva	19	1.1	1.3	0.9
Anus /Rectum	13	0.4	-	-
Penis	13	0.7	-	-



³³ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; (U.S. 2000 Standard Population, World Standard Population 2000-2025)

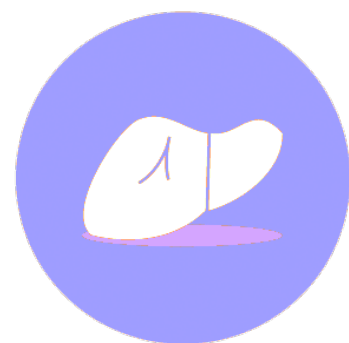
Liver Cancer

Signs and symptoms: Symptoms, which do not usually appear until the cancer is advanced, can 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: Approximately 70% of liver cancer cases in the U.S. could potentially be prevented through the elimination of risk factors, the most important being excess body weight, type 2 diabetes, chronic infection with hepatitis B virus (HBV) and/or hepatitis C virus (HCV), heavy alcohol consumption (3 or more drinks per day), and tobacco smoking. Risk is also increased by eating food contaminated with aflatoxin (poison from a fungus that can grow on improperly stored foods, such as nuts and grains).

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 U.S. 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.

Early detection: Although screening for liver cancer has not been shown to reduce mortality, many health care providers in the U.S. test individuals at high risk (e.g., those with cirrhosis) with ultrasound and/or blood tests³⁴.



³⁴ Adapted from: American Cancer Society, Cancer Facts and Figures 2022

ON-Island Treatment Options Available in the USAPI jurisdictions ³⁵			
Site	Surgery	Chemotherapy	Radiation
Liver	0.00%	66%	Only on Guam

Table 15 Crude and age-standardized rates of Liver Cancer per 100,000 over age 20, ranked by rate adjusted to World standard pop 2007-2020³⁶

Liver Cancer	Cases	Crude	U.S. Std	World Std	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis
USAPI Total	419	11.4	10.3	8.5	347	83%
Guam	230	16.2	13.4	10.6	181	79%
Republic of Palau	51	22.9	22.0	15.9	48	94%
Republic of the Marshall Islands	36	8.1	8.7	6.9	35	97%
Pohnpei State, FSM	29	9.1	8.8	6.9	23	79%
Yap State, FSM	25	23.9	16.0	14.0	25	100%
Chuuk State, FSM	24	6.9	6.3	5.4	22	92%
CNMI	18	3.6	4.2	3.3	9	50%
American Samoa	4	1.0	-	-	2	50%
Kosrae State, FSM	2	4.1	-	-	2	100%
U.S. - USCS*	-	-	9.0	-	-	-
World^	-	9.4	-	8.2	-	-

³⁵ Source: Cancer Council of the Pacific Islands internal meeting discussions 2013 - 2020

³⁶ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

* 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 2020, IARC 2.27.2023

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, 41.8% of high school students are current tobacco users. In Palau, 47.6% of youth report any tobacco use. Adult current smokers are reported to be 20.4% of their population³⁷. 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: Lung cancer screening with low-dose spiral computed tomography (LDCT) has been shown to reduce lung cancer mortality. The American Cancer Society (ACS) is currently reviewing recent scientific evidence in order to update our lung cancer screening guideline, which is expected to be released in 2022. In

the meantime, ACS recommends following guidance from the U.S. Preventive Services Task Force and other major organizations, which recommend annual LDCT for generally healthy adults ages 50 to 80 years with a 20 pack-year smoking history who smoke or have quit within the past 15 years. For more information on lung cancer screening, see the American Cancer Society's [website](#)³⁸.

Of note, there is no CT capability in the RMI or any of the FSM States (Pohnpei, FSM has one CT accessible via private hospital services). 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 jurisdictions³⁹.






³⁷ FSM Youth NCD Risk Factors Report, 2017, available at: <https://www.pihoa.org/regional-initiatives/health-information-management-systems-surveillance-2/usapi-ncd-surveillance-data/>

³⁸ If the link does not work, copy-paste the following address into your web browsers address bar: <https://www.cancer.org/cancer/lung-cancer.html>

³⁹ Adapted from: American Cancer Society, Cancer Facts, and Figures 2022

Table 16 Recommended Lung Cancer Screening Guidelines⁴⁰

	American Cancer Society	USPSTF
	Aged 50 to 80 years old, fairly good health	Aged 50 to 80 years old
	At least 20 pack-year smoking history and currently smoking or quit within 15 years	A 20 pack-year smoking history and currently smoke or have quit within the past 15 years
	Low dose chest CT scan annually	Low dose chest CT scan annually

Available Screening Method ON-island in the USAPI jurisdictions ⁴¹			
Type of Cancer	Modality	Yes	No
Lung & Bronchus	16-slice CT Scanner	American Samoa CNMI Guam Palau FSM-Pohnpei (Private clinic)	FSM (most states) RMI (machine not operational)
	Chest X-ray	All	N/R
ON-Island Treatment Options Available in the USAPI jurisdictions			
Site	Surgery	Chemotherapy	Radiation
Lung & Bronchus	0.00%	66%	only on Guam

⁴⁰ <https://www.cancer.org/cancer/lung-cancer/detection-diagnosis-staging/detection.html>
<https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/lung-cancer-screening>

⁴¹ Source: Cancer Council of the Pacific Islands internal meeting discussions 2013 - 2022

Table 17 Crude and age-standardized rates of Lung & Bronchus Cancer 2007-2020⁴²

Lung and Bronchus	Cases	Crude	U.S. Std	World Std	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive after 5 yrs of diagnosis	% alive after 5 yrs of diagnosed with Stage 3 and higher
USAPI Total	1110	30.2	36.7	26.4	827	75%	25%	23%
Guam	783	55.0	54.0	38.6	542	69%	31%	28%
Republic of the Marshall Islands	61	16.0	30.0	21.5	57	93%	7%	4%
Republic of Palau	60	29.7	31.8	23.9	52	87%	13%	10%
Pohnpei State, FSM	52	19.4	22.6	18.7	48	92%	8%	6%
CNMI	56	11.3	19.6	13.8	39	70%	30%	24%
Chuuk State, FSM	43	12.3	14.5	11.6	38	88%	12%	13%
Yap State, FSM	32	35.2	37.8	29.6	31	97%	3%	3%
American Samoa	12	2.9	-	-	10	83%	17%	20%
Kosrae State, FSM	11	22.6	-	-	10	91%	9%	11%
U.S. - USCS*	-	-	56	-	-	-	-	-
World [^]	-	21.1	-	18.2	-	-	-	-

⁴² Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; Rates per 100,000 over age 20, ranked by rate adj to World Std pop (U.S. 2000 Standard Popn, World Standard Popn 2000-2025)

* 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 2020, IARC 2.27.2023

Leukemia

Signs and symptoms: Symptoms of leukemia, which can appear suddenly for acute subtypes, can include fatigue, paleness, weight loss, repeated infections, fever, bleeding or bruising easily, bone or joint pain, and swelling in the lymph nodes or abdomen. Chronic leukemia typically progresses slowly with few symptoms during early stages, but sometimes with signs of abnormal blood cell counts.

Risk factors: The risk of most types of leukemia is increased among individuals exposed to high-level ionizing radiation, most commonly from prior cancer treatment. Some types of chemotherapy also increase risk. In addition, risk is increased in people with certain genetic abnormalities and in workers exposed to certain chemicals, such as benzene (e.g., during oil refining or rubber manufacturing). Cigarette smoking increases risk for Acute Myeloid Leukemia (AML) in adults, and there is accumulating evidence that parental smoking before and after childbirth may increase risk of acute leukemia in children.

Treatment: Chemotherapy, sometimes in combination with targeted drugs, is used to treat most acute leukemias. Several targeted drugs are effective for treating chronic myelogenous leukemia (CML) because they attack cells with the Philadelphia chromosome, the acquired genetic abnormality that is the hallmark of the disease. Some of these drugs are also used to treat a type of Acute Lymphocytic Leukemia (ALL) with a similar genetic defect. Chronic lymphocytic leukemia (CLL) that is not progressing or causing symptoms may not require treatment right away, but these patients need to be closely monitored. More aggressive CLL is treated with

targeted drugs and/or chemotherapy. Certain types of leukemia may be treated with high-dose chemotherapy followed by stem cell transplantation under appropriate conditions. Newer treatments that boost the body's immune system, such as CAR T-cell therapy, have 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: Five-year relative survival rates vary substantially by age and leukemia subtype: the rate is 27% for AML, 40% for ALL, 70% for CML, and 87% for CLL among adults ages 20 and older, and 69% for AML and 89% for ALL among youth ages 0-19 years. Treatment advances such as the development of targeted drugs have resulted in large survival improvements for most types of leukemia; for example, the current 5-year relative survival rate for CML is triple that in the mid-1970s (22%)⁴³. Notably, there are largely no clinical trials available in the USAPI. Work is ongoing to gain this capacity in Guam.



⁴³ Adapted from: American Cancer Society, Cancer Facts and Figures 2022

ON-Island Treatment Options Available in the USAPI jurisdictions ⁴⁴			
Site	Surgery	Chemotherapy	Radiation
Leukemia	N/A	66.00%	only on Guam

Table 18 Crude rates of Leukemia per 100,000 over age 20 ranked by rate adjusted to World standard population 2007-2020⁴⁵

Leukemia	Cases	Crude	U.S. std	World std
USAPI Total	224	6.1	7.1	5.0
Guam	156	11.0	11.2	7.8
CNMI	16	3.2	4.2	3.2
Republic of the Marshall Islands	15	3.9	-	-
Pohnpei State, FSM	11	4.1	-	-
Republic of Palau	9	4.5	-	-
Kosrae	6	12.3	-	-
U.S. - USCS*	-	-	17.0	-
World [^]	-	5	-	4.7

⁴⁴ Source: Cancer Council of the Pacific Islands internal meeting discussions 2013 - 2020

⁴⁵ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; (U.S. 2000 Standard population, World Standard population 2000-2025); * 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 2020, IARC 2.27.2023

Oral Cavity and Pharyngeal Cancer

Signs and symptoms: Symptoms may include a sore in the throat or mouth that bleeds easily and does not heal; a persistent red or white patch, 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 jaw 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 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.

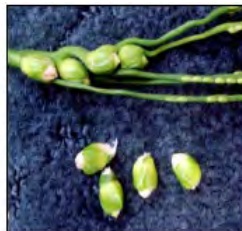
Through visual inspection, dentists and primary care physicians can often detect premalignant abnormalities and cancer at an early stage, when treatment is both less extensive and more successful. Some of the USAPIs with high utilization of betel nut use are considering screening programs. Table 19 denotes the very high age adjusted incidence in Yap, Pohnpei, and Palau. Yap has among the highest rates of oral cancer in the world.

Treatment: Surgery and/or radiation therapy are standard treatments; chemotherapy is often added for high-risk or advanced disease. Chemotherapy or targeted therapy may be combined with radiation as initial treatment in some cases. Immunotherapy with or without chemotherapy is a newer option for advanced or recurrent cancer. 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 overall is 67% but is much lower in Black people (51%) than in White people (69%). This partly reflects the higher proportion in Whites of HPV-associated cancer, which generally has better outcomes⁴⁶.



Color variation of the betel nut fruit⁴⁷.



Unripe and ripe nuts⁴⁷.



Components of a betel quid including *Piper betle* (leaf), tobacco, and slaked lime⁴⁷.

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⁴⁶ Adapted from: American Cancer Society, Cancer Facts and Figures 2022 and Paulino, Y., Areca (Betel) Nut Chewing Practices in Micronesian Populations. Hawaii Journal of Public Health, 2011. 3(1): p. 19-29

⁴⁷ Photos from a May 2012 presentation to the CCPI by Dr. Yvette Paulino, University of Guam

Table 19 Crude rates of Oral Cavity and Pharyngeal Cancer per 100,000 over age 20 ranked by rate adjusted to World standard population 2007-2020⁴⁸

Oral Cavity and Pharyngeal Cancer	Cases	Crude	U.S. std	World std
USAPI Total	396	10.8	9.1	7.5
Guam	102	7.2	5.9	4.7
CNMI	83	16.8	14.3	11.5
Pohnpei State, FSM	81	30.2	23.8	21.1
Yap State, FSM	65	71.4	60.9	52.5
Republic of Palau	33	16.4	13.6	10.9
Republic of the Marshall Islands	14	3.7	-	-
American Samoa	5	1.2	-	-
Kosrae State, FSM	7	12.3	-	-
Chuuk State, FSM	6	1.7	-	-
U.S. - USCS*	-	-	12.0	-
World [^]	-	4.2	-	3.7



⁴⁸ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; * 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 2020, IARC 2.27.2023; (U.S. 2000 Standard Population, World Standard Population 2000-2025); ~ per 100,000 over age 20 ranked by rate adj to World Std population

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 clinician during an exam. Other symptoms can include a tight or full feeling in the neck, difficulty breathing or swallowing, hoarseness, 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 when an abnormality is seen on an imaging test done for another reason.

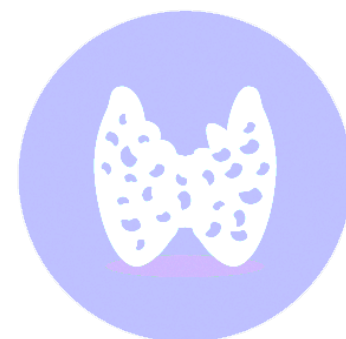
Risk factors: Risk factors for thyroid cancer include being female, having a history of goiter (enlarged thyroid) or thyroid nodules, a family history of thyroid cancer, radiation exposure early in life (e.g., during cancer treatment), excess body weight, and certain rare genetic syndromes, such as familial adenomatous polyposis (FAP). People who test positive for a mutation in the RET gene, 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.

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 3% (medullary and anaplastic thyroid cancers) are more aggressive and likely to spread to other organs. Treatment depends on patient age, tumor size and cell type, and the extent of the 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 (I-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 pituitary gland from producing 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 is 98%, largely because two-thirds of cases are diagnosed at a local stage, but also because treatment is usually successful for most tumor types; among people diagnosed with distant-stage disease, more than half (53%) survive at least five years⁴⁹.



⁴⁹ Adapted from: American Cancer Society, Cancer Facts, and Figures 2021

Site	Surgery	Chemotherapy	Radiation
Thyroid	100%	66%	only on Guam

Table 20 Crude and age-standardized rates of Thyroid Cancer 2007-2020⁵¹

Thyroid Cancer	Cases	Crude	U.S. std	World std
USAPI Total	224	6.1	5.0	4.2
Guam	164	11.5	8.5	7.3
Republic of the Marshall Islands	13	3.4	-	-
Republic of Palau	12	5.9	-	-
Pohnpei State, FSM	12	4.5	-	-
American Samoa	7	1.7	-	-
CNMI	7	1.4	-	-
Yap State, FSM	5	5.5	-	-
U.S. - USCS*	-	-	15.0	-
World [^]	-	7.3	-	6.5

⁵⁰ Source: Cancer Council of the Pacific Islands internal meeting discussions 2013 – 2022

⁵¹ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

* 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 2020, IARC 2.27.2023

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: Well-established risk factors for prostate cancer are increasing age, African ancestry, a family history of the disease, and certain inherited genetic conditions (e.g., Lynch syndrome and BRCA1 and BRCA2 mutations). Black men in the U.S. and Caribbean have the highest documented prostate cancer incidence rates in the world. The only modifiable risk factors are smoking and excess body weight, which may increase risk of aggressive and/or fatal disease.

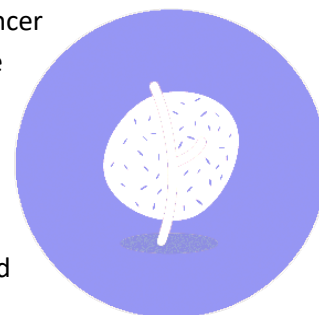
Early detection: No major medical organization presently endorses routine screening for men at average risk because of concerns about the high rate of overdiagnosis (detecting disease that would never have caused symptoms or harm), along with the high potential for serious side effects associated with prostate cancer treatment. However, because prostate cancer is a leading cause of cancer death in men, many organizations recommend an “informed decision-making” approach whereby men are educated about screening and encouraged to make a personal choice. 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 health care provider about the benefits and limitations of PSA testing and make an informed decision about whether to be tested. Black men and 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 (several close relatives diagnosed at an early age and BRCA mutation carriers) should have this discussion beginning at age 40. Diagnosis

requires an invasive transrectal prostate biopsy, which is not widely available in the USAPI.

Treatment: Recent changes in the grading system for prostate cancer have improved tumor characterization and disease management. Careful monitoring of disease instead of immediate treatment (called active surveillance) is appropriate for many patients, particularly men who are diagnosed at an early stage, have less aggressive tumors, and are older. The main treatment options for early-stage disease include surgery, external beam radiation, or radioactive seed implants (brachytherapy). Focal therapies, in which only part

of the prostate is treated, are being studied as well. Hormone therapy may be used along with surgery or radiation in locally advanced cases. Treatment often impacts a man’s quality of life due to temporary or long-term side effects or complications, such as urinary and erectile difficulties. Current research is exploring new biologic markers for prostate cancer that could be used to minimize unnecessary treatment by distinguishing early-stage cancers that are more likely to progress if left untreated from those that are less likely to progress.

Late-stage prostate cancer treatment options include hormonal therapy, chemotherapy, and/or radiation therapy. Hormone treatment may control 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. 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 attack prostate cancer cells specifically. Other types of drugs can be used to treat prostate cancer that has spread to the bones.



Survival: The 5-year relative survival rate approaches 100% for the vast majority (84%) of men diagnosed with local- or regional-stage prostate cancer, but drops to 31%

for those diagnosed with distant-stage disease. The 10- year survival rate for all stages combined is 98%.⁵²

Table 21 Crude and age-standardized rates of Prostate Cancer per 100,000 over age 20, ranked by rate adjusted to World standard population 2007-2020⁵³

Prostate Cancer	Cases	Crude	U.S. Std	World Std	# dead within 5 yrs of diagnosis	% dead within 5 yrs of diagnosis	% alive after 5 yrs of diagnosis	% alive after 5 yrs of diagnose d with Stage 3 and higher
USAPI Total	686	36.7	55.1	37.0	121	18%	82%	74%
Guam	546	75.3	84.5	58.0	68	12%	88%	81%
Republic of Palau	35	31.8	43.3	31.8	11	31%	69%	56%
CNMI	34	13.4	21.5	15.5	3	9%	91%	86%
Yap State, FSM	20	45.8	75.2	54.6	9	45%	55%	50%
Republic of the Marshall Islands	15	7.8	-	-	7	47%	53%	36%
Pohnpei State, FSM	14	10.5	-	-	7	50%	50%	36%
Chuuk State, FSM	10	5.6	-	-	10	100%	0%	0%
American Samoa	9	4.3	-	-	3	33%	67%	67%
U.S. - USCS*	-	-	110.0	-	-	-	-	-
World^	-	25.9	-	23.6	-	-	-	-

⁵² Adapted from: American Cancer Society, Cancer Facts, and Figures 2022

⁵³ Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020; (U.S. 2000 Standard population, World Standard population 2000-2025); * Annual

Report to the Nation on the Status of Cancer, Part I: National Cancer Statistics <https://doi.org/10.1093/jnci/djab131>

^ Crude and age-standardised rates per 100,000. Cumulative risk [0-74], percent GLOBOCAN 2020, IARC 2.27.2023

Top 10 Cancer Sites by Jurisdiction

American Samoa

AMERICAN SAMOA ⁵⁴	
Political status with U.S.A.	Territory
Total Population	49,710
Land surface area (sq. km)	199
Coastline (sq. km)	116
Public transportation	Yes
4-year University or College	None
2-year College	X
Hospitals	1
Regularly occurring continuing education program for physicians or nurses	Physicians, Nurses, Project ECHO
Health expenditures per capita	\$692
Age Structure	0-14 years: 30% (male 7,577/female 7,332) 15-24 years: 16.6% (male 4,259/female 3,973) 25-54 years: 37.9% (male 9,585/female 9,183) 55-64 years: 9.3% (male 2,337/female 2,317) 65 years and over: 4.5% (male 1,496/female 1,651)
Birth Rate	17.19 births/1,000 population (2021 Est)
Death Rate	6 deaths/1,000 population (2021 Est.)
Life Expectancy	total population: 76 years

AMERICAN SAMOA PROGRAM OR SERVICE	
CANCER SCREENING AND EARLY DETECTION	
CDC Breast and Cervical Cancer Early Detection Program	X
Mammography	X
What specialty performs the breast biopsies in your Jurisdiction?	OB, Surgery, Family Planning, BCCEDPP(DOH)
Pap Smears	X
How long does it take for the pap smears to return to the clinician and/or program staff?	3-4 weeks
Cervical cancer screening using VIA	No
Prostate cancer screening (PSA)	X
Transrectal ultrasound	No
CT on-island	X
Colorectal cancer screening (FOBT or FIT)	X
Colonoscopy	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
Fine needle aspiration is available on island	Yes - Surgery

⁵⁴ Source: U.S. Census data, 2010; WHO Health Information and Intelligence Platform 2015; CIA – The World Factbook

On-island histopathology	X - some
On-island cytopathology	No
How long does it take for biopsies to return from off-island?	2-3 weeks
General Radiologist ON-island	X
Tele-radiology	X - National Diagnostic Imaging main office – Ohio
How long does it take to get the radiology readings back to the clinicians	On island-1 day, teleradiology-1 to 2 days
MRI on island	No
PET scan on island	No
Bronchoscopy (Lung Mass/Cancer)	No
General surgeon	X
Urologist	No
OB-Gyn	X
Surgical subspecialists	X
Oncologist	No
On-island chemotherapy	X (Maintenance)
On-island radiation therapy	No
Off-island referral to Philippines for diagnosis / treatment	No
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand or Taiwan for diagnosis / treatment	X

Table 22 American Samoa: Incident Cancer Cases 2007-2020⁵⁵

Top 10 Cancers for American Samoa 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	445	106.7	102.9	80.1	449.0	28%	16%	81%
Uterus	137	65.5	55.9	46.9	28.0	15%	19%	78%
Breast	96	45.4	39.2	31.8	128	26%	20%	76%
Colon & Rectum	51	12.2	13.3	9.8	33.0	24%	18%	80%
Stomach	28	6.7	6.7	5.2	6.0	61%	11%	82%
Cervical Cancer, invasive	22	10.5	9.1	7.5	7.8	18%	23%	77%
Ovary	15	7.2	-	-	10.0	33%	20%	67%
Lung & Bronchus	12	2.9	-	-	56.0	83%	17%	83%
Ill-defined & unspecified (unknown+misc)	9	2.2	-	-	-	33%	0%	100%
Prostate	9	4.3	-	-	110	44%	0%	100%
Skin excl Basal & Squamous & Melanoma	7	1.7	-	-	23.0	14%	0%	100%

⁵⁵ Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.; Breast cancer rate is based on female population only. 1 Male breast cancer case(s) reported
Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

Cancer cases reported to PRCCR and CDC diagnosed in 2007-2020 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. Patients 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, the U.S. mainland, or New Zealand.

The 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 6 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, Breast and Cervical Cancer Early Detection Program (ASBCCEDP), 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 that 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 data for the fact sheets are gathered from NCD partners from within the Department of Health and the Department of Education.

Commonwealth of the Northern Mariana Islands (CNMI)

CNMI ⁵⁶	
Political status with U.S.A.	Commonwealth
Total Population	47,329
Land surface area (sq. km)	475
Coastline (sq. km)	1,482
Public transportation	Yes
4-year University or College	None
2-year College	X
Hospitals	1
Regularly occurring continuing education program for physicians or nurses	Yes, Project ECHO
Health expenditures per capita	\$261
Age Structure	0-14 years: 23.5% (male 5,823/female 5,315) 15-24 years: 14.2% (male 3,526/female 3,216) 25-54 years: 44% (male 10,922/female 9,872) 55-64 years: 12.4% (male 3,184/female 2,679) 65 years and over: 5.8% (male 1,437/female 1,355)
Birth Rate	11.1 births/1,000 population (2021 Est)
Death Rate	5.1 deaths/1,000 population (2021 Est)
Life Expectancy	total population: 75.2 years

CNMI PROGRAM OR SERVICE	
CANCER SCREENING AND EARLY DETECTION	
CDC Breast and Cervical Cancer Early Detection Program	X
Mammography	X
What specialty performs the breast biopsies in your Jurisdiction?	Radiologist
Pap Smears	X
How long does it take for the pap smears to return to the clinician and/or program staff?	2-3 weeks
Cervical cancer screening using VIA	No
Prostate cancer screening (PSA)	X
Transrectal ultrasound	No
CT on-island	X
Colorectal cancer screening (FOBT)	X
Colonoscopy	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
Fine needle aspiration is available on island	Yes, Radiologist
On-island histopathology	X

⁵⁶ Source: U.S. Census data, 2020; 2022 Vital Statistics Annual Report, CHCC; NOAA – CORIS system

On-island cytopathology	No
How long does it take for biopsies to return from off-island?	8-10 days
General Radiologist ON-island	X - 1 Intervention radiologist; 1 General radiologist
Tele-radiology	X – Apollo Teleradiology (India)
How long does it take to get the radiology readings back to the clinicians	From India – Within 1-2 hrs. On-island – within the hour
MRI on island	No
PET scan on island	No
Bronchoscopy (Lung Mass/Cancer)	No
General surgeon	X
Urologist	No
OB-Gyn	X
Surgical subspecialists	X
Oncologist	X
On-island chemotherapy	X (maintenance)
On-island radiation therapy	No
Off-island referral to Philippines for diagnosis / treatment	X
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand or Taiwan for diagnosis / treatment	No

Table 23 Commonwealth of the Northern Mariana Islands (CNMI): Incident Cancer Cases 2007-2020⁵⁷

Top 10 Cancers for CNMI 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	570	115.4	129.8	100.5	449.0	35%	12%	78%
Breast	103	41.7	38.1	31.2	128	9%	12%	79%
Tobacco-related Oral Cavity & Pharynx	83	16.8	14.3	11.5	12.0	40%	10%	83%
Lung & Bronchus	56	11.3	19.6	13.8	56.0	70%	11%	89%
Colon & Rectum	56	11.3	12.1	9.7	38.0	29%	13%	75%
Uterus	43	17.9	17.0	14.8	28.0	30%	19%	67%
Cervical Cancer, invasive	34	14.2	11.4	9.6	7.8	18%	9%	62%
Prostate	34	13.4	21.5	15.5	110.0	9%	21%	62%
Liver	18	3.6	4.2	3.3	9.0	50%	0%	89%
Leukemia	16	3.2	4.2	3.2	14.0	63%	0%	100%
Stomach	12	2.4	-	-	6.0	50%	0%	75%

⁵⁷ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Breast cancer rate is based on female population only. 3 Male breast cancer case(s) reported
Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2020 are shown in the table above. Breast cancer is currently the cancer most diagnosed in CNMI. 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 U.S. mainland.

Provision of hospital-based and home-based palliative care services is in early stages of development. Efforts to train staff and family caregivers are ongoing. There 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 can 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, Breast and Cervical Cancer Early Detection Program 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 (FSM)

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 ⁵⁸	
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	All none except Chuuk: Chaminade University Hawaii - Caroline College & Pastoral Institute
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	\$416
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 AND EARLY DETECTION				
FSM STATE	CHUUK	KOSRAE	POHNPEI	YAP
CDC Breast and Cervical Cancer Early Detection Program	No	No	No	No
Mammography	No	No	Breast X-ray Only - PNI – (Private provider)	No
What specialty performs the breast biopsies in your Jurisdiction?	Surgeons	No	Surgeons, OB	Surgeons, OB
Pap Smears	X	X	X	X
How long does it take for the pap smears to return to the clinician and/or program staff?	2-3 weeks	No	3-4 Days	2-3 weeks
Cervical cancer screening using VIA	X	X	X	X
Prostate cancer screening (PSA)	No	No	X	X

⁵⁸ * Source: WHO statistical Profile, 2013; WHO Health Information and Intelligence Platform 2015

FSM PROGRAM OR SERVICE				
Transrectal ultrasound	No	No	No	Have equipment but no one to do it.
CT on-island	No	No	Private provider	No
Colorectal cancer screening (FOBT)	No	X	X (temp. not available)	X
Colonoscopy	No	No	Has equipment, but no one to perform	Yes
CANCER DIAGNOSIS AND TREATMENT				
FSM STATE	CHUUK	KOSRAE	POHNPEI	YAP
Pathologist	No	No	No	No
Fine needle aspiration is available on island	No	No	X	X (Surgeon, OB)
On-island histopathology	No	No	X	No
On-island cytopathology	No	No	X (Telepathology)	No
How long does it take for biopsies to return from off-island?	No	No	2 weeks avg.	2 weeks min.
General Radiologist ON-island	No	No	No	No
Tele-radiology	No	No	Yes	Yes (off island partners)
How long does it take to get the radiology readings back to the clinicians	No	No	No	No
MRI on island	No	No	No	No
PET scan on island	No	No	No	No
Bronchoscopy (Lung Mass/Cancer)	No	No	No	No
General surgeon	X	X	X	X
Urologist	No	No	No	No
OB-Gyn	X	X	X	X
Surgical subspecialists	X	No	X – Ortho.	No
Oncologist	No	No	No	No
On-island chemotherapy	No	No	X (maintenance, rare)	X (maintenance, rare)
On-island radiation therapy	No	No	No	No
Off-island referral to Philippines for diagnosis / treatment	X	X	X	X

FSM PROGRAM OR SERVICE				
Off-island referral to Hawaii for diagnosis / treatment	X	X	X – mostly self referral	No
Off-island referral to New Zealand or Taiwan for diagnosis / treatment	No	No	No	No

Table 24 Federated States of Micronesia (FSM - all States): Incident Cancer Cases 2007-2020⁵⁹

Top 10 Cancers for Federated States of Micronesia (combined), 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	1026	135.5	141.6	112.7	449.0	65%	12%	84%
Tobacco-related Oral Cavity & Pharynx	159	21.0	18.5	16.0	12.0	48%	23%	74%
Lung & Bronchus	138	18.2	21.4	17.0	56.0	92%	5%	93%
Cervical Cancer, invasive	109	28.8	23.2	20.1	7.8	54%	9%	75%
Breast	102	26.5	25.5	20.1	128	51%	11%	85%
Liver	80	10.6	9.4	7.9	9.0	90%	11%	88%
Uterus	61	16.1	16.4	13.2	28.0	39%	11%	87%
Prostate	47	12.4	27.2	17.3	110.0	62%	28%	70%
Colon & Rectum	41	5.4	6.5	4.7	38.0	66%	5%	95%
Stomach	35	4.6	5.7	4.3	6	83%	11%	86%
Ill-defined & unspecified (unknown+misc)	27	3.6	4.5	3.2	-	85%	0%	100%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2020 are shown in the table above and, by State, on the next pages. Tobacco related oral, lung 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 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. This number can be used by health officials to look at trends in cancer diagnosis over time. This number can be used as one measure of health system improvements in detecting cancer cases. Pohnpei has cervical cancer cases 4 times as high as the U.S. rates and Yap has the highest rates of oral cancer in the world.

Treatment options vary by cancer, but in general, are limited to early-stage cancers. One or two surgeons are available on-island to manage most early cancers requiring resection. As there is 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, when their 5-year survival rate is expected to be more than 50%.

⁵⁹ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Breast cancer rate is based on female population only. 2 Male breast cancer case(s) reported
Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020 * Chuuk, FSM data incomplete unavailable

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 25 Chuuk State, FSM: Incident Cancer Cases 2007-2020⁶⁰

Top 10 Cancers for Chuuk State, FSM, 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	199	57.0	66.7	50.8	449.0	78%	6%	94%
Lung & Bronchus	43	12.3	14.5	11.6	56.0	88%	7%	93%
Liver	24	6.9	6.3	5.4	9.0	92%	0%	100%
Breast	21	12.2	11.2	9.2	128	57%	5%	95%
Cervical Cancer, invasive	14	8.1	-	-	7.8	79%	7%	93%
Stomach	11	3.1	-	-	6	91%	9%	91%
Ill-defined & unspecified (unknown+misc)	10	5.6	-	-	-	90%	0%	100%
Prostate	10	4.9	-	-	110	100%	0%	100%
Colon & Rectum	8	2.3	-	-	38.0	75%	0%	100%
Leukemia	6	1.7	-	-	14.0	100%	0%	100%
Tobacco-related Oral Cavity & Pharynx	6	1.7	-	-	12.0	0%	33%	67%

⁶⁰ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020 * Chuuk, FSM data incomplete unavailable

Table 26 Kosrae State, FSM: Incident Cancer Cases 2007-2020⁶¹

Top 10 Cancers for Kosrae State, FSM, 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	84	172.4	175.6	130.0	449.0	80%	17%	81%
Lung & Bronchus	11	22.6	-	-	56.0	91%	18%	82%
Breast	10	41.4	-	-	128.0	80%	0%	100%
Cervical Cancer, invasive	10	41.4	-	-	7.8	60%	10%	80%
Uterus	8	33.1	-	-	28.0	38%	25%	75%
Tobacco-related Oral Cavity & Pharynx	7	14.4	-	-	12.0	71%	14%	71%
Leukemia	6	12.3	-	-	14.0	100%	0%	100%
Ovary	4	16.6	-	-	10.0	100%	0%	100%
Prostate	3	12.2	-	-	110.0	100%	33%	67%
Ill-defined & unspecified (unknown+misc)	3	6.2	-	-	-	100%	0%	100%
Stomach	3	6.2	-	-	6.0	100%	67%	33%

Table 27 Pohnpei State, FSM: Incident Cancer Cases 2007-2020⁶²

Top 10 Cancers for Pohnpei State, FSM, 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	472	176.1	180.6	145.6	449.0	59%	10%	84%
Tobacco-related Oral Cavity & Pharynx	81	30.2	23.8	21.1	12.0	46%	22%	74%
Cervical Cancer, invasive	69	51.4	41.2	35.9	7.8	45%	7%	71%
Lung & Bronchus	52	19.4	22.6	18.7	56.0	92%	0%	94%
Breast	52	38.0	41.6	31.8	128	50%	12%	81%
Uterus	30	22.4	26.6	20.5	28.0	43%	13%	83%
Liver	29	10.8	10.3	8.4	9.0	79%	7%	90%
Colon & Rectum	22	8.2	11.6	8.0	38.0	64%	5%	95%
Stomach	20	7.5	8.7	6.9	6.0	80%	5%	90%
Prostate	14	10.5	-	-	110	50%	21%	79%
Nasopharynx	13	5.7	-	-	0.5	77%	0%	100%

⁶¹ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020, * Chuuk, FSM data incomplete unavailable

⁶² * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.; Breast cancer rate is based on female population only. 1 Male breast cancer case(s) reported

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020, * Chuuk, FSM data incomplete unavailable

Table 28 Yap State, FSM: Incident Cancer Cases 2007-2020⁶³

Top 10 Cancers for Yap State, FSM, 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	271	297.7	267.2	220.9	449.0	62%	21%	78%
Tobacco-related Oral Cavity & Pharynx	65	71.4	60.9	52.5	12.0	52%	23%	75%
Lung & Bronchus	32	35.2	37.8	29.6	56.0	97%	6%	94%
Liver	25	27.5	19.6	17.3	9.0	100%	24%	76%
Prostate	20	45.8	75.2	54.6	110.0	45%	45%	50%
Breast	19	37.9	27.1	23.7	128	32%	21%	79%
Uterus	17	35.8	26.4	24.1	28.0	18%	6%	94%
Cervical Cancer, invasive	16	33.7	22.4	19.7	7.8	69%	19%	75%
Colon & Rectum	9	9.9	-	-	38	56%	11%	89%
Larynx	9	9.9	-	-	3.0	100%	22%	78%
Ovary	8	16.8	-	-	10.0	63%	38%	63%

⁶³ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Breast cancer rate is based on female population only. 1 Male breast cancer case(s) reported

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020, * Chuuk, FSM data incomplete unavailable

Guam

Guam ⁶⁴	
Political status with U.S.A.	Unincorporated Territory
Total Population	168,322
Land surface area (sq. km)	541
Coastline (sq. km)	125
Public transportation	Yes
4-year University or College	X
2-year College	X
Hospitals	Guam Memorial Hospital (GMHA); Guam Regional Medical City (GRMC - private); US Naval Hospital Guam (USNHG)
Regularly occurring continuing education program for physicians or nurses	Both; hospital and PHN, Project ECHO
Health expenditures per capita	\$1,990
Age Structure	0 - 14 years: 24% (male 20,577/female 19,441) 15 - 24 years: 16% (male 14,356/female 13,332) 25 - 54 years: 39% (male 33,021/female 32,069) 55 - 64 years: 11% (male 9,007/female 8,695) 65 years and over: 11% (male 8,115/female 9,709)
Birth Rate	19.3 births/1,000 population (2018 Est)
Death Rate	6.4 deaths/1,000 population (2018 Est)
Life Expectancy	total population: 79.7 years

GUAM PROGRAM OR SERVICE	
CANCER SCREENING AND EARLY DETECTION	
CDC Breast and Cervical Cancer Early Detection Program	X
Mammography	X
What specialty performs the breast biopsies in your Jurisdiction?	Surgeons, Interventional Radiologist
Pap Smears	X
How long does it take for the pap smears to return to the clinician and/or program staff?	No
Cervical cancer screening using VIA	No
Prostate cancer screening (PSA)	X
Transrectal ultrasound	Yes – Guam Regional Medical City (GRMC); Guam Radiology Consultants (GRC); MDX imaging center (MDX)
CT on-island	X
Colorectal cancer screening (FOBT)	X
Colonoscopy	X

⁶⁴ Source: U.S. Census data, 2010; WHO Country profiles 2011; WHO Health Information and Intelligence Platform 2015; CIA – The World Factbook

CANCER DIAGNOSIS AND TREATMENT	
Pathologist	X
Fine needle aspiration is available on island	Yes – Surgeon , Interventional Radiologist, Endocrinologist for Thyroid
On-island histopathology	X
On-island cytopathology	Collection only – Sent to DLS Hawaii
How long does it take for biopsies to return from off-island?	7-10 days
General Radiologist ON-island	X
Tele-radiology	Guam Memorial Hospital (GMHA), GRMC, GRC , MDX ,FHP Health Center
How long does it take to get the radiology readings back to the clinicians	Immediate for Guam Usually same-day on island reading including teleradiology
MRI on island	X
PET scan on island	No (GRMC does not offer it any more)
Bronchoscopy (Lung Mass/Cancer)	Yes – Surgeon, Pulmonologist, Critical Care Intensivist Specialist
General surgeon	X
Urologist	X
OB-Gyn	X
Surgical subspecialists	X
Oncologist	X
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 or Taiwan for diagnosis / treatment	Yes - Taiwan

Table 29 Guam: Incident Cancer Cases 2007-2020⁶⁵

Top 10 Cancers for Guam 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	4669	328.1	299.5	222.8	449.0	36%	20%	78%
Lung & Bronchus	783	55.0	54.0	38.6	56.0	69%	8%	91%
Breast	749	106.3	87.1	67.6	128	10%	28%	70%
Prostate	546	75.3	84.5	58.0	110.0	12%	43%	56%
Colon & Rectum	524	36.8	33.8	25.0	38.0	31%	15%	79%
Liver	230	16.2	13.4	10.6	9.0	79%	9%	89%
Uterus	220	31.5	24.6	19.9	28.0	14%	28%	67%
Thyroid	164	11.5	8.5	7.3	14	7%	30%	67%
Leukemia	156	11.0	11.2	7.8	14.0	37%	1%	99%
Tobacco-related Oral Cavity & Pharynx	102	7.2	5.9	4.7	12.0	37%	19%	76%
Stomach	101	7.1	7.0	4.9	6.0	54%	7%	93%
Cervical Cancer, invasive	99	14.2	10.2	8.8	7.8	28%	19%	74%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2020 are shown in the table above.

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

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

Provision of hospital-based and home-based palliative care services is in early stages of development. 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

⁶⁵ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Breast cancer rate is based on female population only. 6 Male breast cancer case(s) reported
Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

change. The cancer registry responds to data requests from NCD Coalition members, Cancer Coalition, Department of Public Health and Social Services, 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)

RMI ⁶⁶	
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	\$643
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 AND EARLY DETECTION	
CDC Breast and Cervical Cancer Early Detection Program	X
Mammography	X (Majuro)
What specialty performs the breast biopsies in your Jurisdiction?	Surgery
Pap Smears	X
How long does it take for the pap smears to return to the clinician and/or program staff?	Up to 4 weeks since the COVID-19 pandemic
Cervical cancer screening using VIA	X
Prostate cancer screening (PSA)	Available on physician's orders
Transrectal ultrasound	No
CT on-island	X - Non-operational
Colorectal cancer screening (FOBT)	X (FOBT/FIT)
Colonoscopy	X (Ebeye/Majuro)
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	No
Fine needle aspiration is available on island	Yes
On-island histopathology	No
On-island cytopathology	No

⁶⁶ Source: WHO statistical Profile, 2013; WHO World Health Statistics 2015; WHO Health Information and Intelligence Platform 2015

How long does it take for biopsies to return from off-island?	Up to 4 weeks (under COVID -19)
General Radiologist ON-island	X (Majuro)
Tele-radiology	Yes (Majuro reads both Majuro and Ebeye) electronically
How long does it take to get the radiology readings back to the clinicians	Highly dependent on patient loads
MRI on island	No
PET scan on island	No
Bronchoscopy (Lung Mass/Cancer)	No
General surgeon	X
Urologist	No
OB-Gyn	X
Surgical subspecialists	X - ENT
Oncologist	No
On-island chemotherapy	No
On-island radiation therapy	No
Off-island referral to Philippines for diagnosis / treatment	X
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand or Taiwan for diagnosis / treatment	Taiwan

Table 30 Republic of the Marshall Islands: Incident Cancer Cases 2007-2020⁶⁷

Top 10 Cancers for RMI 2007-2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	568	149.2	185.5	145.8	449.0	58%	15%	74%
Cervical Cancer, invasive	131	69.9	62.4	53.6	7.8	45%	24%	58%
Lung & Bronchus	61	16	30	21.5	56.0	93%	3%	89%
Breast	47	24.5	24.7	21.1	128	30%	21%	68%
Liver	36	9.5	11.8	9.6	9.0	97%	14%	78%
Uterus	33	17.6	24.6	19.9	28.0	21%	42%	42%
Colon & Rectum	22	5.8	9	6.1	38	50%	18%	73%
Ill-defined & unspecified (unknown+misc)	21	5.5	7.8	5.9	-	86%	0%	100%
Nasopharynx	20	5.3	5.3	4.4	0.5	70%	0%	100%
Ovary	20	10.7	10.2	9.1	10.0	60%	0%	85%
Non-Hodgkin Lymphoma	17	4.5	3.8	3.4	19.0	53%	6%	94%

⁶⁷ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Breast cancer rate is based on female population only. 1 Male breast cancer case(s) reported
Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2020 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 are 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 system can make informed decisions about areas to focus precious resources. Certain types of cancers can 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

Palau ⁶⁸	
Political status with U.S.A.	Freely Associated
Total Population	17,614
Land surface area (sq. km)	458
Coastline (sq. km)	1,519
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	\$1,723
Age Structure	0-14 years: 19% (male 1,756/female 1,623) 15-24 years: 11% (male 1,017/female 923) 25-54 years: 47% (male 4,757/female 3,562) 55-64 years: 13% (male 1,211/female 1,094) 65 yrs and over: 9% (male 756/female 915)
Birth Rate (live births)	12.1 births/1,000 population
Death Rate	8.4 deaths/1,000 population
Life Expectancy	total population: 73 years

PALAU PROGRAM OR SERVICE	
CANCER SCREENING AND EARLY DETECTION	
CDC Breast and Cervical Cancer Early Detection Program	X
Mammography	X
What specialty performs the breast biopsies in your Jurisdiction?	Surgery
Pap Smears	X
How long does it take for the pap smears to return to the clinician and/or program staff?	1 month
Cervical cancer screening using VIA	No
Prostate cancer screening (PSA)	X
Transrectal ultrasound	No
CT on-island	X
Colorectal cancer screening (FOBT)	X
Colonoscopy	X
CANCER DIAGNOSIS AND TREATMENT	
Pathologist	No
Fine needle aspiration is available on island	Yes available – performed by surgeon
On-island histopathology	No
On-island cytopathology	No

⁶⁸ Source: 2020 Census results; WHO statistical Profile, 2013; WHO World Health Statistics 2015; WHO Health Information and Intelligence Platform 2015

How long does it take for biopsies to return from off-island?	1 month
General Radiologist ON-island	No
Tele-radiology	Yes – Asian Hospitals, Philippines
How long does it take to get the radiology readings back to the clinicians	2 weeks
MRI on island	No (will be installed in 2023)
PET scan on island	No
Bronchoscopy (Lung Mass/Cancer)	No
General surgeon	X
Urologist	No
OB-Gyn	X
Surgical subspecialists	No
Oncologist	No
On-island chemotherapy	No
On-island radiation therapy	No
Off-island referral to Philippines for diagnosis / treatment	X
Off-island referral to Hawaii for diagnosis / treatment	X
Off-island referral to New Zealand or Taiwan for diagnosis / treatment	Taiwan

Table 31 Republic of Palau: Incident Cancer Cases 2007-2020⁶⁹

Top 10 Cancers for Palau 2007 - 2020	Cases	Crude	U.S. std	World std	Incidence rate U.S.*	% dead within 5 yrs of diagnosis	% diagnosed stage 1	% diagnosed stage 3 or higher
All Sites	374	185.4	179.2	138.3	449.0	60%	14%	83%
Lung & Bronchus	60	29.7	31.8	23.9	56.0	87%	13%	85%
Liver	51	25.3	23.5	18	9.0	94%	12%	86%
Breast	38	41.6	33.7	27.2	128.0	18%	18%	82%
Prostate	35	31.8	43.3	31.8	110.0	31%	23%	71%
Tobacco-related Oral Cavity & Pharynx	33	16.4	13.6	10.9	12.0	45%	18%	79%
Uterus	26	28.4	22.7	17.5	28.0	23%	19%	81%
Colon & Rectum	21	10.4	11.3	8.4	38.0	48%	14%	76%
Cervical Cancer, invasive	14	15.3	-	-	7.8	57%	7%	93%
Thyroid	12	5.9	-	-	14	25%	8%	83%
Stomach	11	5.5	-	-	6.0	73%	9%	82%

Cancer cases reported to PRCCR, and CDC diagnosed in 2007-2020 are shown in the table above. Lung, liver, and breast cancers are most diagnosed in the Republic of Palau, with breast cancer cases outnumbering prostate cancer cases in 2020. Because of limitations in screening and diagnosis, other cancers may be underreported. We have included crude

⁶⁹ * Source for U.S. data: U.S. Cancer Statistics Working Group. U.S. Cancer Statistics Data Visualizations Tool, based on 2021 submission data (1999-2019): U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; <https://www.cdc.gov/cancer/dataviz>, released in November 2022.

Source: Pacific Regional Central Cancer Registry (PRCCR), 2007-2020

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 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 10 years.

Appendix

Table 32 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	Commonwealth	Territory	Freely Associated	Freely Associated	Freely Associated
Total Population	49,710	47,329	168,322	102,116	17,614	53,952
Land surface area (sq. km)	199	475	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	None	None	X	All None except Chuuk: Chaminade University Hawaii - Caroline College & Pastoral Institute	None	None
2-year College	X	X	X	X	X	X
Hospitals	1	1	GMHA; GRMC – private; Naval Hospital (USNHG)	5 (1 private in PNI)	1	1
Health expenditures per capita	\$692	\$261	\$1,990	\$416	\$1,723	\$643
Age Structure	0-14 years: 30% (male 7,577/female 7,332) 15-24 years: 16.6% (male 4,259/female 3,973) 25-54 years: 37.9% (male 9,585/female 9,183) 55-64 years: 9.3% (male 2,337/female 2,317) 65 years and over: 4.5% (male 1,496/female 1,651)	0-14 years: 23.5% (male 5,823/female 5,315) 15-24 years: 14.2% (male 3,526/female 3,216) 25-54 years: 44% (male 10,922/female 9,872) 55-64 years: 12.4% (male 3,184/female 2,679) 65 years and over: 5.8% (male 1,437/female 1,355)	0 - 14 years: 24% (male 20,577/female 19,441)15 - 24 years: 16% (male 14,356/female 13,332)25 - 54 years: 39% (male 33,021/female 32,069)55 - 64 years: 11% (male 9,007/female 8,695)65 years and over: 11% (male 8,115/female 9,709)	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: 19% (male 1,756/female 1,623) 15-24 years: 11% (male 1,017/female 923) 25-54 years: 47% (male 4,757/female 3,562) 55-64 years: 13% (male 1,211/female 1,094) 65 yrs and over: 9% (male 756/female 915)	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	17.19 births/1,000 population (2021 Est)	11.1 births/1,000 population (2021 Est)	19.3 births/1,000 population (2018 Est)	2.5 births/1,000 population	12.1 births/1,000 population	1.4 births/1,000 population
Death Rate	6 deaths/1,000 population (2021 Est.)	5.1 deaths/1,000 population (2021 Est)	6.4 deaths/1,000 population (2018 Est)	0.6 deaths/1,000 population	8.4 deaths/1,000 population	0.3 deaths/1,000 population
Life Expectancy	total population: 76 years	total population: 75.2 years	total population: 79.7 years	total population: 70 years	total population: 73 years	total population: 70 years

	American Samoa	CNMI	Guam	FSM	Palau	RMI
SCREENING AND EARLY DETECTION						
CDC Breast and Cervical Cancer Early Detection Program	X	X	X	No	X	X
Mammography	X	X	X	Breast X-ray Only - PNI – (Private provider)	X	X (Majuro)
What specialty performs the breast biopsies in your Jurisdiction? (surgery, OB)	OB, Surgery, Family Planning, BCCEDPP(DOH)	Radiologist	Surgeons, Interventional Radiologist	Surgeons, OB (PNI, Yap) Surgery (TKK)	Surgery	Surgery
Pap Smears	X	X	X	X	X	X
How long does it take for the pap smears to return to the clinician and/or program staff?	3-4 weeks	2-3 weeks	No	3-4 days (PNI) 2-3 weeks (Chuuk) 2-3 weeks (Yap)	1 month	Up to 4 weeks since the COVID-19 pandemic
Cervical cancer screening using VIA	No	No	No	X	No	X
Prostate cancer screening (PSA)	X	X	X	X (PNI,YAP)	X	Available on physician's orders
Transrectal ultrasound	No	No	Yes – GRC & MDX	(Yap has equipment, but no personnel to perform the screening)	No	No
CT on-island	X	X	X	X (PNI – Private provider)	X	X - Non-operational
Colorectal cancer screening (FOBT)	X	X	X	X (KSA,YAP) PNI – currently N/A (expected in 2022)	X	X (FOBT/FIT)
Colonoscopy	X	X	X	X (Yap) PNI - has the equipment but no specialist to perform the procedure)	X	X (Ebeye/Majuro)
CANCER DIAGNOSIS AND TREATMENT						
Pathologist	X	X	X	No	No	No
Fine needle aspiration is available on island? <i>Yes / NO if Yes – please include who/what specialty does it.</i>	Yes - Surgery	Yes, Radiologist	Yes – Surgeon , Interventional Radiologist , Endocrinologist for Thyroid	X (PNI) X (Yap – Surgeon, OBGYN)	Yes available – performed by surgeon	Yes
On-island histopathology	X - some	X	X	X (PNI)	No	No
On-island cytopathology (Paps or fine needle aspiration analysis)	No	No	Collection only – Sent to DLS Hawaii	PNI lab telepath	No	No
How long does it take for biopsies to return from off-island?	2-3 weeks	8-10 days	7-10 days	2 weeks avg (PNI) 2 weeks minimum (YAP)	1 month	Up to 4 weeks (under COVID -19)
General Radiologist ON-island	X	X	X	No	No	X (Majuro)

Tele-radiology (<i>specify where & what hospital or facility</i>)	X National Diagnostic Imaging main office – Ohio	X- 1 Intervention radiologist; 1 General radiologist	GMHA, GRMC, GRC , MDX ,FHP	X - PNI Yap - off-island partners	Yes – Asian Hospitals, Philippines	Yes (Majuro reads both Majuro and Ebeye) electronically
How long does it take to get the radiology readings back to the clinicians (<i>specify for both on- island and teleradiology</i>)	On island-1 day, teleradiology-1 to 2 days	X – Apollo Teleradiology (India)	Immediate for Guam Usually same-day on island reading including teleradiology	No	2 weeks	Highly dependent on patient loads
MRI on island	No	From India – Within 1-2 hrs. On-island – within the hour	X	No	No (will be installed in 2023)	No
PET scan on island	No	No	No	No	No	No
Bronchoscopy (Lung Mass/Cancer) (i.e., pulmonologist or general surgeon who does bronchoscopy)?	No	No	Yes – Surgeon, Pulmonologist, Critical Care Intensivist Specialist	No	No	No
General surgeon	X	No	X	X	X	X
Urologist	No	X	X	No	No	No
OB-Gyn	X	No	X	X	X	X
Surgical subspecialists	X	X	X	X (PNI) - Orthopedics X (Chuuk)	No	X - ENT
Oncologist	No	X	X	No	No	No
American Samoa CNMI Guam FSM Palau RMI						
On-island chemotherapy	X	X (maintenance)	X	X (maintenance, rare)	No	No
On-island radiation therapy	No	No	X	No	No	No
Off-island referral to Philippines for diagnosis / treatment	No	X	X	X	X	X
Off-island referral to Hawaii for diagnosis / treatment	X	X	X	X PNI – mostly self referral (not for Yap)	X	X
Off-island referral to New Zealand or Taiwan for diagnosis / treatment	X	No	Yes	No	Taiwan	Taiwan

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