

GUAM CANCER FACTS & FIGURES

2013 - 2017





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Hafa Adai!

Storytelling has long been a part of Guam’s rich and historic culture – used as a method to pass knowledge from one generation to the next, to educate and even to entertain. Access to accurate cancer data is vital to storytelling and this publication allows us to tell the story of the cancer experience in Guam.

Identifying the stories, like the patterns in incidence and mortality rates or the disparities that exist among cancer sites or ethnicities, helps us continue to shine a light on cancer as a public health priority. These data will serve as the basis for many working in public health in Guam – helping to inform policy decisions, develop and support programs, guide advocacy and education efforts and improve access and care for cancer patients and their families.

This third data report, produced in collaboration with the Guam Cancer Registry, the University of Guam Cancer Research Center, the Department of Public Health and Social Services and the various partners that comprise the Guam Comprehensive Cancer Control Coalition, is a testament to a 16-year partnership that has prioritized cancer control in Guam. Turning this data from stories into action will help the Coalition move towards its vision of Guam’s people being “cancer-free, embracing a healthy lifestyle and living in a healthy environment.”

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A COMMUNITY COLLABORATIVE EFFORT



Letter from the U54 Pacific Island Partnership for Cancer Health Equity (PIP CHE) Principal Investigators, Dr. Rachael T. Leon Guerrero and Dr. Margaret Hattori-Uchima

Hafa Adai!

Pacific Islanders and Filipinos, whose communities comprise the majority of Guam's population, remain underserved minorities with high rates of particular cancers and other non-communicable diseases; and cancer remains the second leading cause of death in Guam. Our underserved communities in Guam have a greater likelihood of developing and dying from certain cancers due to disparities in access to healthcare and certain lifestyle choices such as tobacco and alcohol use, physical activity, and diet. The 3rd Guam Cancer Facts and Figures, covering data for the years 2013—2017, is evidence of the sustained commitment from the various cancer prevention and control stakeholders within our community to combat a major cause of premature mortality in our island using data-driven strategies and approaches.

This report provides data on cancer incidence, mortality, its socio-demographic correlates and its risk factors. Building on the 1st and 2nd Guam Cancer Facts and Figures (2003—2007 and 2008—2012, respectively), we have sufficient data to examine trends and to determine which areas in cancer prevention and control stand out as service and resource priorities. By translating these data into action through policies and programs, we hope to reverse the growing burden of cancer in Guam.

The University of Guam, Guam Cancer Registry, and Guam Department of Public Health and Social Services, Comprehensive Cancer Control Program will continue to work closely with the Guam Comprehensive Cancer Control Coalition and the Guam NCD Consortium and other community stakeholders to fully utilize these data to guide policy and program decisions in a strategic approach to cancer control and prevention.

Si yu'os ma'ase,

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INTRODUCTION

GUAM CANCER REGISTRY

The Guam Cancer Registry (GCR) is a population-based registry tasked with recording all cancer cases occurring among residents of Guam. It was established by law in 1998 by the 24th Guam Legislature under the Department of Public Health and Social Services (DPHSS). Funding from the National Institute of Health (NIH)/National Cancer Institute (NCI) to support the registry was obtained in 2004 through the University of Hawai'i Cancer Research Center. Shortly after, the University of Guam (UOG) and DPHSS formalized a joint operation, and the GCR became a unit of the Cancer Research Center of Guam in 2005 - now the Research Corporation of the University of Guam (RCUOG). In 2006 the GCR was awarded full-member status in the North American Association of Central Cancer Registries (NAACCR). Regulations governing the GCR were expanded in October 2010, with approval by the Guam Legislature, to include mandatory reporting of new cancer cases by non-medical providers of services to persons diagnosed with cancer. DPHSS and UOG continue to cooperatively run the registry under Public Law 30-80 that provides for the exchange of information and sharing of resources to support GCR operations.¹

GCR operates under stringent national standards and collects detailed information on all cancer cases (as well as benign brain/CNS tumors) diagnosed in Guam residents. This information is reported by Guam's hospitals, laboratories, oncology clinics, insurance companies, and nonprofits – all agencies and organizations that provide services to Guam cancer patients. GCR is required to collect follow-up information for cancer patients in its database and works closely with DPHSS's Office of Vital Statistics. All data collected on cancer patients is kept strictly confidential; no personal health information is released to the public. ²





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PACIFIC REGIONAL CENTRAL CANCER REGISTRY*

The Pacific Regional Central Cancer Registry (PRCCR) oversees the systematic and accurate collection of cancer data in all US-affiliated Pacific Island (USAPI) jurisdictions, including Guam. It was initiated by the Cancer Council of the Pacific Islands (CCPI) in 2003 to mitigate the lack of quality cancer data in the region. The University of Hawai'i John A. Burns School of Medicine (JABSOM), Department of Family Medicine and Community Health, is the designated official agent on behalf of the USAPI jurisdictions to plan and implement the Centers for Disease Control (CDC) National Program of Cancer Registries (NPCR) in the USAPI. GCR and most USAPI jurisdictions began reporting to the CDC NPCR in December 2009 through PRCCR. In addition to the standard data variables that are reported to CDC by cancer registries nationwide, the CCPI, as Advisory Board to PRCCR, added collection of data on screening, prevention, and Non-Communicable Disease (NCD) risk factors. Responsibilities of PRCCR include:

- 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 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 USAPI⁴

PRCCR assists USAPI registries through quarterly training, sharing program and technical resources, limited funding for personnel and equipment, and consultation and advocacy. As a Central Registry, it answers NPCR's annual Calls for Data, editing and submitting cancer data from all the USAPI registries to CDC.

* The following is adapted from Cancer in the USAPI 2007-2018.⁴⁻⁵

METHODS AND APPROACH

Previous publications of Guam Cancer Facts & Figures (GCFF) presented information from 1998- 2002, 2003-2007, and 2008-2012, and were based on data provided by the Guam Cancer Registry (GCR). This publication is based on Guam cancer data submitted by GCR to the Pacific Regional Central Cancer Registry (PRCCR) and edited for quality assurance. PRCCR edits all cases received by GCR and other United States-Affiliated Pacific Island (USAPI) registries prior to its annual submission of cancer data to CDC.

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INCIDENCE DATA (NEW CANCERS)

Guam cancer Incidence Data for this report was supplied by PRCCR. Guam cancers diagnosed between 2013-2017 were extracted from the PRCCR database on February 8, 2021. This report includes only invasive cancer cases, edited by PRCCR for quality and completeness. Earlier publications of GCFE included some incomplete (not fully abstracted) and some “in situ” (noninvasive) cancer cases. *The change in data source and the consequent exclusion of incomplete and non-invasive cases may contribute to a decrease in cancer incidence for the time period discussed in this publication.*

Included in this report are sections for specific cancers of interest, such as breast and cervix. As an exception, these sections will include additional counts of in situ and/or pre-cancerous lesions due to their relevance to cancer screening and control.

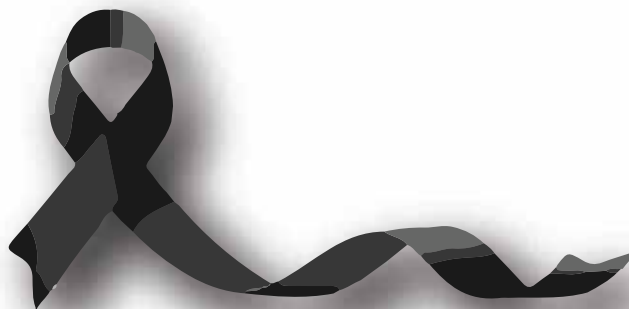
MORTALITY DATA (CANCER-RELATED DEATHS)

Guam cancer mortality data in this report was extracted from GCR’s database on November 30, 2020. Cancer-related deaths occurring between 2013-2017 were included. Cancer cases that were not in PRCCR’s database were excluded to ensure quality. The authors of this report agreed that using GCR (versus PRCCR) as the primary source for mortality would ensure a more accurate count. Two major factors supported this:

- There is a delay in time from when GCR updates the Vital Status of its exported cases compared to when PRCCR receives the information and updates its cases.
- GCR started abstracting cancer cases in 1998 (known as its Reference Date). PRCCR’s Reference Date is 2007. Deaths of residents diagnosed with cancer prior to 2007 would not be in the PRCCR database, resulting in an undercount.

The primary sources of death data are death certificates (D.C.s) provided monthly by the DPHSS Office of Vital Statistics to GCR. In line with national standards, only cases with cancer listed as the “immediate” or “underlying” cause of death are included in the mortality count⁶. This is consistent with Guam cancer mortality data from 1998-2012.

A small portion of deaths of persons with cancer are based solely on an online or published Obituary, lacking critical information that would be found in a death certificate, such as cause(s) of death.





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STAGING

Staging data for cancer cases is vital data to have for patients, physicians/oncologists, and for community cancer prevention and screening programs. In short, the stage of a malignant tumor tells how much or little it has grown and/or spread at the time of diagnosis. It directly correlates with the types of treatment a doctor may recommend. Cancer registries use standardized codes to identify the stage of a cancer at the time of diagnosis. While various staging systems have been used in past years, such as Collaborative Staging and now American Joint Committee on Cancer (AJCC) Staging, Surveillance, Epidemiology, and End Results (SEER) Summary Stage has remained the most basic staging system⁷. Its five stages include:

- **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.
- **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.
- **Regional** indicates a cancer that has spread beyond the original (primary) site to nearby lymph nodes or organs and tissues.
- **Distant** indicates a cancer that has spread from the primary site to distant organs or distant lymph nodes or by implantation metastasis.
- **Unstaged or Unknown** indicates there is a cancer, but insufficient information exists to determine the stage or extent of the disease at diagnosis.⁷

In this publication, SEER Summary Stage for invasive cancers were analyzed and categorized as: Early (localized), Late (regional and distant spread), and Unstaged (unknown stage).

There are many reasons for a registry to have a large number of unknown or unstaged cancers. Some cancers, such as breast, cervix, and colorectal, are easier to screen for and identify at an earlier stage due to specific symptomology. Other cancers, such as lung, pancreas, and ovarian, have more generalized symptoms and fewer screening tools. Some persons with a new cancer diagnosis may lack health insurance, money, and/or transportation to complete the required tests to adequately stage their cancer. And cancer registries often do not have all documents needed to stage a cancer. For example, Guam and PIJ registries have a high number of abstracts built from a single pathology report or a death certificate; thus, the cancer is reported but unstaged.



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RACE/ETHNICITY DATA

Race and ethnicity are coded according to standardized codes used in CDC’s Abstract Plus software, and national registry standards. 7 Ethnic/race analysis includes five (5) groups with the largest number of cancer cases in Guam: CHamoru, Filipino, Micronesian (other than CHamoru), Asian (other than Filipino), and Caucasian. They are the same as in previous publications of Guam Cancer Facts & Figures. When a person is documented to have two or more ethnicities/races, only the primary ethnicity/race is used in the analysis.

“CHamoru” is used in place of “Chamorro” in accordance with Guam Public Law 33-236 passed in 2018.⁸ CHamoru include persons in Guam whose primary ethnic identity is CHamoru, and CHamorus from the Commonwealth of the Northern Mariana Islands (CNMI) and elsewhere who were residents of Guam at the time of their cancer diagnosis. “Micronesian” includes persons from all islands in Micronesia (other than CHamorus) such as the Federated States of Micronesia (Chuuk, Yap, Pohnpei, Kosrae), Republic of Belau, and Republic of the Marshall Islands. Carolinians from the CNMI are included as Micronesians. The data analysis did not subdivide Micronesians into various ethnicities because numbers were too small for analysis. “Asian” includes all ethnicities originating in Asia, excluding the Philippines. While GCR collects more specific Asian group information (e.g. Japanese, Chinese, Korean, etc.), small numbers preclude their analysis.

LIMITATIONS AND CONSIDERATIONS WHEN INTERPRETING CANCER DATA IN SMALL POPULATIONS

Guam’s cancer population is small relative to other states and countries with much larger general populations. This makes statistical analysis of cancer cases in Guam and other Pacific Islands a challenge, and interpretation of findings just as challenging. GCR analyzes its cancer data in five-year aggregate periods to strengthen the statistical validity of incidence and mortality rates. Interpreting increases and decreases in case numbers and rates should be done with caution, as other factors may influence fluctuating case counts. These include:

Case reporting – The frequency, consistency, amount of data, and timeliness of case reporting from oncology clinics, hospitals, labs, radiology and surgical centers, non-profits, and insurance companies vary greatly. Staff changes affect the knowledge base about registry obligations, and shifting workloads affect cancer reporters’ ability and willingness to report.

Active case collection and follow-back – Data quality increases when registry staff have direct clinic/agency access to collect needed documents and obtain follow-up information for cases. Mandated reporters’ confidentiality concerns and misunderstanding of HIPAA regulations may delay timely access to records. Availability of registry staff to do this time-intensive work also varies.



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A fragmented health care system and off-island care – Utilization of varied health care systems challenge GCR’s ability to account for all cancer cases diagnosed in Guam residents. Complete documentation of cancer diagnoses and treatments may be “lost in the process,” adversely affecting Continuity of Care. This is not unique to Guam or the USAPI – but is a national problem.

The Department of Defense (DOD) and the Veterans Administration (VA) systems – The DOD and VA have separate systems for cancer registration, and do not routinely share cancer data with non-DOD registries. Veterans and their dependents do at times access civilian oncology and other medical services, which then may be picked up by GCR.



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CANCER IN GUAM: AN OVERVIEW

SHOULD OUR COMMUNITY STILL BE CONCERNED ABOUT CANCER?

Cancer remains the second leading cause of death in Guam, accounting for 16.9% of all deaths or about 1 in every 6 deaths in 2017 (Table 1).

Table 1. Top Ten Causes of Death, Guam, 2017

Rank	Cause of Death	Number of Deaths	Percent of all Deaths
1	Cardiovascular Diseases	339	33.7
2	Malignant Neoplasms	170	16.9
3	Septicaemia	50	5.0
4	Cerebrovascular Diseases	47	4.7
5	Diseases of the Digestive System	45	4.5
6	Diseases of the Genitourinary System	45	4.5
7	Pneumonia	43	4.3
8	Suicide	36	3.6
9	Injury, Poisoning and certain other consequences of external causes	30	3.0
10	Diseases of the Respiratory System	26	2.6
11	All Others	176	17.5
	Total deaths	1007	100.0

Source: 2018 Guam Statistical Yearbook (Bureau of Statistics and Plans, Office of the Governor), 2019.



Pacific Island Partnership for Cancer Health Equity (PIPCHÉ) — Group Photo (2021)

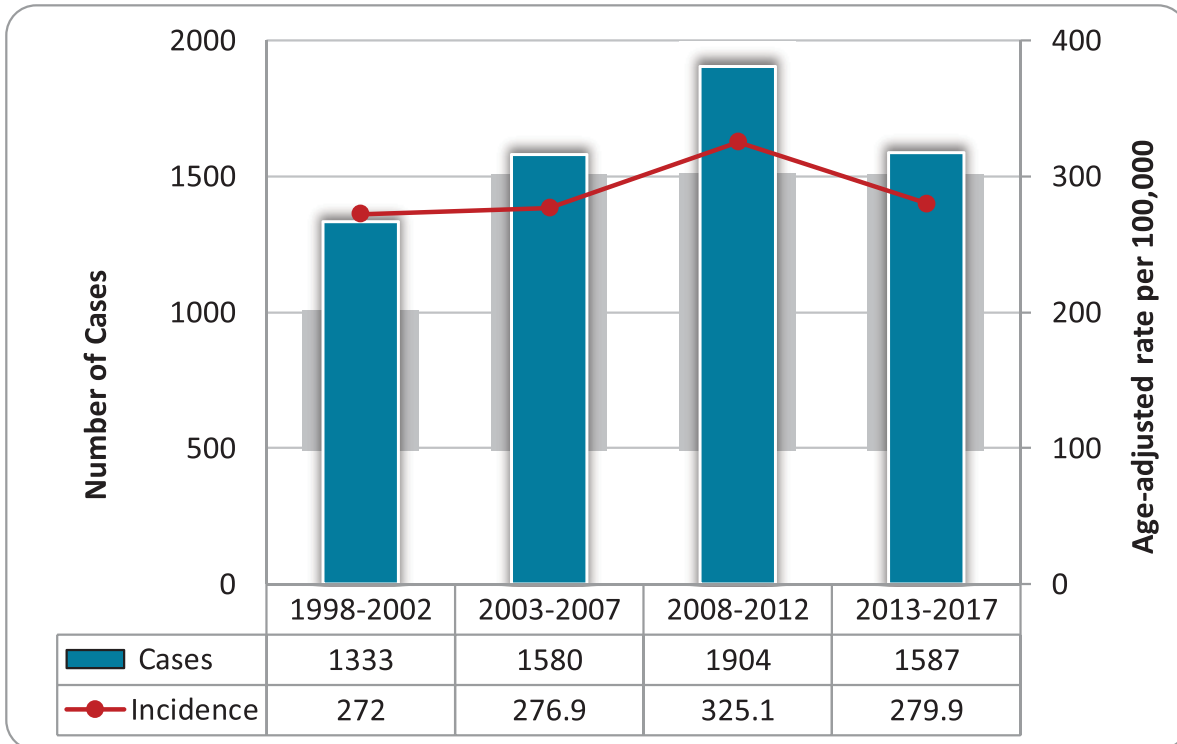


GUAM

CANCER FACTS & FIGURES 2013-2017

Data from 2013-2017 suggests that cancer incidence has declined since the 2008-2012 time period (Figure 1) indicating a 13.9% decrease in incidence rate. This may be in part due to the data from 2013-2017 time period including only invasive cases. Despite the decrease relative to the 2008-2012 time period, incidence is about the same as that documented for the 1998-2002 and 2003-2007 time periods (Figure 1). Current data indicates an average of 1 person diagnosed with cancer every 1.1 days.

Figure 1. Trends in Cancer Incidence Counts and Rates, All Cancers, Guam: 1998-2017



1998 - 2012: All cancer cases; 2013-2017: invasive cases only.

Rates are per 100,000 and age-adjusted to the 2000 US Standard population.

Source years: 2013-2017 UOG Cancer Research Center, Pacific Regional Central Cancer Registry (PRCCR); Source years 2003-2012, Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

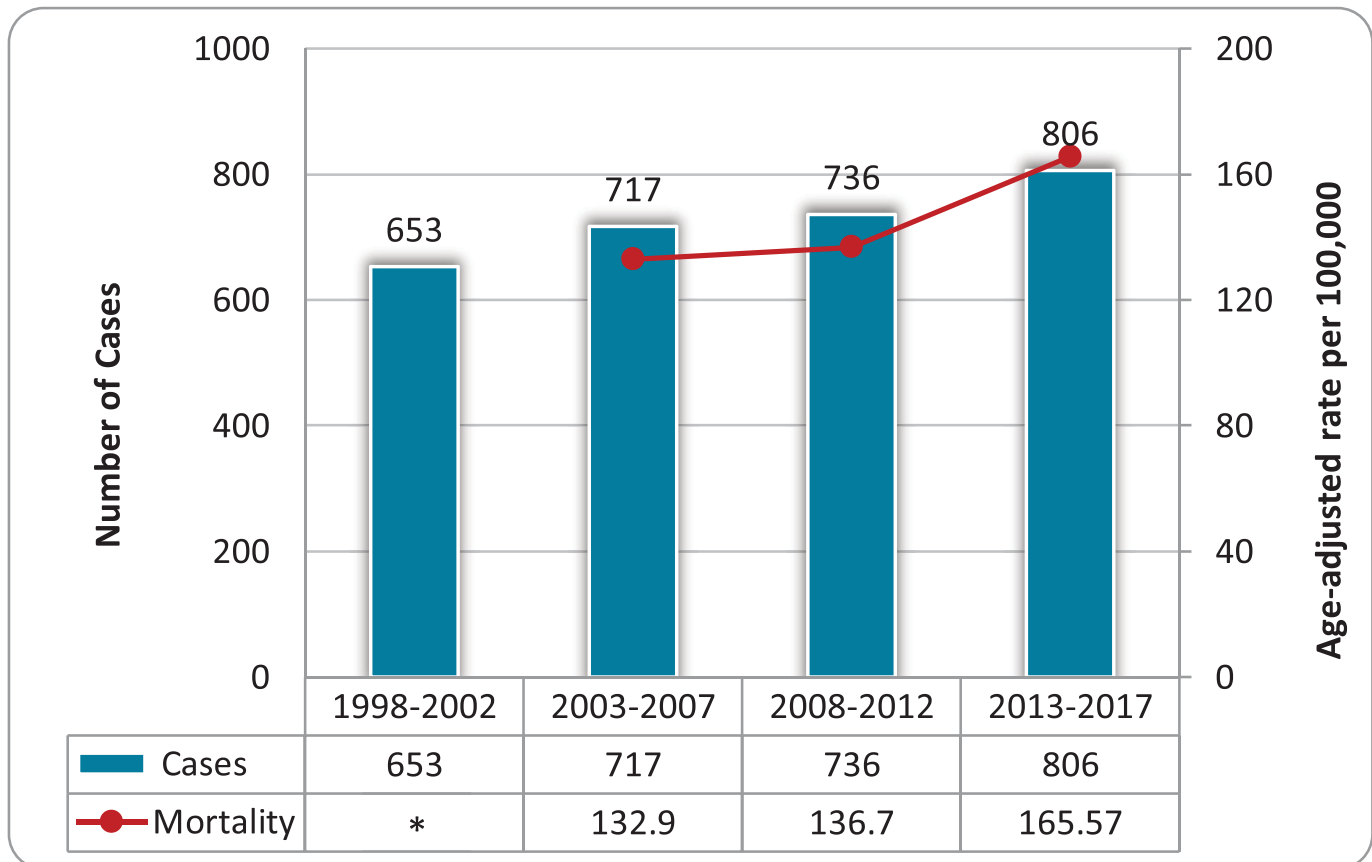


Guam Cancer Coalition's Annual Cancer Retreat (2019)

A COMMUNITY COLLABORATIVE EFFORT

The number of cancer deaths increased relative to the previous time periods reported (Figure 2). Mortality rates (165.57) increased 21% from 2008-2012 (136.7). This translates to an average of 1 person dying of cancer every 2.3 days.

Figure 2. Trends in Cancer Mortality Counts and Rates, All Cancers, Guam: 1998-2017



**Data not available for this period.*

1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

On average, in Guam, 1 person is diagnosed with cancer every 1.1 days and dies of cancer every 2.3 days.



GUAM

CANCER FACTS & FIGURES 2013-2017

MOST COMMON CANCERS IN GUAM

The five most common cancer sites for new cancer cases are breast, lung and bronchus, colorectal, prostate, and liver. Colorectal sites indicate cancers in the colon, rectum, and/or anus. Four cancer sites – breast, lung and bronchus, colorectal, and prostate – account for about 55% of all new cancer cases (Table 2). The majority of cancer deaths are from lung and bronchus, colorectal, liver, and breast, as these sites account for about 56% of all cancer deaths (Table 2).

Table 2. Top Ten Cancer Cases, Guam, 2013-2017

Cancer Sites	Incidence Counts (New Cases)	Percent of Total Cancer Incidence		Cancer Sites	Mortality Counts (Death)
Breast	267	16.8	1	Lung & Bronchus	222
Lung & Bronchus	261	16.4	2	Colon-Rectum-Anus	82
Colon-Rectum-Anus	177	11.2	3	Liver	79
Prostate	175	11.0	4	Breast	69
Liver	78	4.9	5	Prostate	49
Uterus	76	4.8	6	Pancreas	30
Mouth & Pharynx	50	3.2	7	Mouth & Pharynx	24
Thyroid	43	2.7	8	Ovary	24
Non-Hodgkin Lymphoma	36	2.3	9	Leukemia	23
Skin	36	2.3	10	Stomach	22
Other Cancer Sites	388	24.4		Other Cancer Sites	182
All New Cancer Cases	1587	100		All Cancer Deaths	806

Invasive cases only.

Source: University of Guam (UOG) Cancer Research Center, PRCCR.

Although the incidence for all sites decreased in 2013-2017 compared to 2008-2012, the relative contribution of breast, colorectal, and lung and bronchus cancer to overall cancer incidence increased in 2013-2017 compared to 2008-2012. The relative contribution of prostate cancer slightly increased while the relative contribution for liver cancer slightly decreased for the same time periods (Table 3A).

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Table 3A. New cancer cases, selected cancer sites, Guam, 2003-2007, 2008-2012, 2013-2017

Cancer Sites	Incidence Counts			Percentage of Total Cancer Incidence		
	2003-2007	2008-2012	2013-2017	2003-2007	2008-2012	2013-2017
Breast	202	292	267	12.8	15.3	16.8*
Colorectal	165	190	177	10.4	10	11.2
Liver	66	105	78	4.2	5.5	4.9
Lung and Bronchus	272	281	261	17.2	14.8	16.5
Prostate	223	201	175	14.1	10.6	11
Other Cancer Sites	652	835	629	41.3	43.8	39.6
All Sites	1580	1904	1587	100	100	100

*Breast cancer count for this period includes 2 cases of male breast cancer and is not exclusive to females.

1998-2012: All cancer cases, 2013-2017: Invasive cases only.

Source Years 2013-2017: UOG Research Cancer Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

The mortality counts for breast, colorectal, lung and bronchus, and prostate cancer increased when compared to the counts for 2008-2012 time period. The mortality count for liver cancer slightly decreased compared to the count for the 2008-2012 time period. The relative contribution of breast cancer to new cancer deaths increased in 2013-2017 compared to previous reported years. The relative contribution of prostate cancer to new cancer deaths slightly increased compared to 2008-2012. The relative contribution of colorectal and lung and bronchus to all cancer deaths decreased compared to previous reported years. The relative contribution of liver cancer to all cancer deaths decreased compared to 2008-2012 (Table 3B).

Table 3B. New cancer deaths, selected cancer sites, Guam, 2003-2007, 2008-2012, 2013-2017

Cancer Sites	Mortality Counts (Death)			Percentage of Total Mortality		
	2003-2007	2008-2012	2013-2017	2003-2007	2008-2012	2013-2017
Breast	57	37	69	7.9	5.0	8.6
Colon and Rectum (includes anus)	82	78	82	11.4	10.6	10.2
Liver	50	81	79	6.9	11.0	9.8
Lung and Bronchus	206	213	222	28.6	28.9	27.5
Prostate	59	40	49	8.2	5.4	6.1
Other Cancer Sites	266	287	305	36.9	39.0	37.8
All Sites	720	736	806	100.0	100.0	100.0

1998-2012: All cancer cases, 2013-2017: Invasive cases only.

Source Years 2013-2017: UOG Research Cancer Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.



GUAM

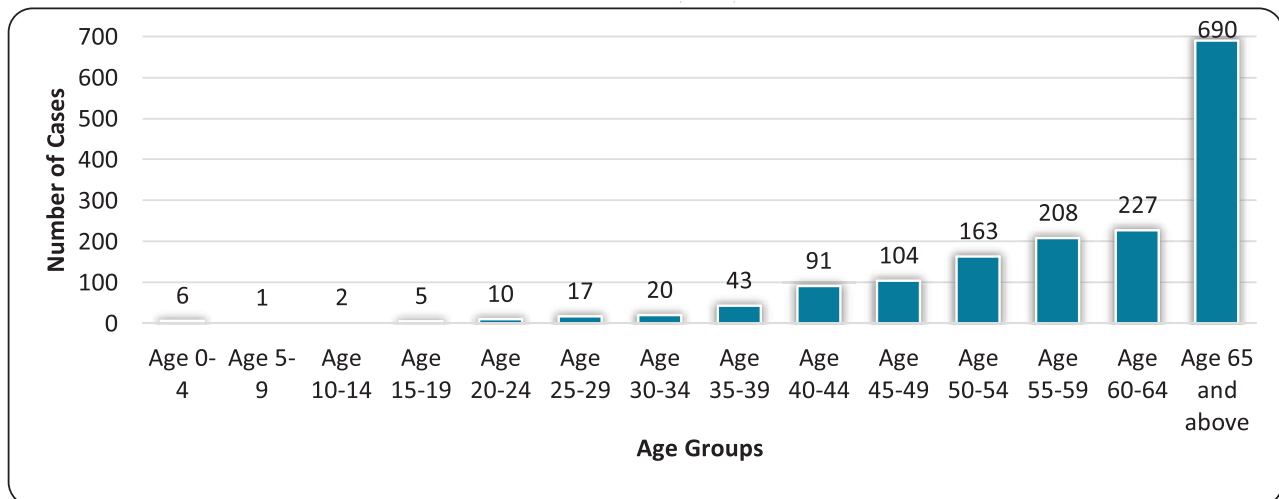
CANCER FACTS & FIGURES 2013-2017

THE DEMOGRAPHICS OF CANCER

Cancer and Age

A person's risk of developing cancer increases with age. Both the number of cancer cases and cancer incidence increased with age (Figure 3, Table 4). About 1.5% of new cancer cases were diagnosed in persons aged 0-24 years old in Guam. In contrast, about 43% of new cases were diagnosed in persons aged 65 and older in Guam (Table 4).

Figure 3. Cancer Incidence by Age Group, Guam, 2013-2017



Invasive cases only.

Cases are not indicated if the case is less than 5 in the age group.

Source: UOG Cancer Research Center, PRCCR.

Table 4. Cancer Cases and Percent of Cases by Age Group, Guam, 2013-2017

	Age Group													
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 and above
Number of Cases	6	1	2	5	10	17	20	43	91	104	163	208	227	690
Percentage of Total Number of Cases	0.38	0.06	0.13	0.32	0.63	1.07	1.26	2.71	5.73	6.55	10.27	13.11	14.30	43.48

Invasive cases only.

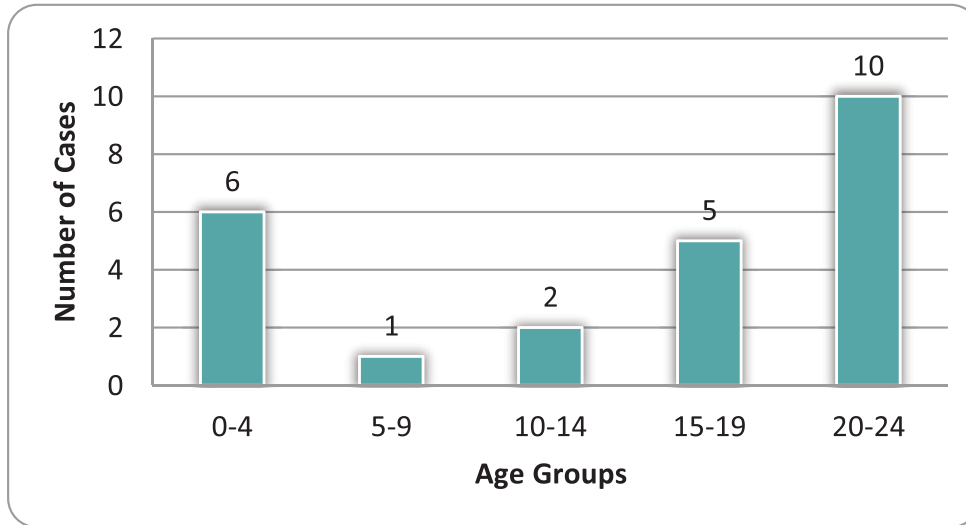
Source: UOG Cancer Research Center, PRCCR.

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CANCER IN CHILDREN AND YOUNG ADULTS

There were 24 cancer cases in persons aged 0-24 years old in Guam (Figure 4). Most of the cases (about 42%) were in the group aged 20-24 years old. The second most cases were seen in the age group 0-4 years old at 25%. At 21%, the third highest number of cases was in the group aged 15-19 years old.

Figure 4. Age Distribution of Childhood and Young Adult Cancers, Guam, 2013-2017



Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

Nine new cases of cancer were reported in children aged 0-14 years old in Guam (Table 5). Leukemia accounted for the majority of these cases at 44%. Kidney and ureter cancer was the second most common site, accounting for 22% of these cases. Brain, ovary, and liver cancer each accounted for 11% of these cases.

Four children aged 0-14 years old died from cancer in Guam (Table 5). Leukemia, kidney and ureter cancer, brain cancer, and liver cancer each accounted for one death in this age group.

Table 5. Cancer incidence and mortality in children aged 0-14 years, Guam, 2013-2017

Cancer Sites	Incidence (New Cases)	Percent of Total	Cancer Sites	Mortality (Deaths)	Percent of Total
Leukemia	4	44.4%	Liver	1	25.0%
Kidney and Ureter	2	22.2%	Leukemia	1	25.0%
Brain	1	11.1%	Kidney and Ureter	1	25.0%
Ovary	1	11.1%	Brain	1	25.0%
Liver	1	11.1%			
All Sites	9	100.0%		4	100%

Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.



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CANCER FACTS & FIGURES 2013-2017

In teens and young adults aged 15-24 years old in Guam, 15 new cases of cancer were reported (Table 6). Thyroid cancer accounted for the majority of cases at about 27%. Leukemia, colorectal cancer, and testicular cancer each accounted for about 13% of cases. The distribution was even for the other cancers listed in Table 6, as each site accounted for one new case during this time period.

Four teens and young adults aged 15-24 years old died from cancer in Guam (Table 6). Leukemia was the cause for two deaths, and cancer of the kidney and ureter and cancer of the testis was the cause of one death each.

Table 6. Cancer incidence and mortality in adolescents and young adults aged 15-24 years, Guam, 2013-2017

Cancer Sites	Incidence (New Cases)	Percent of Total	Cancer Sites	Mortality (Death)	Percent of Total
Thyroid	4	26.7%	Leukemia	2	50.0%
Leukemia	2	13.3%	Kidney and Ureter	1	25.0%
Colorectal*	2	13.3%	Testis	1	25.0%
Testis	2	13.3%			
Skin	1	6.7%			
Kidney and Ureter	1	6.7%			
Non-Hodgkin Lymphoma	1	6.7%			
Ovary	1	6.7%			
Other or Unspecified Male Genital Organs	1	6.7%			
All Sites	15	100.0%	All Sites	4	100.0%

Invasive cases only.

**Case counts for this age group are for colon and rectum sites and do not include anus.*

Source: UOG Cancer Research Center, PRCCR.

Cancer and Sex

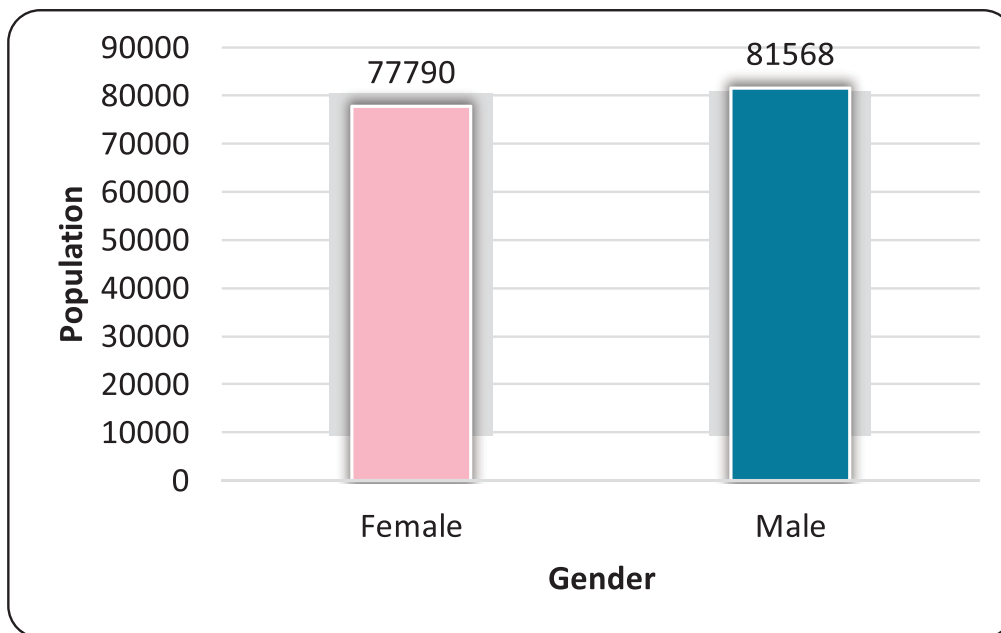
From 2013-2017, 1,587 people in Guam were diagnosed with cancer (Table 2) and 806 people died from cancer (Table 2). As per the 2010 Census, Guam had a total population of 159,358 with 81,568 males (51%) and 77,790 females (49%).



Guam Comprehensive Cancer Control – Breast Cancer Awareness (2016)

A COMMUNITY COLLABORATIVE EFFORT

Figure 5. Guam Total Population by Sex, 2010 Census Guam Demographic Profile

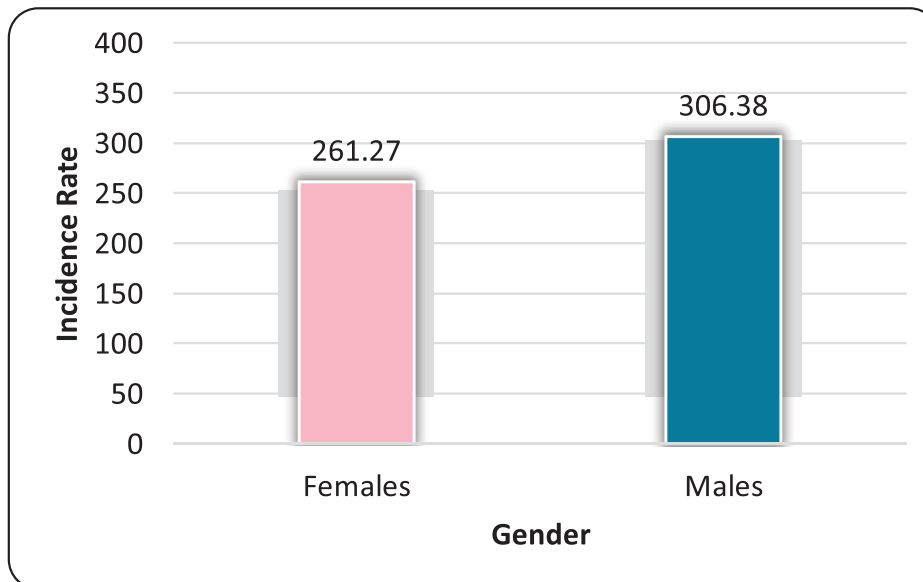


Source: 2010 Census Guam Demographic Profile Summary File.

Prepared by Guam State Data Center of Bureau of Statistics and Plans. December 2012.

In comparing incidence by sex for the 2013-2017 time period, males have an incidence rate of about 306 per 100,000 and females have an incidence rate of about 261 per 100,000 (Figure 6A). In comparison to the 2008-2012 time period, the number of new cases in 2013-2017 decreased for males by about 14% (931 vs 804 cases) and by 19.5% for females (973 vs 783 cases) (Figure 6B).

Figure 6A. New Cancer Cases by Sex, Guam, 2013-2017



Age-adjusted rate per 100,000 population.

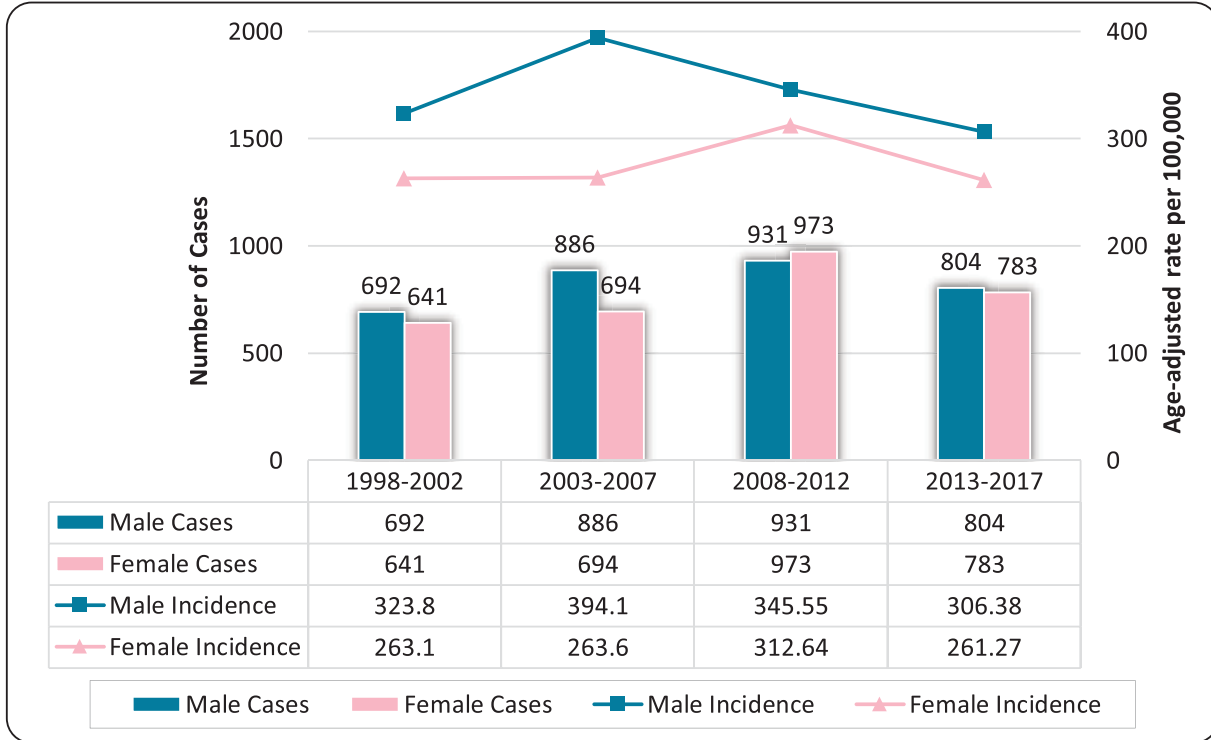
Source Years 2013-2017: UOG Cancer Research Center, PRCCR.



GUAM

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Figure 6B. Cancer Incidence, 5-year total number of cases and Age-Adjusted Rates, Guam: 1998-2017



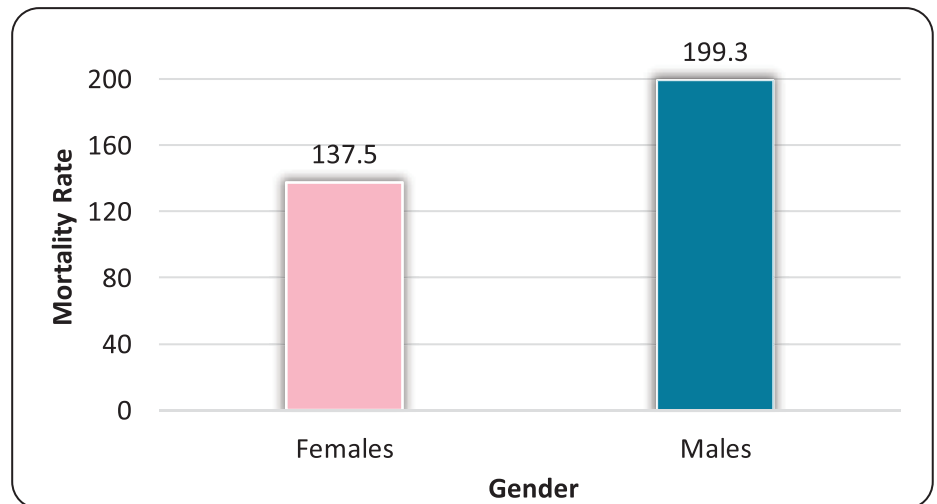
1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

Figure 7A. Cancer deaths by Sex, Guam, 2013-2017



2013-2017: Invasive cases only.

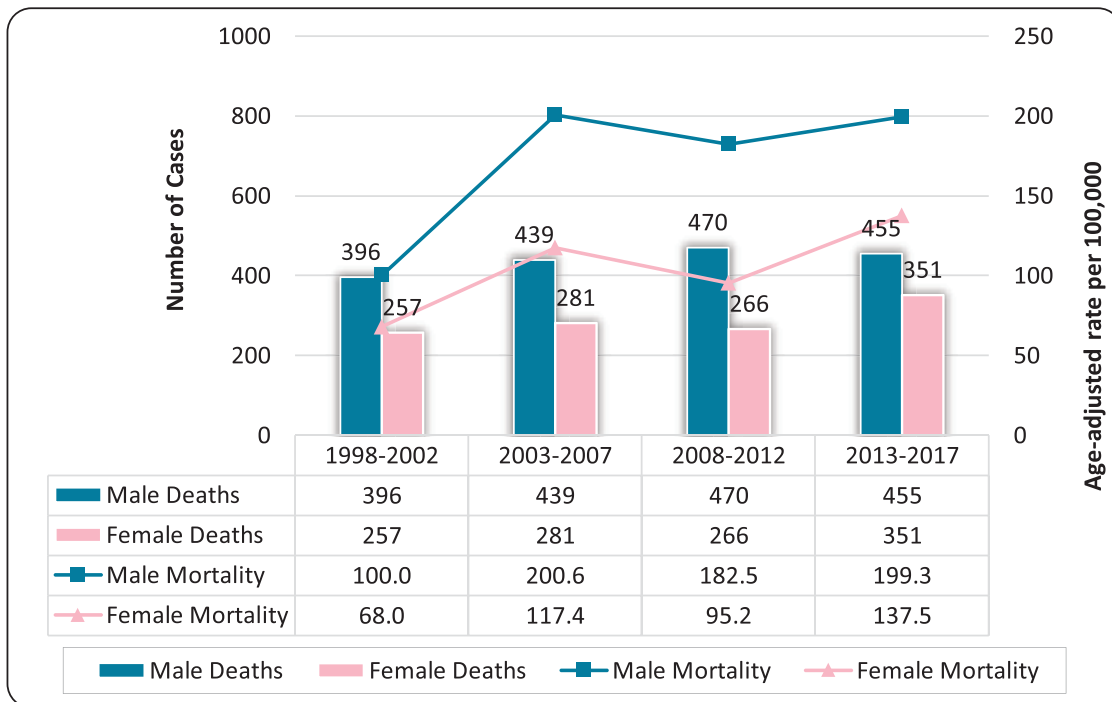
Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

In comparing mortality rates by sex, males have a mortality rate of about 199 per 100,000 and females have a mortality rate of about 138 per 100,000 (Figure 7A). As seen with the previously reported time periods, males had more cancer deaths than females in 2013-2017 (Figure 7B).

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Figure 7B. Cancer Mortality, 5-year total number of cases and Age-Adjusted Rates, Guam: 1998-2017



1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.



Guam Comprehensive Cancer Control Program - Breast Cancer Awareness Month (2019)



GUAM

CANCER FACTS & FIGURES 2013-2017

Cancer sites with the highest incidence differ by sex. The prostate was the most frequently reported site of new cancer cases in males whereas the breast was the most frequently reported site for new cancer cases in females. Lung and bronchus cancer has the second highest incidence in both males and females. Colorectal cancer was another common cancer diagnosis for both sexes. Included in the five most common cancer sites for new cancer cases in males were liver cancer and mouth and pharynx cancer. Uterine and cervical cancers were among the five most common cancer sites for new cases in females (Table 7).

Table 7. Ten top sites of new cancer cases by sex, Guam, 2013-2017

Males			Females		
Cancer Sites	Incidence Counts (New Cases)	Percent of Male Cancer Incidence	Cancer Sites	Incidence Counts (New Cases)	Percent of Female Cancer Incidence
1 Prostate	175	21.8	1 Breast	265	33.8
2 Lung & Bronchus	161	20.1	2 Lung & Bronchus	100	12.8
3 Colon-Rectum-Anus	106	13.2	3 Uterus	76	9.7
4 Liver	61	7.6	4 Colon-Rectum-Anus	71	9.1
5 Mouth & Pharynx	42	5.2	5 Cervix	35	4.5
6 Skin	28	3.5	6 Thyroid	34	4.3
7 Non-Hodgkin Lymphoma	23	2.9	7 Ovary	21	2.7
8 Kidney and Ureter	19	2.4	8 Pancreas	18	2.3
9 Leukemia	19	2.4	9 Liver	17	2.2
10 Pancreas	16	2.0	10 Kidney and Ureter	16	2.0
Other Cancer Sites	154	19.2	Other Cancer Sites	130	16.6
All Male Cancer Cases	804	100	All Female Cancer Cases	783	100

**There were 2 male breast cancer cases not included in this count.*

Source: UOG Cancer Research Center, PRCCR.

From 2013-2017, 806 people in Guam died from cancer. Males accounted for about 56% of these deaths whereas females accounted for 44% of these deaths. Cancer of the lung and bronchus was the leading cause of cancer deaths in both males and females (Table 8).

A COMMUNITY COLLABORATIVE EFFORT

Table 8. Top ten causes of cancer deaths by sex, Guam, 2013-2017

Males			Females		
Cancer Sites	Mortality Counts (Death)	Percent of Total Cancer Mortality	Cancer Sites	Mortality Counts (Death)	Percent of Total Cancer Mortality
1 Lung & Bronchus	142	31.2	1 Lung & Bronchus	80	22.8
2 Liver	62	13.6	2 Breast	69	19.7
3 Prostate	49	10.8	3 Colon-Rectum-Anus	35	10.0
4 Colon-Rectum-Anus	47	10.3	4 Ovary	24	6.8
5 Mouth & Pharynx	18	4.0	5 Cervix	20	5.7
6 Pancreas	15	3.3	6 Liver	17	4.8
7 Leukemia	15	3.3	7 Pancreas	15	4.3
8 Kidney and Ureter	14	3.1	8 Stomach	12	3.4
9 Non-Hodgkin Lymphoma	12	2.6	9 Uterus	11	3.1
10 Nasopharynx	11	2.4	10 Leukemia	8	2.3
Other Cancer Sites	70	15.4	Other Cancer Sites	60	17.1
All Cancer Deaths	455	100	All Cancer Deaths	351	100

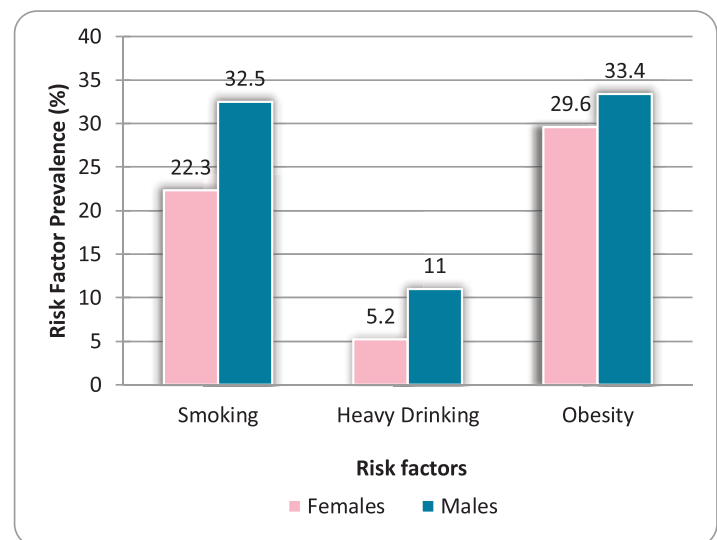
Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

After lung and bronchus cancer, the most common sites for cancer deaths in Guam differ by sex. Liver, prostate, and colorectal cancer were among the leading causes of cancer deaths in males. Breast and colorectal were among the leading causes of cancer death in females (Table 8).

More new cancer cases and deaths were seen in males than females in Guam. This correlates with males having a higher prevalence of risk factors for cancer. Relative to females, males in Guam had a higher prevalence of smoking, heavy drinking, and obesity (Figure 8).

Figure 8. Cancer Risk Factors Prevalence by Sex, Guam, 2015



Source: Behavioral Risk Factor Surveillance System, U.S. CDC 2015



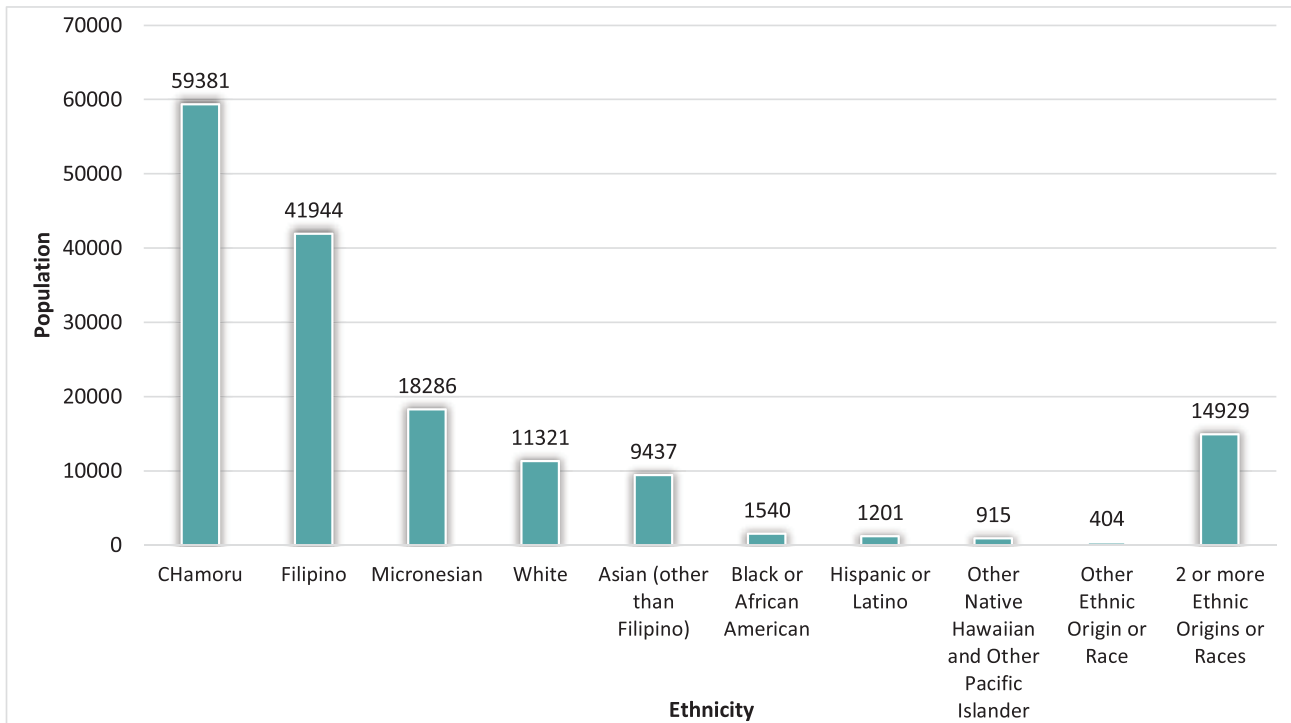
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CANCER FACTS & FIGURES 2013-2017

Cancer and Ethnicity

The 2010 Census data indicates the top five ethnic/racial groups in Guam, excluding 2 or more ethnic origins or races, were CHamoru, Filipino, Micronesia, White, and Asian (other than Filipino) (Figure 9).

Figure 9. Guam Population by Ethnic Origin or Race, 2010



Prepared by Guam State Data Center Bureau of Statistics and Plans, December 2012.

Source: 2010 Census Guam Demographic Profile Summary File.



A COMMUNITY COLLABORATIVE EFFORT

Table 9 shows the mean annual age-adjusted cancer incidence rates for all cancer sites for these 5 major ethnic/race groups from 1998-2017. Table 9 also shows total Guam incidence mean annual rate versus the total U.S. incidence mean annual rate for the time period 2013- 2017. A table showing this information for different cancer sites by ethnicity can be found in the appendix (Table 41).

Table 9. Comparison of Guam and U.S. Mean Annual Age-Adjusted Cancer Incidence Rates by Ethnicity, 1998-2017

Cancer Site	CHamoru	Filipino	Micronesia	Asian (other than Filipino)	Caucasian	Total Guam	Total U.S.
All Cancers							
1998-2002	406.8	215.7	401.5	149.7	585.4	272.0	479.5
2003-2007	395.7	218.6	598.3	408.1	531.2	276.9	458.4
2008-2012	384.5	206.0	414.7	199.6	365.1	325.1	456.7
2013-2017	352.8	175.6	438.0	148.8	412.9	279.9	435.0

1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

Table 10 shows the Guam mean annual age-adjusted cancer mortality rates for selected sites by ethnicity for 2013-2017. The ethnic/race groups reported in Table 10 are the top 5 ethnic/race groups in Guam as identified by the 2010 Census, excluding the category of 2 or more ethnic origins or races (Figure 9). Micronesians and CHamoruses have the highest mortality rates for all cancers (Table 10).

Table 10 also compares the 2010 U.S. aggregate age adjusted cancer mortality rate versus the total Guam rate. The total Guam mean annual age-adjusted cancer mortality rate was higher than the U.S. aggregate age-adjusted cancer mortality rate for lung and bronchus cancer, prostate cancer, breast cancer, colon-rectum-anus cancer, liver cancer, cervical cancer, stomach cancer, mouth and pharynx cancer, and nasopharynx cancer (Table 10).

A table showing the Guam mean annual age-adjusted cancer mortality counts for selected sites by ethnicity for 2013-2017 can also be found in the appendix (Table 42).



Micronesia Resource Center One-Stop Shop Group Photo (2010)



GUAM

CANCER FACTS & FIGURES 2013-2017

Table 10. Comparison of Guam mean annual age-adjusted cancer mortality rates for selected sites by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rates

Cancer Site	CHamoru		Filipino		Micronesian		Caucasian		Asian		Total Guam		Total U.S.
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Rate
All	446	226.0	163	102.4	97	336.1	50	252.3	36	106.4	806	165.6	158.3
Lung & Bronchus	131	66.2	45	30.8	19	86.3	14	55.2	9	22.0	222	46.9	40.2
Prostate	23	41.7	15	23.2	4	*	5	73.9	2	*	49	31.7	19.6
Breast	30	27.9	16	17.9	12	104.6	5	77.3	4	*	69	27.3	20.3
Colon-Rectum-Anus	44	23.2	21	12.8	5	11.5	6	26.6	5	15.2	82	17.3	14.2
Liver	56	22.7	5	2.6	10	25.2	2	*	3	*	79	12.2	4.9
Cervix	8	6.4	5	6.2	6	22.3	0	*	1	*	20	6.7	2.3
Pancreas	17	10.3	5	2.8	5	14.2	2	*	1	*	30	6.5	11.0
Leukemia	15	9.2	5	3.3	1	*	2	*	0	*	23	5.6	6.4
Stomach	11	6.1	3	*	6	18.8	0	*	1	*	22	4.5	3.1
Non-Hodgkin Lymphoma	7	4.7	7	4.3	1	*	3	*	0	*	18	4.5	5.5
Mouth & Pharynx	12	5.0	2	*	7	12.3	3	*	0	*	24	4.0	2.3
Uterus	5	4.9	4	*	2	*	0	*	0	*	11	3.9	4.8
Urinary Bladder	2	*	5	3.8	1	*	2	*	2	*	12	3.1	4.4
Esophagus	7	4.3	1	*	2	*	0	*	1	*	11	2.6	3.9
Nasopharynx	9	3.8	0	*	4	*	1	*	0	*	14	2.1	0.2
Thyroid	1	*	1	*	1	*	0	*	1	*	4	*	0.5

Invasive cases only.

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

**Rates are suppressed if fewer than five (5) cases were recorded in the cancer site category.*

Source Years: UOG Cancer Research Center, PRCCR.



A COMMUNITY COLLABORATIVE EFFORT

CANCER DISPARITIES AND SOCIAL DETERMINANTS OF HEALTH

CANCER DISPARITIES

Cancer impacts all populations, but it does not affect everyone equally. Some communities are more heavily impacted than others due to social, environmental, and economic disadvantages, and they carry a disproportionate burden of cancer compared with other groups.⁹ The National Cancer Institute defines cancer disparities as differences between groups in cancer measures such as deaths, new and existing cases, cancer-related health complications, financial burden, screening rates, stage of diagnosis, and years of survival after diagnosis.⁹ Although mentioned in previous sections, key cancer disparities in Guam are summarized below.

- By sex, males had a 17% higher age-adjusted rate of overall cancer incidence than females. Compared to females, males had higher percentages of lung (20.0 vs. 12.8), colorectal (13.2 vs. 9.1), and liver cancer (7.6 vs. 2.2) incidence. Females had higher rates in thyroid cancer.
- Males had an approximately 45% higher age-adjusted rate of cancer mortality than females. Of the 806 cancer deaths in this time period, 56% occurred in males and 44% occurred in females. Specifically, males had higher percentages of cancer deaths in lung and bronchus, liver, prostate, mouth & pharynx, leukemia, kidney and ureter, non-Hodgkin lymphoma, and nasopharynx cancers.
- Females had higher percentages of death in specific cancers such as breast, pancreas, and stomach cancers.
- By ethnicity, Micronesians had the highest age-adjusted cancer incidence rates (438.0) compared to the overall Guam population (279.9). They had the highest incidence rates specifically in stomach, pancreas, liver, lung and bronchus, breast, cervix, uterus, and prostate cancers. Their rates for liver cancer incidence were almost five times higher than the U.S. and three times higher than the incidence rate in Guam.
- CHamorus had the highest age-adjusted incidence rates in cancers of the nasopharynx (the upper part of the throat that starts at the back of the nasal cavity), esophagus, urinary bladder, and leukemia. Their rate in nasopharynx cancers was nine times that of the U.S. They have the second highest rates in Guam for stomach, colorectal, pancreas, liver, lung and bronchus, cervix, and uterine cancers. Liver cancer incidence for CHamorus was almost three times the U.S. rate.
- Caucasians had the highest rates of age-adjusted cancer incidence in cancers of the mouth and pharynx, colorectal, and Non-Hodgkin lymphoma. They had the second highest rates in breast and prostate cancers.
- Micronesians had the highest age-adjusted cancer mortality rates in all cancers combined (336.1) and twice as high as the mortality rates for all cancers in Guam (165.5) and the U.S. (158.3).
- Micronesians (86.3) and CHamorus (66.2) had higher rates of death in lung and bronchus cancer than in the U.S. (40.2) and the total Guam population (46.9).



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- Micronesians had the highest age-adjusted cancer mortality rates in lung and bronchus, liver, breast, pancreas, cervix, stomach, and mouth & pharynx cancers in Guam. Rates of death compared to the U.S. were twice as high for lung and bronchus cancer, five times higher for breast, liver, and mouth and pharynx cancers, six times higher for stomach cancer, and almost ten times higher for cervical cancer.
- CHamorus had higher age-adjusted cancer mortality rates in lung and bronchus, prostate, breast, colorectal, liver, cervix, leukemia, stomach, mouth and pharynx, esophagus, and nasopharyngeal cancers compared to the U.S. The starkest comparisons are that CHamorus had death rates twice as high in prostate, stomach, and mouth and pharynx cancers, three times higher in cervical cancer, four times higher in liver cancer, and nineteen times higher in nasopharynx cancer than the U.S. population.

SOCIAL DETERMINANTS OF HEALTH

Central to the issue of cancer and cancer disparities are social determinants of health (SDOH).¹⁰ Social determinants of health are the conditions that people are born in to, in which they live, work, and grow, and the wider set of systems that affect their lives, health risks, and health outcomes.¹¹ Examples of conventional social determinants include but are not limited to income, education, housing quality, employment status, health insurance status, racism, and discrimination.¹²⁻¹⁴ Some examples of social determinants of health in Micronesia are climate change, U.S. thermonuclear weapons testing, cultural disruption, political status, and access to healthcare.¹⁵⁻¹⁷

Attention to social determinants provides a wider perspective of health and wellness that encompasses the health care system but extends beyond for a broader approach to addressing cancer disparities and health equity. Examples of social determinant indicators for Guam are the poverty rate at 23%, education status, and income.¹⁸ In 2010, 20.4% of persons aged 25 and above had a bachelor's degree or higher. Income data show median household income at \$39,052 with an average household size estimated at 3.8.¹⁹ Household per capita income was \$12,864.²⁰ In 2016, Medicaid and Medically Indigent Program (MIP) payments comprised 31% of insurance payments to Guam Memorial Hospital,²¹ highlighting the use and continued need for health care insurance for low-income families. Consideration of social determinants like these highlight the relationships between living conditions, environment, and health outcomes. Examining social determinants of health does not disregard biologically determined factors or individual health-related behaviors. Rather, it puts these in comprehensive context of socioeconomics, culture, history, environment, and policy.



A COMMUNITY COLLABORATIVE EFFORT

COMMON CANCERS IN GUAM

LUNG AND BRONCHUS CANCER

The leading cause of cancer deaths in men and women worldwide is lung cancer.²² From 2013- 2017, lung cancer accounted for about 16% of all new cancer cases and about 28% of all cancer deaths in Guam (Table 11).

Table 11. Incidence and mortality from cancer of the lung and bronchus, Guam, 2013-2017

	Count	Percentage
Incidence (New cases)	261	16.4
Mortality (Deaths)	222	27.5

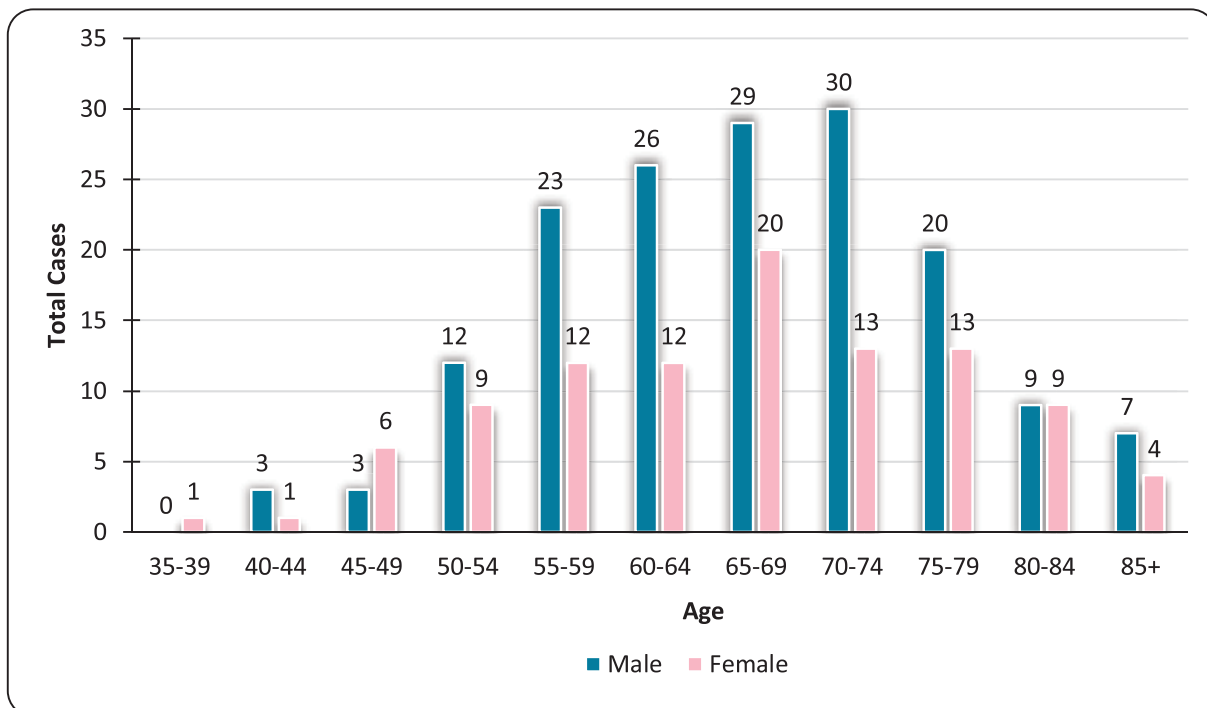
Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

LUNG CANCER BY SEX AND AGE

Figure 10 illustrates the distribution of lung and bronchus cancer cases by sex and age at diagnosis for the 2013-2017 time period. Lung and bronchus cancer cases increased with age with the majority of cases occurring between the ages of 50 to 79 years of age (Figure 10).

Figure 10. Lung and Bronchus Cancer Cases by Sex and Age at Diagnosis, Guam, 2013-2017



Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

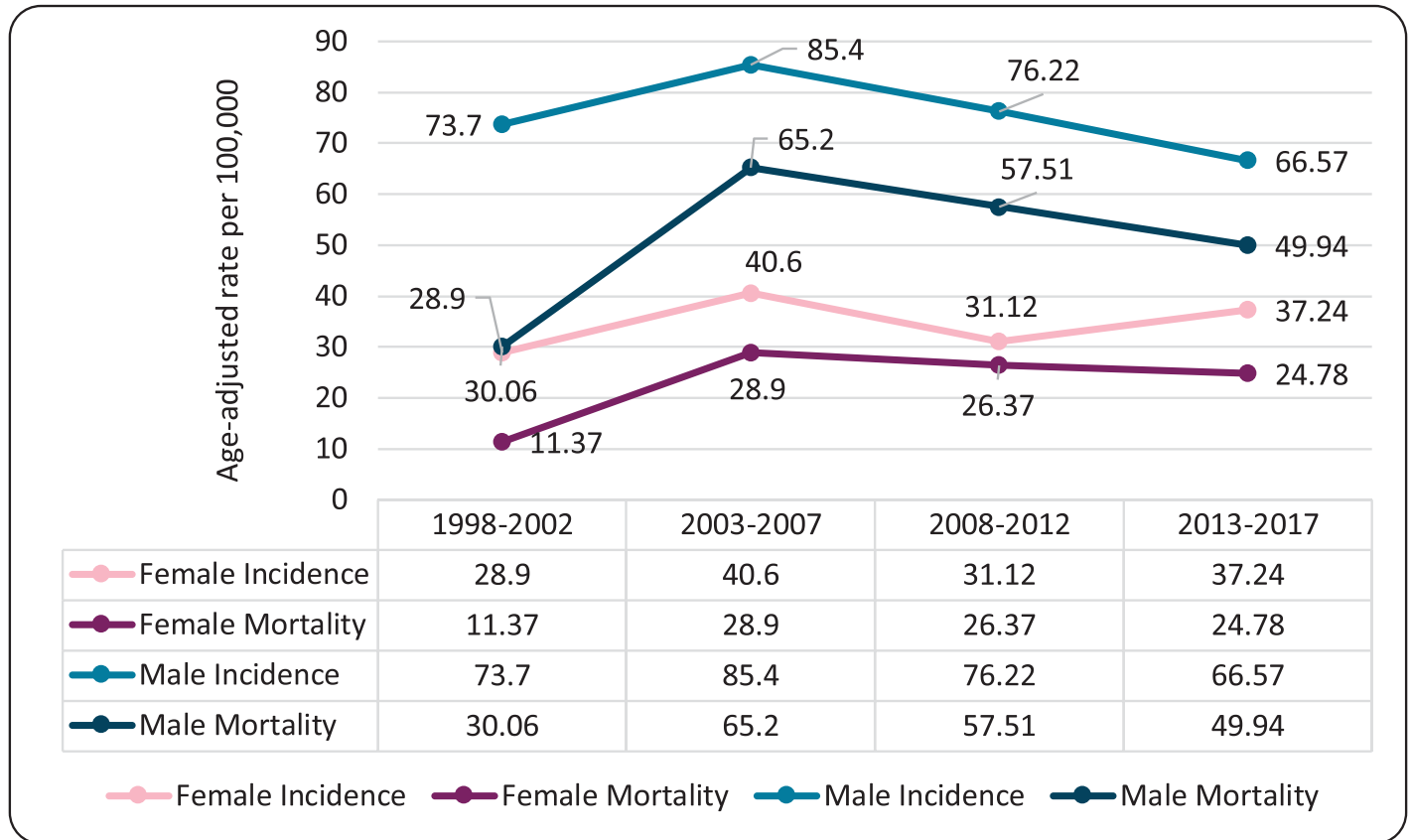


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As with previous time periods, male incidence and mortality for lung and bronchus cancer were higher than female incidence and mortality for the 2013-2017 time period (Figure 11).

Figure 11. Lung & Bronchus Cancer Incidence and Mortality by Sex, Guam: 1998-2017



1998-2017: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2017, Guam Cancer Facts and Figures 2008-2012.

For the 2013-2017 time period, lung and bronchus cancer accounted for 20% of all new cancer cases in males and about 13% of all new cancer cases in females. Lung and bronchus cancer was the cause of about 31% of cancer deaths in males and about 23% of cancer deaths in females (Table 12).

Table 12. Incidence and mortality from cancer of the lung and bronchus by sex, Guam 2013-2017

	Incidence		Mortality	
	Counts	Percentage	Counts	Percentage
Female	100	12.8	80	22.8
Male	161	20.0	142	31.2

Invasive cases only.

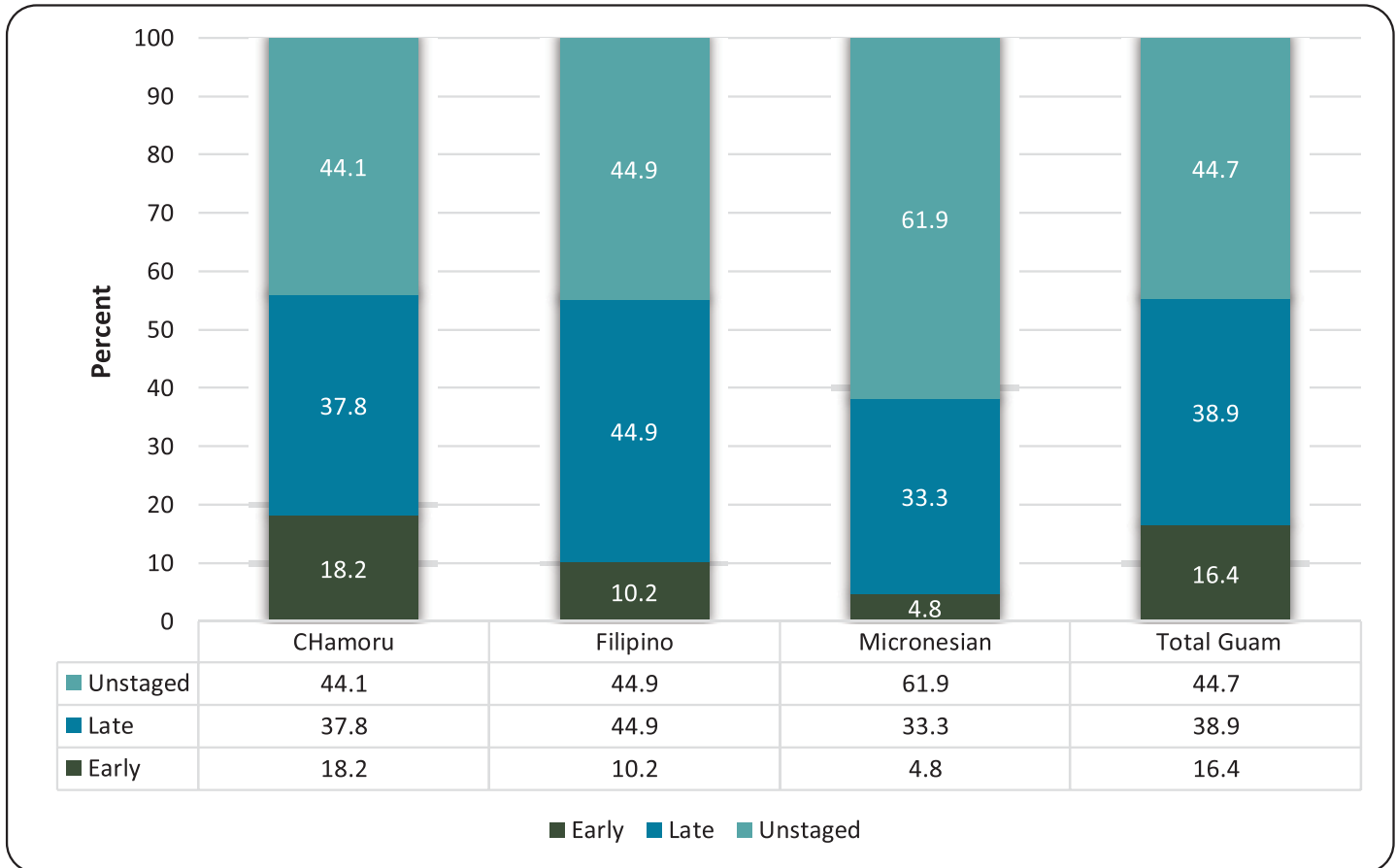
Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

LUNG CANCER BY STAGE DISTRIBUTION

The majority of lung and bronchus cancer cases reported during the 2013-2017 time period were late stage or unstaged (Figure 12). Filipinos had the highest percentage of late stage diagnosis (44.9) and Micronesians had the highest percentage of unstaged lung cancer (61.9).

Figure 12. Lung & Bronchus Cancer Stage Distribution, Guam, 2013-2017



Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

LUNG CANCER BY ETHNICITY

When comparing Guam’s lung cancer incidence rates by ethnicity, Micronesians, CHamorus, and Caucasians had higher rates than that reported for the total Guam population and the total U.S. (Table 13).





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Table 13. Comparison of Guam and US mean annual age-adjusted cancer incidence rates for of the lung and bronchus by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Lung and Bronchus	69.4	29.6	78.6	63.1	38.3	50.9	52.6

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

When comparing Guam’s cancer mortality rate by ethnicity, Micronesians and CHamorus had the highest mortality rates for lung and bronchus. Additionally, the mortality rates for lung and bronchus in Micronesians, CHamorus, and Caucasians were higher than that reported for the total Guam population and the total U.S. (Table 14).

Table 14. Comparison of Guam mean annual age-adjusted cancer mortality rates for lung and bronchus by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Lung and Bronchus	66.2	30.8	86.3	55.2	22.0	46.9	40.2

Invasive cases only.

Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population. Source Years: UOG Cancer Research Center, PRCCR.

RISK FACTORS FOR LUNG CANCER²³

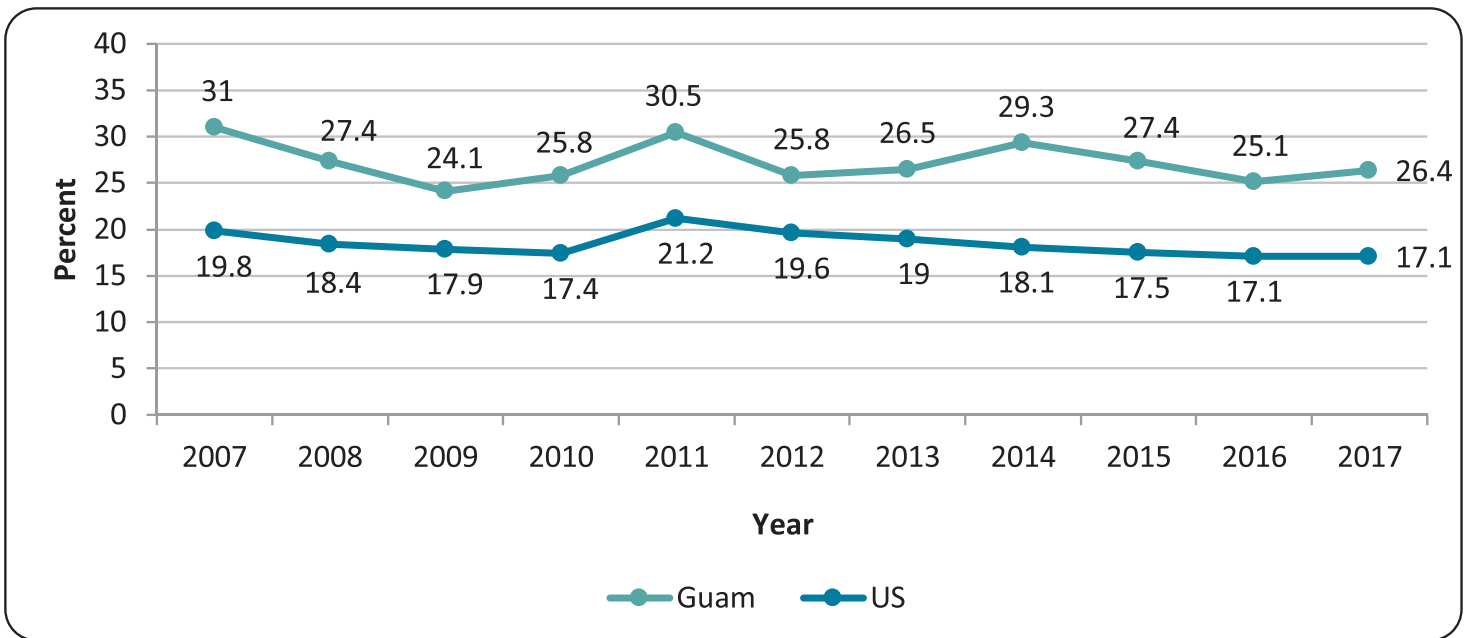
- Cigarette smoking
- Exposure to secondhand smoke
- Radiation exposure
- Occupational exposure to lung carcinogens
- Air pollution

The major cause of lung cancer is cigarette smoking.²³ The prevalence of smoking by adults in Guam remained higher than that for their U.S. counterparts (Figure 13 and 14). As seen in the U.S., a higher percentage of adult males than adult females were current smokers in Guam (Figure 14).



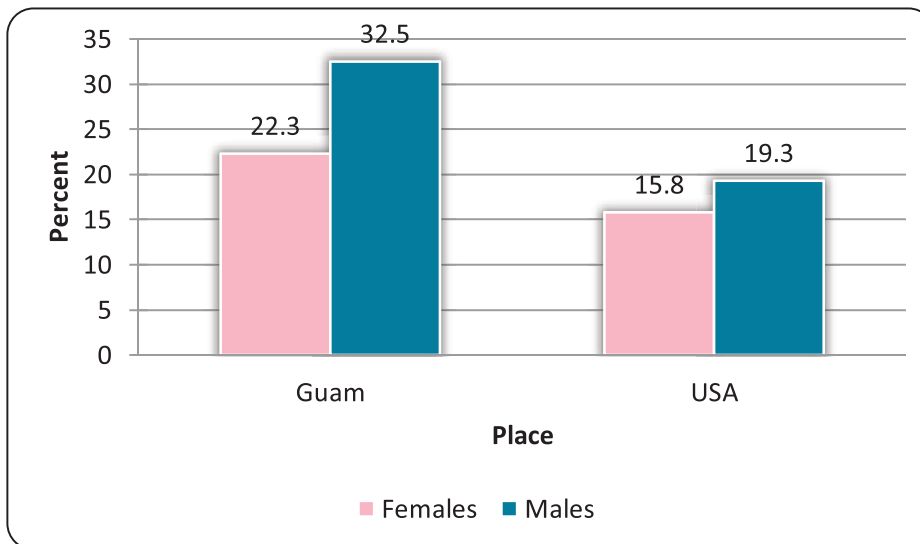
A COMMUNITY COLLABORATIVE EFFORT

Figure 13. Smoking Prevalence Adults, Guam vs US, 2007-2017



Data source: Behavioral Risk Factor Surveillance System, U.S. CDC.

Figure 14. Current smoking adults by sex, Guam vs US, 2015



Data Source: Behavioral Risk Factor Surveillance System, U.S. CDC.

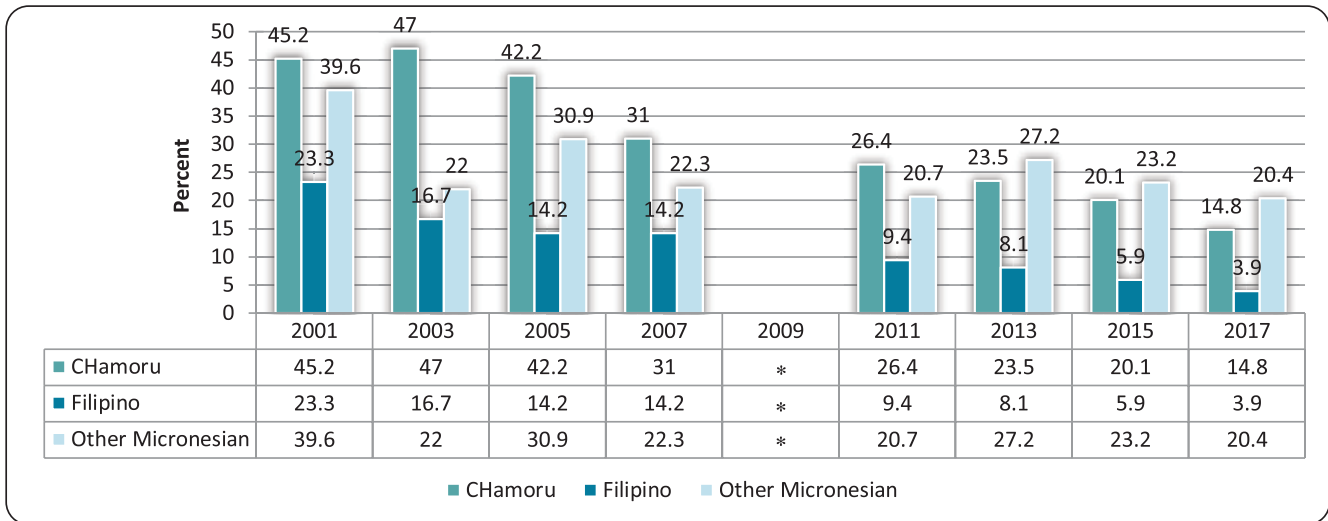
Figure 15 illustrates the percentage of high school teens by ethnicity who reported smoking from 2001 through 2017. The percentage of CHamoru and Filipino high school students who report smoking has decreased through the years whereas the percentage of Other Micronesian high school students who report smoking initially decreased but then appears to be plateauing in the 20+ percentage range (Figure 15). Although the percentage of CHamoru high school students who report smoking has decreased through the years, the percentage of them smoking was comparable to Other Micronesians from 2011 through 2015 (Figure 15).



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Figure 15. Current smoking, high school teens by ethnicity, Guam, 2001-2017



*No data available for the year 2009.

Source: Youth Risk Behavioral Surveillance System, 2001-2017.

COLORECTAL CANCER

The second most common cancer in females and the third most common cancer in males worldwide is colorectal cancer. It is the third most common cancer in males and females in the U.S.²⁴ From 2013-2017, colorectal cancer accounted for about 11% of all new cancer cases and about 10% of all cancer deaths in Guam (Table 15).

Table 15. Incidence and mortality from colorectal cancer (including anus), Guam, 2013-2017

	Count	Percentage
Incidence (New cases)	177	11.2
Mortality (Deaths)	82	10.2

Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.



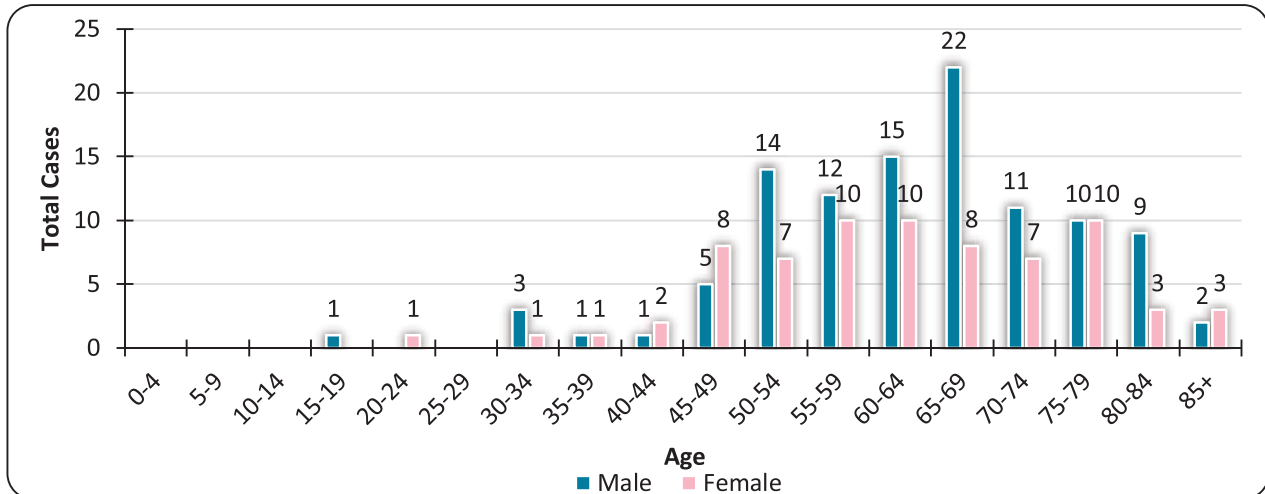
UOG Cancer Research Center - Colorectal Cancer Awareness (2018)

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COLORECTAL CANCER BY SEX AND AGE

Figure 16 illustrates the distribution of colorectal cancer cases by sex and age at diagnosis for the 2013-2017 time period. The number of colorectal cancer cases increased from age 45 years and up for both men and women (Figure 19).

Figure 16. Colorectal Cancer Cases by Sex and Age at Diagnosis, Guam, 2013-2017

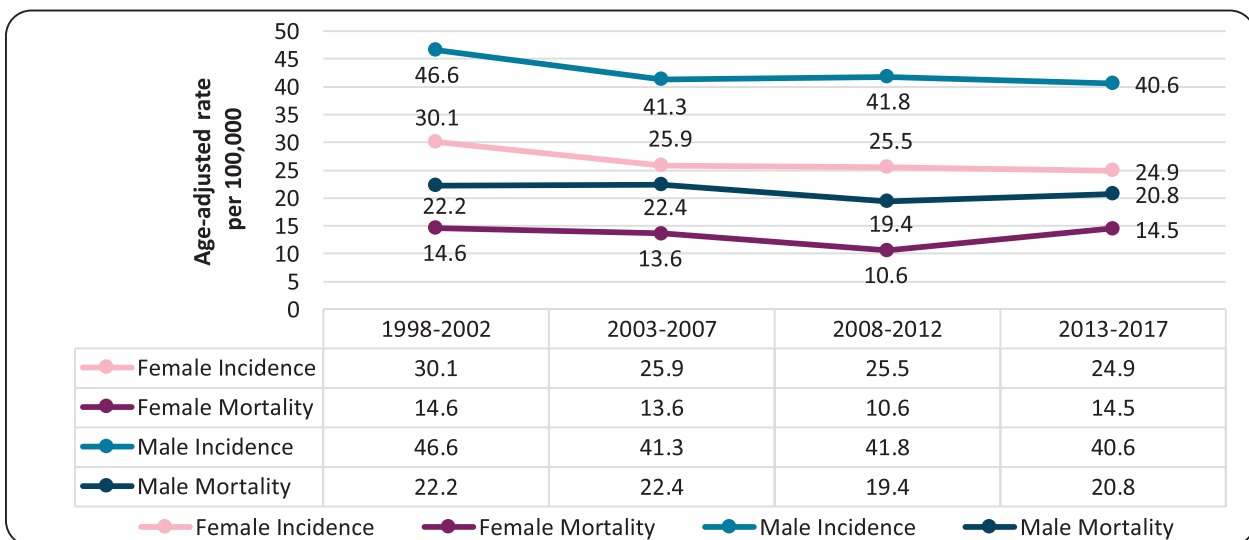


All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

As with previous time periods, male incidence and mortality for colorectal cancer were higher than female incidence and mortality for the 2013-2017 time period (Figure 17).

Figure 17. Colorectal cancer incidence and mortality by sex, Guam: 1998-2017



1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.



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Colorectal cancer accounted for about 13% of all new cancer cases in males and about 9% of all new cancer cases in females. Colorectal cancer was the cause of about 10% of cancer deaths in both males and females (Table 16).

Table 16. Incidence and mortality from colorectal cancer by sex, Guam, 2013-2017

	Incidence		Mortality	
	Counts	Percentage	Counts	Percentage
Female	71	9.1	35	10.0
Male	106	13.2	47	10.3

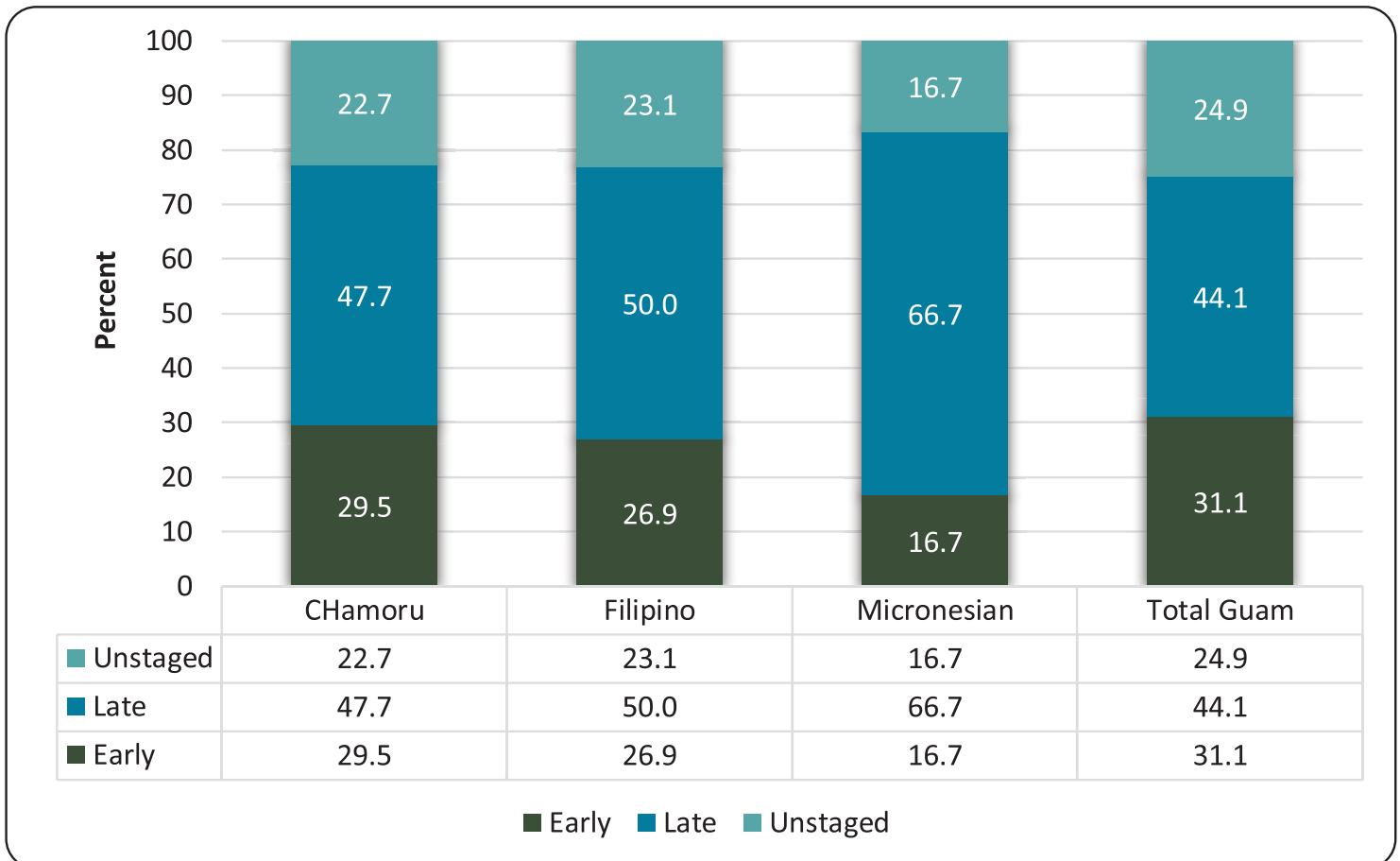
Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

COLORECTAL CANCER BY STAGE DISTRIBUTION

The majority of colorectal cancer cases reported during the 2013-2017 time period were either late stage or unstaged (Figure 18). Micronesians had the highest percentage of late stage diagnosis in colorectal cancer (66.7) and Filipinos had the highest percentage of unstaged colorectal cancer (23.1).

Figure 18. Colorectal Cancer Stage Distribution, Guam, 2013-2017



All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

COLORECTAL CANCER BY ETHNICITY

When comparing Guam’s cancer incidence rates for colorectal cancer by ethnicity, Caucasians and CHamorus had higher rates than that reported for the total Guam population and the total U.S. (Table 17).

Table 17. Comparison of Guam and US mean annual age-adjusted cancer incidence rates for colorectal cancer by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Colon and Rectum	41.0	25.8	8.7	47.5	11.4	32.3	40.3

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

When comparing Guam’s cancer mortality rates by ethnicity Caucasians and CHamorus had the highest mortality rate for colorectal cancer. Additionally, Caucasians and CHamorus had a higher mortality rate for colorectal cancer than that reported for the total Guam population and the total U.S. (Table 18).

Table 18. Comparison of Guam mean annual age-adjusted cancer mortality rates for colorectal cancer by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Colon and Rectum	23.2	12.8	11.5	26.6	15.2	17.3	14.2

Invasive cases only.

*Rates are suppressed if fewer than five (5) cases were recorded in the cancer site category.

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

Source Years: UOG Cancer Research Center, PRCCR.

RISK FACTORS FOR COLORECTAL CANCER²⁵

- Excessive alcohol use
- Cigarette smoking
- Obesity
- Family/personal history of colorectal cancer and other hereditary conditions

FACTOR THAT DECREASES RISK OF COLORECTAL CANCER²⁵

- Physical activity



Guam Comprehensive Cancer Control - Celebrate Life! Cancer Survivors Conference (2016)



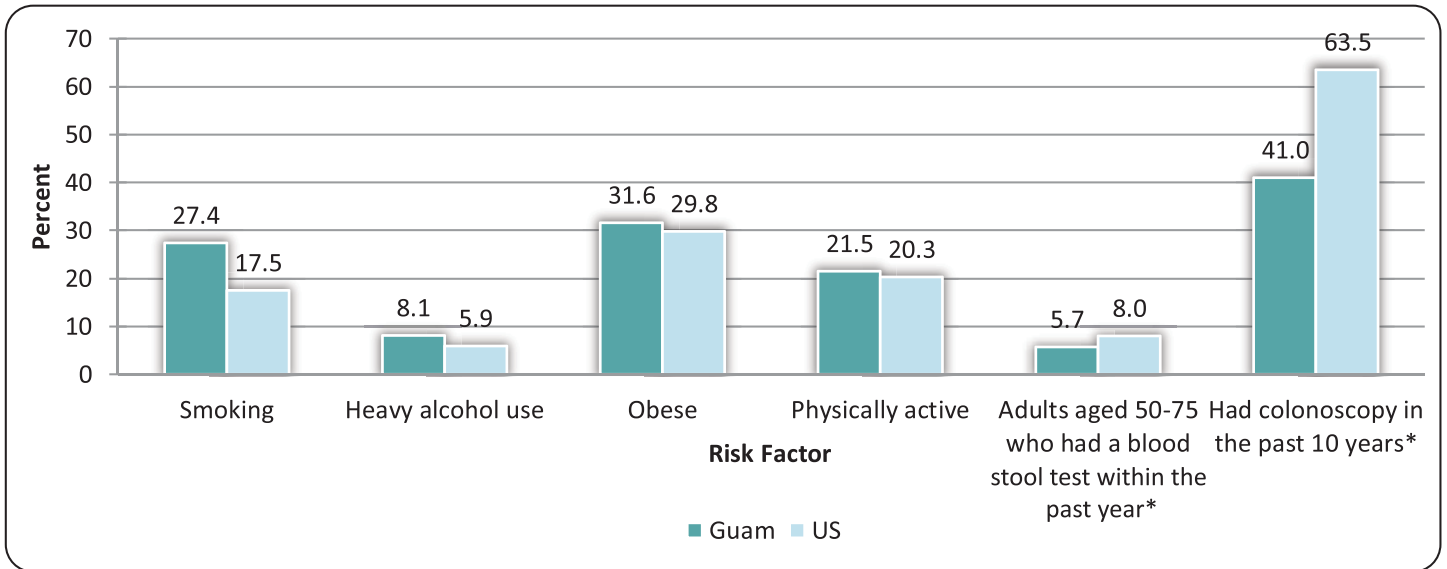
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From 2015-2016, Guam's population reported higher rates of smoking and slightly higher rates of heavy alcohol use and obesity than the U.S. population (Figure 19). Smoking, excessive alcohol use, and obesity are all modifiable factors that increase one's risk for colorectal cancer.

Physical activity decreases one's risk of developing colorectal cancer, and from 2015-2016, Guam's population reported slightly higher rates of physical activity than the U.S. population (Figure 19).

Figure 19. Prevalence of factors affecting colorectal cancer, Guam vs US, 2015-2016



*Data from 2016.

Data Source: Behavioral Risk Factor Surveillance System, U.S. CDC (2015-2016).

Stool tests and colonoscopy are methods for screening for colorectal cancer. Guam's population reported lower screening participation in colonoscopy in the past 10 years and slightly less participation in stool test within the past year than the U.S. population from 2015- 2016 (Figure 19).



UOG Cancer Research Center - Health Providers Cancer Symposium (2019)

A COMMUNITY COLLABORATIVE EFFORT

LIVER CANCER

The sixth most diagnosed cancer worldwide is liver cancer.²⁶ From 2013-2017, liver cancer accounted for about 5% of all new cancer cases and about 10% of all cancer deaths in Guam (Table 19).

Table 19. Incidence and mortality from cancer of the liver, Guam 2013-2017

	Count	Percentage
Incidence (New cases)	78	4.9
Mortality (Deaths)	79	9.8

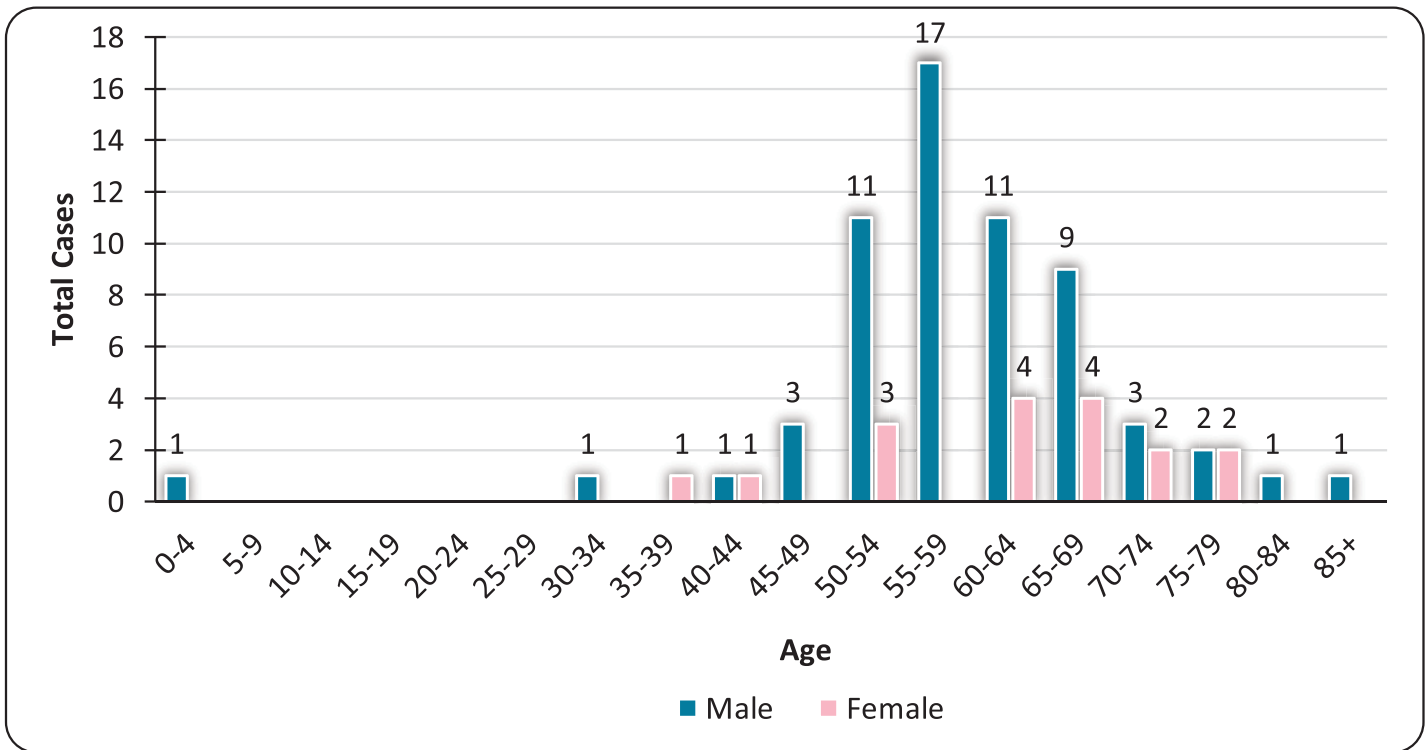
Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

LIVER CANCER BY SEX AND AGE

Figure 16 illustrates the distribution of liver cancer cases by sex and age at diagnosis for the 2013-2017 time period. The majority of cases during this time period occurred in men between the ages of 50 to 69 years old (Figure 20).

Figure 20. Liver Cancer by Sex and Age at Diagnosis, Guam, 2013-2017



All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

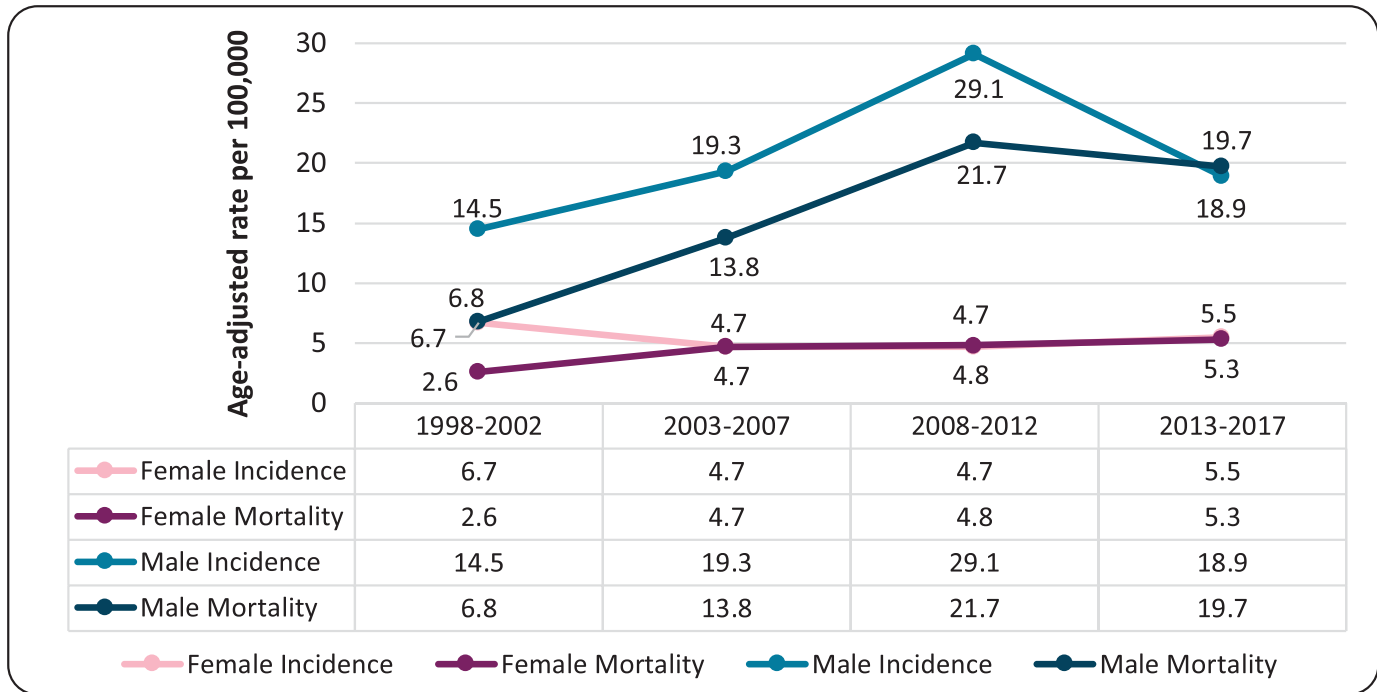
As with previous time periods, male incidence and mortality for liver cancer were higher than female incidence and mortality for the 2013-2017 time period (Figure 21).



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Figure 21. Liver Cancer Incidence and Mortality, Guam, 1998-2017



1998-2012: All cancer cases, 2013-2017: Invasive cases only.
 Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.

For the 2013-2017 time period, liver cancer accounted for about 8% of all new cancer cases in males and about 2% of all new cancer cases in females. For the same time period, liver cancer was the cause of 14% of cancer deaths in males and about 5% of cancer deaths in females (Table 20).

Table 20. Incidence and mortality from cancer of the liver by sex, Guam, 2013-2017

	Incidence		Mortality	
	Counts	Percentage	Counts	Percentage
Female	17	2.2	17	4.8
Male	61	7.6	62	13.6

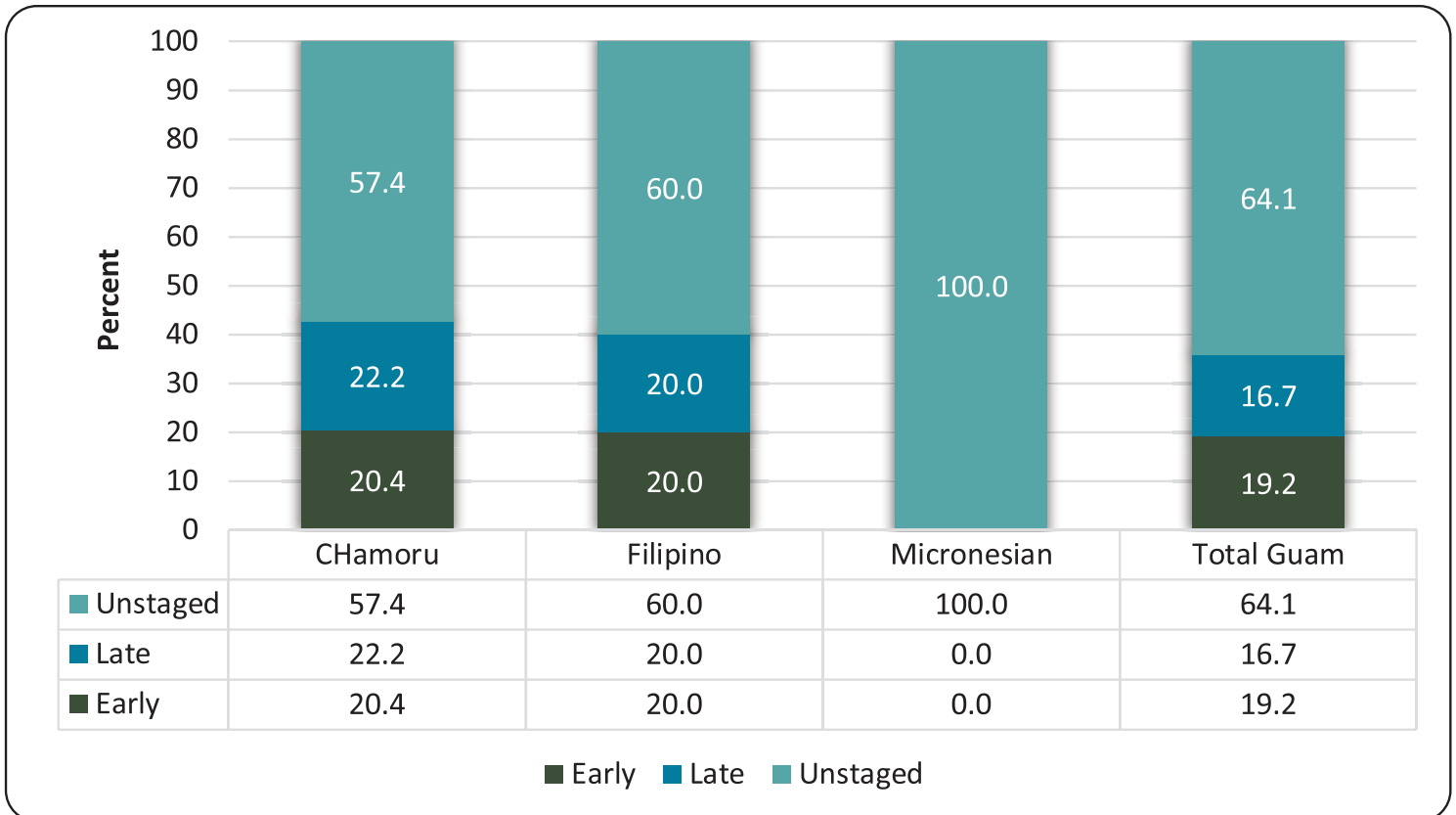
Invasive cases only.
 Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

LIVER CANCER BY STAGE DISTRIBUTION

Most liver cancer cases reported during the 2013-2017 time period were late or unstaged (Figure 22). All cases for liver cancer among Micronesians were unstaged.

Figure 22. Liver cancer stage distribution, Guam, 2013-2017



All cases are invasive.

Source: UOG Cancer Research Center, PRCCR,

LIVER CANCER BY ETHNICITY

When comparing Guam's liver cancer incidence rates by ethnicity, Micronesians had 3 times the rate for the total Guam population and 4.6 times the U.S. rate. CHamorus had incidence rates 1.8 times the total Guam population and 2.8 times the U.S. rate. Additionally, the incidence rate for liver cancer for the total Guam population was higher than that reported for the total U.S. (Table 21).

Table 21. Comparison of Guam and US mean annual age-adjusted cancer incidence rates for cancer of the liver by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian	Total Guam	Total U.S.
Liver	22.0	2.2	36.2	*	*	12.1	7.8

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.



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When comparing Guam’s liver cancer mortality rates by ethnicity, Micronesians and CHamorus had much higher rates than that reported for the total Guam population and the total U.S. Additionally, the mortality rates for liver cancer for the total Guam population were higher than that reported for the total U.S. (Table 22).

Table 22. Comparison of Guam mean annual age-adjusted cancer mortality rates for liver by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Liver	22.7	2.6	25.2	*	*	12.1	4.9

Invasive cases only.

**Rates are suppressed if fewer than five cases were recorded in the cancer site category.*

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

RISK FACTORS FOR LIVER CANCER²⁷

- Chronic hepatitis B infection
- Chronic hepatitis C infection
- Cirrhosis
- Heavy alcohol use
- Aflatoxin B1 exposure
- Nonalcoholic steatohepatitis (NASH)
- Cigarette smoking
- Certain genetic and medical conditions: untreated hereditary hemochromatosis, alpha1-antitrypsin deficiency, glycogen storage disease, porphyria cutanea tarda, Wilson disease

BREAST CANCER

Breast cancer is the leading cancer diagnosis and leading cause of cancer death in women worldwide.²⁸ From 2013-2017, breast cancer accounted for about 17% of all new cancer cases and about 9% of all cancer deaths in Guam (Table 23). Breast cancer was the most frequently reported site for new cancer cases in females and the second leading cause of cancer deaths in females in Guam (Table 7 and Table 8).

Table 23. Incidence and mortality from cancer of the breast, Guam 2013-2017

	Count	Percentage
Incidence (New cases)	267	16.8
Mortality (Deaths)	69	8.6

Invasive cases only.

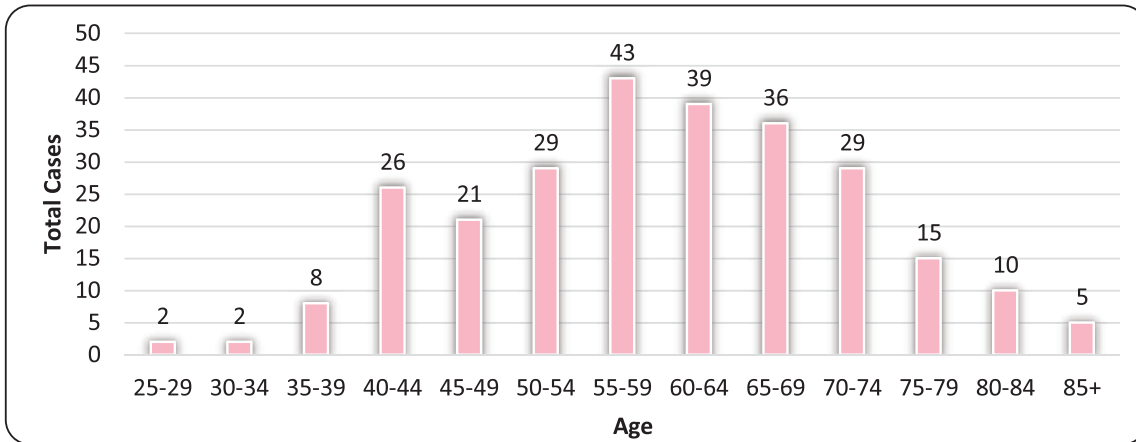
Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

BREAST CANCER BY AGE

Figure 23 illustrates the distribution of breast cancer by age at diagnosis for the 2013-2017 time period. Most cases during this time period occurred between the ages of 40 to 74 years old (Figure 23).

Figure 23. Breast Cancer Cases by Age at Diagnosis, Guam, 2013-2017

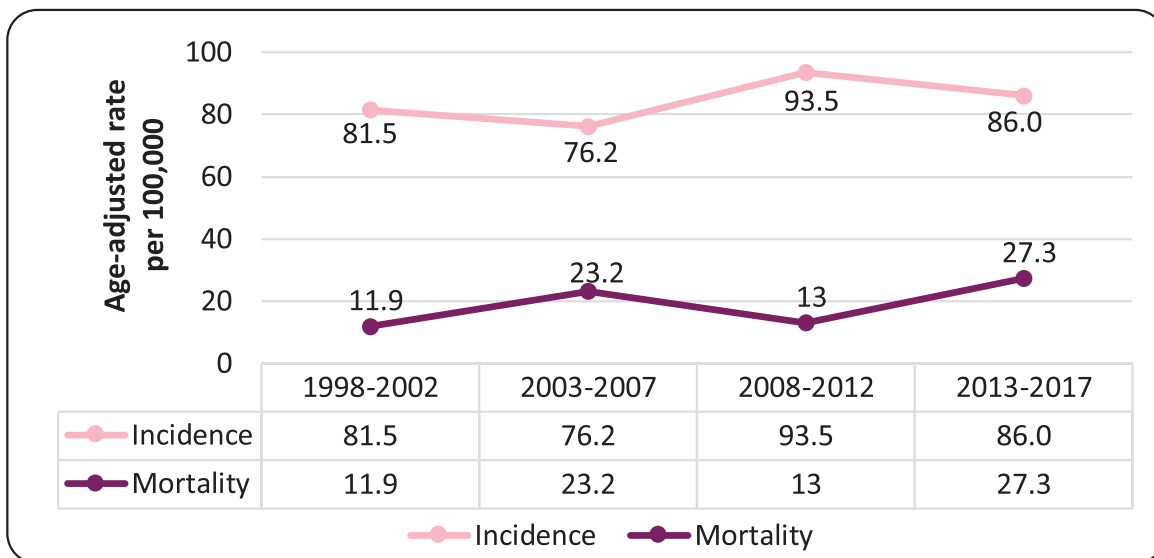


All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

The breast cancer incidence rate in the 2013-2017 time period decreased by 8% compared to the 2008-2012 time period (Figure 24). This may be in part due to the data from 2013-2017 time period including only invasive cases versus the previous time periods that included all cancer cases. Breast cancer mortality was 2.1 times the 2008-2012 rate (Figure 24).

Figure 24. Breast Cancer Incidence and Mortality, Guam, 1998-2017



1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007: Guam Cancer Facts and Figures 2008-2012.



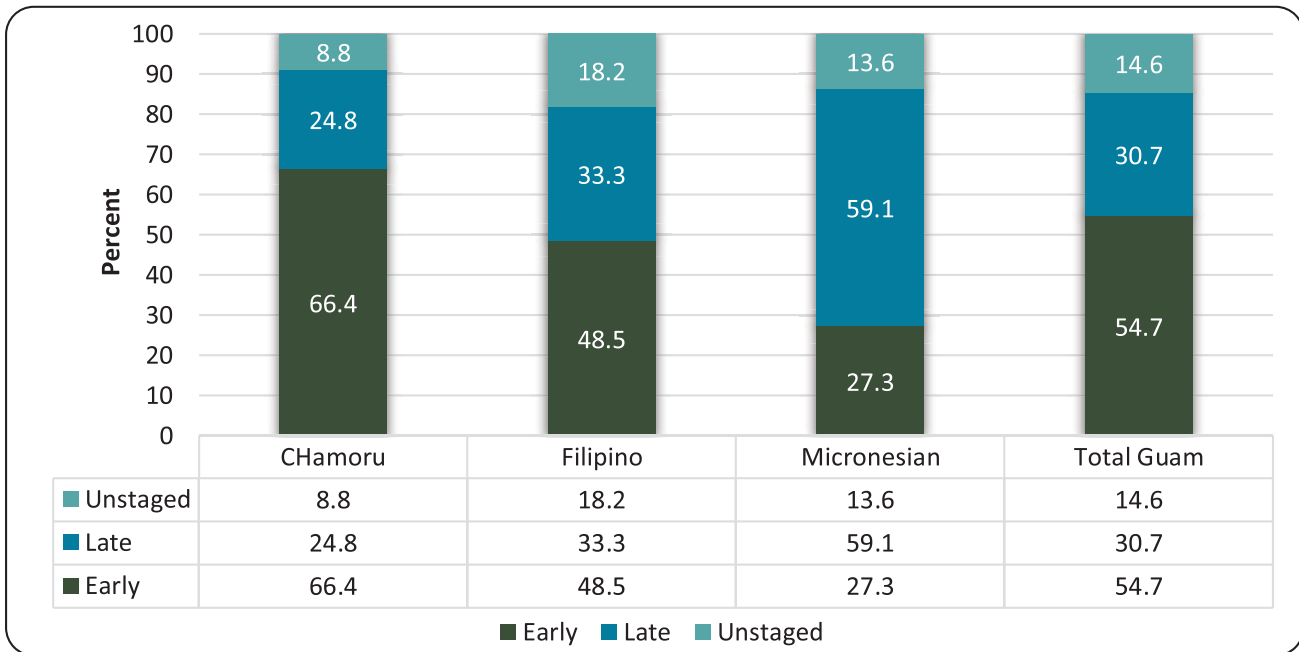
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BREAST CANCER BY STAGE DISTRIBUTION

The majority of breast cancer reported was early stage (Figure 25 and Figure 26). CHamorus had the highest percentage of early stage distribution (66.4) and Micronesians had the highest percentage of late stage distribution (59.1) (Figure 25). Figure 26 includes data for in situ cases.

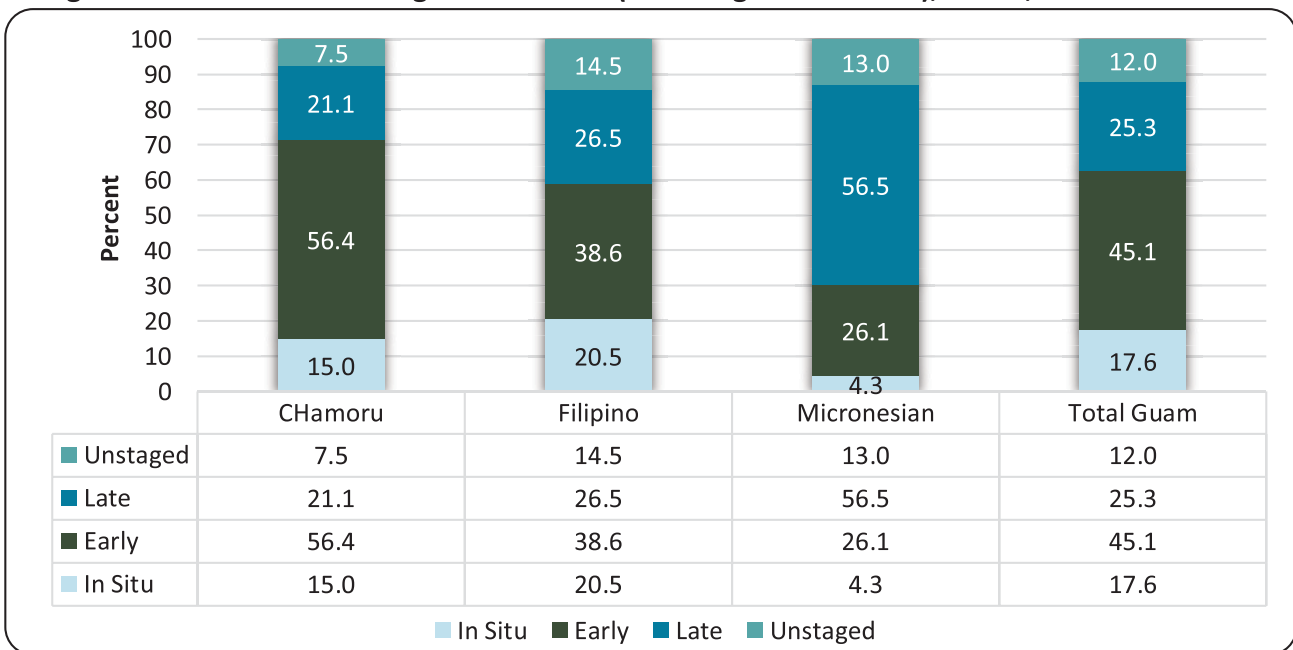
Figure 25. Breast Cancer Stage Distribution, Guam, 2013-2017



All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

Figure 26. Breast Cancer Stage Distribution (Including In Situ Cases), Guam, 2013-2017



Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

BREAST CANCER BY ETHNICITY

When comparing Guam’s cancer incidence rates for breast (female) cancer by ethnicity, Micronesians had the highest incidence and their rate was higher than that reported for the total Guam population and total U.S. Caucasians and CHamoros had a higher incidence rate for breast (female) cancer than that reported for the total Guam population (Table 24).

Table 24. Comparison of Guam and US mean age-adjusted cancer incidence rates for cancer of the breast (female) by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Breast (Female)	94.0	59.8	137.5	121.9	46.7	86.6	126.8

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

When comparing Guam’s cancer mortality rates by ethnicity, Micronesians had the highest mortality rate for breast (female). Micronesians had a mortality rate for breast cancer (female) that was 3.8 times the rate reported for the total Guam population and 5.1 times the total U.S. rate. Caucasians also had a high mortality rate that was 2.8 times the total Guam rate and 3.8 times the total U.S. rate. Additionally, the mortality rate for breast cancer for the total Guam population was 34.5% higher than that reported for the total U.S. (Table 25).



Guam Comprehensive Cancer Control - Breast Cancer Awareness (2016)

Table 25. Comparison of Guam mean annual age-adjusted cancer mortality rates for breast (female) by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Breast (Female)	27.9	17.9	104.6	77.3	*	27.3	20.3

Invasive cases only.

*Rates are suppressed if fewer than five (5) cases were recorded in the cancer site category.

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

Source Years: UOG Cancer Research Center, PRCCR.



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FACTORS FOR BREAST CANCER²⁹

- Female sex
- Older age
- Family history, especially in first-degree relative
- Dense breasts
- Menopausal hormone therapy
- Combination hormone therapy
- Estrogen therapy
- Ionizing radiation
- Obesity
- Alcohol consumption



FACTORS THAT DECREASE RISK OF BREAST CANCER²⁹

- Full-term pregnancy before the age of 20 years old
- Breastfeeding
- Exercise
- Estrogen use by women with prior hysterectomy



A COMMUNITY COLLABORATIVE EFFORT

PROSTATE CANCER

Eleven percent of men in the U.S. will have prostate cancer at one point in their lifetime.³⁰ From 2013-2017, prostate cancer accounted for 11% of all new cancer cases and about 6% of all cancer deaths in Guam (Table 26). Prostate cancer was the most frequently reported site for new cancer cases in males and the third leading cause of cancer deaths in males in Guam (Table 7 and Table 8).

Table 26. Incidence and mortality from cancer of the prostate, Guam, 2013-2017

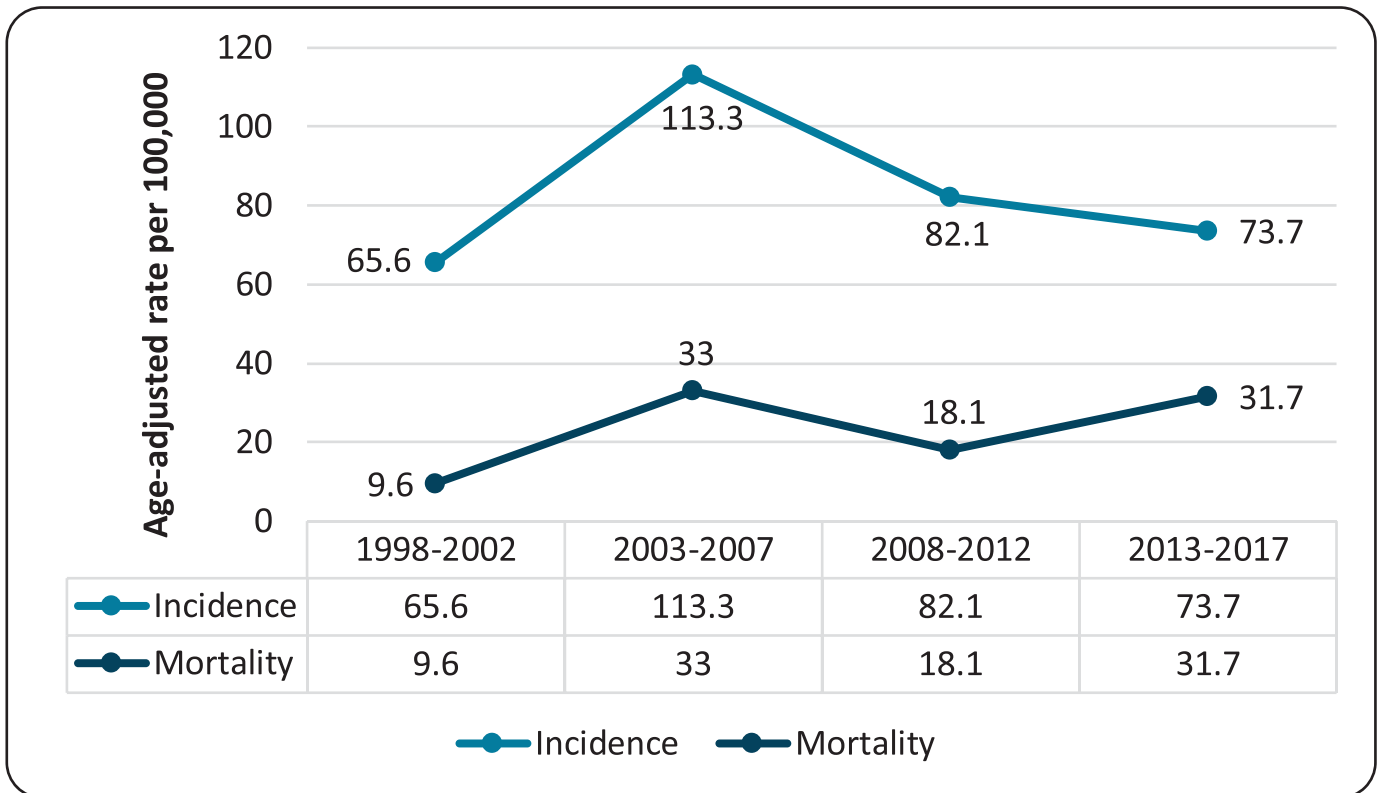
	Count	Percentage
Incidence (New cases)	175	11.0
Mortality (Deaths)	49	6.1

Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

The incidence of prostate cancer in Guam appears to be decreasing over time (Figure 27). The incidence rate decreased by 10.2% compared to the 2008-2012 period. The prostate cancer mortality rate increased by 75% compared to the 2008-2012 period (Figure 27).

Figure 27. Prostate Cancer Incidence and Mortality, Guam, 1998-2017



1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.



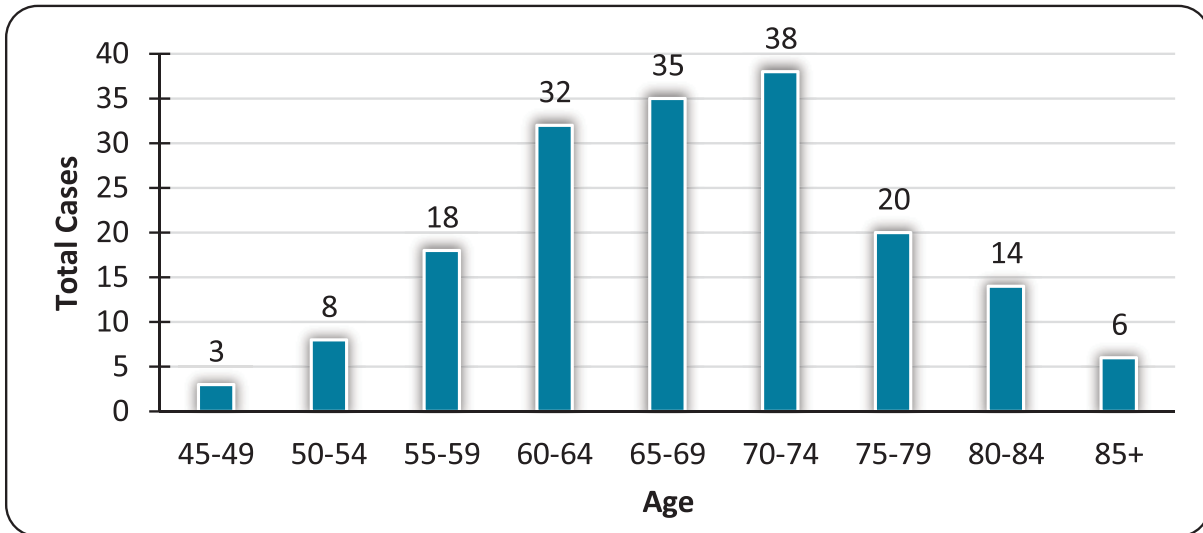
GUAM

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PROSTATE CANCER BY AGE

Figure 28 illustrates the distribution of prostate cancer by age at diagnosis. Most cases occurred between the ages of 55 to 84 years old (Figure 28).

Figure 28. Prostate Cancer by Age at Diagnosis, Guam, 2013-2017



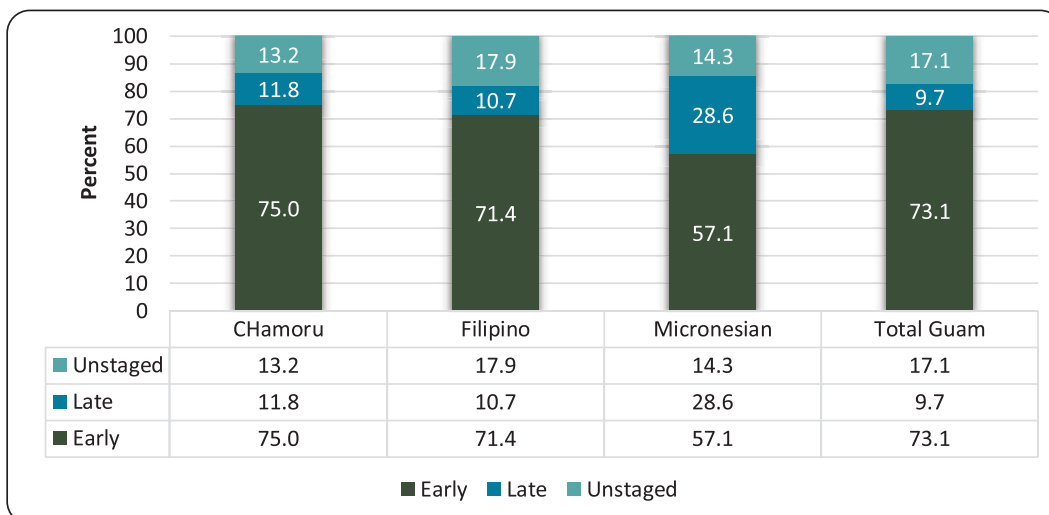
All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

PROSTATE CANCER BY STAGE DISTRIBUTION

More than 50% of prostate cancer cases were early stage across ethnicities (Figure 29). CHamorus had the highest percentage of early stage prostate cancer (75.0). Micronesians had the highest percentage of late stage diagnosis (28.6) and Filipinos had the highest percentage of unstaged prostate cancer (17.9).

Figure 29. Prostate Cancer by Stage Distribution, Guam, 2013-2017



All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

PROSTATE CANCER BY ETHNICITY

When comparing Guam’s cancer incidence rates for prostate cancer by ethnicity, Micronesians had the highest incidence and their rate was higher than that reported for the total Guam population and the total U.S. Caucasians had the second highest incidence for prostate cancer and their rate was higher than that reported for the total Guam population and the total U.S. CHamorus also had a higher incidence of prostate cancer than the rate reported for the total Guam population (Table 27).

Table 27. Comparison of Guam and US mean annual age-adjusted cancer incidence rates for cancer of the prostate by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Prostate	81.8	59.3	143.1	124.5	40.4	73.7	107.0

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

When comparing Guam’s prostate cancer mortality rates by ethnicity, Caucasians and CHamorus had the highest rates. Additionally, the mortality rate for prostate cancer for the total Guam population was higher than that reported for the total U.S. (Table 28).

Table 28. Comparison of Guam mean annual age-adjusted cancer mortality rates for prostate by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Prostate	41.7	23.2	*	73.9	*	31.7	19.6

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

FACTORS FOR PROSTATE CANCER³¹

- Older age
- Family history, especially in first-degree relative
- Hormones
- Dietary fat
- Dairy and calcium intake
- Folic acid





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PANCREATIC CANCER

In the U.S., cancer of the pancreas is the fourth leading cause of cancer deaths.³² In Guam, pancreatic cancer was the sixth leading cause of cancer deaths and accounted for about 4% of all cancer deaths (Table 29). Pancreatic cancer ranked eighth for new cancer cases in females and tenth for new cancer cases in males (Table 7).

Table 29. Mortality from cancer of the pancreas, Guam, 2013-2017

	Count	Percentage
Mortality (Deaths)	30	3.7

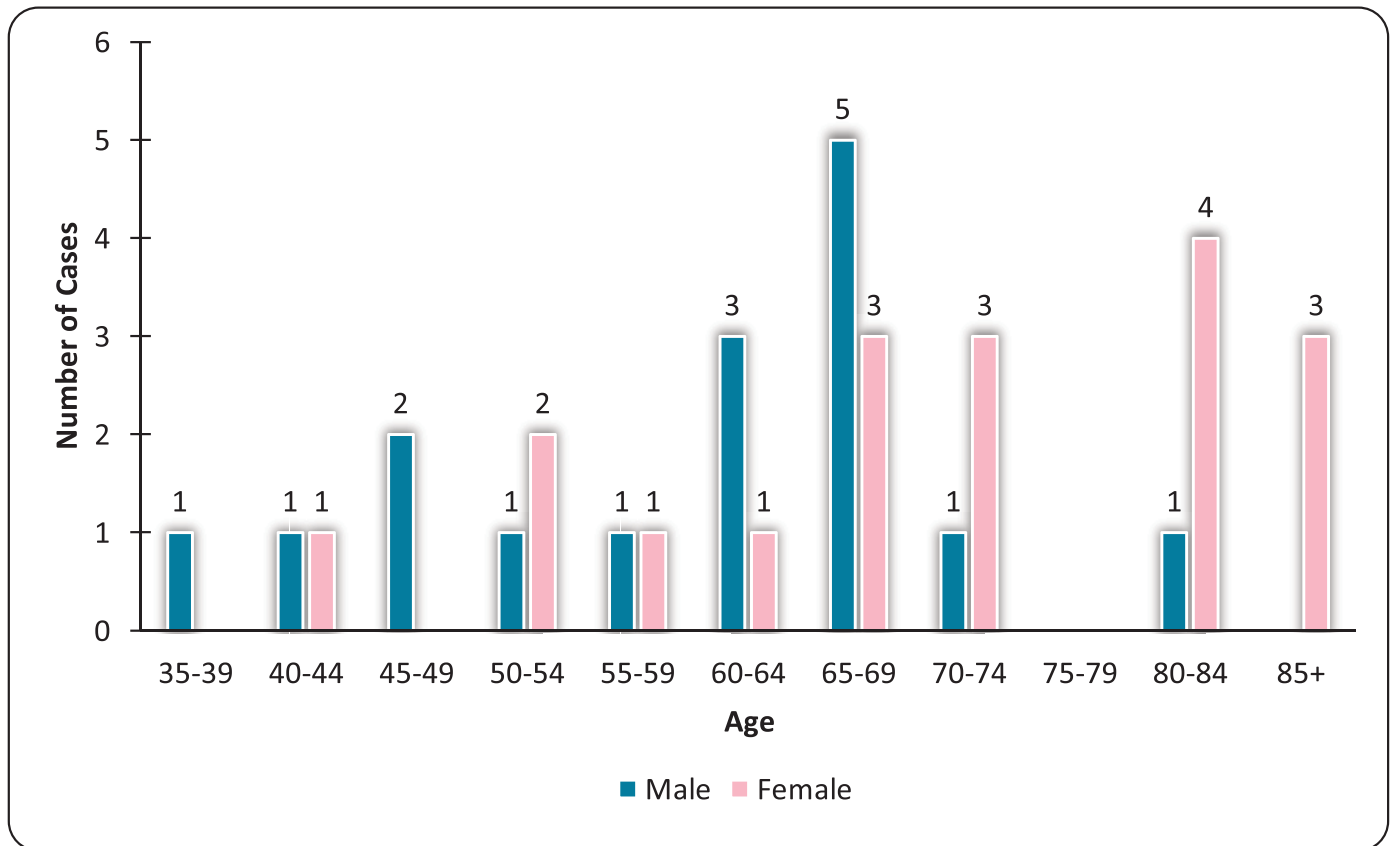
Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

PANCREATIC CANCER BY SEX AND AGE

Figure 30 illustrates the distribution of pancreatic cancer cases by sex and age at diagnosis.

Figure 30. Pancreas Cancer Cases by Sex and Age at Diagnosis, Guam, 2013-2017



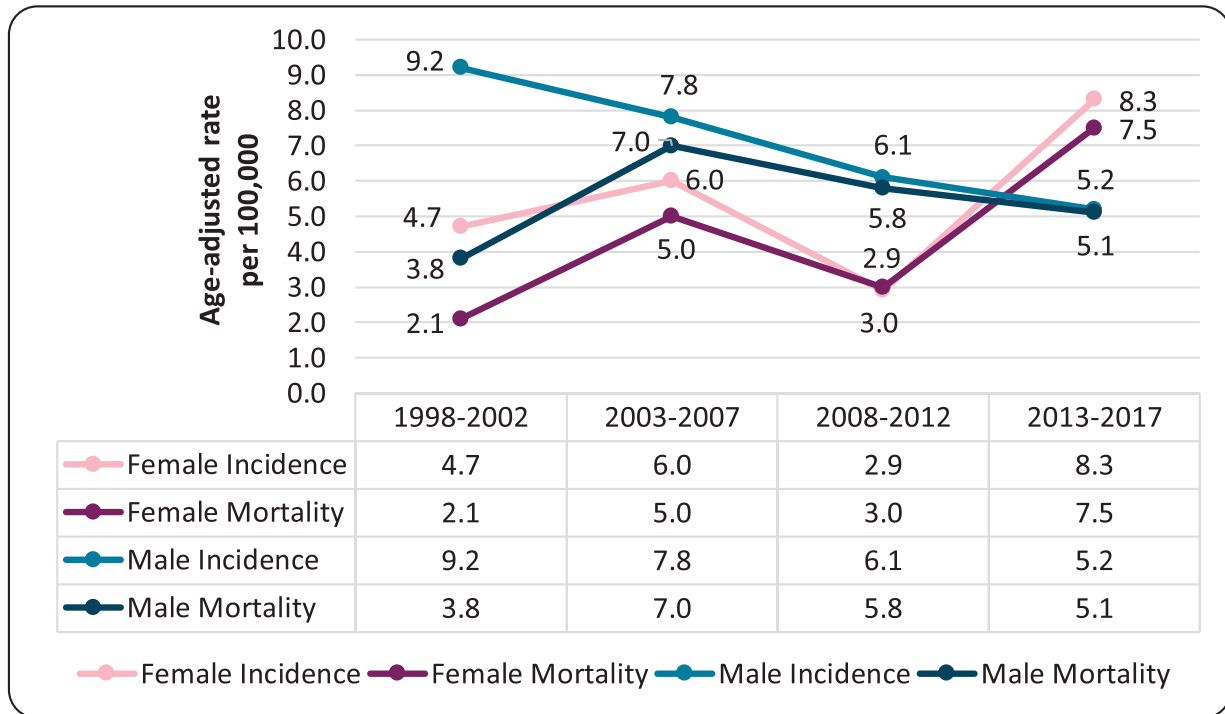
Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

Unlike previous time periods, female incidence and mortality for pancreatic cancer were higher than male incidence and mortality for the 2013-2017 time period (Figure 31).

Figure 31. Pancreas Cancer Incidence and Mortality, Guam, 1998-2017



1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

For the 2013-2017 time period, pancreatic cancer accounted for about 2% of all new cancer cases in both males and females. Pancreatic cancer was the cause of about 4% of cancer deaths in females and about 3% of cancer deaths in males (Table 30).

Table 30. Incidence and mortality from cancer of the pancreas by sex, Guam 2013-2017

	Incidence		Mortality	
	Counts	Percentage	Counts	Percentage
Female	18	2.3	15	4.3
Male	16	2.0	15	3.3

Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

PANCREATIC CANCER BY STAGE DISTRIBUTION

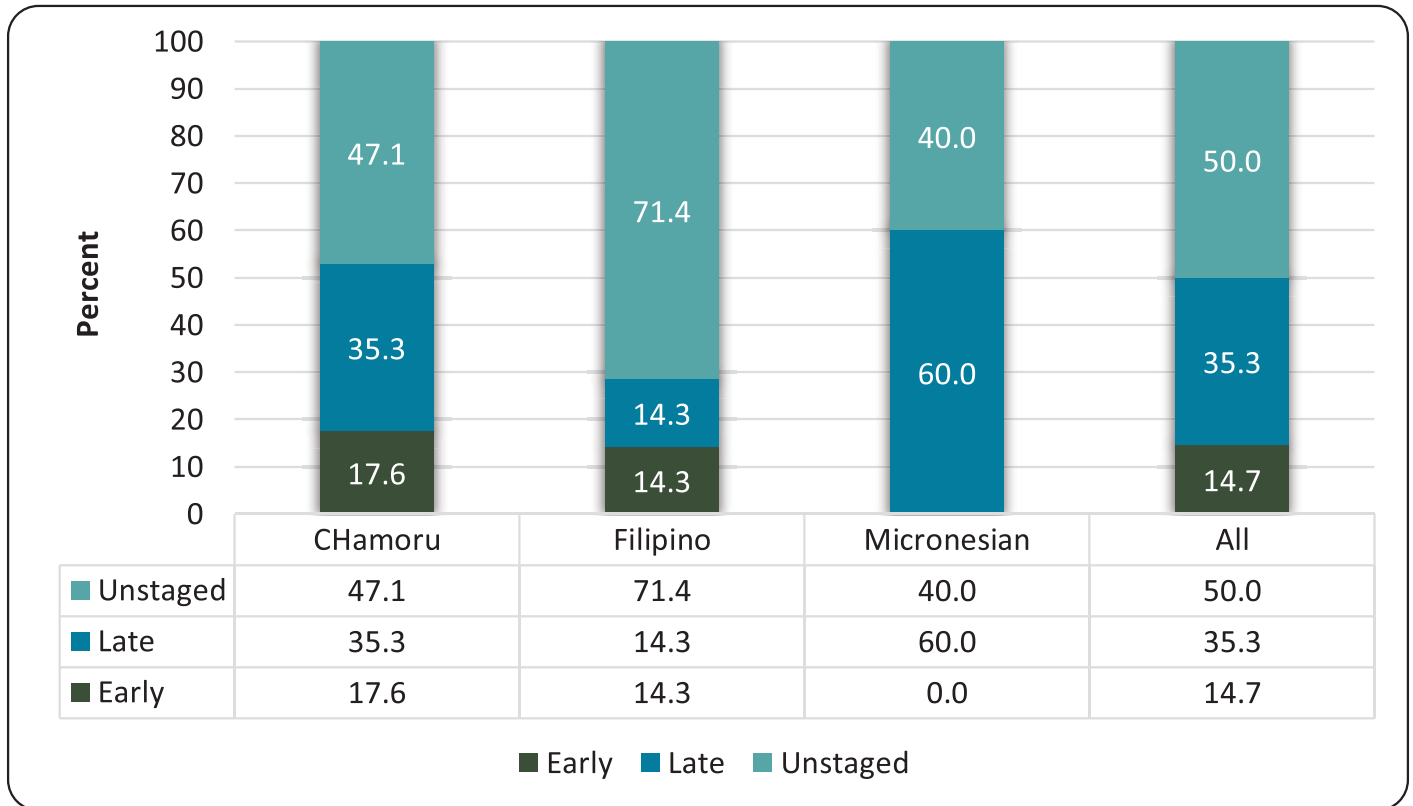
Most pancreatic cancer cases reported during the 2013-2017 time period were either late stage or unstaged (Figure 32).



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Figure 32. Pancreas Cancer Stage Distribution, Guam, 2013-2017



All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

PANCREATIC CANCER BY ETHNICITY

When comparing Guam’s cancer incidence rates for pancreatic cancer by ethnicity, Micronesians and CHamorus had higher rates than that reported for the total Guam population. Micronesians also had higher incidence of pancreatic cancer than that reported for the total U.S. (Table 31).

Table 31. Comparison of Guam and US mean annual age-adjusted cancer incidence rates for cancer of the pancreas by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Pancreas	10.6	3.4	14.2	*	*	7.2	12.8

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

When comparing Guam’s cancer mortality rates by ethnicity, Micronesians and CHamorus had the highest mortality rates for cancer of the pancreas (Table 32). CHamorus had a mortality rate 1.6 times higher than the total Guam rate. The mortality rate of pancreatic cancer in Micronesians is 2.2 times higher than the total Guam rate and 1.3 times higher than that reported for the total U.S. (Table 32).

A COMMUNITY COLLABORATIVE EFFORT

Table 32. Comparison of Guam mean annual age-adjusted cancer mortality rates for pancreas by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Pancreas	10.3	2.8	14.2	*	*	6.5	11.0

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded in the cancer site category.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

RISK FACTORS FOR PANCREATIC CANCER³³

The NCI does not list evidence-based information specific to pancreatic cancer but has provided general cancer prevention risk factors below.

- Cigarette smoking and tobacco use
- Infections
- Radiation
- Immunosuppression after organ transplantation

MOUTH AND PHARYNX CANCER

From 2013-2017, mouth and pharynx cancer was the seventh most common cancer site for new cases and the seventh most common cause of cancer deaths in Guam. During the same time period, mouth and pharynx cancer accounted for about 3% of all new cancer cases and about 3% of all cancer deaths in Guam (Table 33).

Table 33. Incidence and mortality from cancer of the mouth and pharynx, Guam 2013-2017

	Count	Percentage
Incidence (New cases)	50	3.2
Mortality (Deaths)	24	3.0

Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.



UOG Cancer Research Center - Women's Health Initiative (2022)



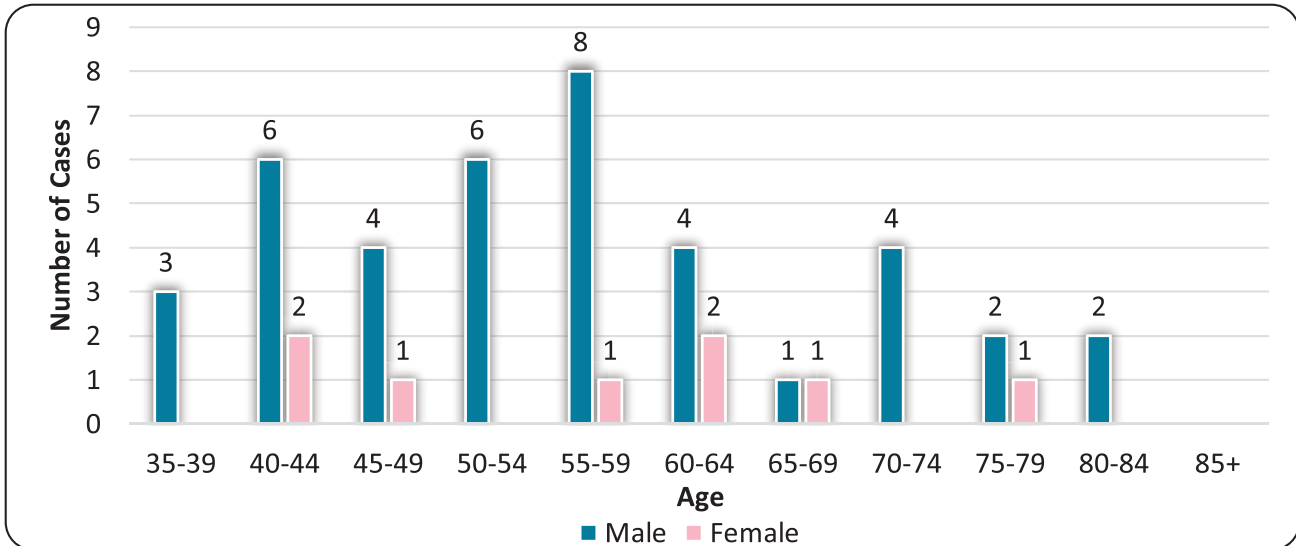
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CANCER FACTS & FIGURES 2013-2017

MOUTH AND PHARYNX CANCER BY SEX AND AGE

Figure 33 illustrates the distribution of mouth and pharynx cancer cases by sex and age.

Figure 33. Mouth & Pharynx Cancer Cases by Sex and Age at Diagnosis, Guam, 2013-2017

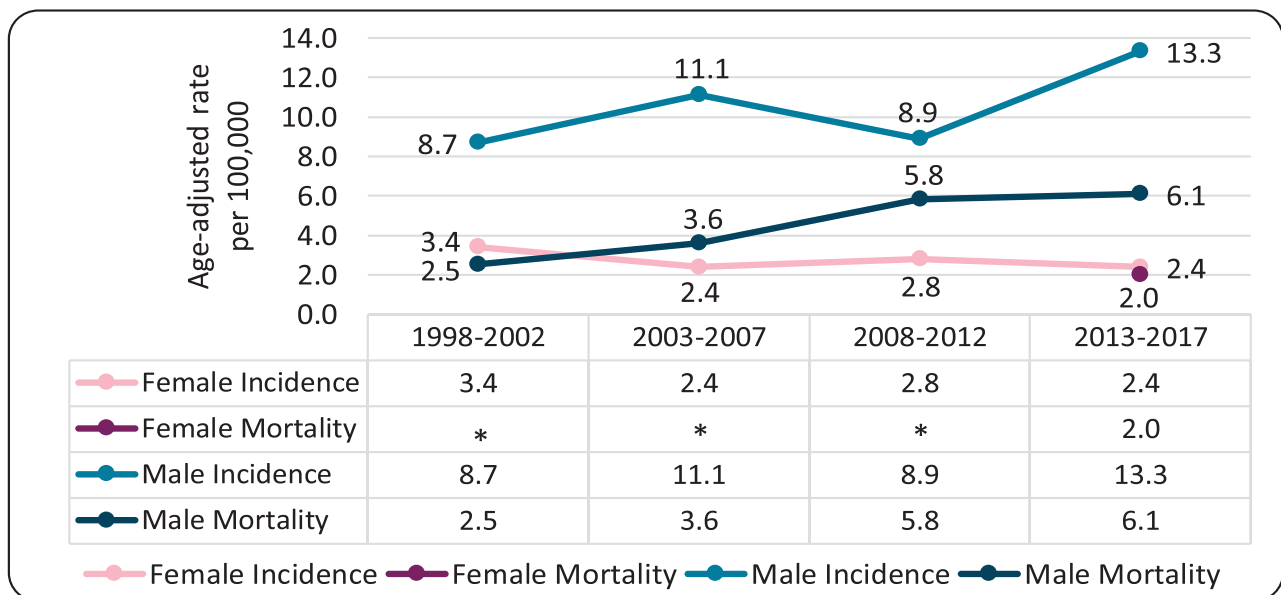


Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

As with previous time periods, male incidence and mortality for mouth and pharynx cancer were higher than female incidence and mortality for the 2013-2017 time period (Figure 34).

Figure 34. Mouth & Pharynx Cancer Incidence and Mortality, Guam, 1998-2017



1998-2012: All cancer cases, 2013-2017: Invasive cases only.

**Less than 5 mortality cases occurred for females for years: 1998-2002 (3), 2008-2012 (2).*

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

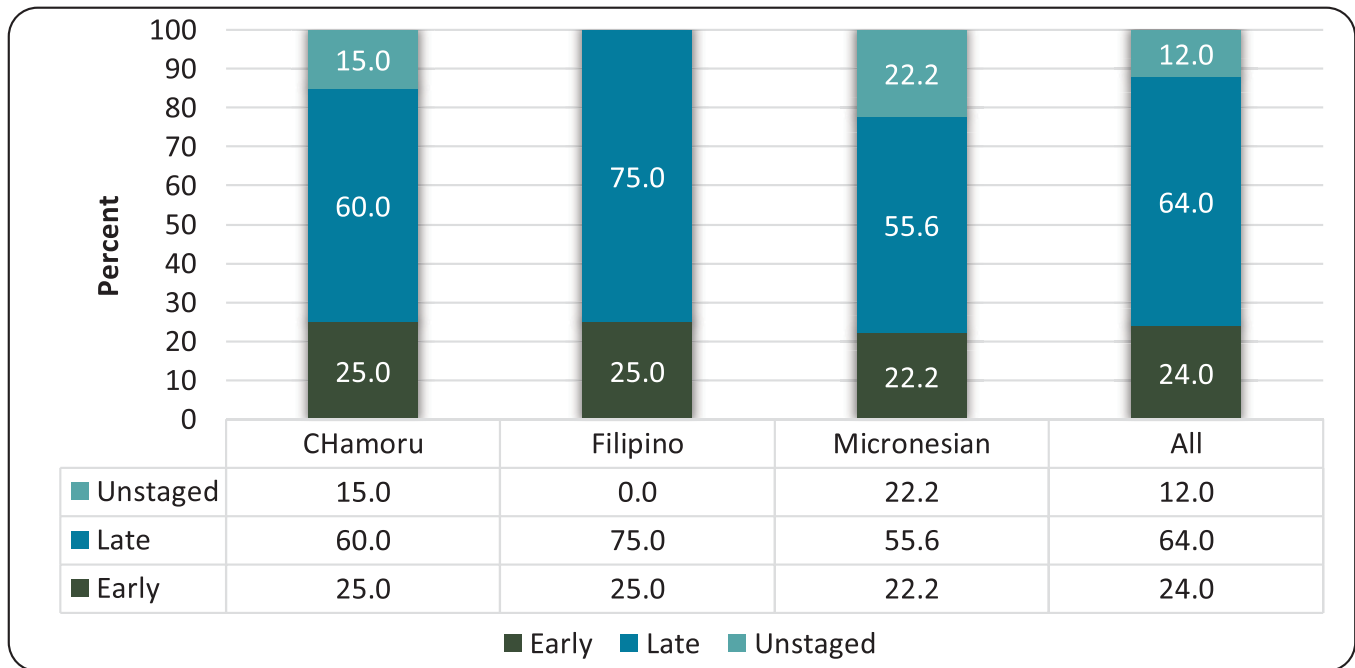
Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

A COMMUNITY COLLABORATIVE EFFORT

MOUTH AND PHARYNX CANCER BY STAGE DISTRIBUTION

Most mouth and pharynx cancer cases reported were late stage across ethnicities indicated (Figure 35).

Figure 35. Mouth & Pharynx Cancer Stage Distribution, Guam, 2013-2017



Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.

MOUTH AND PHARYNX CANCER BY ETHNICITY

When comparing Guam’s cancer incidence rates for mouth and pharynx cancer by ethnicity, Caucasians had the highest rate and their rate was 2.7 times higher than that reported for the total Guam population and two times higher the total U.S. rate. Micronesians also had a higher incidence rate for mouth and pharynx cancer than that reported for the total Guam population and the total U.S. Additionally, CHamorus had a higher incidence rate for mouth and pharynx cancer than that reported for the total Guam population. (Table 34).

Table 34. Comparison of Guam and US mean annual age-adjusted cancer incidence rates for cancer of the mouth and pharynx by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Mouth & Pharynx	8.9	*	13.8	21.4	*	7.8	10.8

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were reported.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.



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When comparing Guam’s cancer mortality rates by ethnicity, Micronesians and CHamorus had the only reportable rates for the mouth and pharynx. Micronesians had a mortality rate three times the total reported Guam rate and 5.3 times the total U.S. CHamorus also had a higher mortality rate for mouth and pharynx cancer than that reported for the total Guam population and it was 2.2 times the total U.S. rate. Additionally, the mortality rate for mouth and pharynx cancer for the total Guam population was higher than that reported for the total U.S. (Table 35).

Table 35. Comparison of Guam and US mean annual age-adjusted cancer mortality rates for mouth and pharynx cancer by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Mouth and pharynx	5.0	*	12.3	*	*	4.0	2.3

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were reported.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

RISK FACTORS FOR ORAL CANCER³⁴

- Tobacco use
- Alcohol use
- Betel-quid chewing
- Human papillomavirus (HPV) infection

NASOPHARYNX CANCER

The incidence of nasopharyngeal cancer in Guam is almost seven times higher than that for the total U.S. When comparing Guam’s cancer incidence rates for nasopharyngeal cancer by ethnicity, CHamorus and Filipinos had the only reportable rates and their rates were much higher than that for the total U.S. The incidence of nasopharyngeal cancer in CHamorus was almost ten times higher than that for the total U.S. Filipinos had an incidence of nasopharyngeal cancer that was almost five times higher than that for the total U.S. (Table 36).

Table 36. Comparison of Guam and US mean annual age-adjusted cancer incidence rates for cancer of the nasopharynx by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Nasopharynx	5.7	2.8	*	*	*	3.9	0.6

2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were reported.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

Nasopharyngeal cancer causes cancer death at a much higher rate for the total Guam population than the total U.S. When comparing Guam’s cancer mortality rates by ethnicity, CHamorus had the only reportable rate for the nasopharynx. The mortality rate for nasopharyngeal cancer in CHamorus was higher than that for total Guam population and was nineteen times higher than that reported for the total U.S. (Table 37).

Table 37. Comparison of Guam mean annual age-adjusted cancer mortality rates for nasopharynx by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Nasopharynx	3.8	*	*	*	*	2.1	0.2

Invasive cases only.

**Rates are suppressed if fewer than five (5) cases were recorded in the cancer site category.*

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

CERVICAL CANCER

Cervical cancer is a common cancer in females worldwide.³⁵ Cervical cancer accounted for about 3% of all cancer deaths in Guam (Table 38). During the same time period, cervical cancer was the fifth leading site for new cancer cases in females and the fifth leading cause of cancer deaths in females in Guam (Table 7 and Table 8).

Table 38. Mortality from cancer of the cervix, Guam, 2013-2017

	Count	Percentage of all cancer deaths
Mortality (Deaths)	20	2.5

Invasive cases only.

Source: UOG Cancer Research Center, PRCCR.



Guam Comprehensive Cancer Control Coalition- Cervical Cancer Conference (2017)

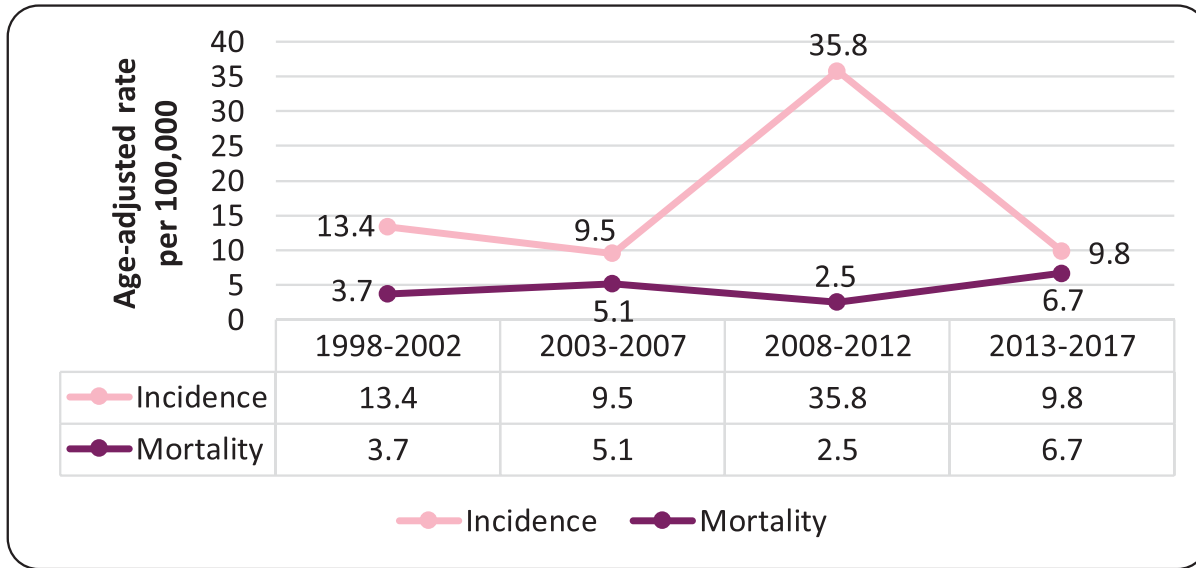


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During the 2013-2017 time period, cervical cancer incidence in Guam decreased relative to the 2008-2012 time period and was comparable to the rate seen in the 2003-2007 time period. The move to include only invasive cases for the 2013-2017 time period versus all cancer cases in the previous time periods may have contributed to the decreased incidence observed for the 2013- 2017 time period. During the 2013-2017 time period, cervical cancer mortality increased relative to the previous time periods (Figure 36).

Figure 36. Cervical Cancer Incidence and Mortality, Guam, 1998-2017



Note: 2008-2012 incidence includes both invasive and in-situ.

1998-2012: All cancer cases, 2013-2017: Invasive cases only.

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

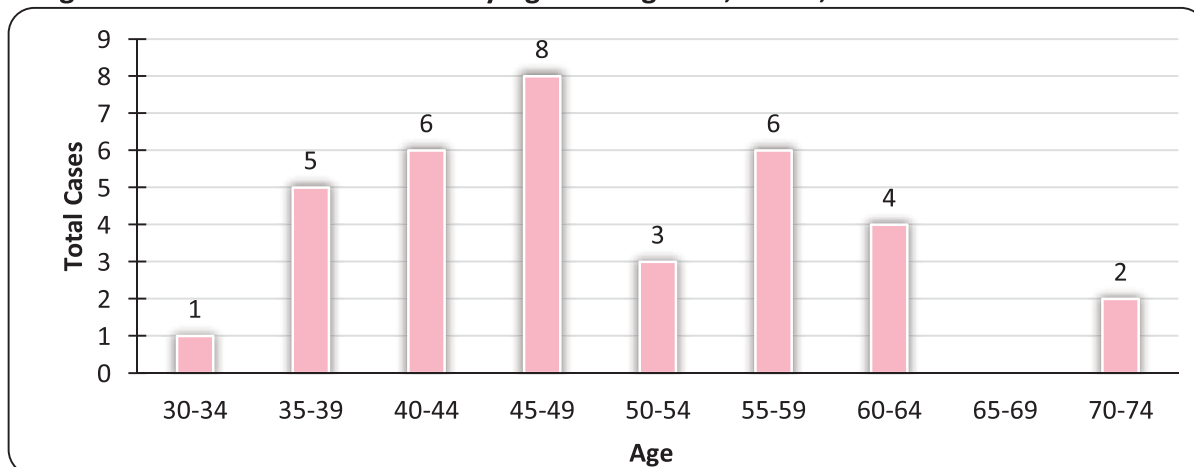
Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012.

CERVICAL CANCER BY AGE

Figure 37 illustrates the distribution of cervical cancer by age at diagnosis. Most cases occurred between the ages of 35 to 64 years old (Figure 37).

Figure 37. Cervical Cancer Cases by Age at Diagnosis, Guam, 2013-2017



All cases are invasive.

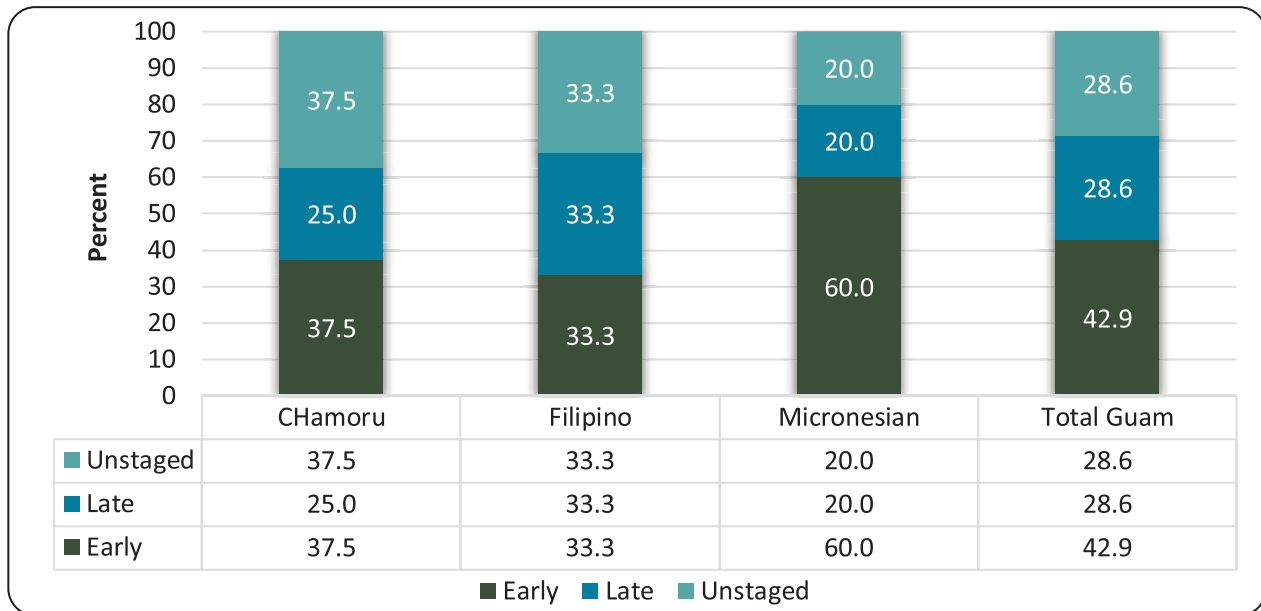
Source: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

CERVICAL CANCER BY STAGE DISTRIBUTION

The majority of cervical cancer cases in Guam was early stage. Equal percentages of unstaged and late-stage cervical cancer were observed across ethnicities for the total Guam population (Figure 38 and Figure 39). Micronesians had the highest percentage of early stage cervical cancer (60.0) and Filipinos had the highest percentage of late stage cases (33.3) (Figure 38). Figure 39 includes data for in situ cases.

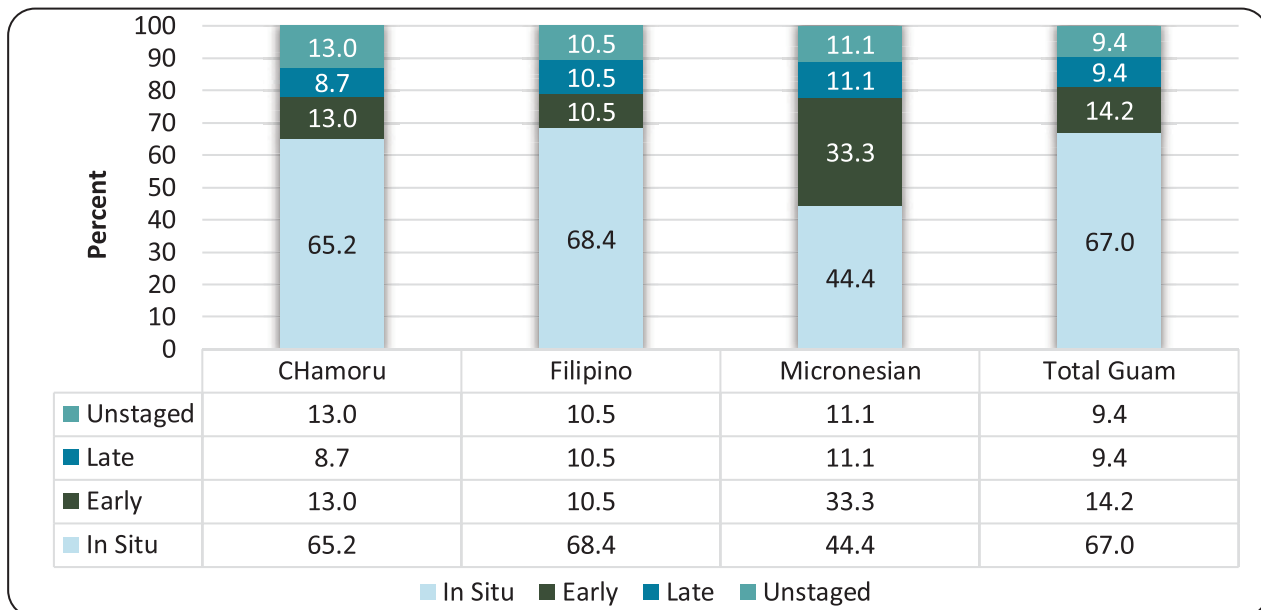
Figure 38. Cervical Cancer Stage Distribution, Guam, 2013-2017



All cases are invasive.

Source: UOG Cancer Research Center, PRCCR.

Figure 39. Cervical Cancer Stage Distribution (Including In Situ Cases), Guam, 2013-2017



Source: UOG Cancer Research Center, PRCCR.



GUAM

CANCER FACTS & FIGURES 2013-2017

CERVICAL CANCER BY ETHNICITY

When comparing Guam's cancer incidence rates for cervical cancer by ethnicity, Micronesians had the highest incidence and their rate was 3.2 times higher than that reported for the total Guam population and 4.2 times higher than the total U.S. CHamorus also had a higher incidence of cervical cancer than that reported for the total Guam population and the total U.S. Additionally, the incidence rate for cervical cancer for the total Guam population was higher than that for the total U.S. (Table 39).

Table 39. Comparison of Guam and US mean annual age-adjusted cancer incidence for cancer of the cervix by ethnicity, 2013-2017

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Cervix	11.9	5.8	31.2	*	*	9.8	7.4

2013-2017: Invasive cases only.

*Rates are suppressed if fewer than five cases were recorded.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

When comparing Guam's cancer mortality rates by ethnicity, Micronesians had the highest rates for the cervix. Micronesians had a mortality rate for cervical cancer 3.3 times higher than that reported for the total Guam population and 9.7 times higher than the total U.S. Additionally, the mortality rate for cervical cancer for the total Guam population was almost three times higher than the total U.S. (Table 40).

Table 40. Comparison of Guam mean annual age-adjusted cancer mortality rates for cervix by ethnicity for 2013-2017 with the 2010 US aggregate age-adjusted cancer mortality rate

Cancer Site	CHamoru	Filipino	Micronesian	Caucasian	Asian (other than Filipino)	Total Guam	Total U.S.
Cervix	6.4	6.2	22.3	*	*	6.7	2.3

2013-2017: Invasive cases only.

*Rates are suppressed if fewer than five cases were recorded in the cancer site category.

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

Source Years: UOG Cancer Research Center, PRCCR.

A COMMUNITY COLLABORATIVE EFFORT

RISK FACTORS FOR CERVICAL CANCER³⁶

- Human Papillomavirus (HPV) infection
- Immunosuppression
- Sexual activity at an early age and with an increased number of sexual partners
- Seven or more full term pregnancies
- Long-term use of oral contraceptives
- Both active and passive cigarette smoke exposure
- Diethylstilbestrol (DES) exposure



FACTOR THAT DECREASES RISK OF CERVICAL CANCER³⁶

- Sexual abstinence

INTERVENTIONS WITH ADEQUATE EVIDENCE OF A DECREASED RISK OF CERVICAL CANCER³⁶

- HPV Vaccination



UOG Cancer Research Center - Cervical Cancer Screening & HPV Vaccination (2017)



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CANCER FACTS & FIGURES 2013-2017

APPENDIX

Table 41. Comparison of Guam and US mean annual age-adjusted cancer incidence by ethnicity, 1998-2017

Cancer Site	CHamoru	Filipino	Micronesian	Asian (other than Filipino)	Caucasian	Total Guam	Total U.S.
All Cancers							
1998-2002	406.8	215.7	401.5	149.7	585.4	**	479.5
2003-2007	395.7	218.6	598.3	408.1	531.2	**	458.4
2008-2012	384.5	206.0	414.7	199.6	365.1	**	456.7
2013-2017	352.8	175.6	438.0	148.8	412.9	279.9	435.0
Mouth & Pharynx							
1998-2002	24.4	9.9	6.3	6.9	9.6	**	10.7
2003-2007	18.0	2.7	29.4	6.2	26.7	**	10.3
2008-2012	17.9	6.3	11.9	1.8	8.6	**	11.1
2013-2017	8.9	*	13.8	*	21.4	7.9	10.8
Nasopharynx							
1998-2002	13.9	5.1	0.0	5.4	0.0	**	0.6
2003-2007	8.6	1.4	4.2	2.8	7.0	**	0.6
2008-2012	9.8	2.7	6.3	1.8	1.6	**	0.5
2013-2017	5.7	2.8	*	*	*	3.9	0.6
Esophagus							
1998-2002	4.6	2.3	4.4	0.0	10.1	**	4.9
2003-2007	4.3	1.1	2.0	5.5	15.4	**	4.9
2008-2012	3.7	0.0	3.1	3.6	0.0	**	4.6
2013-2017	5.2	*	*	*	*	3.3	4.1

A COMMUNITY COLLABORATIVE EFFORT

Table 41. Comparison of Guam and US mean annual age-adjusted cancer incidence by ethnicity, 1998-2017 - Continued

Cancer Site	CHamoru	Filipino	Micronesian	Asian (other than Filipino)	Caucasian	Total Guam	Total U.S.
Stomach							
1998-2002	10.5	4.0	9.0	18.1	10.1	**	7.4
2003-2007	6.0	2.1	9.2	24.4	7.0	**	6.7
2008-2012	13.2	1.8	27.4	9.8	11.8	**	6.8
2013-2017	7.5	4.0	16.8	*	*	5.1	7.1
Colorectal							
1998-2002	44.3	37.1	4.1	26.3	91.4	**	55.5
2003-2007	44.8	21.9	19.8	73.7	54.7	**	48.3
2008-2012	39.4	27.8	23.4	27.8	30.3	**	42.8
2013-2017	41.0	25.8	8.7	11.4	47.5	32.3	40.3
Pancreas							
1998-2002	12.4	1.7	4.1	12.5	17.6	**	11.1
2003-2007	8.8	3.0	0.0	17.4	16.3	**	11.3
2008-2012	1.8	3.1	13.1	4.1	9.4	**	12.2
2013-2017	10.6	3.4	14.2	*	*	7.0	12.8
Liver							
1998-2002	13.2	9.6	39.4	10.7	4.0	**	5.2
2003-2007	17.0	5.1	38.2	9.7	26.1	**	5.8
2008-2012	23.1	9.0	28.0	8.5	13.4	**	7.3
2013-2017	22.0	2.2	36.2	*	*	12.1	7.8
Lung & bronchus							
1998-2002	75.4	35.6	111.5	25.8	89.6	**	70.2
2003-2007	88.4	34.0	174.7	77.3	85.3	**	67.7



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Table 41. Comparison of Guam and US mean annual age-adjusted cancer incidence by ethnicity, 1998-2017 - Continued

Cancer Site	CHamoru	Filipino	Micronesian	Asian (other than Filipino)	Caucasian	Total Guam	Total U.S.
2008-2012	70.6	28.0	128.7	35.5	59.2	**	63.1
2013-2017	69.4	29.6	78.6	38.3	63.1	50.9	52.6
Breast (Female)							
1998-2002	115.9	60.7	35.0	63.0	148.6	**	131.0
2003-2007	100.6	66.0	62.4	108.4	58.5	**	117.7
2008-2012	97.2	76.7	41.9	48.4	120.3	**	120.3
2013-2017	94.0	59.8	137.5	46.7	121.9	86.6	126.8
Cervix							
1998-2002	16.2	8.4	27.4	8.5	9.6	**	9.6
2003-2007	11.6	5.5	21.1	14.5	10.5	**	8.1
2008-2012	24.8	5.2	43.2	17.4	24.4	**	7.6
2013-2017	11.9	5.8	31.2	*	*	9.8	7.4
Uterus							
1998-2002	31.6	4.8	16.0	0.0	0.0	**	23.8
2003-2007	34.4	6.8	4.3	5.2	17.7	**	25.4
2008-2012	25.9	16.9	66.9	5.0	4.7	**	25.2
2013-2017	32.3	9.9	34.2	*	*	23.2	26.8
Prostate							
1998-2002	103.9	46.1	78.4	32.3	88.1	**	168.4
2003-2007	114.8	91.8	259.3	41.7	188.3	**	142.4
2008-2012	106.2	60.0	53.6	36.9	78.4	**	131.1
2013-2017	81.8	59.3	143.1	40.4	124.5	73.7	107.0

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Table 41. Comparison of Guam and US mean annual age-adjusted cancer incidence by ethnicity, 1998-2017 - Continued

Cancer Site	CHamoru	Filipino	Micronesian	Asian (other than Filipino)	Caucasian	Total Guam	Total U.S.
Urinary Bladder							
1998-2002	6.0	3.9	0.0	9.9	15.1	**	21.9
2003-2007	4.8	3.6	0.0	7.0	18.1	**	21.1
2008-2012	7.4	4.1	3.4	12.5	21.7	**	20.6
2013-2017	6.9	*	*	*	*	4.5	19.1
Thyroid							
1998-2002	6.2	7.5	39.4	14.4	33.8	**	7.3
2003-2007	7.0	12.4	34.9	16.9	5.6	**	10.1
2008-2012	11.4	11.0	9.7	14.9	2.0	**	13.5
2013-2017	4.9	5.9	*	8.4	*	6.0	14.5
Non-Hodgkin Lymphoma							
1998-2002	7.0	8.4	6.6	4.9	7.9	**	18.9
2003-2007	11.0	8.1	9.3	14.0	25.1	**	18.9
2008-2012	11.2	7.4	17.2	1.3	21.3	**	19.2
2013-2017	7.8	5.7	*	*	18.2	7.0	19.3
Leukemia							
1998-2002	11.0	4.7	6.3	5.0	17.7	**	12.8
2003-2007	9.5	6.8	0.0	0.0	18.7	**	11.6
2008-2012	10.8	7.1	16.1	8.3	13.8	**	13.2
2013-2017	10.4	4.9	*	*	*	6.6	13.8

1998-2012: All cancer cases, 2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

**Data not available.

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

Source Years 2003-2012: Guam Cancer Facts and Figures 2003-2007, Guam Cancer Facts and Figures 2008-2012



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Table 42. Comparison of Guam and US mean annual age-adjusted cancer mortality rates for selected sites by ethnicity for 2013-2017 with 2010 US aggregate age-adjusted cancer mortality rates

Cancer Site	CHamoru		Filipino		Micronesian		Asian (other than Filipino)		Caucasian		Total Guam		Total U.S.
	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Count	Rate	Rate
All	446	226.0	163	102.4	97	336.1	36	106.4	50	252.3	806	165.6	158.3
Oral Cavity & Pharynx													
Mouth & Pharynx	12	5.0	2	*	7	12.3	0	*	3	*	24	4.0	2.3
Nasopharynx	9	3.8	0	*	4	*	0	*	1	*	14	2.1	0.2
Digestive System													
Esophagus	7	4.3	1	*	2	*	1	*	0	*	11	2.6	3.9
Stomach	11	6.1	3	*	6	18.8	1	*	0	*	22	4.5	3.1
Colon-Rectum-Anus	44	23.2	21	12.8	5	11.5	5	15.2	6	26.6	82	17.3	14.2
Pancreas	17	10.3	5	2.8	5	14.2	1	*	2	*	30	6.5	11.0
Liver	56	22.7	5	2.6	10	25.2	3	*	2	*	79	12.2	4.9
Respiratory System													
Lung & Bronchus	131	66.2	45	30.8	19	86.3	9	22.0	14	55.2	222	46.9	40.2
Breast	30	27.9	16	17.9	12	104.6	4	*	5	77.3	69	27.3	20.3
Genital System													
Cervix	8	6.4	5	6.2	6	22.3	1	*	0	*	20	6.7	2.3
Uterus	5	4.9	4	*	2	*	0	*	0	*	11	3.9	4.8
Prostate	23	41.7	15	23.2	4	*	2	*	5	73.9	49	31.7	19.6
Urinary System													
Urinary Bladder	2	*	5	3.8	1	*	2	*	2	*	12	3.1	4.4
Endocrine System													
Thyroid	1	*	1	*	1	*	1	*	0	*	4	*	0.5
Lymphoma													
Non-Hodgkin Lymphoma	7	4.7	7	4.3	1	*	0	*	3	*	18	4.5	5.5
Leukemia	15	9.2	5	3.3	1	*	0	*	2	*	23	5.6	6.4

1998-2012: All cancer cases, 2013-2017: Invasive cases only.

*Rates were suppressed if fewer than five cases were recorded.

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

Source Years: UOG Cancer Research Center, PRCCR.

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ANNEX

Annex 1. Cancer Incidence and Mortality Counts and Rates, By Sex, Guam, 2013-2017

Cancer site	Male Incidence Rate	Total Male Cases	Female Incidence Rate	Total Female Cases	Total Cases	Male Mortality Rate	Total Male Cases	Female Mortality Rate	Total Female Cases	Total Cases
Mouth & Pharynx	13.3	42	2.4	8	50	6.1	18	2.0	6	24
Nasopharynx	4.6	16	2.8	10	26	3.0	11	*	3	14
Esophagus	6.6	16	*	1	17	5.3	10	*	1	11
Stomach	5.3	16	4.8	14	30	4.0	10	5.0	12	22
Colon	25.4	60	17.4	50	110	15.6	33	8.8	23	56
Pancreas	5.2	16	8.3	18	34	5.1	15	7.5	15	30
Liver	18.9	61	5.5	17	78	19.7	62	5.3	17	79
Lung & Bronchus	66.6	161	37.2	100	261	63.7	142	32.4	80	222
Breast	*	2	86.0	265	267	*	0	27.3	69	69
Cervix	*	0	9.8	35	35	*	0	6.7	20	20
Uterus	*	0	23.2	76	76	*	0	3.9	11	11
Prostate	73.7	175	*	0	175	31.7	49	*	0	49
Urinary Bladder	7.3	13	2.3	6	19	5.5	9	*	3	12
Thyroid	3.0	9	9.4	34	43	*	2	*	2	4
Non-Hodgkin Lymphoma	9.7	23	4.6	13	36	6.8	12	2.5	6	18
Rectum	14.2	43	6.8	19	62	4.8	13	4.5	9	22
Parotid and Other Unspecified Glands	1.6	6	*	2	8	*	1	*	0	1
Anus	*	3	*	2	5	*	1	*	3	4
Larynx	3.4	11	*	2	13	*	2	*	2	4
Articular Cartilage	*	4	*	2	6	*	2	*	1	3
Leukemia	6.8	19	5.4	15	34	7.8	15	3.6	8	23
Skin	11.1	28	3.9	8	36	*	3	*	1	4
Other Soft Tissue	*	2	*	1	3	*	0	*	0	0
Kidney and Ureter	6.7	19	5.7	16	35	5.3	14	*	2	16
Brain	1.2	5	*	3	8	*	4	*	3	7



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Annex 1. Cancer Incidence and Mortality Counts and Rates, By Sex, Guam, 2013-2017 - Continued

Cancer site	Male Incidence Rate	Total Male Cases	Female Incidence Rate	Total Female Cases	Total Cases	Male Mortality Rate	Total Male Cases	Female Mortality Rate	Total Female Cases	Total Cases
Unknown and Ill-Defined Primary Sites	4.6	13	7.3	22	35	3.7	9	4.6	13	22
Testis	3.1	11	*	0	11	*	3	*	0	3
Peritoneum, Omentum and Mesentery	*	0	*	1	1	*	0	*	2	2
Ovary	*	0	6.3	21	21	*	0	7.7	24	24
Other Endocrine	*	3	*	1	4	*	0	*	0	0
Nose, Nasal Cavity and Middle Ear	*	2	*	1	3	*	2	*	0	2
Other or Unspecified Male Genital Organs	2.4	7	*	0	7	*	1	*	0	1
Other or Unspecified Female Genital Organs	*	0	2.8	7	7	*	0	*	4	4
Other Digestive Organs	*	3	*	1	4	*	2	*	1	3
Small Intestine	*	1	*	0	1	*	1	*	1	2
Soft Tissues, Nerves, Nervous System	3.0	9	1.6	5	14	*	2	*	2	4
Gallbladder, Extrahepatic Bile Ducts, Ampulla of Vater	*	2	*	4	6	*	3	*	4	7
Hodgkin Lymphoma	*	3	*	1	4	*	1	*	1	2
Myeloma	*	0	*	2	2	*	2	*	1	3
Kaposi Sarcoma	*	0	*	0	0	*	1	*	0	1
Other	*	0	*	0	0	*	0	*	1	1
All Cancer Sites	306.4	804	261.3	783	1587	199.3	455	137.5	351	806

Invasive cases only.

**Rates are suppressed if fewer than five cases were recorded.*

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

Source Years 2013-2017: UOG Cancer Research Center, PRCCR.

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Annex 2. Comparison of Cancer Incidence and Mortality with U.S. Standard and WHO rates, Guam, 2013-2017

Cancer Sites	Incidence				Mortality			
	Counts	Crude Rate	2000 U.S. Standard Adjusted Rate	WHO 2000-2005 Adjusted Rate	Counts	Crude Rate	2000 U.S. Standard Adjusted Rate	WHO 2000-2005 Adjusted Rate
All Sites	1587	199.2	279.9	211.39	806	101.16	165.6	112.3
Mouth & Pharynx	50	6.3	7.8	6.25	24	3.01	4.0	3.0
Nasopharynx	26	3.3	3.9	3.2	14	1.76	2.1	1.8
Esophagus	17	2.1	3.3	2.35	11	1.38	2.6	1.7
Stomach	30	3.8	5.1	3.94	22	2.76	4.5	3.1
Colon	110	13.8	21.0	15.03	56	7.03	11.8	7.8
Pancreas	34	4.3	7.0	4.76	30	3.77	6.5	4.3
Liver	78	9.8	12.1	10	79	9.91	12.2	10.1
Lung & Bronchus	261	32.8	50.9	36.11	222	27.86	46.9	31.5
Breast (female)	265	33.3	86.0	67.78	69	8.66	27.3	18.5
Cervix	35	4.4	9.8	8.45	20	2.51	6.7	5.0
Uterus	76	9.5	23.2	19.05	11	1.38	3.9	2.8
Prostate	175	22.0	73.7	51.73	49	6.15	31.7	17.0
Urinary Bladder	19	2.4	4.6	2.77	12	1.51	3.1	1.8
Thyroid	43	5.4	6.0	5.43	4	*	*	*
Non-Hodgkin Lymphoma	36	4.5	7.0	4.89	18	2.26	4.5	2.6
Rectum	62	7.8	10.5	8.2	22	2.76	4.8	3.1
Parotid and Other Unspecified Glands	8	1.0	1.1	0.97	1	*	*	*
Anus	5	0.6	0.8	0.65	4	*	*	*
Larynx	13	1.6	2.0	1.69	4	*	*	*
Articular Cartilage	6	0.8	0.8	0.76	3	*	*	*
Leukemia	34	4.3	6.1	4.69	23	2.89	5.6	3.4
Skin	36	4.5	7.4	4.94	4	*	*	*
Other Soft Tissue	3	*	*	*	0	*	*	*
Kidney and Ureter	35	4.4	6.2	4.59	16	2.01	3.1	2.2
Brain	8	1.0	1.0	0.97	7	0.88	1.2	0.9
Unknown and Ill-Defined Primary Sites	35	4.4	6.0	4.58	22	2.76	4.1	3.0



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Annex 2. Comparison of Cancer Incidence and Mortality with U.S. Standard and WHO rates, Guam, 2013-2017 (continued)

Cancer Sites	Incidence				Mortality			
	Counts	Crude Rate	2000 U.S. Standard Adjusted Rate	WHO 2000-2005 Adjusted Rate	Counts	Crude Rate	2000 U.S. Standard Adjusted Rate	WHO 2000-2005 Adjusted Rate
Testis	11	1.4	3.1	3.12	3	*	*	*
Peritoneum, Omentum and Mesentery	1	*	*	*	2	*	*	*
Ovary	21	2.6	6.3	5.48	24	3.01	7.7	6.2
Other Endocrine	4	*	*	*	0	*	*	*
Nose, Nasal Cavity and Middle Ear	3	*	*	*	2	*	*	*
Other or Unspecified Male Genital Organs	7	0.9	2.4	1.91	1	*	*	*
Other or Unspecified Female Genital Organs	7	0.9	2.8	1.9	4	*	*	*
Other Digestive Organs	4	*	*	*	3	*	*	*
Small Intestine	1	*	*	*	2	*	*	*
Soft Tissues, Nerves, Nervous System	14	1.8	2.3	1.86	4	*	*	*
Gallbladder, Extrahepatic Bile Ducts, Ampulla of Vater	6	0.8	1.0	0.79	7	0.88	1.2	0.9
Hodgkin's Lymphoma	4	*	*	*	2	*	*	*
Myeloma	2	*	*	*	3	*	*	*
Kaposi Sarcoma	0	*	*	*	1	*	*	*
Other	2	*	*	*	1	*	*	*

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NOTES :



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- Guam Comprehensive Cancer Control/Program/Vivian Pareja
 - Annual Cancer Retreat (2019)
 - Breast Cancer Awareness (2016)
 - Breast Cancer Awareness (2019)
 - Celebrate Life! Cancer Survivors Conference (2016)
- Joshua S. Miller
 - Cover photo
 - Header
- Micronesian Resource Center One-Stop Shop (MRCOSS)
 - MRCOSS group photo
- University of Guam — Guam Cancer Registry
 - Guam Cancer Registry group photo
- University of Guam Cancer Research Center — Community Outreach Core
 - Colorectal Cancer Awareness (2018)
 - Health Providers Awareness Symposium (2019)
 - Women's Health Initiative
- Tress P. Diaz, Cover Photo (Urunao Beach)

