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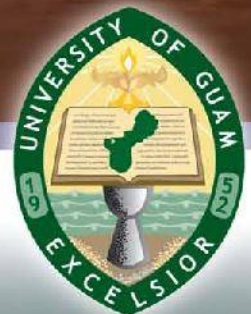
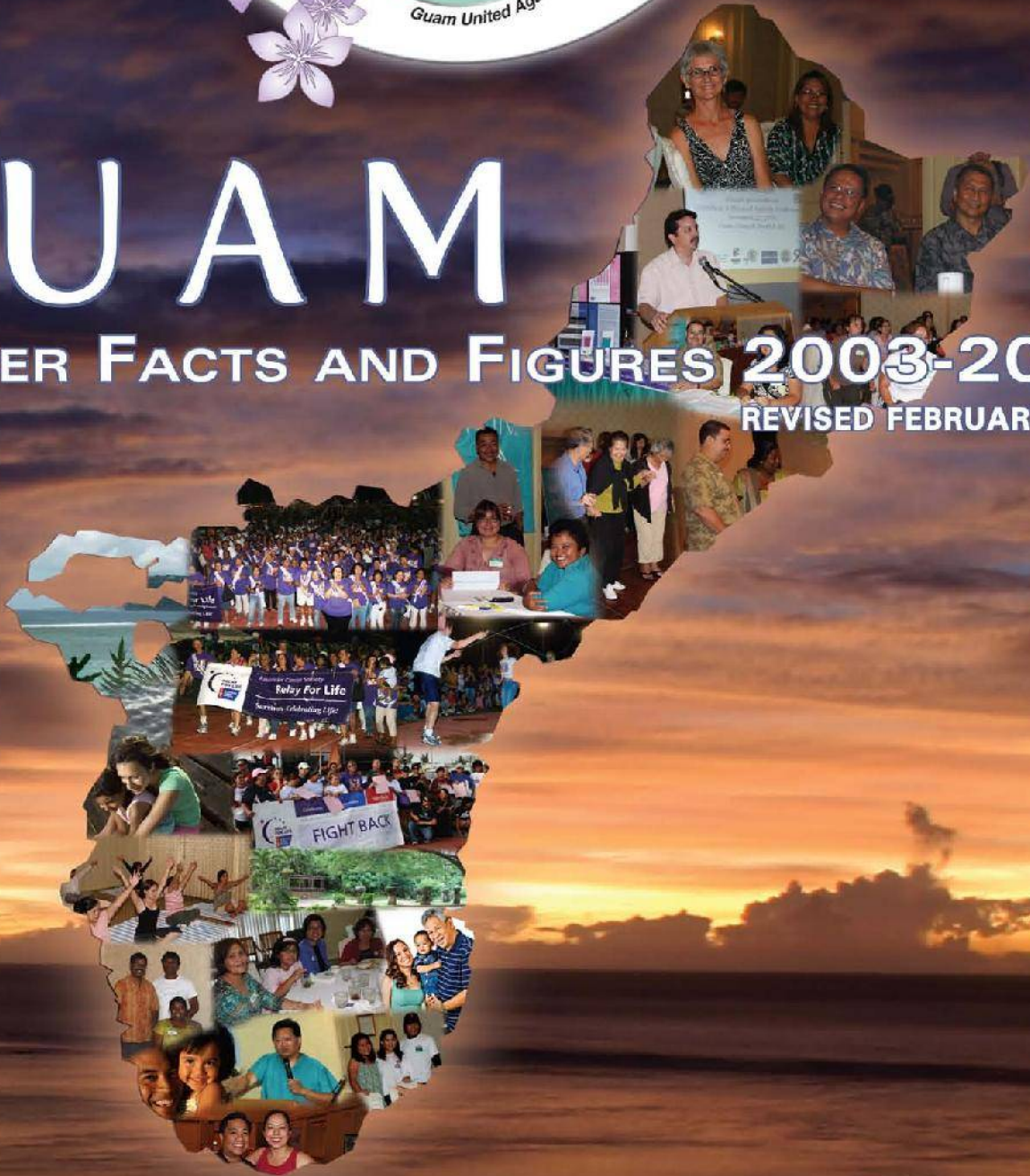




GUAM

CANCER FACTS AND FIGURES 2003-2007

REVISED FEBRUARY 2011



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The Data and Research Action Team of the Guam Comprehensive Cancer Control Coalition, the Guam Comprehensive Cancer Control Coalition, the Guam Comprehensive Cancer Control Program of the Department of Public Health and Social Services, the Guam Cancer Registry of the University of Guam Cancer Research Center, the National Cancer Institute's Cancer Information Service Pacific Region, and American Cancer Society Guam Field Office.

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GUAM COMPREHENSIVE CANCER CONTROL COALITION

<i>Vision:</i>	"The people of Guam will be cancer free, embracing a healthy lifestyle and living in a healthy environment."
<i>Mission:</i>	To reduce cancer incidence and mortality on Guam through the collaboration of public and private stakeholders.
<i>Goals:</i>	To prevent and reduce exposure to cancer risk factors. To improve access to and utilization of cancer screening, diagnosis, treatment, and related services. To enhance the quality of life for cancer survivors. To advocate for sustainable funding for cancer programs. To promote a social and policy environment that is conducive to healthy lifestyles.

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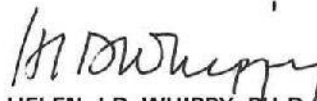
Buenas yan Háfa Adai! Accurate and comprehensive data is fundamental to any effective cancer control and prevention program. The collaborative efforts of the Guam Cancer Registry under the University of Guam (UOG), the Department of Public Health and Social Services (DPHSS) and the Guam Comprehensive Cancer Control Coalition have resulted in this publication, which presents the most current data regarding cancer on Guam.

Cancer is clearly a public health priority on our island. Our people have some of the highest rates of certain cancers when compared to the US and its Territories. The data presented in this publication reveal patterns and trends in cancer incidence and mortality, and provide a baseline against which to judge progress in the future. The information will also prove essential to those working in cancer control and prevention, whether it be in the areas of policy and advocacy, health promotion and prevention, clinical service delivery, support services for cancer patients, or health care financing.

The partnership between the Guam Cancer Registry team, UOG, DPHSS and the various stakeholders that comprise the Guam Comprehensive Cancer Control Coalition will continue as we pool resources and expertise to address the urgent need to reduce the burden from cancer on our island. This publication represents one of many first steps in the fight against cancer, upon which we will build future efforts, using 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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Cancer in Guam: An Overview



Figure 1. A panoramic view of the Western shore of Guam overlooking Tamuning village.

What is cancer?

Hundreds of Guam's people live with cancer. Cancer is a large group of diseases that begins in individual cells. Normally cells grow and divide to form new cells as the body needs them. "When cells grow old, they die, and new cells take their place. Sometimes, this process goes wrong, and new cells form when the body does not need them, and old cells do not die when they should. These extra cells can form a mass of tissue called a growth or tumor. Tumors can be benign or malignant. Benign tumors are not cancer. Malignant tumors are cancer. Cells from malignant tumors can spread (metastasize) to other parts of the body and can damage these organs."¹ When cancer spreads, and the spread is not controlled, it usually results in death.

"Cancer can be caused by external (chemicals, tobacco smoke, radiation, viruses), internal (hormones, immune conditions, genetics), and lifestyle (tobacco and alcohol use, unprotected sun exposure, poor nutrition, physical inactivity) factors."² Many cancers can be cured if detected and treated early, and many others can be prevented by changes in lifestyle. The lifestyle factor that is probably responsible for more cancers than any other is the use of tobacco products.

How common is cancer?

Cancer is the second leading cause of death in Guam as well as in the U.S. On Guam, it accounts for nearly 1 in every 5 deaths. The American Cancer Society estimates that over 1.4 million people in the U.S. will be diagnosed with cancer in 2009, and 562,340 will die, that's more than 1,500 deaths per day.³

TABLE 1
Comparison of Cancer Incidence Counts and Mortality Counts,
Guam: 1998-2002 and 2003-2007

Years	Incidence (New Cases)	Mortality (Deaths)
1998 - 2002	1,336	653
2003 - 2007	1,580	720
Total Cancer	2,916	1,373

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

In Guam over the past ten years, there has been an increase in the number of new cancer cases (incidence) and deaths (mortality). There has been an 18% increase in the annual, age-adjusted incidence rates, and a minor increase in mortality rates per 100,000 population. In stark contrast, the U.S. rates for both cancer incidence and deaths have been decreasing due to the steady decline of the common types of cancer.⁴ Comparing the five year period 1998-2002 with 2003-2007, the number of Guam cancer deaths increased 10% (from 653 to 720) and new cancer cases diagnosed increased by 19% (from 1,333 to 1,580).

Between 2003-2007, a total of 1,580 Guam residents were diagnosed with cancer, and 720 people died of this disease (Table 1). On average, this translates to approximately 316 people diagnosed with cancer, and 144 who die annually of this disease, or 1 person every two to three days.

Economic Costs of Cancer⁵

The National Cancer Institute estimated the direct and indirect economic costs for cancer in 2004 were \$120.4 billion, and the nationwide costs for cancer treatment were \$72.0 billion⁶. In Guam, these costs were not available for inclusion in this report. Suffice it to say that the costs are high and are estimated to grow with the increase in new cases. However high, this cost does not come close to taking into consideration the gut wrenching human suffering and vast emotional toll that cancer inflicts on those who have cancer, their families and friends, and the community.

To reduce this tremendous burden, we must work together to allocate resources for prevention and control of cancer, for cancer screening and early detection, for comprehensive cancer treatment, support services for quality of life programs, and for policy changes to strengthen and support programs to reduce preventable risk factors such as tobacco use and promote healthy lifestyles.

What are cancer incidence and mortality rates?

“Cancer incidence rates are measures of the risk of being diagnosed with cancer among Guam’s general population, while mortality rates are measures of the risk of dying among Guam’s general population.

Cancer rates in this document represent the number of new cases of cancer per 100,000 population (incidence) or the number of cancer deaths per 100,000 population (mortality) during a specific time period.”⁷ For example, if Guam’s cancer incidence rate for females is 160.0 that means for every 100,000 females in Guam, approximately 160 new cases of cancer were diagnosed for the selected time period. Another example: if the population of women in Guam was 50,000, then approximately 80 new cases of cancer would have been diagnosed for the selected time period. “Rates provide a useful way to compare the cancer burden irrespective of the actual population size.”⁸ Populations vary greatly, so this method allows us to ‘normalize’ the data and make valid comparisons between Guam and the U.S. or other States; or comparisons by sex, ethnic group, and/or geographic area.

“Mortality rates depend on the stage at diagnosis, survival rates, and treatment modalities for the cancer type. Mortality rates do not reflect the risk of death among newly diagnosed cancer cases. Persons dying of cancer today were probably diagnosed several years ago. Therefore a new screening program may result in a greater number of new cancers being diagnosed (i.e., higher incidence rates). However, the new screening program, aimed at early detection and increased survival, will take time to influence the mortality rates.”⁹

NOTE: The above was excerpted from the Hawai’i Cancer Facts and Figures 2003-2004, a publication made possible through the collaborative efforts of the American Cancer Society, Hawai’i Pacific, Inc., the University of Hawai’i Cancer Research Center of Hawaii and the Hawai’i Department of Health, 2004.



What are the sources of the Guam data?

Guam's data in this report were extracted from the Guam Cancer Registry (GCR) for the five-year periods 1998-2002, and 2003-2007. Data for the GCR were collected using CanReg4 (a software package provided by the International Agency for Research on Cancer, Lyon, France) and Abstract Plus (a software program made available by Centers for Disease Control and Prevention to facilitate implementation of the National Program of Cancer Registries). The data (current as of March 28, 2009), was exported to EpilInfo6 software for analysis. The cancer staging data were collected on Abstract Plus and analyzed using SAS (Statistical Analysis Software). Abstract Plus is an abstracting tool used to summarize the medical record into an electronic report of cancer diagnosis and treatment by abstractors and other individuals or groups who work with cancer data. This software was developed at CDC's Division of Cancer Prevention and Control in support of CDC's National Program of Cancer Registries (NPCR). All data items in national standard data sets, including text, are supported. Data collection for 1998 and 1999 was passive, but the remaining period from 2000 – 2007, underwent active surveillance.

The Guam Cancer Registry's most recent report, "Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity and Age, Guam: 2003-2007," serves as the basis for this report. The report was issued on April 30, 2009, and was generated at the request of the Data and Research Action Team, Guam Comprehensive Cancer Control Coalition, and was prepared by Dr. Robert L. Haddock, and Rebecca J. Talon, both who are members of the team. NOTE: If cancer was included in either the 'immediate' or 'underlying' cause of death on death certificates, it was included in the cancer mortality count.

Guam and U.S. average nationwide data on cancer screening prevalence, and adult tobacco use were obtained from the website of the Behavioral Risk Factor Surveillance System, Centers for Disease Control and Prevention, and from the Guam State Epidemiological Workgroup. Data on youth tobacco use prevalence were obtained from the Strategic Prevention Framework – State Incentive Grant (SPF-SIG), Guam Substance Abuse Epidemiological Profile, 2007 Update, 3rd Quarter, 2008. PEACE, Hagatna, Guam, 2008.

The number of cancer cases on Guam is relatively small compared to national and international numbers, therefore, statistical comparisons were not performed. In addition, because of Guam's relatively young population, age adjustment was applied as needed to allow for comparison of Guam's rates with the U.S. The U.S. Year 2000 standard population was used for this age-adjustment. Cancer risk of people at older ages is generally higher than people at younger ages. For example, about 3 of every 5 new cases of cancer diagnosed in Guam occur in people 55 years and older. If one ethnic group's (e.g., Chamorro) cancer incidence rate is higher than another, the first question asked is whether the Chamorros have a higher rate because they have an older population. To address this, selected mortality and incidence rates presented in this booklet (when they were provided) were 'age-adjusted.' These same considerations may be applied when comparing cancer in different ethnicities.

Cancer Changes

In Guam over the past ten years (1998 to 2007), changes in the number of new cases (incidence) and deaths (mortality) revealed an increase for both.

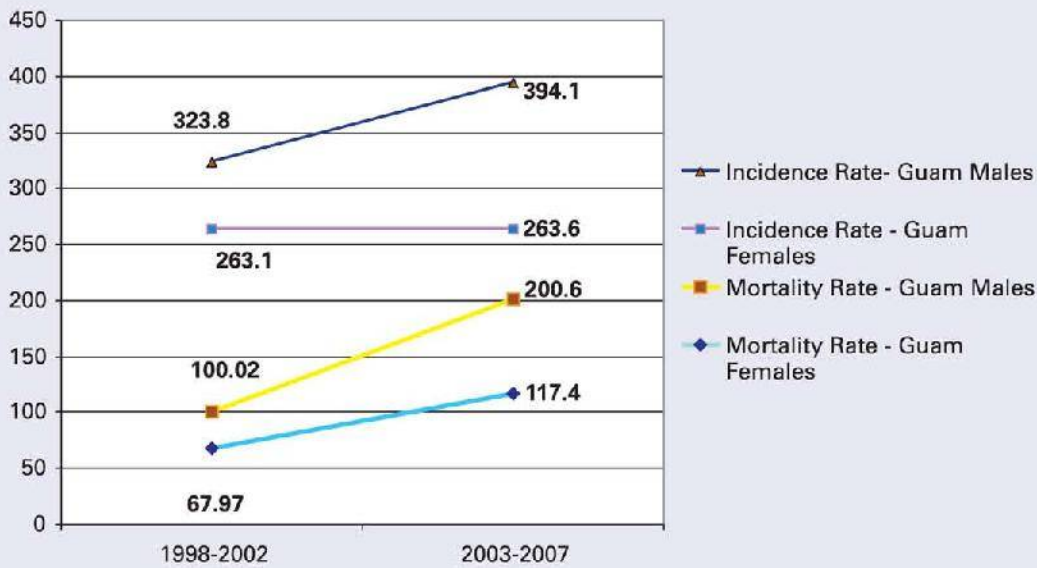
When comparing incidence rates, there was a slight increase in age-adjusted incidence and an increase in mortality rates per 100,000 population. In contrast, the U.S. rates for both incidence and deaths have been decreasing due to the steady decline of the common types of cancer.¹⁰

Comparing the five year period 1998-2002 with 2003-2007, cancer deaths increased 10% (from 653 to 720) and new cancer diagnoses increased by 19% (from 1,333 to 1,580). For Guam women, the age-adjusted incidence rates per 100,000 population for new cases remained nearly the same with only a very slight increase of 0.2% (from 263.1 to 263.6), and a sharp 73% increase (from 67.97 to 117.4) in mortality rates. Among Guam men, the age-adjusted incidence rates increased by 22% (from 323.8 to 394.1), with a 100% increase in mortality rates (from 100.02 to 200.6). (See Figure 2.)

American Cancer Society's Relay For Life, Guam 2008



FIGURE 2.
Cancer Incidence Rates by Sex, Guam: 1998-2002 and 2003-2007



Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*.
 Guam: March 28, 2009. Rates are age-adjusted to 2000 U.S. Standard Population



Cancer Changes

TABLE 2.
Cancer Incidence and Mortality Counts and Rates, Guam: 2003-2007

	INCIDENCE					MORTALITY				
	Female Rate	Total Female Cases	Male Rate	Total Male Cases	Total Cases	Female Rate	Total Female Cases	Male Rate	Total Male Cases	Total Cases
All Sites	263.6	694	394.1	886	1,580	117.4	281	200.6	439	720
Oral Cavity	2.4	6	11.1	29	35	*	3	3.6	8	11
Nasopharynx	3.1	10	5.7	18	28	*	3	4.8	15	18
Esophagus	*	1	6.4	16	17	*	1	3.7	10	11
Stomach	2.8	7	7.5	16	23	*	4	4.2	8	12
Small Intestine	*	2	*	2	4	*	2	*	0	2
Colon	19.2	49	30.8	67	116	10.0	24	15.6	33	57
Rectum	6.7	18	12.7	30	48	3.7	8	8.2	17	25
Anus	*	0	*	1	1	*	0	*	0	0
Liver	4.7	11	19.3	55	66	4.7	10	13.8	40	50
Gallbladder	*	4	*	1	5	*	3	*	0	3
Pancreas	6.0	12	7.8	17	29	5.0	10	7.0	14	24
Other Digestive	*	3	*	4	7	*	3	*	2	5
Larynx	*	1	3.3	7	8	*	1	*	4	5
Lung and Bronchus	40.6	91	85.4	181	272	28.9	65	65.2	141	206
Other Respiratory	*	2	*	1	3	*	1	*	0	1
Heart and Adjacent	2.6	7	2.5	6	13	*	1	*	1	2
Bones and Joints	1.4	5	*	2	7	*	2	*	0	2
Skin	3.7	8	4.2	14	22	*	2	3.2	7	9
Soft Tissues	*	4	4.1	12	16	*	1	1.5	5	6
Breast	76.2	202	*	0	202	23.2	57	*	0	57
Cervix	9.5	31	-	-	31	5.1	15	-	-	15
Uterus	18.4	59	-	-	59	3.7	10	-	-	10
Ovary	5.8	16	-	-	16	3.5	10	-	-	10
Other Fem. Genital	*	3	*	-	3	*	1	-	-	1
Prostate	-	-	113.3	223	223	-	-	33.0	59	59
Testes	-	-	1.8	6	6	-	-	-	0	0
Other Male Genital	-	-	*	4	4	-	-	*	3	3
Urinary Bladder	*	0	10.7	21	21	*	0	5.1	10	10
Kidney and Ureter	2.9	7	6.1	16	23	*	3	*	4	7
Eye and Orbit	*	0	*	0	0	*	0	*	1	1
Brain	2.3	6	3.0	9	15	2.0	5	*	4	9
Other C.N.S.	*	1	*	1	2	*	0	*	1	1
Thyroid	15.5	49	5.3	12	61	*	1	*	3	4
Other Endocrine	*	1	*	2	3	*	1	*	1	2
Lymph Nodes	*	0	*	1	1	*	0	*	1	1
Hodgkin Lymphoma	*	3	2.1	8	11	*	0	*	3	3
Non-Hodgkin Lymphoma	8.7	24	12.9	33	57	4.5	11	5.0	11	22
Multiple Myeloma	*	3	3.9	9	12	*	3	3.3	7	10
Leukemia	5.8	15	10.7	27	42	4.2	10	4.8	11	21
Other or Ill-defined	13.7	33	16.0	35	68	3.7	10	7.4	15	25

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009. Incidence and mortality rates are age-adjusted to 2000 U.S. Standard Population.

*Rates are suppressed if fewer than 5 cases were reported in a specific category.

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

"-" Not applicable.

TABLE 3.
Cancer Incidence and Mortality Counts and Rates, Guam: 1998-2002

	INCIDENCE					MORTALITY				
	Female Rate	Total Female Cases	Male Rate	Total Male Cases	Total Cases	Female Rate	Total Female Cases	Male Rate	Total Male Cases	Total Cases
All Sites	263.1	641	323.8	692	1333	67.97	257	100.02	396	653
Oral Cavity	3.4	7	8.7	20	27	*	3	2.53	10	13
Nasopharynx	3.6	10	10.5	31	41	2.18	5	5.0	15	20
Esophagus	*	3	5.1	13	16	*	3	2.27	9	12
Stomach	7.6	18	7.2	18	34	3.44	13	4.29	17	30
Small Intestine	*	0	*	1	1	0	0	0	0	0
Colon	23.9	52	34.4	68	120	11.5	23	17.7	35	58
Rectum	6.2	14	12.2	25	39	3.1	6	4.5	9	15
Anus	*	1	*	0	1	*	0	*	0	0
Liver	6.7	15	14.5	34	49	2.64	10	6.82	27	37
Gallbladder	*	2	*	0	2	*	1	*	1	2
Pancreas	4.7	11	9.2	19	30	2.12	8	3.79	15	23
Other Digestive	2.2	5	*	1	6	*	2	*	1	3
Larynx	*	1	5.4	11	12	0	0	4.53	10	10
Lung and Bronchus	28.9	62	73.7	154	216	11.37	43	30.06	119	162
Other Respiratory	*	0	*	0	0	0	0	0	0	0
Heart and Adjacent	2.0	5	2.0	5	10	*	1	*	2	3
Bones and Joints	1.6	5	*	4	9	1.68	5	*	2	7
Skin	2.4	7	11.9	26	33	*	3	2.24	6	9
Soft Tissues	2.4	6	1.5	5	11	*	3	*	4	7
Breast	81.5	201	*	2	203	11.90	45	0	0	45
Cervix	13.4	36	-	-	36	3.70	14	-	-	14
Uterus	15.3	42	-	-	42	3.70	14	-	-	14
Ovary	9.7	27	-	-	27	2.38	9	-	-	9
Other Fem. Genital	*	1	-	-	1	*	0	-	-	0
Prostate	-	-	85.6	116	116	-	-	9.60	38	38
Testes	-	-	2.2	9	9	-	-	*	2	2
Other Male Genital	-	-	*	3	3	-	-	0	0	0
Urinary Bladder	*	2	9.5	18	20	0	0	2.53	10	10
Kidney and Ureter	4.1	9	6.9	15	24	2.28	5	3.89	9	14
Eye and Orbit	*	1	*	1	2	*	2	0	0	2
Brain	2.3	7	*	3	10	*	2	*	4	6
Other C.N.S.	*	0	*	1	1	*	0	*	0	0
Thyroid	12.2	35	4.0	7	42	*	4	*	2	6
Other Endocrine	*	1	*	1	2	*	0	*	1	1
Lymph Nodes	*	0	*	0	0	*	0	*	0	0
Hodgkin Lymphoma	1.2	5	2.4	9	14	*	0	*	1	1
Non-Hodgkin Lymphoma	8.0	20	7.2	19	39	2.31	5	2.02	8	13
Multiple Myeloma	*	3	3.9	7	10	*	4	2.93	5	9
Leukemia	4.6	13	9.5	27	40	2.38	9	5.30	21	30
Other or Ill-defined	7.3	16	8.1	19	35	6.66	15	6.22	13	28

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. **Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007.** Guam: March 28, 2009. Incidence and mortality rates are age-adjusted to 2000 U.S. Standard Population.

* Rates are suppressed if fewer than 5 cases were reported in a specific category.
Rates are per 100,000 persons and are age-adjusted to the 2000 U.S. standard population.
“-” Not applicable.

Stage of Disease at Diagnosis

Cancer staging is an important part of the diagnostic process as it helps doctors and patients plan for the best treatment.

Staging is based on tumor size, the presence of cancer in the lymph nodes, and how far the disease has spread to other parts of the body.¹¹ The terms used to describe cancer stages are *in situ*, localized, regional, distant, and un-staged.

In situ is an early, non-invasive cancer that is present only in the layer of the cells in which it began.

Localized (Early stage) is cancer that is limited to the organ in which it began. There is no evidence that the cancer has spread.

Regional (Late stage) is cancer that has spread beyond the original site to the lymph nodes, organs, or tissues nearby.

Distant (Late stage) is cancer that has spread from the original site to distant organs or lymph nodes.

Un-staged is a cancer case where there is not enough information to identify a stage.

National Cancer Institute, 2004¹²

Cancer cases among Guam residents, by stage and selected ethnicity and sites for 2003-2007, are shown in Table 4. There was a high percentage (75%) of breast cancer cases diagnosed at the late stage among Asian women in Guam. At least half of the breast cancer cases among the other ethnic groups were diagnosed at the early stage. However, there is still room for improvement of early breast cancer detection across all ethnic groups. Late stage diagnosis of cervical, colorectal and lung cancer was higher than early stage diagnosis among all ethnic groups, including those with fewer than five cases across the five-year period. Prostate cancer was the only cancer with

a consistently higher percentage of early stage diagnosis than late stage diagnosis across all ethnic groups.

The Guam Comprehensive Cancer Control Coalition is working diligently with other community organizations to improve cancer screening and early detection of breast, cervical, colorectal, and prostate cancer on Guam. Since there is no screening tool available yet for lung cancer, the Guam Comprehensive Cancer Control Coalition is working on tobacco prevention and control projects to reduce smoking rates as the most effective, preventive measure to reduce the incidence of lung cancer.

Stage of Disease at Diagnosis

TABLE 4.

Total Number of Cases and Percent of Total by Stage at Diagnosis by Selected Race/Ethnicity, Invasive Cancers, Selected Sites, Guam: 2003-2007

SITE	ASIAN			
	Total	% Early Staged	% Late Staged	% Un-Staged
Breast	12	17	75	8
Cervix	*	*	*	*
Colorectal	17	35	53	12
Lung	14	14	72	14
Prostate	*	*	*	*

SITE	CHAMORRO			
	Total	% Early Staged	% Late Staged	% Un-Staged
Breast	90	50	48	2
Cervix	13	39	46	15
Colorectal	85	36	59	5
Lung	151	14	69	17
Prostate	77	75	14	11

SITE	FILIPINO			
	Total	% Early Staged	% Late Staged	% Un-Staged
Breast	62	64	34	2
Cervix	7	43	43	14
Colorectal	44	43	46	11
Lung	62	13	82	5
Prostate	87	86	10	4

SITE	MICRONESIAN			
	Total	% Early Staged	% Late Staged	% Un-Staged
Breast	9	56	44	0
Cervix	*	*	*	*
Colorectal	*	*	*	*
Lung	15	7	73	20
Prostate	8	62	38	0

SITE	WHITE			
	Total	% Early Staged	% Late Staged	% Un-Staged
Breast	6	50	50	0
Cervix	*	*	*	*
Colorectal	12	25	67	8
Lung	18	17	55	28
Prostate	16	81	0	19

Percentages are based on rounded totals.

Early = localized; Late = regional and distant. Localized, regional and distant cancers are invasive. In situ cases (non-invasive) are not included.

*Fewer than 5 cases in the five-year time period.

Breast includes female cases only.

Colorectal includes cancer of the colon, rectum, anus, and rectosigmoid.

Lung includes cancer of the lung and bronchus.

Source: Guam Cancer Registry, Cancer Research Center, University of Guam.

Who gets cancer?

There were differences in cancer incidence and deaths by sex, ethnicity, and age group for the period 2003-2007. In Guam, more men (886) than women (694) were diagnosed with cancer at 1.3 times greater, and more men (439) than women (281) died of cancer at 1.5 times greater. Chamorros, the indigenous people of Guam, had nearly half of the newly diagnosed cancer cases in Guam at 48% (756) of all cancer cases, and represented more than half of the cancer deaths at 57% (410). Since Chamorros comprise 42.1% of the total Guam population,¹³ they are over-represented in cancer cases and deaths.

Cancer knows no bounds when it comes to age. It has afflicted our young children, adolescents, young and middle-aged adults, as well as elderly adults, but not all equally. As expected, it is Guam's middle-aged and elderly adults (ages 55-74) who have suffered the most from this disease that tends to strike more people as they age. Only a small percent (1.5% or 24 cases) of all cancers occurred in Guam's children under the age of 15 years.

For the period 2003-2007, four cancer sites (lung and bronchus, prostate, breast, and colon and rectum) accounted for 55% of Guam's cancer burden. (See Table 5 & 6.) They also accounted for an estimated 62% (195) new cases of cancer diagnosed, and 63% (91) of cancer deaths in Guam residents. Non-Hodgkin lymphoma (6) and leukemia (5) were the leading cancers in children under the age of 15; and thyroid (4) and Non-Hodgkin Lymphoma (4), Bones and Joints (3) and Leukemia (3) for those 15 to 24 years of age.

TABLE 5
Number of New Cancer Cases and Deaths, Selected Cancer Sites, Guam: 2003-2007

Cancer Sites	Incidence Counts (New Cases)	Percentage of Total Cancer Incidence	Mortality Counts (Death)	Percentage of Total Cancer Mortality
Breast (Female)	202	12.8%	57	7.9%
Colon and Rectum	165	10.4%	82	11.4%
Liver	66	4.2%	50	6.9%
Lung and Bronchus	272	17.2%	206	28.6%
Prostate	223	14.1%	59	8.2%
Other Cancer Sites	652	41.3%	266	36.9%
All Sites	1,580	100.0%	720	100.0%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

The Impact of Sex, Age, and Race/Ethnicity

TABLE 6.
Top Ten Cancer Cases and Deaths, Selected Cancer Sites, Guam: 2003-2007

Cancer Sites	Incidence Counts (New Cases)	Percentage of Total Cancer Incidence	Cancer Sites	Mortality Counts (Death)	Percentage of Total Cancer Mortality
1 Lung and Bronchus	272	17.2%	1 Lung and Bronchus	206	28.6%
2 Prostate	223	14.1%	2 Colon and Rectum	82	11.4%
3 Breast (Female)	202	12.8%	3 Prostate	59	8.2%
4 Colon and Rectum	165	10.4%	4 Breast (Female)	57	7.9%
5 Liver	66	4.2%	5 Liver	50	6.9%
6 Thyroid	61	3.9%	6 Pancreas	24	3.3%
7 Uterus Non-Hodgkin	59	3.7%	7 Lymphoma	22	3.1%
8 Lymphoma	57	3.6%	8 Leukemia	21	2.9%
9 Leukemia	42	2.7%	9 Nasopharynx	18	2.5%
10 Oral Cavity	35	2.2%	10 Cervix	15	2.1%
Other Cancer Sites	398	25.2%	Other Cancer Sites	166	23.1%
All New Cancer Cases	1,580	100.0%	All Cancer Deaths	720	100.0%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007.* Guam: March 28, 2009.

Cancer knows no bounds
when it comes to age.



Cancer affects both sexes, but differently

NOTE: Definitions of Sex and Gender: The term sex has multiple meanings, some of which violate sensitivities. One practice has been to substitute the seemingly innocuous term gender. The terms, however, are not synonymous. This section uses them in their strict senses: sex denotes biology (female and male); gender denotes social roles (masculine and feminine).

Cancer incidences (cases) and mortality (deaths) on Guam do not discriminate between the sexes: females and males both experience cancer too frequently. However, the incidence and mortality rates differ, as well as where cancer occurs and how damaging it is. Males on Guam experienced relatively more new cancer cases than women (56% and 44%, respectively) and greater mortality (61% and 39%). (See Table 7.) That is, over this five-year period of the 1,580 incidents of cancer on Guam, 886 males and 694 females were diagnosed with cancer. And across the same time frame, of the 720 cancer deaths 439 were males while 281 were females. On average, every week four men and three women hear the ominous words, "You have cancer." A stark reminder that each statistic represents a person whose life and family members' lives have been disrupted in a most profound way.

TABLE 7.
Cancer in Guam Residents by Sex, Guam: 2003 - 2007

	INCIDENCE		MORTALITY	
	Count	Percentage of Total Cancer	Count	Percentage of Total Cancer
Male	886	56.1%	439	61.0%
Female	694	43.9%	281	39.0%
Total Cases	1,580	100.0%	720	100.0%
	Incidence Rate per 100,000 Population		Mortality Rate per 100,000 Population	
Male	394.1		200.6	
Female	263.6		117.4	

The Impact of Sex, Age, and Race/Ethnicity

The specific site of the body most affected by cancer was different for females and males (see Tables 8 & 9 and Figures 3 to 6). The highest incidence site for females was the breast totaling nearly one-third of all new female cases (29%). For males, the highest incidence site was the prostate totaling one-fourth of all new male cases (25%). After breast, for females the other top incidence sites were lung & bronchus (13%), colon & rectum (9%), uterus (9%), and thyroid (7%). The site with the highest mortality cases, however, was the same for both males (32%) and females (23%): lung & bronchus. The other top mortality sites for females were breast (20%), colon & rectum (11%), and cervix (5%). The other top mortality sites for males were prostate (13%), colon & rectum (11%), and liver (9%).

Overall, these percentages indicate that Guam's males and females share the burden of cancer incidence and mortality. When each sex was considered by incidence, the sex-specific sites stand out: breast was the highest for females while prostate was highest for males. Mortality tells a slightly different story, however. Although the sex-specific sites dominate incidence, the site most associated with death for Guam residents was lung & bronchus irrespective of sex. The fact that the top incidence sites for the sexes are different from the top mortality sites suggests that a cancer diagnosis is not a death sentence, perhaps a reason for optimism and support for early detection. However, the fact that the **highest mortality site** for both sexes is **lung and bronchus** reminds us of the preeminent need to reduce smoking rates on Guam. **Stopping smoking is the single most important act a person can do to reduce her or his chance of contracting any form of cancer, and a family member stopping follows close behind in impacting cancer incidence.**¹⁴

Cancer incidence and mortality on Guam do not discriminate between the sexes...

The Impact of Sex, Age, and Race/Ethnicity


TABLE 8.
Top Ten Cancer Incidence (New Cases) and Mortality (Deaths) for Males,
Guam: 2003-2007

Cancer Sites	Incidence Counts (New Cases)	Percentage of Total Cancer Incidence	Cancer Sites	Mortality Counts (Death)	Percentage of Total Cancer Mortality
1 Prostate	223	25.2%	1 Lung and Bronchus	141	32.1%
2 Lung and Bronchus	181	20.4%	2 Prostate	59	13.4%
3 Colon and Rectum	98	11.1%	3 Colon and Rectum	50	11.4%
4 Liver	55	6.2%	4 Liver	40	9.1%
5 Non-Hodgkin Lymphoma	33	3.7%	5 Nasopharynx	15	3.4%
6 Oral Cavity	29	3.3%	6 Pancreas	14	3.2%
7 Leukemia	27	3.0%	7 Non-Hodgkin Lymphoma	11	2.5%
8 Urinary Bladder	21	2.4%	8 Leukemia	11	2.5%
9 Nasopharynx	18	2.0%	9 Urinary Bladder	10	2.3%
10 Pancreas	17	1.9%	8 Esophagus	10	2.3%
Other Cancer Sites	184	20.8%	9 Oral Cavity	8	1.8%
All Male Cancer Cases	886	100.0%	9 Stomach	8	1.8%
			10 Skin	7	1.6%
			10 Multiple Myeloma	7	1.6%
			Other Cancer Sites	33	7.5%
			All Male Cancer Deaths	439	100.0%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007. Guam: March 28, 2009.



... the highest mortality site for both sexes is lung and bronchus ...



The Impact of Sex, Age, and Race/Ethnicity



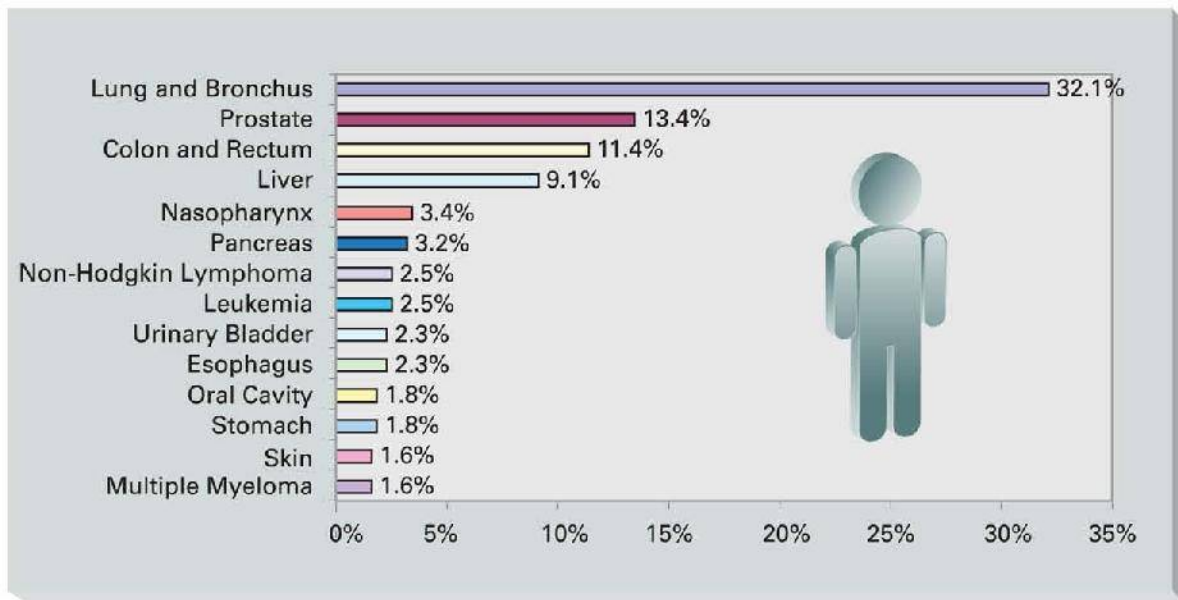
TABLE 9.
Top Ten Cancer Incidence (New Cases) and Mortality (Deaths) for Females,
Guam: 2003-2007

Cancer Sites		Incidence Counts (New Cases)	Percentage of Total Cancer Incidence	Cancer Sites		Mortality Counts (Death)	Percentage of Total Cancer Mortality
1	Breast	202	29.1%	1	Lung and Bronchus	65	23.1%
2	Lung and Bronchus	91	13.1%	2	Breast	57	20.3%
3	Colon and Rectum	67	9.7%	3	Colon and Rectum	32	11.4%
4	Uterus	59	8.5%	4	Cervix	15	5.3%
5	Thyroid	49	7.1%	5	Non-Hodgkin Lymphoma	11	3.9%
6	Cervix	31	4.5%	6	Uterus	10	3.6%
7	Non-Hodgkin Lymphoma	24	3.5%	6	Ovary	10	3.6%
8	Ovary	16	2.3%	6	Leukemia	10	3.6%
9	Leukemia	15	2.2%	6	Pancreas	10	3.6%
10	Pancreas	12	1.7%	6	Liver	10	3.6%
				7	Brain	5	1.8%
				8	Stomach	4	1.4%
				9	Oral Cavity	3	1.1%
				9	Nasopharynx	3	1.1%
				9	Other Digestive	3	1.1%
				9	Multiple Myeloma	3	1.1%
				9	Gallbladder	3	1.1%
				10	Small Intestine	2	0.7%
				10	Bones and Joints	2	0.7%
				10	Skin	2	0.7%
	Other Cancer Sites	107	15.4%		Other Cancer Sites	30	10.7%
	All Female Cancer Cases	694	100.0%		All Female Cancer Deaths	281	100.0%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007. Guam: March 28, 2009.

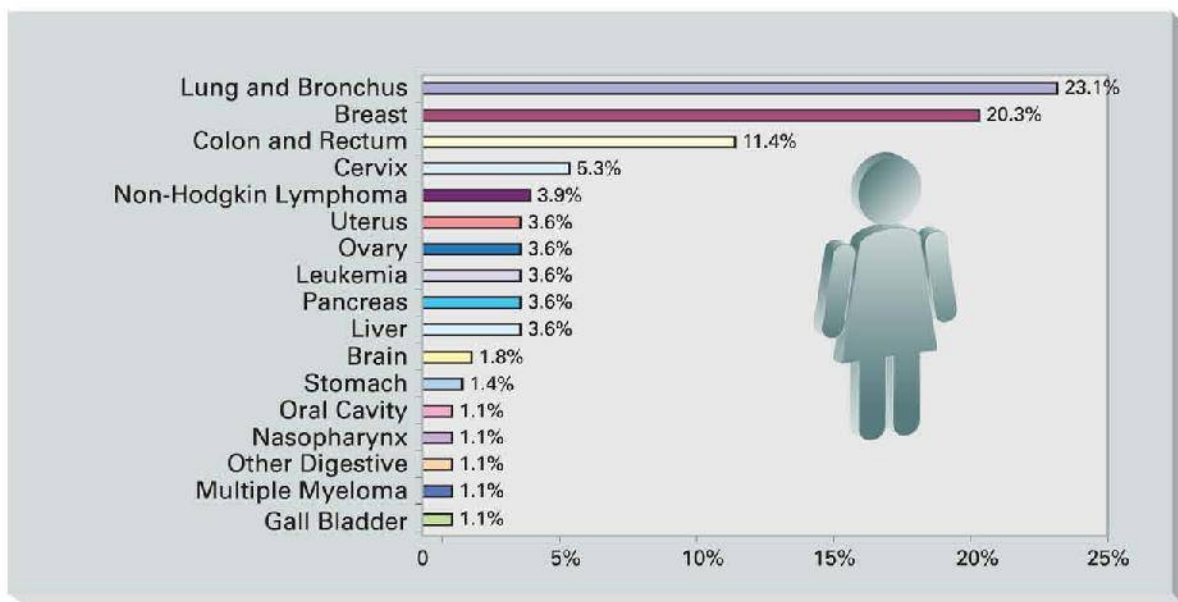
The Impact of Sex, Age, and Race/Ethnicity

FIGURE 3.
Leading Sites of Cancer Mortality (Deaths) for Males, Guam: 2003-2007



Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

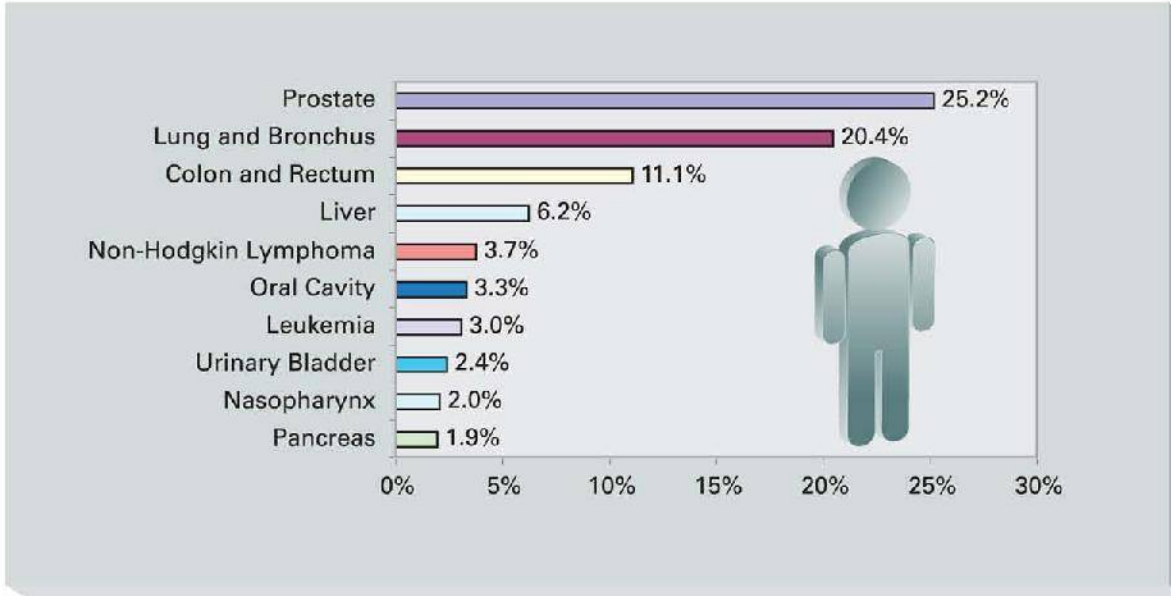
FIGURE 4.
Leading Sites of Cancer Mortality (Deaths) for Females, Guam: 2003-2007



Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

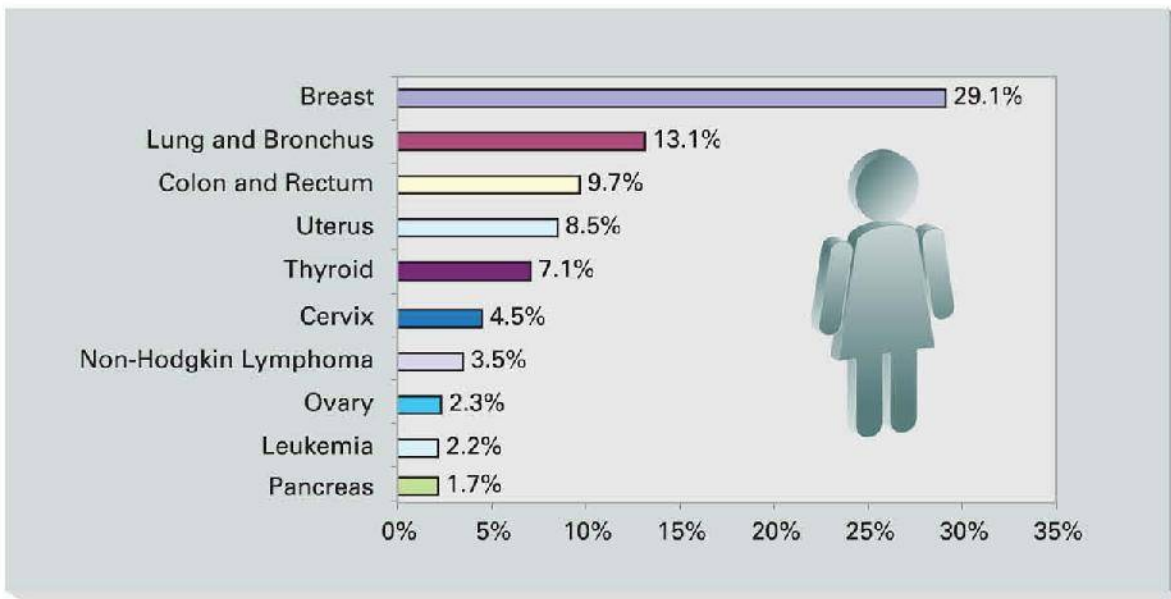


FIGURE 5.
Leading Cancer Incidence for Males, Guam: 2003-2007



Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

FIGURE 6.
Leading Cancer Incidence for Females, Guam: 2003-2007



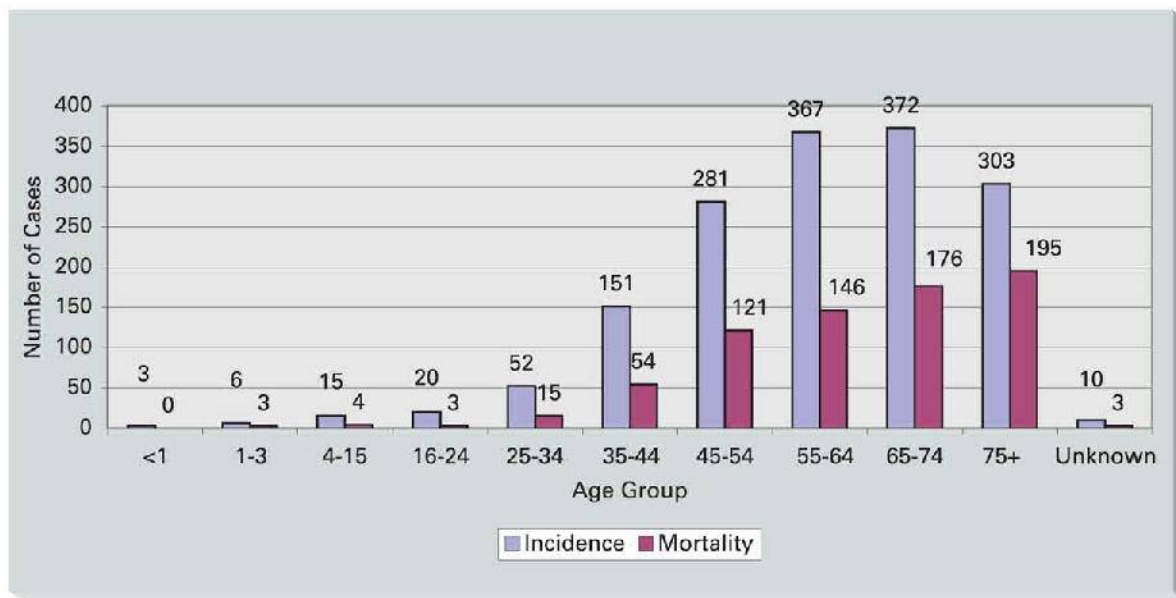
Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

Age and Cancer Risk

In the years 2003-2007, there were on average 316 new cases of cancer diagnosed on Guam each year. Age was a primary risk factor for the disease. About 66% of all cancers being diagnosed were found in people over the age of 55 and almost 72% of all cancer deaths occurred in the same age group. (See Figure 7.)

Cancer begins when cells undergo genetic mutations, become abnormal and start making more cells at an abnormal rate. Sometimes this process may occur very quickly but usually it takes a long time. In addition, the longer a person lives, the greater the chance that the person will develop such genetic mistakes. Many scientists believe this fact is responsible for higher incidence rates of cancer in older people. However, the association between age and an increased risk of cancer is still not well understood.

FIGURE 7.
Cancer Incidence (New Cases) and Mortality (Deaths) Counts by Age, Guam: 2003-2007



Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007. Guam: March 28, 2009.

According to the National Cancer Institute (NCI), people 65 and older have an incidence rate for all cancers 10 times greater than that of younger people. The mortality rate for older cancer patients is also 16 times greater than that of their younger counterparts.

Some cancers such as Leukemia and Non-Hodgkin Lymphoma are more common in children. However, most cancers occur in older people. Cancers that are more common on Guam with advanced age include:

Breast Cancer: From 2003-2007, approximately 3% of Guam women diagnosed with breast cancer were under age 35; 14% between 35 and 44; 24% between 45 and 54; 28% between 55 and 64; and 31% were 65+ years of age.

Approximately 2% of women who died of breast cancer were under age 35; 7% between 35 and 44; 23% between 45 and 54; 26% between 55 and 64; and 42% were 65+ years of age.

Prostate Cancer: From 2003-2007, no men under age 45 were diagnosed with prostate cancer; 6% were between 45 and 54; 25% between 55 and 64; and 69% were 65+ years of age. Approximately 2% of the Guam men who died of prostate cancer were between 45 and 54; 10% were between 55 and 64; and 88% were 65+ years of age.

Lung Cancer: From 2003-2007, approximately 0.4% of Guam residents diagnosed with lung cancer under the age of 35; 5.1% between 35 and 44; 12.1% between 45 and 54; 25.0% between 55 and 64; and 57.4% 65+ years of age. Approximately 3.9% of the Guam residents who died of lung cancer were under age 45; 16.5% between 45 and 54; 25.2% between 55 and 64; and 54.4% were 65+ years of age.

Clearly, the risk of these three cancers increases with age. Therefore everyone should have screening tests for various types of cancer based on their age. Treatment is more likely to be successful if cancer is diagnosed at an early stage.

Ethnicity

When comparing the age-adjusted cancer incidence rates by ethnicity (see Table 10), Caucasians manifested the highest incidence rate of 585.4 for the years 1998-2002 and Micronesians had the highest incidence rate at 598.3 for the years 2003-2007. These statistics are higher than the U.S. incidence rates of 479.5 (1998-2002) and 458.4 (2003-2007). [Note: All incidence and mortality rates are calculated per 100,000 population.]

In looking at specific types of cancer, all ethnic groups had a higher incidence rate of nasopharyngeal cancer when compared with the U.S. rate. This same phenomenon is manifested in the incidence rates for all ethnic groups (except Filipinos) in cancers of the liver, lung and bronchus, and cervix. More specifically, Chamorros had the highest incidence rate of nasopharyngeal cancer at 8.6, as compared with the U.S. rate of 0.6. Micronesians had the highest rate of cancer in the lung and bronchus with a rate of 174.7 as compared with the U.S. rate of 67.7. Micronesians also had the highest rate of cervical cancer at 21.1, as compared to the U.S. incidence rate of 8.1.

The Impact of Sex, Age, and Race/Ethnicity

TABLE 10.
Comparison of Guam and U.S. Mean Annual Age-Adjusted Cancer
Incidence Rates¹ by Ethnicity for the Periods 1998-2002 and 2003-2007

CANCER SITE	ETHNICITY ²					TOTAL U.S. ³
	CHAMORRO	FILIPINO	MICRONESIAN	ASIAN	CAUCASIAN	
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
Mouth and 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
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
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
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
Colon-Rectum-Anus						
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
Pancreas						
1998-2002	12.4	1.7	4.1	12.5	17.6	11.1
2003-2007	8.7	3.0	0.0	17.4	16.3	11.3
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
Lung and 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
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
Cervix						
1998-2002	16.2	8.4	27.4	8.5	10.5	9.6
2003-2007	11.6	5.5	21.1	14.5	9.6	8.1
Uterus						
1998-2002	31.6	4.8	16.0	0.0	0.0	0.8
2003-2007	34.4	6.8	4.3	5.2	17.7	0.7
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
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
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
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
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

NOTES:

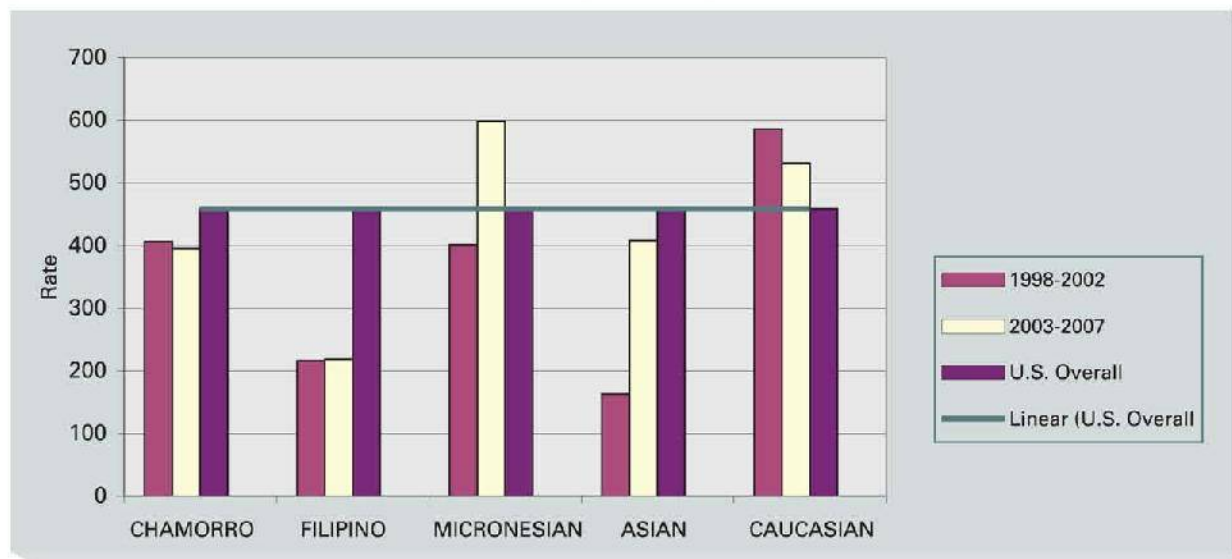
¹ Cases per 100,000 persons of the specified population.

² "Chamorro" ethnicity includes only those Chamorros residing on Guam. "Micronesian" includes persons of Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Republic of the Marshall Islands or Republic of Palau ancestry.

³ U.S. Cancer Statistics Working Group. *United States Cancer Statistics: 1999-2005 Incidence and Mortality Web-based Report*. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention and National Cancer Institute; 2009. Available at www.cdc.gov/uscs. For the period 1998-2002, year 2000 data were used; for the period 2003-2007, year 2005 data were used.



FIGURE 8.
Comparison of U.S. and Guam Mean Annual Age-Adjusted Cancer Incidence (New Cases) Rates by Ethnicity, 1998 - 2002 vs. 2003 - 2007



Note: U.S. Overall Rate is mid-period (2000-2005) cancer incidence rate.



... everyone should have screening tests for various types of cancer based on their age.

When reviewing cancer across all age groups, cancer in children is relatively uncommon with 1.5% (24) of all cancers occurring before the age of 15.

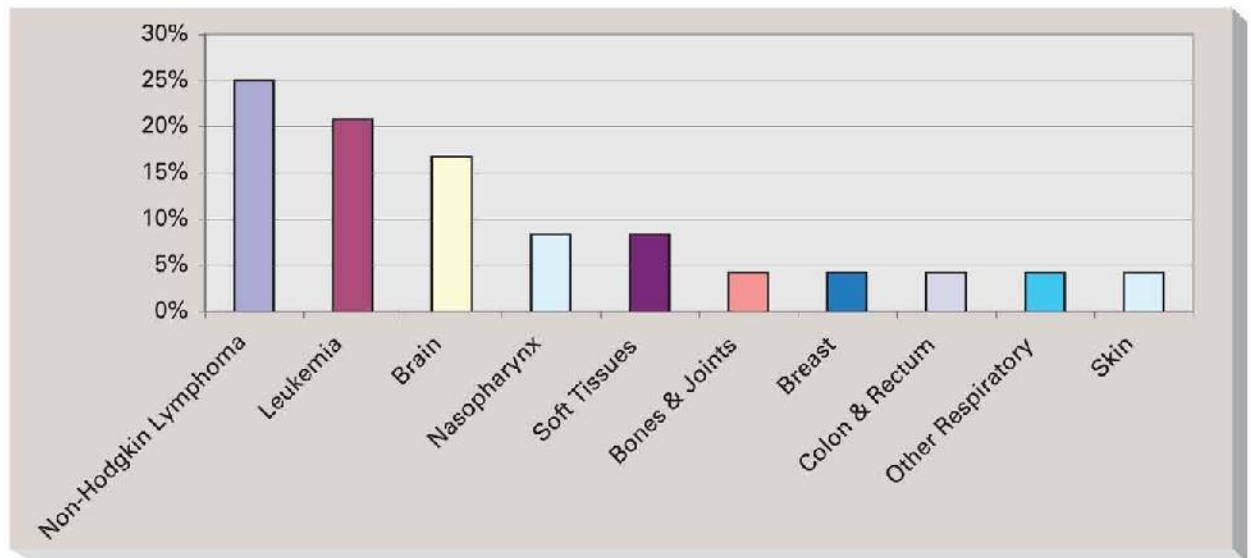
Although it is low when contrasted with adults, the toll in potential years of life lost is high. In 2003-2007, cancer was diagnosed in 24 children, and 7 died from the disease.

The major causes of childhood cancers remain unknown. "For children, genetic factors are likely to play a more prominent

etiological role; however, cancers that occur in adolescence and young adulthood probably represent more of a mix of genetic and environmental causes."¹⁵

Non-Hodgkin Lymphoma (NHL) is the leading cancer in boys and girls age 0-14 years old, followed by leukemia, and brain cancer. On average, there were 5 cancer cases diagnosed in children yearly. Deaths were due primarily to Non-Hodgkin Lymphoma and leukemia. (See to Figure 9, and Table 11.) Five of the 24 children diagnosed with cancer were Chamorro (21%), 4 (17%) were Micronesian, and 3 (13%) Filipino.

FIGURE 9.
Percent of Cancers by Type in Children, Ages 0-14, Guam: 2003-2007



Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

TABLE 11.
Cancers in Children, Ages 0-14, Guam: 2003-2007

Cancer Site	Incidence (New Cases)	Percent of Total	Cancer Site	Mortality (Deaths)	Percent of Total
Non-Hodgkin Lymphoma	6	25.0%	Non-Hodgkin Lymphoma	2	28.6%
Leukemia	5	20.8%	Leukemia	2	28.6%
Brain	4	16.7%	Nasopharynx	1	14.3%
Nasopharynx	2	8.3%	Bones & Joints	1	14.3%
Soft Tissues	2	8.3%	Brain	1	14.3%
Bones & Joints	1	4.2%			
Breast	1	4.2%			
Colon & Rectum	1	4.2%			
Other Respiratory	1	4.2%			
Skin	1	4.2%			
All Sites	24	100.0%	All Sites	7	100.0%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007. Guam: March 28, 2009.

On average, there were 5 cancer cases diagnosed in children yearly.



Cancer in Children and Youth

Cancer in adolescents and young adults (ages 15 to 24 years) is also relatively low at 1.2% (20) of all cancers diagnosed, compared to older adults. The leading cancers were thyroid and Non-Hodgkin Lymphoma, both at 20% for the period 2003-2007. (See Table 12.) The highest total cancer incidence (new cases) was found among Chamorro youth at 60% (12) of all youth cancer cases diagnosed, followed by Filipino youth at 25% (5).

When comparing the percent of children and youth combined within their specific ethnic group, the highest rate found was among Micronesians, although Chamorros had the highest count. Micronesian residents in Guam had higher rates of children diagnosed with cancer at 6% (5 of 89) of all Micronesians diagnosed with cancer. A total of 4% (27 of 756) of all Chamorros diagnosed with cancer were Chamorro children (ages 0-14).



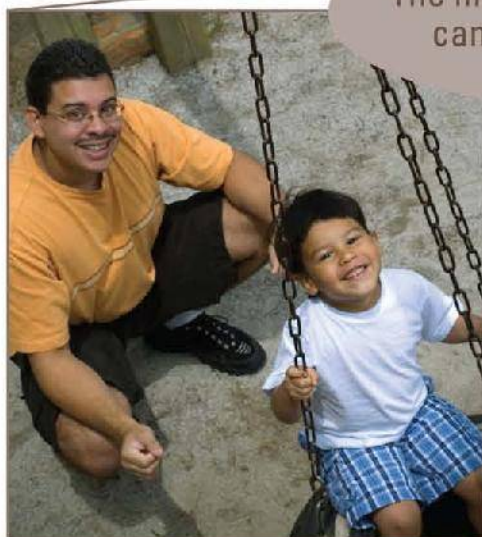
Cancer in adolescents and young adults (ages 15 to 24 years) is also relatively low at 1.2% (20) of all cancers diagnosed, compared to older adults.



TABLE 12.
Cancers in Youth and Young Adults, Ages 15-24, Guam: 2003-2007

Cancer Site	Incidence (New Cases)	Percent of Total	Cancer Site	Mortality (Deaths)	Percent of Total
Thyroid	4	20.0%	Non-Hodgkin Lymphoma	1	33.3%
Non-Hodgkin Lymphoma	4	20.0%	Bones & Joints	1	33.3%
Bones & Joints	3	15.0%	Soft Tissues	1	33.3%
Leukemia	3	15.0%			
Hodgkin Lymphoma	2	10.0%			
Breast	1	5.0%			
Other Endocrine	1	5.0%			
Soft Tissues	1	5.0%			
Testis	1	5.0%			
All Sites	20	100.0%	All Sites	3	100.0%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.



The major causes of childhood cancer remain unknown.

Lung Cancer:

Lung and Bronchus Cancer, Guam: 2003 - 2007		
	Count	% of Total Cancer
Incidence (New Cases)	272	17.2%
Mortality (Deaths)	206	28.6%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

Cancers that begin and develop in the lungs are referred to as lung cancer. There are two major types, nonsmall cell lung cancer and small cell lung cancer. Each type grows and spreads in different ways and is treated

differently. Several causes of lung cancer have been discovered by researchers; primary among the causes is smoking cigarettes. Those who smoke cigars and pipes also have a higher risk of lung cancer. The best way to prevent lung cancer is to quit, or never start, smoking. Exposure to environmental (second-hand) tobacco smoke, radon, and asbestos also increases your risk of developing lung cancer.¹⁶

Guam's people have the distinction of having the highest adult (27.3%, BRFSS 2008) and youth (23.1%, YRBS 2007) smoking rates in the entire U.S., which is reflected in the high lung cancer cases.¹⁷ There were 162 lung cancer deaths for the five-year period from 1998-2002. Since then, lung cancer deaths increased 27% to 206 for the following five-year period 2003-2007.

In 2003-2007, 272 new cases of cancer of the lung and bronchus cancer were diagnosed in Guam residents, and as mentioned earlier, 206 residents died from the disease. Lung cancer ranked second in cancer incidence (new cases) for both men and women (when considered separately). However, when both sexes are combined, it's the leading cancer diagnosed in Guam residents. **Lung cancer is also the leading cause of cancer deaths for both sexes, and all ethnic groups.** Lung cancer accounts for more deaths (206), than prostate (59), breast (57), and colon and rectum (82) cancer combined. Nearly 7 out of 10 people who died of lung and bronchial cancer were men (141). The age-adjusted lung cancer incidence rates for men (85.4) were double that of women (40.6), and the mortality rates were 2.3 times higher at 65.2 for men and 28.9 for women. However, the U.S. 2005 male age-adjusted death rate of 69.4 was higher than the Guam men's rate. [Incidence and mortality rates are calculated per 100,000 population.]

Of those who died of lung cancer in 2003-2007, a majority were Chamorros at 59% (121), and 19% (39) were Filipinos. Of the Chamorros who died, 46% (56) were under the age of 65 years, 30% (36) were 65-74 years, and 24% (29) were 75 years and older.

A total of 79% (163) of those who died of lung cancer were 55 years and older, and 20% (42) were 35 to 54 years old. In other words, close to 8 of 10 people who died of lung cancer were 55 years and older.

TABLE 13.

Trends in Prevalence of Adult Current Smoking, Guam vs. U.S., 2001-2003 and 2007-2008

Year	Guam	U.S.
2001	31.2	22.8
2002	31.9	22.8
2003	34	22
2007	31	19.7
2008	27.3	18.3

Source: Behavioral Risk Factor Surveillance System at: <http://www.cdc.gov/brfss/index/htm>. Last accessed May 30, 2009.

Because of the strong relationship between tobacco use and lung cancer, additional information on the prevalence of adult smoking rates was provided as part of this report. Table 13 compares prevalence of adult current smoking between Guam and the U.S. national average for the years 2001-2003, and 2007-2008. Current smokers were defined as adults who had smoked at least 100 cigarettes and who reported being a smoker at the time of the survey. Although the prevalence rate of cigarette smoking declined in 2008 by 13% (27.3) from 2001 (31.2), it is still 1½ times more than the U.S. rate of 18.3.

TABLE 14

Current Smoking, High School, Guam vs U.S., 1995-2007

	1995	1997	1999	2001	2003	2005	2007
Guam	41.1	44.7	37.3	37.1	31.6	30.8	23.1
US Average	34.8	36.4	34.8	28.5	21.9	23	20

Source: Youth Risk Behavior Survey, 1995-2007, extracted from the Guam Substance Abuse Epidemiological Profile, 2007 Update, Guam State Epidemiological Workgroup, 3rd Quarter, 2008. PEACE, Hagatna, Guam. 2008.

Table 14 depicts the smoking rates for high school youth for the period 1995-2007 and the U.S. average for the same period. On the positive side, the rates for both the U.S. and Guam have been declining steadily since 1995. However, Guam's rate in 2007 is still 16% higher than the U.S. rate.

Prostate Cancer:

Prostate Cancer, Guam: 2003 - 2007		
	Count	% of Total Cancer in Men
Incidence (New Cases)	223	25.2%
Mortality (Deaths)	59	13.4%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

Prostate cancer usually occurs in the gland cells of men's prostates and most are slow growing.

The prostate is part of a man's reproductive system. The true cause of prostate cancer is

unknown, but we do know that as with all cancers, you cannot 'catch' it from another person. Doctors can check men for prostate cancer using digital rectal exams (DRE), and/or blood tests for prostate-specific antigen (PSA). According to the American Cancer Society's screening recommendations, the PSA test and the DRE should be offered annually beginning at age 50 to men who have a life expectancy of at least 10 years. Men at high risk (men who have a first-degree relative diagnosed with prostate cancer at a young age) should begin testing at age 45. Unlike many other cancers, prostate cancer grows slowly. **Men should talk to their doctor about the possible benefits and potential risks of being screened, to assist them in making informed decisions about screening and treatment.**¹⁸

"Due to the widespread implementation of PSA testing in the United States, approximately 90 percent of all prostate cancers are currently diagnosed at an early stage and, consequently, men are surviving longer after diagnosis. However, the results of two ongoing clinical trials, the NCI-sponsored Prostate, Lung, Colorectal, and Ovarian (PLCO) screening trial and the European Study of Screening for Prostate Cancer (ERSPC) will be needed to determine whether PSA screening actually saves lives."¹⁹

In Guam, the number of deaths related to prostate cancer has increased 55%, from 38 in 1998-2002 to 59 deaths in 2003-2007. When comparing age-adjusted prostate mortality rates (deaths per 100,000 population) for Guam men for the respective time periods, it has risen 344% from 9.6 to 33.0. The Guam rate is higher than the U.S. 2005 age-adjusted mortality rate of 24.6. Guam's age-adjusted incidence rates also increased 73% from 65.6 to 113.3.

A total of 223 new cases of prostate cancer were diagnosed in Guam during 2003-2007 and 59 men died from the disease. It is the leading cancer diagnosed in men, and the second leading cause of cancer deaths in men. Prostate cancer accounted for 25% of total new cancer cases diagnosed in men, and 13% of total cancer deaths in men. Filipino men had the highest number (84) of prostate cancer cases diagnosed, followed by Chamorro men (83), Caucasian men (18), and Micronesian men (8). However, when comparing age-adjusted, incidence rates in 2003-2007, Micronesian men (259.3) had the highest rates, followed by Caucasian (188.3), Chamorro (114.8), Filipino (91.8) and Asian (41.7) men. (See Table 10.)

Age is the main risk factor for prostate cancer. In the U.S., most men with prostate cancer are older than 65.²⁰ Of the Guam men who developed prostate cancer, 68% were over the age of 64 years, and 94% were age 55 or older.

According to the 2008 Behavioral Risk Factor Surveillance Survey (BRFSS) conducted in Guam, 34.1% of Guam’s adult men 40 and older reported “having had a PSA test within the past two years.” This is up 17.2% from 29.1% reported in 2002. However, in comparison to the 2008 U.S. nationwide average rate of 54.7%, Guam is lagging far behind.

Breast Cancer:

Breast Cancer, Guam: 2003 - 2007		
	Count	% of Total Cancer in Women
Incidence (New Cases)	202	29.1%
Mortality (Deaths)	57	20.3%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 26, 2009.

Cancer that develops in the tissues of the breast, usually the ducts or the lobules, is called breast cancer.

It can affect both women and men, although the large

majority occurs in women. No one knows the causes of breast cancer but research has shown that women with certain risk factors are more likely than others to develop breast cancer. Risk factors may include age (the older you get the more at risk), personal history of breast cancer, family history of breast cancer, certain breast changes such as abnormal cells (atypical hyperplasia and lobular carcinoma in situ), gene changes (BRCA1, BRCA2 and others), reproductive and menstrual history, race, radiation therapy to the chest, breast density, taking the drug DES (diethylstilbestrol), being overweight or obese after menopause, lack of physical activity, and drinking alcohol. According to the National Cancer Institute, nearly 90% of women diagnosed with breast cancer will survive their disease at least 5 years.²¹

Fortunately, there are screening tests for breast cancer that can help doctors find and treat cancer early. These screening tests are mammogram and clinical breast exam. Treatment works best when cancer is detected early.²² The most important actions a woman (starting at age 40) can take to detect breast cancer at its earliest stage, is to have an annual mammogram and clinical breast exam as part of a periodic health exam.

The National Cancer Institute recommends that:

- Women in their 40s and older should have mammograms every 1 to 2 years. A mammogram is a picture of the breast tissue made with x-rays.
- Women who are younger than 40 and have risk factors for breast cancer should ask their health care provider whether to have mammograms and how often to have them.²³

The American Cancer Society (ACS) recommends that women age 40 and older have a screening mammogram every year as long as they are in good health. For women in their 20s and 30s, ACS recommends a clinical breast exam (CBE) as part of a periodic (regular) health exam by a health professional.

Cancer in Guam: Major Sites

In Guam, the number of deaths from breast cancer has increased 27% (from 45 deaths in 1998-2002 to 57 deaths in 2003-2007). When comparing age-adjusted breast cancer mortality rates for Guam women for the respective time periods, the rate has risen 95% from 11.90 to 23.2 per 100,000 population. In comparison to the U.S. nationwide average, Guam's breast cancer mortality rate is 4.1% lower than the 2004 U.S. rate of 24.4.²⁴ The Guam age-adjusted incidence rates for female breast cancer declined 6.5% from 81.5 to 76.2 when comparing the two time periods. The U.S. incidence rate of 117.7 (Table 10) is higher than Guam's rate.

In 2003-2007, 202 women on Guam were diagnosed with breast cancer, and 57 women died. It is the most common cancer diagnosed in Guam's women at 29% (202) of all cancers (694) in women, and accounted for 20% (57) of all women's cancer deaths (281). Sixty-eight percent (68%) of the women who died from breast cancer were 55 years and older, and 23% were 45 to 54 years old.

When reviewing ethnicity, Chamorro women had the highest percentage at 63% (36) of all Guam women who died of breast cancer. Stated another way, an estimated 6 of 10 Guam women who died of breast cancer were Chamorro. When comparing breast cancer diagnosis, Chamorro women again had the highest percentage at 47% (95) of all new cases of breast cancer diagnosed. During the same period, the second highest breast cancer percentage at 33% (64) of diagnosed cases were found in Filipino women, and 21% (12) of those who died of the disease were Filipino women.

However, when comparing age-adjusted incidence rates, Asian women (108.4 per 100,000 population) had the highest rate, followed by Chamorro women (100.6), Filipino (66.0), Micronesian (62.4), and Caucasian (58.5). This is still lower than the U.S. rate of 117.7 per 100,000 population. (See Table 10.)

According to the 2008 Behavioral Risk Factor Surveillance Survey (BRFSS) conducted in Guam, 63.7% of Guam's adult women aged 40 or older reported "having had a mammogram within the past two years." This is up 5.6%, from 60.3% reported in the 2002 Guam BRFSS. However, in comparison to the 2008 U.S. nationwide average rate of 76.0%, Guam is again short of the goal of meeting or exceeding the U.S. screening rate.



In Guam, the number of deaths from breast cancer has increased 27%

Colon and Rectum Cancer:

Colon and Rectum Cancer, Guam: 2003 - 2007		
	Count	% of Total Cancer
Incidence (New Cases)	165	10.4%
Mortality (Deaths)	82	11.4%

Source: University of Guam, Cancer Research Center of Guam, Guam Cancer Registry, 2009. *Cancer Incidence and Mortality of Guam Residents by Site, Gender, Ethnicity, and Age, Guam: 2003-2007*. Guam: March 28, 2009.

Cancer that forms in the tissues of the colon and/or in the tissues of the rectum is often called colorectal cancer.

Approximately 90% of all colon cancer cases and deaths are thought to be preventable.²⁵

No one knows the exact causes of colon cancer, but research has shown that people with certain risk factors are more likely to develop this disease. The risk factors include the following: age; colorectal polyps; family history of colon cancer; genetic alterations; personal history of colon cancer; ulcerative colitis or Crohn's disease; diets high in fat and low in calcium, folate, and fiber; and cigarette smoking.²⁶

The National Cancer Institute states that the current guidelines recommend that people at average risk for this disease should be screened starting at age 50. "Unfortunately, only 30 to 40 percent of people in this age group actually get screened, suggesting that we not only need to develop improved screening methods, but we also need to do a better job of encouraging people to take full advantage of available screening approaches. A number of screening methods are now in use and/or under clinical evaluation. One is the fecal occult blood test (FOBT), which is a relatively inexpensive and noninvasive test that detects hidden blood in stool. FOBT, recommended as an annual screening test, can reduce colorectal cancer deaths by up to 33 percent, according to study findings. Two other methods, flexible sigmoidoscopy and colonoscopy, are invasive procedures that allow a physician to visualize the inside of the lower part of the colon or the entire colon, respectively. Both of these methods are more expensive than FOBT, but they allow doctors to see such things as inflamed tissue, abnormal growths, and ulcers. Flexible sigmoidoscopy and colonoscopy are more effective than FOBT in detecting precancerous and cancerous growths; however, their invasiveness poses some risks to patients. Researchers are currently evaluating another screening method known as computed tomographic colonography or virtual colonoscopy. Virtual colonoscopy allows the physician to see the same images of the colon as with colonoscopy-without having to probe inside the body. Through an ongoing NCI-funded trial, researchers are trying to determine whether virtual colonoscopy is as effective as colonoscopy in detecting polyps and cancer."²⁷

"From 1998-2007, 77.6% of newly diagnosed cases of colon cancer were found in Guam residents 55 and older. An average of 20 Guam residents were diagnosed with colon cancer each year. The number of new cases (incidence) of colon cancer and deaths increases with age. In Guam, colon cancer overall was the third most common cause of cancer deaths in adults 55 and older."²⁸

Cancer in Guam: Major Sites

TABLE 15.
Cancer of the Color, Rectum and Anus, Incidence and Mortality Counts and Age-Adjusted Rates by Sex, Guam: 2003-2007

Cancer Site	INCIDENCE					MORTALITY				
	Female Rate	Total Female Cases	Male Rate	Total Male Cases	Total Cases	Female Rate	Total Female Cases	Male Rate	Total Male Cases	Total Cases
Colon	19.2	49	30.8	67	116	10.0	24	15.6	33	57
Rectum	6.7	18	12.7	30	48	3.7	8	8.2	17	25
Anus	*	0	*	1	1	*	0	*	0	0
Colon, rectum, anus	25.9	67	43.8	98	165	13.6	32	23.8	50	82

**Rates are suppressed if fewer than 5 cases were reported in a specific category. Rates are per 100,000 persons and age-adjusted to the 2000 U.S. standard population. Male and female incidence and mortality rates are mean, annual rates.*

In Guam, the number of deaths from cancer of the colon, rectum and anus has increased 12% (by 9 deaths), from 73 in 1998-2002, to 82 deaths in 2003-2007. When comparing age-adjusted cancer mortality rates per 100,000 population for Guam women for the respective time periods, it has increased by 78% from 7.66 to 13.6; and for Guam men, it has increased 114% from 11.11 to 23.8. Guam men were affected more than women in terms of both age adjusted incidence rates (43.8 vs. 25.9) and mortality rates (23.8 vs. 13.6).

When considering differences among ethnicities for cancer of the colon, rectum and anus cases for 2003-2007, Chamorros had the highest proportion at 50% (84) of all new cases of cancer of the colon, rectum and anus diagnosed followed by Filipinos at 24% (40). Chamorros also had the highest death rate at 49% (40) of all Guam people who died of these cancers, followed by Filipinos at 32% (26). Cancer of the colon, rectum and anus was the foremost common cancer diagnosis in Asians (73.7 per 100,000 population), third among Chamorros (44.8) and Caucasians (54.7), fourth with Filipinos (21.9), and seventh with Micronesians (19.8). (See Table 10.) Comparatively, colon cancer deaths were the second leading cause of all cancer deaths for Asians, Chamorros, Filipinos, Caucasians, and fifth for Micronesians.

Of those who died of cancer of the colon, rectum and anus, 93.9% (77) were 45 years and older with only 6.1% (5) between the age of 25-44 years old.

According to the 2008 BRFSS survey conducted in Guam, 38.3% of Guam's adults aged 50 and older reported "having ever had a sigmoidoscopy or colonoscopy." This was 25% higher than the results reported of 30.6% from the 2002 Guam BRFSS survey. However, in comparison to the U.S. nationwide average rate of 62.1%, Guam again falls short of the U.S. screening rate. The 2002 BRFSS had the most recent information on Guam adults aged 50 and older who "had a blood stool test (FOBT) within the past two years." The reported prevalence rate was 13.3%, again lower than the U.S. rate of 30.0%.

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