Puerto Rico Central Cancer Registry
Comprehensive Cancer Center

Cancer in Puerto Rico: 2006-2010

Incidence and Mortality

REGISTRO CENTRAL DE CÁNCER DE PUERTO RICO

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Cancer in Puerto Rico 2006-2010

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Letter from the Directors

Dear Puerto Ricans:

The Puerto Rico Central Cancer Registry is pleased to present the report **Cancer in Puerto Rico 2006-2010.** This Report is a review of the status of cancer in Puerto Rico. It presents a brief description of the incidence and mortality data for cancer and the distribution of the main cancer types that affect our population. In addition, it describes the time trends in cancer incidence and mortality for the period 1987 to 2010.

Cancer is the second leading cause of death in Puerto Rico. In 2010, 14,011 new cases of cancer and 5,197 cancer deaths were reported. The Puerto Rico Central Cancer Registry is the population-based surveillance system for cancer in the island and a key resource for cancer research. The Cancer Registry provides accurate and timely information to set priorities in comprehensive cancer control. It serves as the guide for the development and implementation of interventions to diminish the burden of the disease in our population, as well as to measure the outcomes of such interventions. This information is essential for identifying the patterns and the changes in cancer occurrence in Puerto Rico.

The Puerto Rico Central Cancer Registry would like to take this opportunity to recognize the contribution and support of all the reporting entities. It is due to their effort that Puerto Rico can count with high quality and timely cancer information. This effort has recently been recognized by the National Program of Cancer Registries by the inclusion of the Puerto Rico data in the 2010 United States Cancer Statistics Report for the first time.

The staff of the Puerto Rico Central Cancer Registry dedicates this milestone to the memory of **Nayda R. Figueroa Vallés, MD, MPH, CTR,** Cancer Registry Director from 2001 to 2012.

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Data Sources and Methods

Incidence Data

Population based reporting of newly diagnosed cancers was fully implemented in Puerto Rico in 1950. But through the years the Puerto Rico Central Cancer Registry (PRCCR) has improved the compilation of cancer data through electronic reporting, achieving a completeness of 95% in 2010. The primary source of data on cancer incidence is the medical record. Staff at health care facilities (including hospitals, physicians' offices, therapeutic radiation facilities, freestanding surgical centers, and pathology laboratories) abstract data from patients' medical records and report these data to the PRCCR. Standards for data abstracting, collection, and reporting to PRCCR are based on the North American Association of Central Cancer Registries (NAACCR) standards (1). However, there are other sources that are continuously employed by our cancer registrars in order to obtain all possible cancer cases. Our registrars contact health care facilities regularly in order to ensure complete and timely reporting of cases, clarify doubts, or train hospital registrars to send accurate information of the cases. Our registrars also use other sources of information such as pathology reports, hospital logs, and health insurance claims to find or to complete cancer cases information. In 2012, the Veterans Administration (VA) Hospital agreed to share its cancer data with Central Cancer Registries including the PRCCR and their data are included on this report. The incidence data contained on this document are based on cases of primary cancer that were diagnosed among residents from Puerto Rico between January 1, 1987 and December 31, 2010 and as completed by November 30, 2012.

Completeness

The National Program of Cancer Registries (NPCR) of the Centers for Disease Control and Prevention (CDC) re-evaluated the completeness of case ascertainment estimate for the PRCCR for the first time in order to obtain a more accurate estimate of the true occurrence of cancer in the Puerto Rican population. On this re-evaluation, the PRCCR significantly improved the completeness of case ascertainment and for the year 2010 it reached a completeness of 95%. This is an important achievement for the PRCCR and its data will be included for the first time in the CDC’s United States Cancer Statistics (USCS) report.

Selection Criteria

The cases included in this report are residents of Puerto Rico only. Persons who were treated in Puerto Rico but were residents of another country or a state in the United States at the time of the cancer diagnosis were not included in this report. Cases reported to the PRCCR with unknown age (≤ 0.1%) were excluded from the age-specific and age-adjusted analyses. No unknown or ambiguous gender was observed for the study period (1987-2010). Cases of unknown anatomic site at diagnosis accounted for 2.7% (N = 6,724) incident cancers, and were included in the counts and rates for all sites combined (1987-2010). The coding of cancer as unknown or ill-defined exerts a downward bias on the rates of the specific cancers that were the true sites. Cases with unknown municipality of residence at the time of diagnosis for the period of 2006-2010 were excluded from the calculations of municipality-specific rates (2.4%). For this report, only malignant (invasive) cancers were included, except for *in situ* bladder cancers that were combined with invasive bladder cancers and are included in the total for all invasive cancer sites combined. *In situ* and invasive bladder cancers were combined because of the difficulty in the interpretation of the information used by pathologists to describe the extent of invasion of bladder cancers which is not always available or reliable (2). Carcinoma *in situ* of the cervix and basal and squamous cell carcinomas of the skin were excluded, with the exception of those of the skin of the genital organs (3).

Case Definition

A "case" is defined as a primary cancer, and the anatomic site recorded is the site of tumor origin. Additional tumors that result from the spread or metastasis of cancer to another organ were not counted as incident cancers. Since individuals can have more than one primary cancer and each primary tumor counts as a case, the number of incident cases for a given year will be higher than the number of persons who were diagnosed as having cancer.

Childhood Cancer (0-19 years)

The incidence data used for the Childhood Cancer section were grouped according to the Surveillance Epidemiology and End Results (SEER) modification of the International Classification of Childhood Cancers, Third Edition (ICCC-3) specifications based on the

International Classification of Diseases for Oncology, Third edition (ICD-O-3) (4). The ICCC-3 presents childhood cancers in 12 groups classified primarily by morphology.

Mortality data were coded according to the International Classification of Diseases (ICD-10). The ICCC-3 that was used to describe the incidence of childhood cancer and the ICD-10 codes used for mortality, results in categories that in some cases are not strictly comparable. In the case of childhood cancer only, the mortality data were not stratified by cancer types due to the unstable rates produced by the few mortality cases found. Thus, mortality data were described for all sites cancers combined in the age-specific and age-adjusted rates figures.

Classification of Anatomic Site

Primary anatomic site and histology type of case were coded according to the ICD-O edition in use at the time of diagnosis. Cases diagnosed in 2000 which were originally reported using the ICD-O-2 (5) were converted to ICD-O-3 (6). All cancer cases diagnosed since 2001 were reported using ICD-O-3.

Cancers were grouped according to the convention of the new update for hematopoietic codes based on the *WHO Classification of Tumors of Hematopoietic and Lymphoid Tissues (2008)* from the SEER program (7). For children and adolescents, diagnostic groups were organized using the new *Main and Extended Classification for ICCC Recode ICD-O-3/WHO 2008* of the SEER Program's site/histology modification to the International Classification of Childhood Cancer (ICCC) (4, 8).

Microscopic Confirmation

In 1987 the microscopic confirmation of cancer cases diagnosed in Puerto Rico was 94.1%. This percent has gradually increased through the years reaching 95.9% in 2010. For the period 2006-2010, the average of cases microscopically confirmed was 95.7%. Microscopic confirmation categories include: positive histology, positive exfoliative cytology, and positive microscopically confirmation (method not specified).

Cases from Death Certificate Only

The PRCCR is routinely linked with computerized death certificate files to identify persons who die of cancer, but whose cancer has not yet been reported. Unreported cancer-related deaths receive follow back to the reporting physician and facility to verify the diagnosis and to obtain more information, such as date of diagnosis, residence at diagnosis, and treatment received. If a person's death certificate lists cancer as the underlying cause of death, but the diagnosis cannot be verified through follow back, the decedent is added to the Registry as a "death certificate only case" – that is, the death certificate is the only source of information on the patient's cancer. In 1987, 5.9% of all cases were documented by death certificate only. Through the years this percent has gradually decreased reaching 4.1% in 2010. For the period 2006-2010, the average of death certificate only cases accounted for 4.3%.

Confidentiality

All data obtained by the PRCCR from the medical record of individual patients are held in strict confidence by the Registry. Researchers may obtain case-specific and/or patient identifiable information from the PRCCR by submitting a written application that describes how the data will be used for scientific study. In situations where contact with a patient or patient's family is proposed, the applicant must substantiate the need for any such contact and submit approval from an Institutional Review Board (IRB). Upon favorable review by the PRCCR, the applicant must also agree to maintain the confidentiality and security of the data throughout the course of the study, to destroy or return to the Registry at the end of the study, and to present material to the Registry prior to publication to assure that no identifiable information was released. Aggregate data (i.e. statistical information) from the Registry are considered open to the public and are available upon request.

Mortality

Digital files containing information on cancer-related deaths were obtained from the Demographic Registry of Puerto Rico through the Puerto Rico Department of Health, Division of Statistical Analysis, and Auxiliary Secretariat for Planning and Development (9) and from the Institute of Statistics of Puerto Rico (10). Death certificate master files from 1987-2010 were

used for all years included in this report. Cause of death was coded by the International Classification of Diseases, Ninth Edition (ICD-9) for deaths occurring from 1987-1998 (11). Beginning in 1999 and thereafter, cause of death was coded by the International Classification of Diseases, Tenth Edition (ICD-10) (12). Only deaths among Puerto Rican residents were included in these analyses. Cases with unknown age (< 0.1%) were excluded from the age-specific and age-adjusted analyses. Deaths of unknown anatomic site accounted for 8.9% of cancer-related deaths were included in the analysis for all sites combined. Deaths with unknown municipality (residence of the patient at the moment of death) for the period 2006-2010 were only excluded from the calculations of municipality-specific rates (< 0.1%). Some specific primary sites have low mortality rate; therefore caution should be taken when interpreting these data. All mortality analyses presented in this report are the responsibility of the authors, and were not reviewed or endorsed by the Puerto Rico Demographic Registry prior to publication.

Geospatial Cloropleth Maps

This report includes the geographic distribution of incidence and mortality rates of selected primary sites by municipalities. The maps were created using Arc GIS (Geographic Information System) version 9.2. Arc GIS includes several classification methods to classify numerical fields including equal interval, defined interval, quantile, natural breaks, geometric interval, and standard deviation. Since there is no single best data classification method, the maps in this report were created using the quantile classification method to determine the number of intervals (or classes) into which the incidence and mortality data were grouped. The interval (or class) labeled with a ‘0.00’ indicates that there were no incident cases or deaths due to a particular cancer site (13) (See *Quantile Maps* in Statistical Terms section below).

Age-Adjusted Confidence Intervals by Municipalities

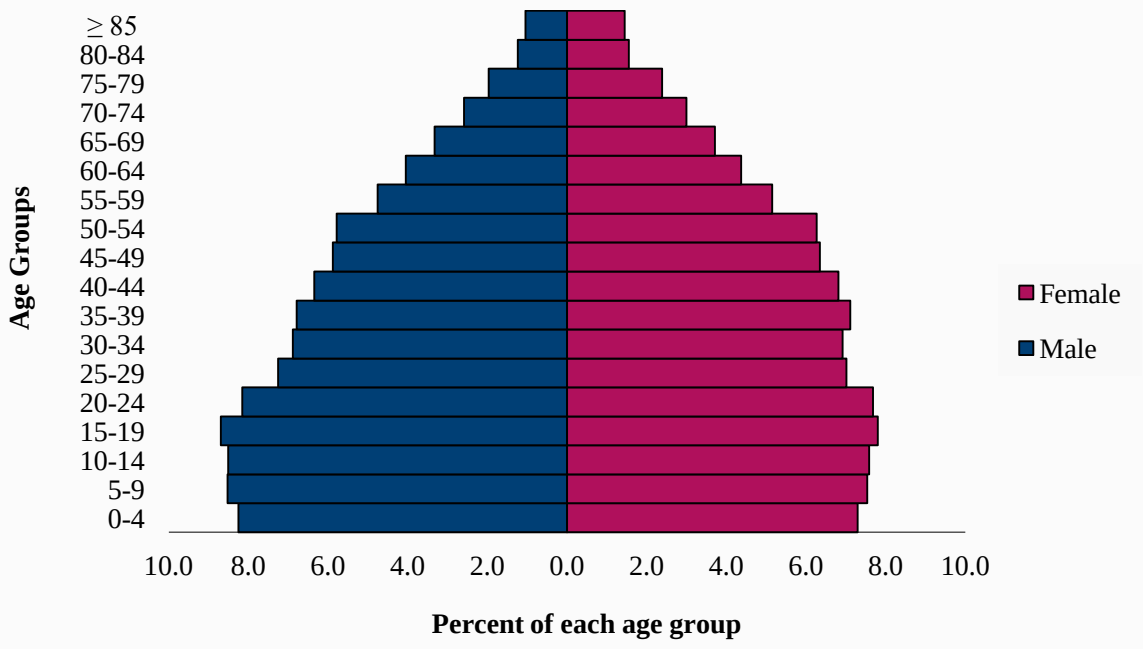
The confidence intervals are a way to measure sampling error and are related to the size of the population observed; for example, cancer rates for a single municipality. The 95 percent confidence intervals are generally used because they are a simple way to understand the stability of the incidence and mortality age-adjusted rates. Wider (longer) confidence intervals in relation to the rate itself indicate instability. On the other hand, narrow (shorter) confidence intervals in

relation to the rate tell you that the rate is relatively stable (See *Age-Adjusted Confidence Intervals* in Statistical Terms on page 17).

Description of Puerto Rico 2000 vs. 2010 Populations

Incidence and mortality rates were calculated using official population estimates provided by the United States Census Bureau. In 2000, a total population of 3,808,610 was estimated in Puerto Rico; 32.0% of the population was under age 20 years; 35.5% between 20-44 years; 21.3% between 45-64 years; 9.9% between 65-84 years, and 1.3% for 85+ years (see Figure 1). In 2000, men represented 48.1% of the total population, 98.8% were Hispanic/Latino; and of these, 96.3% (N = 3,623,392) were Puerto Ricans. Men had a median age of 30.4 years, while women had a median age of 33.7 years. The sex ratio was 92.8 men per each 100 women (14). Although 80.5% of Puerto Rico residents identified themselves as White in the 2000 Census, there is no official classification for race used in PR. The PRCCR is collecting racial and ethnic data consistent with population data. Although ethnicity is well documented by the PRCCR, it uses the NAACCR Hispanic Identification Algorithm (NHIA) to enhance the identification of Hispanic/Latino persons with cancer.

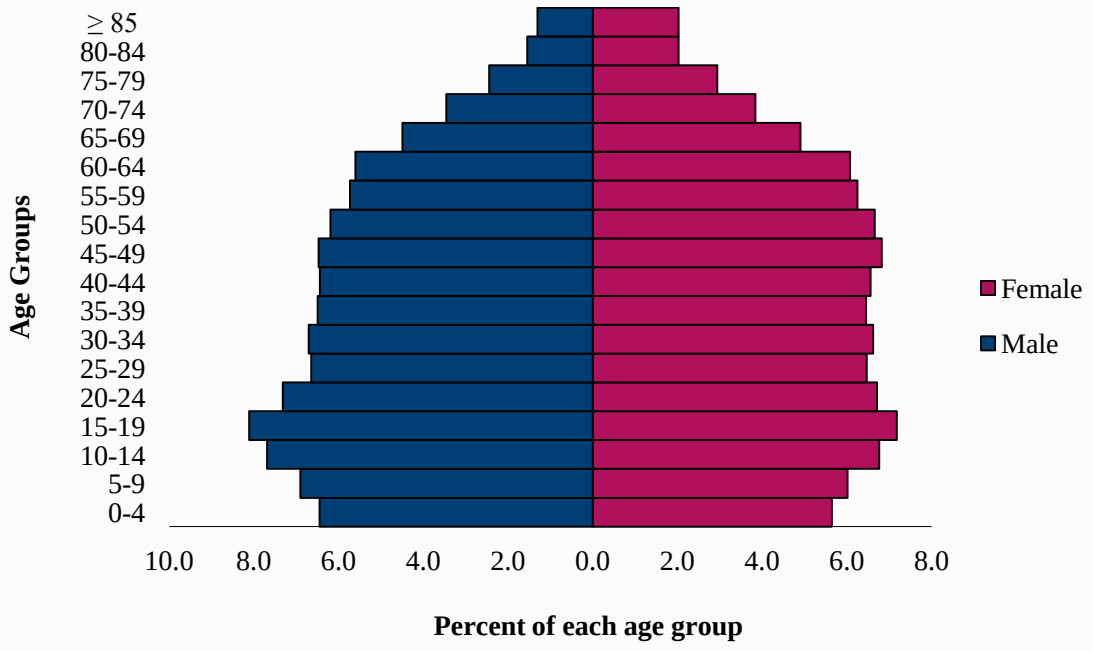
FIGURE 1: POPULATION PYRAMID FOR PUERTO RICO, CENSUS 2000



In 2010, the total population of Puerto Rico was 3,725,789 habitants, decreasing by 2.2% (N = 82,821) in comparison to the 2000 census population. This decrease has affected the age-sex structure of the island population (see Figure 2). Between 2000 and 2010 there was a decrease in the population under 15 years of age from 23.8% to 19.7%, respectively, and an increase in the population 65 years of age or older from 11.2% in 2000 to 14.5% in 2010. These changes have been attributed to a decrease in the birth rate and an increase in emigration. The emigration pattern has been characterized by an increase in the migration from Puerto Rico to the United States mainland of young, working age, individuals with a high level of education (15).

For 2010, men represented 48.0% of the total population. The vast majority (99.0%) of the habitants of the island were Hispanics/Latinos; of these, 96.4% (N= 3,554,642) were Puerto Ricans. Men had a median age of 35.1 years, while women had a median age of 38.6 years. The sex ratio was 92 men per each 100 women (16).

FIGURE 2: POPULATION PYRAMID FOR PUERTO RICO, CENSUS 2010



Statistical Terms

Age-Specific Rates

Age-specific rates were calculated by dividing the number of cases or deaths in a specific age group by the total population at risk in that age group. Age at diagnosis or at death was categorized into the following groups: 0-4 years, 5-9 years, 10-14 years … 80-84 years, and 85+ years. These age groups are used to present graphically age-specific incidence and mortality rates by sex.

Age-Adjusted Rates

Age-adjusted rates are a weighted average of the age-specific rates, where the weights are the proportions of people in the corresponding age groups of a standard population (17). This adjustment is done to reduce the effects of the differences in age structure between populations. In this document age-adjusted rates were calculated using three different standard populations (2000 United States Population, 2000 Puerto Rico Population, and the World Population). Rates age-adjusted to the 2000 United States Standard Population (Census P25-1130) (2000 US Std. Pop.) allow the comparison of Puerto Rico's incidence and mortality cancer to the United States rates. Rates age-adjusted to the World Standard Million Population (Segi 1960) allow the comparison of Puerto Rico to any country around the world that uses the same World Standard Million Population. Rates age-adjusted to the 2000 Puerto Rico Population (2000 PR Std. Pop.) allow the comparison of rates presented in this report to rates calculated in previous PRCCR reports and were estimated for the purpose of comparisons between Puerto Rico's counties (municipalities).

Incidence vs. Mortality

Incidence refers to the number or rate of *newly* diagnosed cases of cancer. The incidence rates are calculated as the number of new cancers diagnosed in Puerto Rico (overall or specific type) occurring in a specific population during a period of time divided by the population at risk during the same time period. *Mortality* refers to the number or rate of deaths from cancer. The mortality rate is the number of deaths from cancer in Puerto Rico (overall or specific type)

occurring in a specific population during a period of time divided by the population or subgroup of population during the same period.

The incidence and mortality rates are expressed as the number of cancers per 100,000 persons, except for childhood cancer rates which are expressed for 1,000,000 persons. In this report, the childhood cancer rates are presented as average annual rates for the five-year period of analysis because of the small number of childhood cancer cases reported annually relative to adult cancer cases.

Cancer **incidence** rates are calculated as:

*Incidence rate = (New cancers / Population)*100,000*

The *numerator* of the incidence rate is the number of new cancers in a given period of time; the *denominator* of the incidence rate is the number of persons that are at risk for that cancer in the same period of time. The number of new cancers may include multiple primary cancers occurring in one patient. The primary site reported is the site of origin and not a metastatic site. The population used depends on the rate to be calculated. For cancer sex-specific cancer sites, the corresponding sex-specific population is used (e.g., women for cervical cancer). In this report, for the computation of incidence rates we used the Vintage 2012 estimates series from the Population Division of the United States Census Bureau.

Cancer death (or **mortality**) rates are calculated as:

*Mortality rate = (Cancer Deaths / Population)*100,000*

The *numerator* of the death rate is the number of deaths from cancer in a given period of time; the *denominator* of the mortality rate is the estimated population during the same period of time. As with the incidence rate, the population used depends on the rate to be calculated. For the computation of mortality rates, we also used the Vintage 2012 estimates series from the Population Division of the United States Census Bureau.

Annual Percent Change (APC)

This is the average rate of change (increase or decrease) in a cancer rate over several years and is used to measure trends over a specific period of time. The APC is calculated by

fitting a least squares regression line to the natural logarithm of the annual rates (*r*) using the calendar year as a predictive variable: $ln\ (r) = m(year) + b$ (18, 19) as implemented in the National Cancer Institute (NCI's) SEER*Stat software (19). From the slope of the regression line *m*, the APC is calculated as $EAPC = 100*(e^{m} - 1)$. Testing the hypothesis that the APC is equal to zero is equivalent to testing the hypothesis that the slope of the line in the regression is equal to zero. The slope of the line is tested for significant increases or decreases (95% confidence intervals were recorded, and $p \leq 0.05$ was considered significant). The APC was calculated for incidence and mortality trends in specific primary sites where there were 15 or more incidence cases or deaths for each year reported during the period of 1987-2010. For this report, trends are based on age-adjusted rates to the 2000 United States Standard Population.

Quantile Maps

Cancer rates for incidence and mortality by county (municipality) were age-adjusted to the 2000 Puerto Rico Standard Population and grouped on the quartile values of the cumulative distribution of rates and displayed in maps (quantile maps). In this method, an equal number of observations are placed in each class. The rates by municipalities were first rank-ordered, and then an equal number of observations were placed in four groups. Quantile maps can be helpful in identifying the spatial patterns of the relative rankings of rates within the geographic units of interest (e.g., municipalities) (13). The major disadvantage of the quantile classification is that an equal number of municipalities are grouped in each group and does not consider how the data are distributed. Therefore, if the data have a highly skewed distribution (e.g., many outliers) this classification will force data observations into the same class (either the lowest or highest, in this case) where this may not be appropriate; as a result, the quantile classification may give a false impression that there is a relatively normal data distribution. Caution must be used in interpreting the distribution of incidence and mortality cancer rates at the municipality level based only on the representation of the maps. In order to help with the interpretation of these maps, the age-adjusted rates (and 95% confidence intervals) for all municipalities are shown in a graph next to each map where the overall rate for Puerto Rico is shown by a vertical line. Rates based on less than 20 cases tend to have large variation of error estimates (i.e. standard error) and are considered highly variable. Municipalities with less than 20 cases reported in the 2006-2010 period are marked with an asterisk (*).

Age-Adjusted Confidence Intervals

Age-adjusted confidence intervals were calculated by the SEER*Stat program using the Tiwari method adjustment (20-22). This method produces similar confidence limits to the standard normal approximation when the counts are large and the population being studied is similar to the standard population (22).

Relative Risks

The relative risk of developing or dying from cancer was calculated by dividing the age-adjusted rate in the population whose risk was being evaluated by the age-adjusted rate in the comparison population. A relative risk of 1.0 indicates that the risk of cancer is the same in the two groups. A relative risk greater than 1.0 indicates that the likelihood of cancer is greater in the group being studied than in the comparison population; conversely, a relative risk of less than 1.0 indicates that the cancer rates are lower in the group of interest. For this report, relative risk is based on age-adjusted rates to the 2000 United States Standard Population.

Lifetime Risks

The lifetime risk is the probability of developing or dying from cancer in the course of one's lifespan (up to 84 years of age). Lifetime risk may also be discussed in terms of the probability of developing or of dying from cancer for a specific cohort of people since birth. The estimates of developing and dying from cancer were implemented using the NCI DevCan Software (23). The methodology is described in detail by Fay et al. (24) (25).

Cautions on Interpretation

The validity of the cancer rates depends on the completeness of cancer reporting and on the accuracy of population estimates. Incidence data on this report are based on cases of primary cancers which were first diagnosed among the residents of Puerto Rico between January 1, 2006 and December 31, 2010 and were reported to the PRCCR as of August 2013. Additional cancer cases will continue to be reported to the PRCCR for 2010 as it is for earlier years, these data will be included in future reports. Population estimates released by the Puerto Rico Census Bureau are also subject to periodic revisions. For these reasons, rates in this report are not directly

comparable to those released in previous annual reports. Finally, caution should also be taken in the interpretation of age-adjusted incidence and mortality rates of counts that are less than 20 because these counts are too few to calculate a stable age-adjusted rate.

Small Numbers

When the numbers of cases or deaths reported to the PRCCR are small (such as being diagnosed with a rare disease), those counts might identify a person diagnosed with a rare type of cancer or a person in a small municipality with few cancer cases. To assure that no identifiable information is released and to avoid potential identification of patients, counts of cases that are fewer than six (6) are not shown on this report.

Cancer in Puerto Rico 2010: An Overview

Cancer Incidence in 2010

In Puerto Rico 14,011 new cancer cases were reported in the year 2010 (Table 1). Of these 7,523 (53.7%) were men and 6,488 (46.3%) were women. Among men, prostate cancer was the most frequent cancer representing 39.8% (n = 2,996) of all cases in men. Among women, breast cancer was the most common, representing 29.3% (n = 1,904) of all cases in women. The second most common cancer diagnosed in men and women was colorectal cancer, representing 12.4% (n = 933) in men, and 12.1% (n = 786) in women. Lung and bronchus cancer was also one of the most common cancer sites, representing 5.7% (n = 431) in men, and 3.9% (n = 255) in women. Thyroid cancer featured as the third most common cancer diagnosed in women, representing 10.8% (n = 701 cases) of all cases in women.

Cancer Mortality in 2010

During 2010, there were approximately 5,197 deaths from cancer reported in the island (Table 2). Of these, 2,927 (56.3%) were in men and 2,270 (43.7%) were in women. Prostate cancer was the most frequent cause of death from cancer among men, representing 18.4% (n = 539) of all deaths in men. Breast cancer was the most common cause of death from cancer in women, representing 18.1% (n = 410) of all deaths in women. Colorectal cancer deaths accounted for 13.0% (n = 381) deaths among men, and 13.3% (n = 303) deaths among women. Lung and bronchus cancer was among the most common causes of death from cancer, representing 14.1% (n = 412) deaths in men, and 8.8% (n = 199) deaths in women.

TABLE 1: INCIDENCE FOR SPECIFIC CANCER SITES† BY SEX, PUERTO RICO: 2010

Sex →	Overall					Male					Female				
Cancer Site ↓	Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*		
			PR	US	World			PR	US	World			PR	US	World
All Sites	14,011	376.5	306.1	332.2	231.3	7,523	422.0	360.4	391.5	262.4	6,488	334.7	265.8	288.7	208.0
Oral Cavity and Pharynx	430	11.6	9.4	10.1	7.1	306	17.2	14.8	15.8	11.2	124	6.4	4.9	5.4	3.7
Esophagus	142	3.8	3.0	3.3	2.0	109	6.1	5.2	5.7	3.6	33	1.7	1.2	1.3	0.7
Stomach	358	9.6	7.5	8.4	4.8	204	11.4	9.8	11.0	6.4	154	7.9	5.7	6.5	3.6
Colon and Rectum	1,719	46.2	36.6	40.0	26.4	933	52.3	44.5	48.4	32.2	786	40.5	30.3	33.3	21.7
Liver and Intrahepatic Bile Duct	314	8.4	6.7	7.3	4.7	228	12.8	11.0	11.9	7.9	86	4.4	3.2	3.6	2.0
Pancreas	288	7.7	6.1	6.7	4.1	157	8.8	7.5	8.3	5.3	131	6.8	4.9	5.5	3.2
Larynx	161	4.3	3.4	3.7	2.6	139	7.8	6.6	7.1	4.9	22	1.1	0.9	0.9	0.7
Lung and Bronchus	686	18.4	14.4	16.0	9.8	431	24.2	20.5	22.9	13.7	255	13.2	9.7	10.8	6.6
Melanoma of the Skin	169	4.5	3.8	4.2	2.9	99	5.6	4.9	5.4	3.6	70	3.6	2.9	3.2	2.3
Prostate	~	~	~	~	~	2,996	168.1	139.1	149.2	101.0	~	~	~	~	~
Testis	~	~	~	~	~	57	3.2	3.3	3.4	3.2	~	~	~	~	~
Breast	~	~	~	~	~	~	~	~	~	~	1,904	98.2	77.6	84.2	61.7
Cervix Uteri	~	~	~	~	~	~	~	~	~	~	254	13.1	11.8	12.8	10.1
Corpus and Uterus, NOS	~	~	~	~	~	~	~	~	~	~	547	28.2	22.5	24.1	18.3
Ovary	~	~	~	~	~	~	~	~	~	~	153	7.9	6.3	6.8	4.9
Urinary Bladder	438	11.8	9.2	10.4	5.9	319	17.9	15.4	17.4	9.8	119	6.1	4.4	5.0	2.8
Kidney and Renal Pelvis	296	8.0	6.5	7.0	4.9	205	11.5	10.0	11.0	7.4	91	4.7	3.7	3.9	2.8
Brain and Other Nervous System	149	4.0	3.6	3.8	3.1	85	4.8	4.4	4.7	3.7	64	3.3	2.9	3.0	2.6
Thyroid	848	22.8	20.7	22.2	17.9	147	8.2	7.7	8.4	6.5	701	36.2	32.1	34.3	28.1
Hodgkin Lymphoma	106	2.8	2.7	2.8	2.5	58	3.3	3.1	3.3	2.8	48	2.5	2.4	2.4	2.2
Non-Hodgkin Lymphoma	510	13.7	11.4	12.4	8.9	259	14.5	12.9	14.1	9.7	251	12.9	10.4	11.1	8.2
Myeloma	158	4.2	3.5	3.8	2.5	94	5.3	4.7	5.2	3.2	64	3.3	2.5	2.7	2.0
Leukemia	331	8.9	7.9	8.5	6.7	181	10.2	9.4	10.2	7.6	150	7.7	6.7	7.1	5.9
Bones and Joints	26	0.7	0.6	0.7	0.6	15	0.8	0.8‡	0.8‡	0.6‡	11	0.6	0.6‡	0.6‡	0.6‡

*Rates are per 100,000.

† Excludes basal and squamous cell carcinomas of the skin except when these occur on the skin of the genital organs, and in situ cancers except urinary bladder. Statistics were generated from malignant cases only except for urinary bladder, which includes malignant and in situ.

Data Source: Incidence Case File of Puerto Rico from the Puerto Rico Central Cancer Registry (August 09, 2013).

Population Source: Vintage 2012 estimates series from the Population Division of the United States Census Bureau.

~ Not applicable.

‡ Counts < 20 are too few to calculate a stable age-adjusted rate.

PR = Puerto Rico; US = United States

TABLE 2: MORTALITY FOR SPECIFIC CANCER SITES BY SEX, PUERTO RICO: 2010

Sex →	Overall					Male					Female				
Cancer Site ↓	Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*		
			PR	US	World			PR	US	World			PR	US	World
All Sites	5,197	139.7	109.7	123.8	71.4	2,927	164.2	142.5	162.0	89.2	2,270	117.1	86.0	96.5	58.0
Oral Cavity and Pharynx	114	3.1	2.4	2.7	1.7	94	5.3	4.5	5.0	3.2	20	1.0	0.7	0.8	0.4
Esophagus	128	3.4	2.7	3.0	1.8	100	5.6	4.8	5.3	3.3	28	1.4	1.0	1.2	0.6
Stomach	196	5.3	4.1	4.7	2.5	108	6.1	5.3	6.0	3.2	88	4.5	3.2	3.7	2.0
Colon and Rectum	684	18.4	14.4	16.2	9.4	381	21.4	18.4	20.6	12.2	303	15.6	11.1	12.7	7.1
Liver and Intrahepatic Bile Duct	277	7.4	5.9	6.6	3.9	179	10.0	8.7	9.6	6.0	98	5.1	3.6	4.2	2.2
Pancreas	257	6.9	5.4	6.1	3.5	127	7.1	6.1	6.8	4.1	130	6.7	4.8	5.4	3.0
Larynx	40	1.1	0.8	0.9	0.6	34	1.9	1.6	1.7	1.2	6	0.3	0.2‡	0.3‡	0.2‡
Lung and Bronchus	611	16.4	12.8	14.4	8.2	412	23.1	19.7	22.3	12.4	199	10.3	7.4	8.4	4.8
Melanoma of the Skin	23	0.6	0.5	0.6	0.3	11	0.6	0.6‡	0.7‡	0.3‡	12	0.6	0.5‡	0.5‡	0.3‡
Prostate	~	~	~	~	~	539	30.2	26.9	32.1	13.5	~	~	~	~	~
Testis	~	~	~	~	~	§	0.3	0.3‡	0.3‡	0.3‡	~	~	~	~	~
Breast	~	~	~	~	~	~	~	~	~	~	410	21.1	15.9	17.5	11.7
Cervix Uteri	~	~	~	~	~	~	~	~	~	~	61	3.1	2.6	2.8	2.1
Corpus and Uterus, NOS	~	~	~	~	~	~	~	~	~	~	112	5.8	4.4	4.8	3.2
Ovary	~	~	~	~	~	~	~	~	~	~	101	5.2	3.9	4.3	2.8
Urinary Bladder	121	3.3	2.5	2.9	1.3	80	4.5	3.9	4.6	2.1	41	2.1	1.4	1.7	0.7
Kidney and Renal Pelvis	85	2.3	1.8	2.0	1.2	59	3.3	2.8	3.3	1.9	26	1.3	1.0	1.1	0.7
Brain and Other Nervous System	86	2.3	1.9	2.0	1.5	47	2.6	2.3	2.5	1.8	39	2.0	1.5	1.6	1.2
Thyroid	13	0.3	0.3‡	0.3‡	0.2‡	§	0.2	0.2‡	0.2‡	0.1‡	§	0.5	0.3‡	0.4‡	0.2‡
Hodgkin Lymphoma	24	0.6	0.6	0.7	0.4	15	0.8	0.8‡	0.9‡	0.6‡	9	0.5	0.4‡	0.4‡	0.3‡
Non-Hodgkin Lymphoma	171	4.6	3.7	4.1	2.5	103	5.8	5.0	5.6	3.4	68	3.5	2.6	2.9	1.8
Myeloma	106	2.8	2.2	2.5	1.5	65	3.6	3.1	3.5	2.1	41	2.1	1.5	1.7	1.0
Leukemia	186	5.0	4.0	4.5	2.6	97	5.4	4.8	5.6	3.1	89	4.6	3.3	3.7	2.3
Bones and Joints	26	0.7	0.6	0.6	0.4	18	1.0	0.9‡	1.0‡	0.7‡	8	0.4	0.3‡	0.3‡	0.2‡

*Rates are per 100,000.
Data Source: Mortality Case File provided by the Demographic Registry of Puerto Rico (February, 2013) & the Institute of Statistics of Puerto Rico (December, 2010).
Population Source: Vintage 2012 estimates series from the Population Division of the United States Census Bureau.
For quality reasons some cases might have been modified in order to accurately represent some sex-specific primary sites.
~ Not applicable.
§ Counts are not presented to avoid potential identification of cancer patients.
‡ Counts < 20 are too few to calculate a stable age-adjusted rate.

PR = Puerto Rico; US = United States

Overview of All Cancer Sites

Incidence for the Period 2006-2010

Between 2006 and 2010, 66,007 persons in Puerto Rico were diagnosed with invasive cancer; 36,273 (54.9%) were men and 29,734 (45.1%) were women. On average, approximately 7,255 men and 5,947 women were diagnosed annually with cancer. Table 3 shows the number of cases for selected cancer sites by sex for the five-year period and the corresponding age-adjusted rates using three standard populations: Puerto Rico, United States and the World Population. In this period, the median age at diagnosis for cancer of all sites was 64 years. Approximately, 1.1% was diagnosed under age 20 years; 3.0% between 20 and 34 years; 10.5% between 35 and 49 years; 30.6% between 50 and 64 years; 39.3% between 65 and 79 years; and 15.6% were 80+ years of age.

The 10 most frequent cancer sites diagnosed during this period for each sex group are presented in Figure 3. Among men, the most common cancer was prostate cancer accounting for approximately 40.7% of all cancers cases in men diagnosed during the period; followed by colorectal cancer (13.1%), and lung and bronchus cancer (6.1%). Among women, cancer of the breast was the most commonly diagnosed cancer accounting for approximately 29.7% of all cancers cases in women diagnosed during the period. Colorectal cancer was the second most commonly diagnosed cancer (13.2%) followed by thyroid cancer (9.1%) among women.

Mortality for the Period 2006-2010

A total of 25,113 deaths due to cancer were registered during the period 2006-2010; 14,201 (56.5%) were men and 10,912 (43.5%) were women. Table 4 shows the number of deaths for selected cancer sites by sex for the five-year period and the corresponding age-adjusted rates using three standard populations: Puerto Rico, United States, and the World Population. The annual-average number of deaths from cancer for this period was 2,840 in men and 2,182 in women. During the period 2006-2010, the median age at death from cancer (all sites) was 72 years. Approximately, 0.4% of cancer deaths occurred under age 20 years; 1.2% between 20 and 34 years; 6.0% between 35 and 49 years; 22.9% between 50 and 64 years; 38.4% between 65 and 79 years; and 31.2% were 80+ years of age.

The 10 most common causes of death from cancer during the period 2006-2010 are presented in Figure 4. Among men, prostate cancer was the most common cause of death from cancer accounting for approximately 18.4% of all death from cancers; followed by lung and bronchus cancer (13.8%), and colorectal cancer (13.1%). Whereas among women, cancer of the breast was the most common cause of death from cancer accounting for approximately 18.9% of all deaths from cancer during the period; followed by colorectal, and lung and bronchus cancer, 13.6% and 9.6% of all cancer deaths in women, respectively.

Lifetime Risk for the Period 2006-2010

Based on the incidence rates for the period 2006-2010, an estimated 35.6% of men and women born today in Puerto Rico will be diagnosed with some type of cancer during their lifetime. This number can also be expressed as: 1 in 3 men and women born today will be diagnosed with some type of cancer during their lifetime.

Trends in Cancer Incidence 1987-2010

The trends in age-adjusted (United States 2000 Standard Population) cancer incidence rate from 1987 to 2010 by sex are shown in Figure 5. Among men, the incidence rate increased from 319.8 per 100,000 in 1987 to 391.5 per 100,000 in 2010, while in women it increased from 224.0 in 1987 to 288.7 in 2010. Between 1987 and 2010, the incidence rate among men had a slight increase of 0.4% per year; while in women it increased an average of 0.9% per year. These increases were statistically significant for both groups ($p<0.05$).

Trends in Cancer Mortality 1987-2010

The trends in age-adjusted (United States 2000 Standard Population) mortality rates from 1987 to 2010 by sex are shown in Figure 6. For men the mortality rate decreased from 191.0 per 100,000 in 1987 to 162.0 per 100,000 in 2010, while for women decreased from 115.8 in 1987 to 96.5 in 2010. Between 1987 and 2010, the mortality rate among men decreased an average of 1.1% per year; whereas, in women the rate decreased an average of 0.9% annually. Both of these changes over time were statistically significant ($p<0.05$).

Median age at diagnosis 2006-2010

During the period 2006-2010, the median age at diagnosis for all cancer sites in men was 68 years, while in women it was 64 years. Figure 7 shows the age-specific incidence rates by sex for this period. The risk of developing cancer among men begins to increase markedly by the end of the fourth decade of life, while in women there is a steady slow increase of cancer risk from 30 years of age onwards. By the age of 80 to 84 years, the risk of developing cancer among men is nearly twice that of women (RR=1.9, 95% CI: 1.8, 2.0).

Median age at death 2006-2010

During the period 2006-2010, the median age at death for all cancer sites in men was 73 years; while in women it was 72 years. Figure 8 shows the age-specific mortality rates by sex for this period. The risk of death due to cancer among men and women are similar up to age 50 to 54 years (below 100 per 100,000), afterwards the increase in mortality rates among men is greater than among women such that by age 80-84 years, there is a nearly two-fold risk of cancer death in men relative to women (RR=1.9, 95% CI: 1.8, 2.0).

TABLE 3: INCIDENCE FOR SPECIFIC CANCER SITES† BY SEX, PUERTO RICO: 2006-2010

Sex →	Overall					Male					Female				
Cancer Site ↓	Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*		
			PR	US	World			PR	US	World			PR	US	World
All Sites	66,007	350.9	296.9	323.3	221.5	36,273	402.2	360.9	393.8	259.6	29,734	303.7	248.6	270.9	192.2
Oral Cavity and Pharynx	1,919	10.2	8.6	9.3	6.5	1,453	16.1	14.4	15.5	10.9	466	4.8	3.8	4.2	2.9
Esophagus	783	4.2	3.4	3.8	2.4	626	6.9	6.2	6.8	4.4	157	1.6	1.2	1.3	0.7
Stomach	1,761	9.4	7.7	8.7	5.0	1,011	11.2	10.2	11.5	6.6	750	7.7	5.9	6.6	3.8
Colon and Rectum	8,681	46.1	38.4	42.4	27.1	4,742	52.6	47.2	52.0	33.2	3,939	40.2	31.5	34.8	22.2
Liver and Intrahepatic Bile Duct	1,546	8.2	6.8	7.5	4.8	1,053	11.7	10.5	11.4	7.5	493	5.0	3.8	4.3	2.5
Pancreas	1,199	6.4	5.3	5.9	3.5	604	6.7	6.0	6.6	4.2	595	6.1	4.6	5.2	3.0
Larynx	743	3.9	3.3	3.6	2.4	664	7.4	6.6	7.1	4.8	79	0.8	0.7	0.7	0.5
Lung and Bronchus	3,449	18.3	15.1	16.8	10.3	2,218	24.6	22.0	24.5	14.8	1,231	12.6	9.7	10.8	6.6
Melanoma of the Skin	550	2.9	2.5	2.8	1.9	308	3.4	3.1	3.4	2.3	242	2.5	2.0	2.3	1.5
Prostate	~	~	~	~	~	14,748	163.5	143.8	155.5	102.5	~	~	~	~	~
Testis	~	~	~	~	~	272	3.0	3.1	3.1	3.0	~	~	~	~	~
Breast	~	~	~	~	~	~	~	~	~	~	8,833	90.2	74.1	80.2	58.9
Cervix Uteri	~	~	~	~	~	~	~	~	~	~	1,149	11.7	10.6	11.5	9.1
Corpus and Uterus, NOS	~	~	~	~	~	~	~	~	~	~	2,220	22.7	18.5	19.7	15.0
Ovary	~	~	~	~	~	~	~	~	~	~	751	7.7	6.4	6.9	4.9
Urinary Bladder	2,114	11.2	9.2	10.4	5.9	1,567	17.4	15.8	17.9	9.9	547	5.6	4.2	4.8	2.7
Kidney and Renal Pelvis	1,336	7.1	6.1	6.5	4.7	848	9.4	8.5	9.2	6.5	488	5.0	4.1	4.4	3.2
Brain and Other Nervous System	906	4.8	4.4	4.6	3.9	473	5.2	5.0	5.2	4.4	433	4.4	3.9	4.1	3.5
Thyroid	3,275	17.4	16.0	17.2	13.9	564	6.3	5.9	6.3	5.0	2,711	27.7	25.0	26.8	21.8
Hodgkin Lymphoma	465	2.5	2.4	2.4	2.2	259	2.9	2.8	2.9	2.6	206	2.1	2.0	2.1	1.8
Non-Hodgkin Lymphoma	2,387	12.7	10.9	11.9	8.3	1,227	13.6	12.6	13.8	9.4	1,160	11.8	9.6	10.4	7.3
Myeloma	758	4.0	3.4	3.7	2.4	401	4.4	4.0	4.4	2.9	357	3.6	2.8	3.1	2.0
Leukemia	1,357	7.2	6.5	7.0	5.2	759	8.4	8.0	8.7	6.3	598	6.1	5.3	5.7	4.3
Bones and Joints	165	0.9	0.8	0.8	0.7	85	0.9	0.9	0.9	0.8	80	0.8	0.7	0.8	0.7

*Rates are per 100,000.

† Excludes basal and squamous cell carcinomas of the skin except when these occur on the skin of the genital organs, and in situ cancers except urinary bladder. Statistics were generated from malignant cases only except for urinary bladder, which includes malignant and in situ.

Data Source: Incidence Case File of Puerto Rico from the Puerto Rico Central Cancer Registry (August 09, 2013).

Population Source: Vintage 2012 estimates series from the Population Division of the United States Census Bureau.

~ Not applicable.

PR = Puerto Rico; US = United States

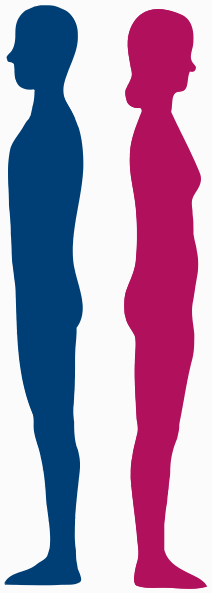
TABLE 4: MORTALITY FOR SPECIFIC CANCER SITES BY SEX, PUERTO RICO: 2006-2010

Sex →	Overall					Male					Female				
Cancer Site ↓	Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*		
			PR	US	World			PR	US	World			PR	US	World
All Sites	25,113	133.5	110.5	124.6	72.1	14,201	157.5	144.0	163.3	90.7	10,912	111.4	86.0	96.7	57.9
Oral Cavity and Pharynx	613	3.3	2.7	3.0	1.9	505	5.6	5.0	5.5	3.5	108	1.1	0.8	1.0	0.5
Esophagus	626	3.3	2.7	3.0	1.8	498	5.5	5.0	5.5	3.4	128	1.3	1.0	1.1	0.6
Stomach	1,095	5.8	4.8	5.5	2.9	668	7.4	6.8	7.8	4.1	427	4.4	3.3	3.8	2.0
Colon and Rectum	3,344	17.8	14.6	16.5	9.5	1,862	20.6	18.7	21	12.3	1,482	15.1	11.4	13	7.1
Liver and Intrahepatic Bile Duct	1,447	7.7	6.3	7.1	4.2	920	10.2	9.2	10.1	6.3	527	5.4	4.1	4.6	2.5
Pancreas	1,131	6.0	4.9	5.6	3.2	556	6.2	5.6	6.2	3.7	575	5.9	4.4	5.0	2.8
Larynx	259	1.4	1.1	1.3	0.8	230	2.6	2.3	2.5	1.6	29	0.3	0.2	0.3	0.2
Lung and Bronchus	3,011	16.0	13.2	14.7	8.6	1,958	21.7	19.6	22	12.7	1,053	10.8	8.2	9.2	5.4
Melanoma of the Skin	111	0.6	0.5	0.6	0.3	64	0.7	0.7	0.7	0.4	47	0.5	0.4	0.4	0.3
Prostate	~	~	~	~	~	2,610	28.9	27.3	32.7	13.5	~	~	~	~	~
Testis	~	~	~	~	~	24	0.3	0.3	0.3	0.3	~	~	~	~	~
Breast	~	~	~	~	~	~	~	~	~	~	2,062	21.1	16.8	18.5	12.5
Cervix Uteri	~	~	~	~	~	~	~	~	~	~	248	2.5	2.1	2.3	1.7
Corpus and Uterus, NOS	~	~	~	~	~	~	~	~	~	~	497	5.1	4.0	4.4	2.8
Ovary	~	~	~	~	~	~	~	~	~	~	457	4.7	3.6	4.0	2.6
Urinary Bladder	520	2.8	2.2	2.6	1.2	333	3.7	3.4	4.0	1.9	187	1.9	1.4	1.6	0.7
Kidney and Renal Pelvis	377	2.0	1.6	1.8	1.1	246	2.7	2.5	2.8	1.7	131	1.3	1.0	1.1	0.7
Brain and Other Nervous System	404	2.1	1.8	2.0	1.4	229	2.5	2.3	2.5	1.8	175	1.8	1.4	1.6	1.1
Thyroid	62	0.3	0.3	0.3	0.2	18	0.2	0.2‡	0.2‡	0.1‡	44	0.4	0.3	0.4	0.2
Hodgkin Lymphoma	93	0.5	0.4	0.5	0.3	57	0.6	0.6	0.7	0.5	36	0.4	0.3	0.3	0.2
Non-Hodgkin Lymphoma	831	4.4	3.7	4.2	2.5	456	5.1	4.6	5.1	3.2	375	3.8	3.0	3.4	2.0
Myeloma	548	2.9	2.4	2.7	1.6	296	3.3	2.9	3.3	2.0	252	2.6	1.9	2.2	1.2
Leukemia	850	4.5	3.8	4.3	2.6	473	5.2	4.9	5.6	3.2	377	3.9	3.0	3.4	2.1
Bones and Joints	116	0.6	0.5	0.6	0.4	70	0.8	0.7	0.8	0.5	46	0.5	0.4	0.4	0.2

*Rates are per 100,000.
Data Source: Mortality Case File provided by the Demographic Registry of Puerto Rico (February, 2013) & the Institute of Statistics of Puerto Rico (December, 2010).
Population Source: Vintage 2012 estimates series from the Population Division of the United States Census Bureau.
For quality reasons some cases might have been modified in order to accurately represent some sex-specific primary sites.
~ Not applicable.
‡ Counts < 20 are too few to calculate a stable age-adjusted rate.
PR = Puerto Rico; US = United States

FIGURE 3: TOP TEN INCIDENCE CANCER SITES, ALL AGES: PUERTO RICO, 2006-2010

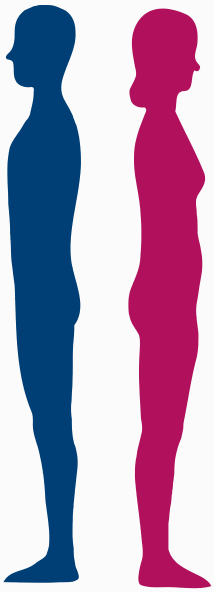
Males (N = 36,273)	%
Prostate	40.6
Colon and Rectum	13.1
Lung and Bronchus	6.1
Urinary Bladder	4.3
Oral Cavity and Pharynx	4.0
Non-Hodgkin Lymphoma	3.4
Liver and Intrahepatic Bile Duct	2.9
Stomach	2.8
Kidney and Renal Pelvis	2.3
Leukemia	2.1
Other Sites	18.4



Females (N = 29,734)	%
Breast	29.7
Colon and Rectum	13.2
Thyroid	9.1
Corpus and Uterus, NOS	7.5
Lung and Bronchus	4.1
Non-Hodgkin Lymphoma	3.9
Cervix Uteri	3.9
Ovary	2.5
Stomach	2.5
Leukemia	2.0
Other Sites	21.6

FIGURE 4: TOP TEN MORTALITY CANCER SITES, ALL AGES: PUERTO RICO, 2006-2010

Males (N = 14,201)	%
Prostate	18.4
Lung and Bronchus	13.8
Colon and Rectum	13.1
Liver and Intrahepatic Bile Duct	6.5
Stomach	4.7
Pancreas	3.9
Oral Cavity and Pharynx	3.6
Esophagus	3.5
Leukemia	3.3
Non-Hodgkin Lymphoma	3.2
Other Sites	26.0



Females (N = 10,912)	%
Breast	18.9
Colon and Rectum	13.6
Lung and Bronchus	9.6
Pancreas	5.3
Liver and Intrahepatic Bile Duct	4.8
Corpus and Uterus, NOS	4.6
Ovary	4.2
Stomach	3.9
Leukemia	3.5
Non-Hodgkin Lymphoma	3.4
Other Sites	28.2

FIGURE 5: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF ALL CANCER SITES BY SEX, PUERTO RICO 1987-2010

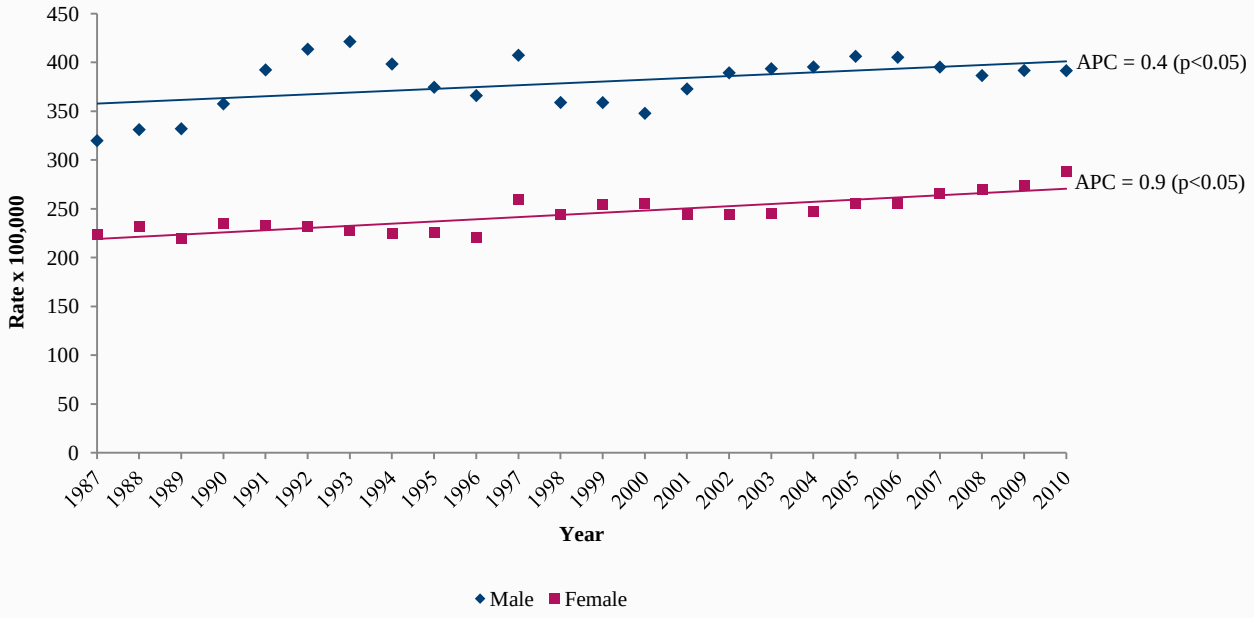


FIGURE 6: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF ALL CANCER SITES BY SEX, PUERTO RICO 1987-2010

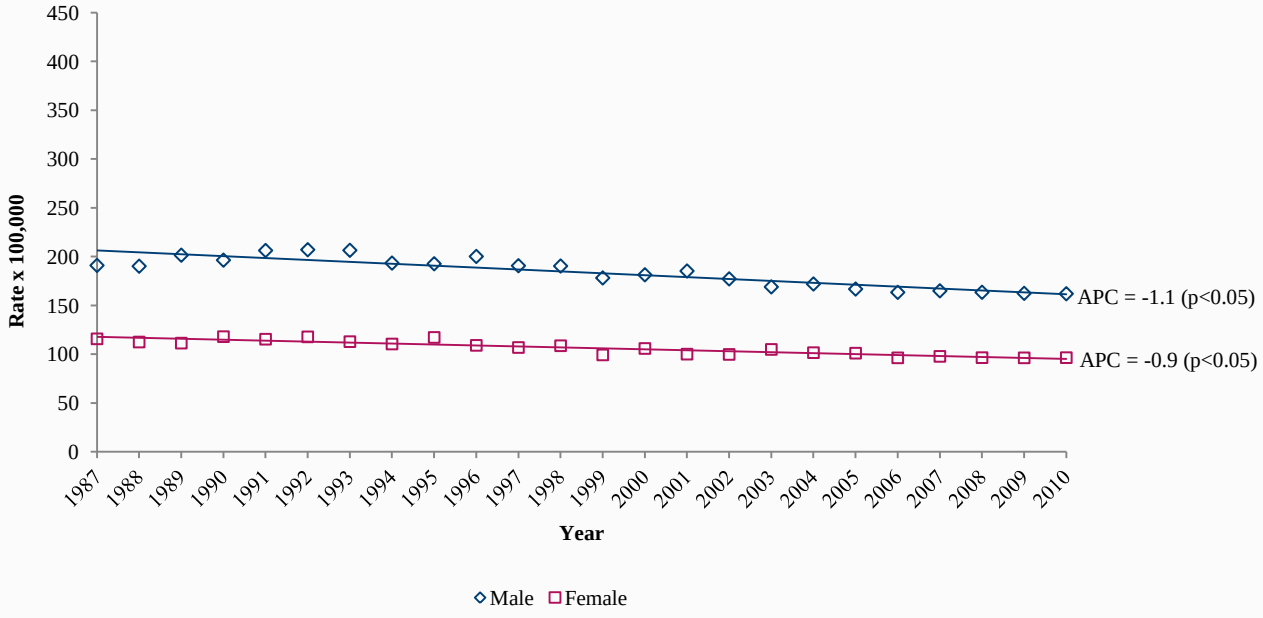


FIGURE 7: AGE-SPECIFIC INCIDENCE RATES OF ALL CANCER SITES BY SEX, PUERTO RICO 2006-2010

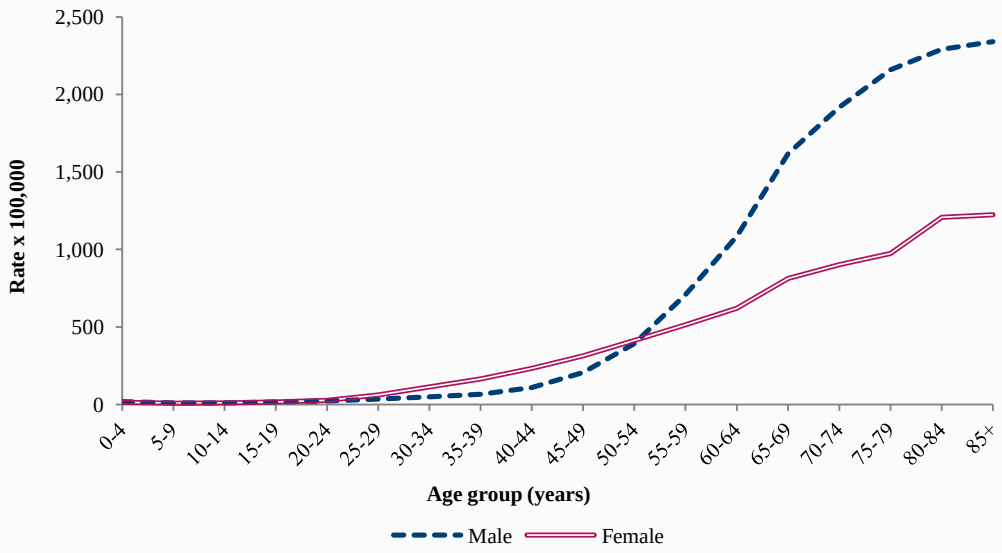


FIGURE 8: AGE-SPECIFIC MORTALITY RATES OF ALL CANCER SITES BY SEX, PUERTO RICO 2006-2010

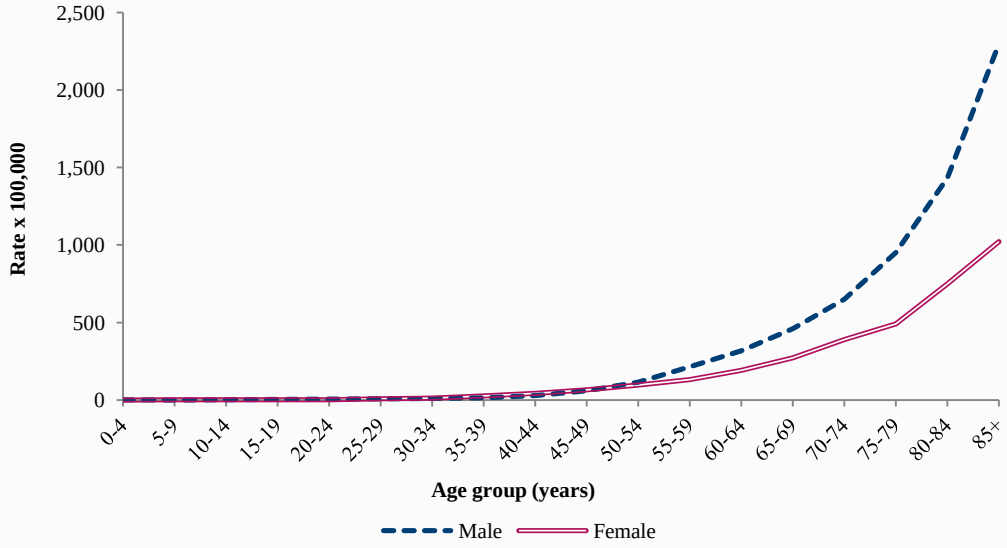
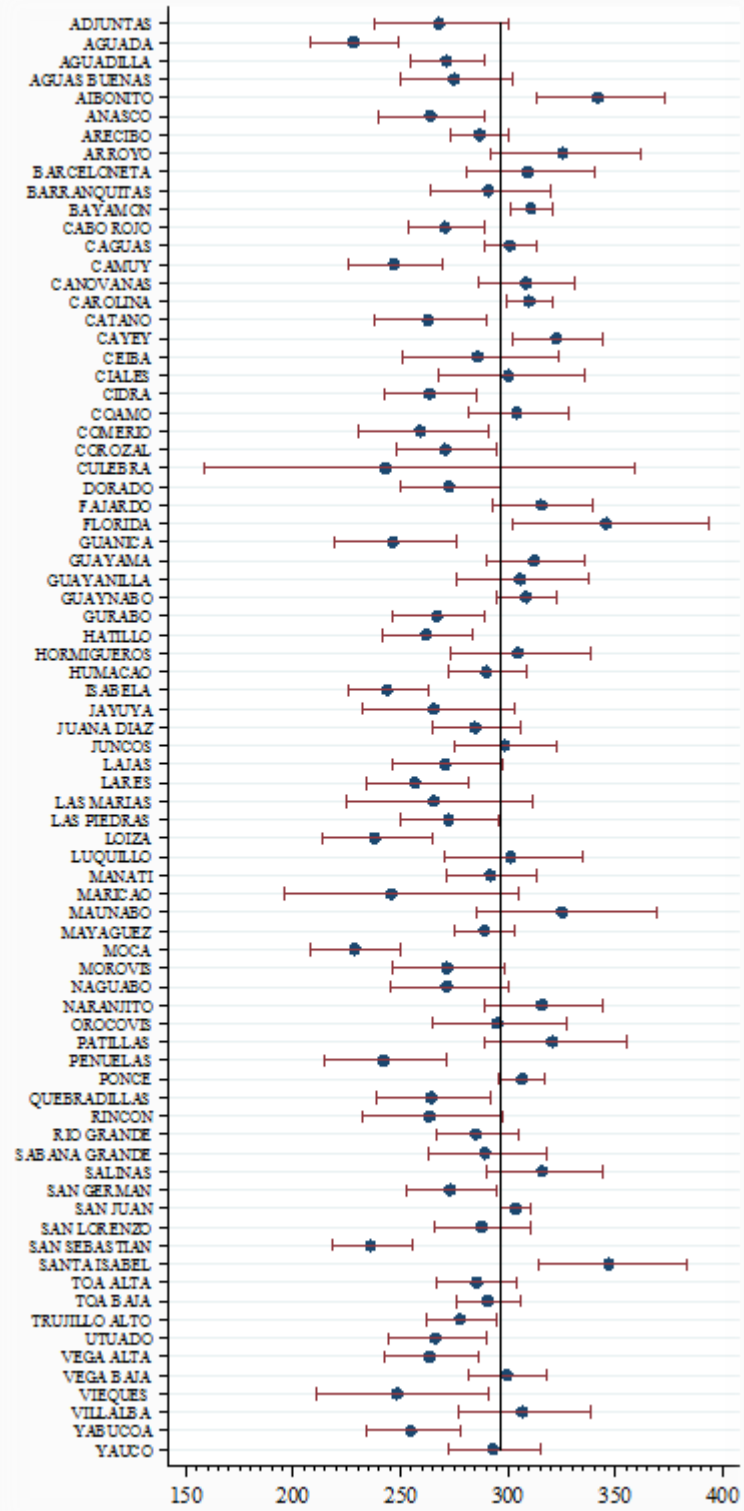
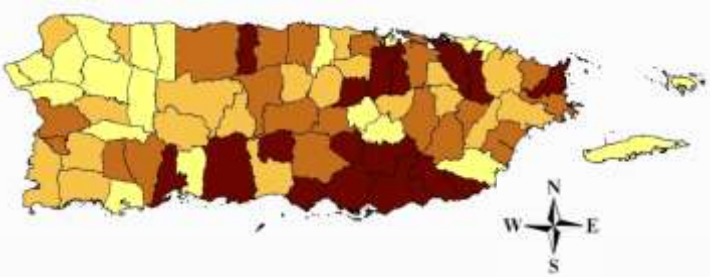


FIGURE 9: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF ALL CANCER SITES BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
296.9 per 100,000



Rate per 100,000
and 95% Confidence Intervals

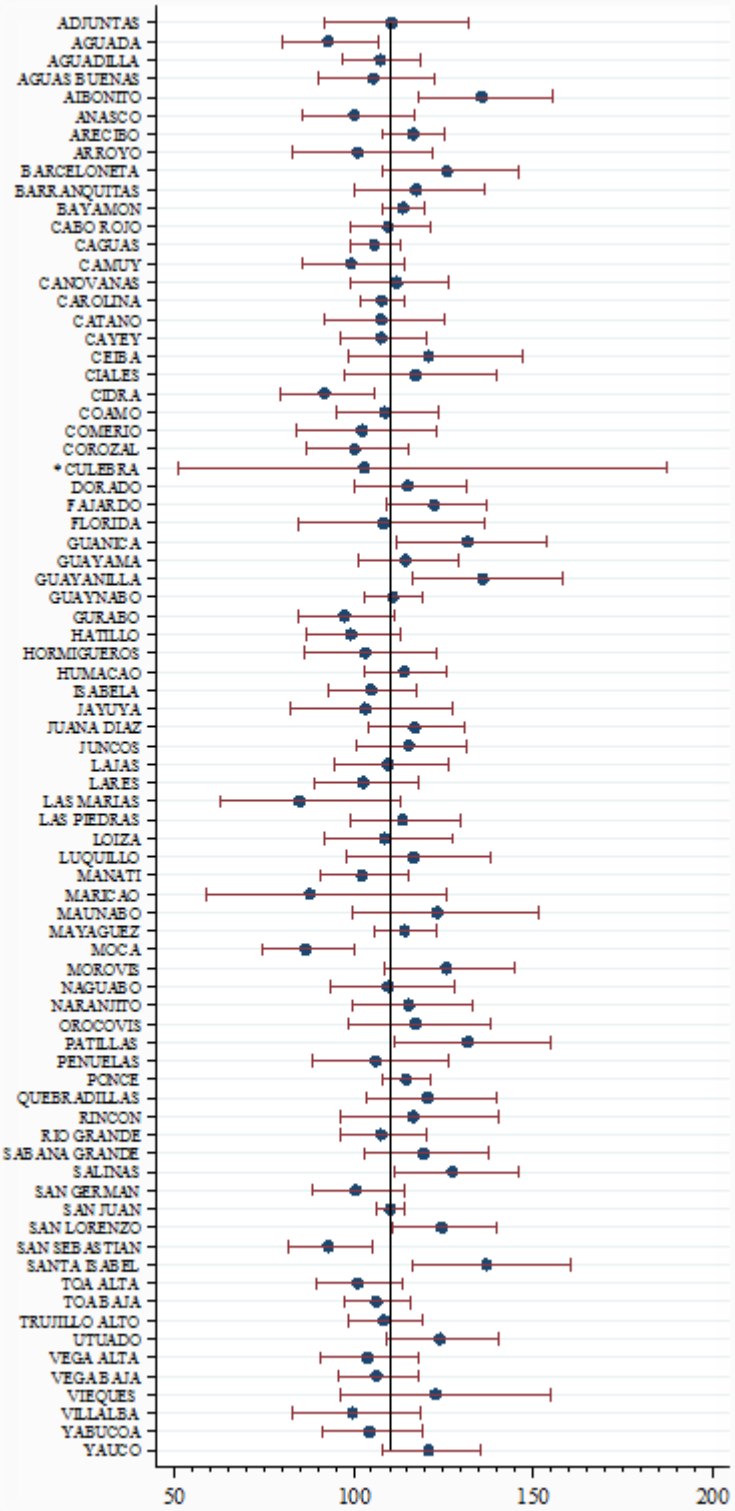


Incidence
Rate per 100,000

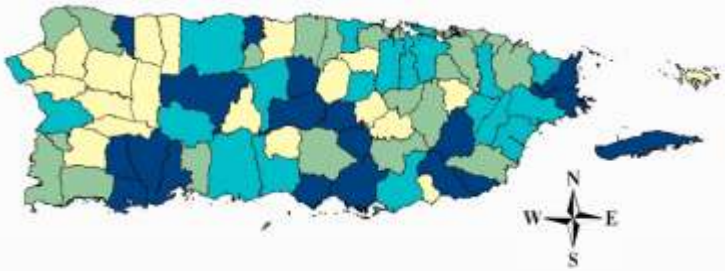
- 304.71 – 347.20
- 285.51 – 304.70
- 263.81 – 285.50
- 228.00 – 263.80

FIGURE 10: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF ALL CANCER SITES BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
110.5 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases



Mortality
Rate per 100,000

- 117.21 – 137.10
- 109.61 – 117.20
- 103.21 – 109.60
- 85.00 – 103.20

Cancer Incidence and Mortality by Age and Sex

The incidence and mortality of invasive cancer varies with age, sex and the type of tumor. During the period 2006-2010 about 54.9% of all new cases and the 69.6% of all deaths attributed to cancer in Puerto Rico occurred after the age of 65 years. Figures 11 and 12 show the percent distribution of the most frequent cancers (diagnosed and cause of death, respectively) during the period 2006-2010 by age and sex in the adult population (> 19 years).

FIGURE 11: THE MOST FREQUENTLY DIAGNOSED CANCERS BY AGE AND SEX IN THE ADULT POPULATION, PUERTO RICO 2006-2010

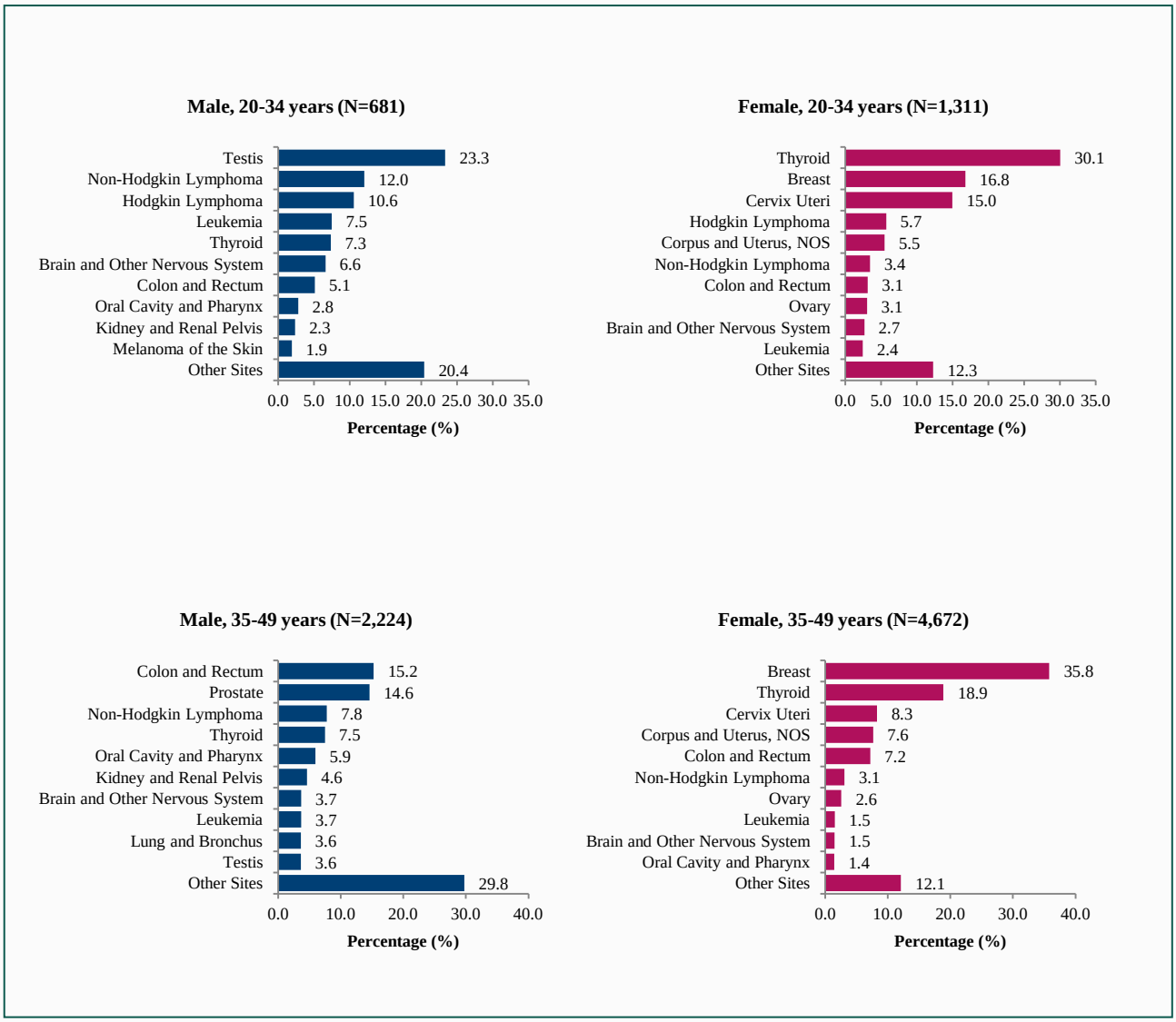


FIGURE 11: THE MOST FREQUENTLY DIAGNOSED CANCERS BY AGE AND SEX IN THE ADULT POPULATION, PUERTO RICO 2006-2010 (CONTINUED)

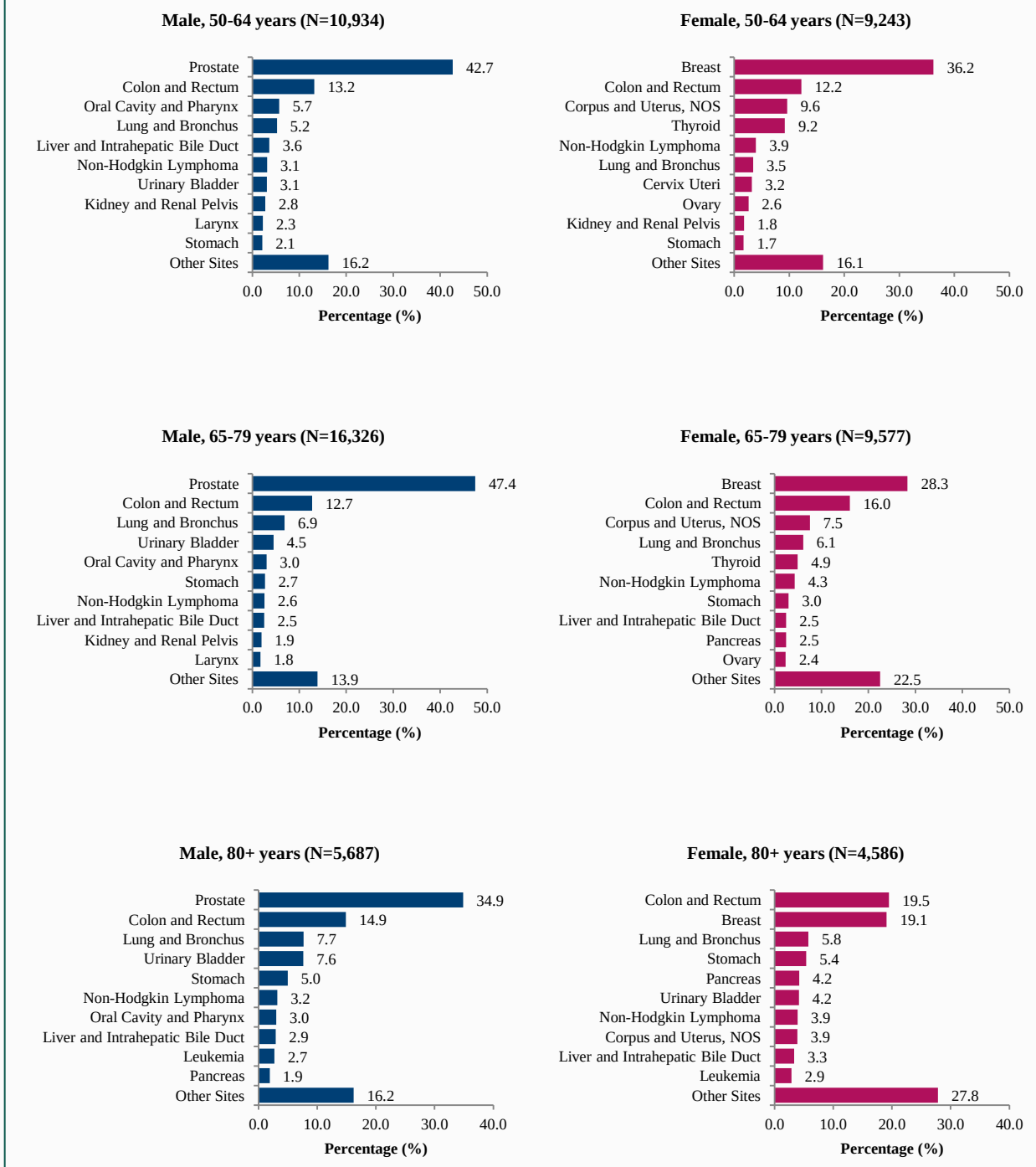


FIGURE 12: MOST FREQUENT CAUSES OF DEATH DUE TO CANCER BY AGE AND SEX IN THE ADULT POPULATION, PUERTO RICO 2006-2010

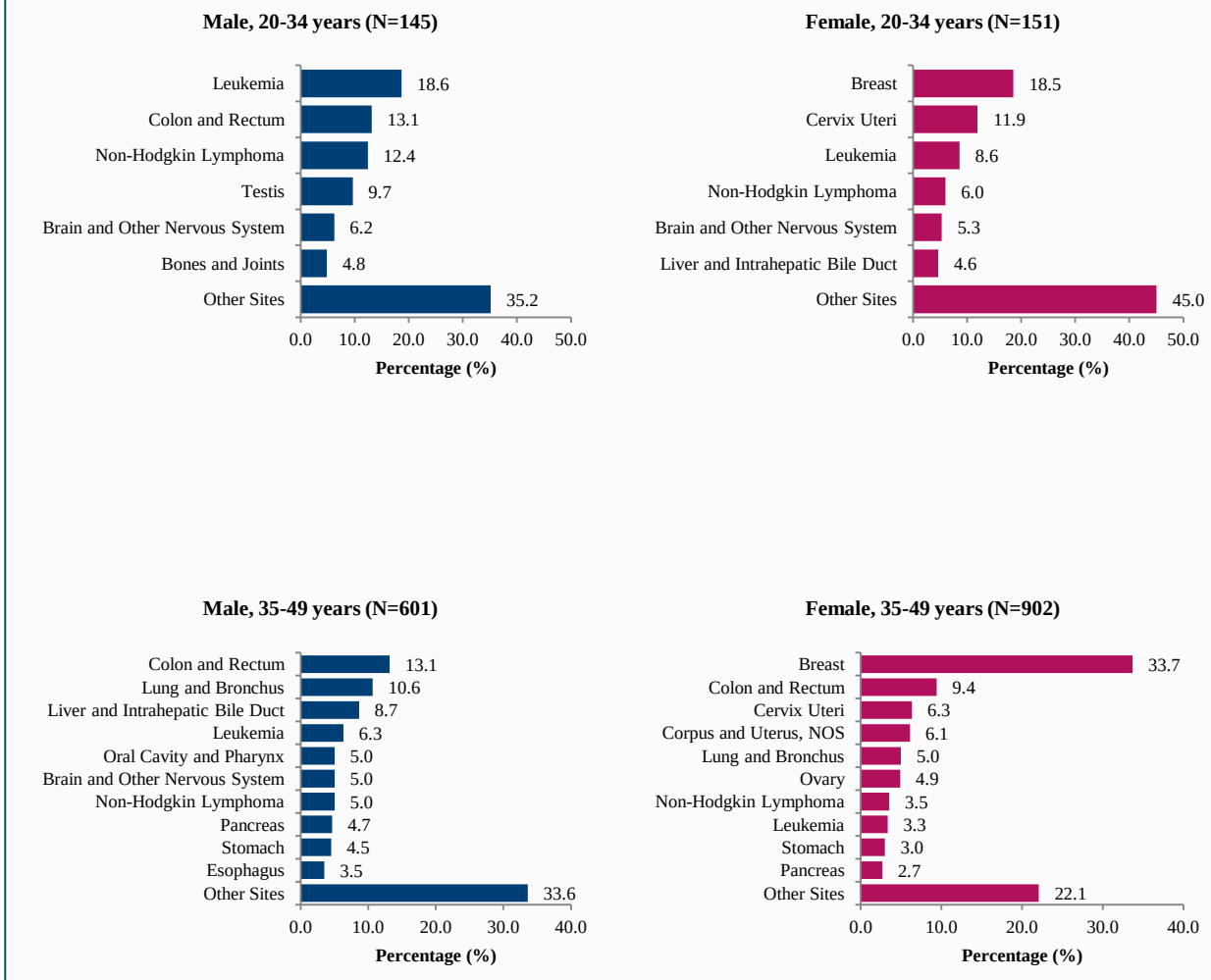
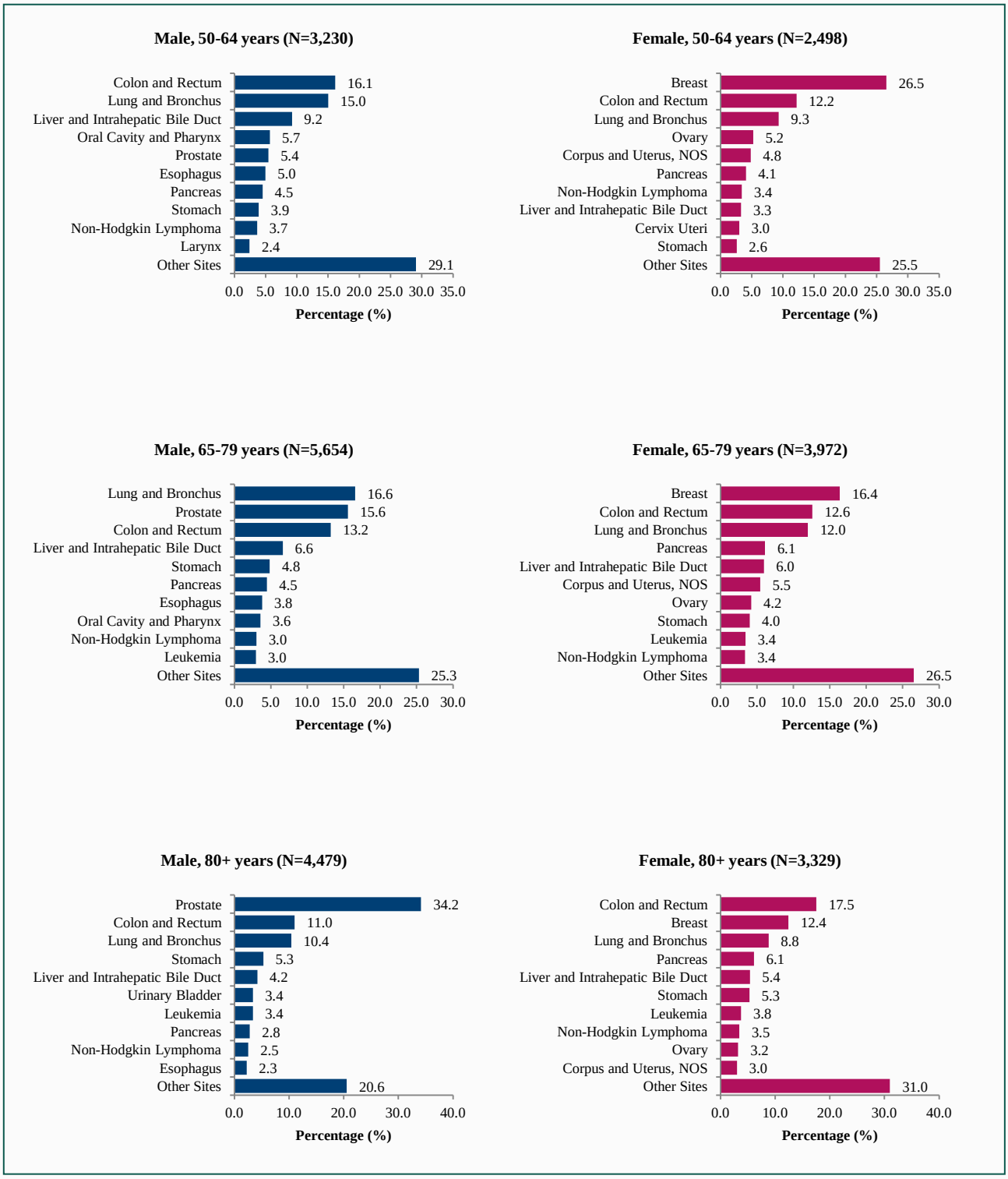


FIGURE 12: MOST FREQUENT CAUSES OF DEATH DUE TO CANCER BY AGE AND SEX IN THE ADULT POPULATION, PUERTO RICO 2006-2010 (CONTINUED)



Cancer of the Oral Cavity and Pharynx

Oral cavity and pharynx cancer was the fifth most commonly diagnosed cancer among men during the period 2006-2010 after prostate, colorectal, lung and bronchus, and urinary bladder cancers. For the same period, oral cavity and pharynx cancer ranked as the seventh cause of death from cancer in men.

Oral cavity and pharynx cancers are the cancers that occur in the mouth and the pharynx, a hollow tube about 5 inches long that starts behind the nose and leads to the esophagus and the trachea. The oral cavity and pharynx consists of many parts: lips, lining of cheeks, salivary glands, roof of mouth (hard palate), back of mouth (soft palate and uvula), floor of mouth (area under the tongue), gums and teeth, tongue, tonsils and pharynx; it has three parts: nasopharynx, oropharynx and hypopharynx. Known risk factors for oral cancer include: smoking cigarettes, cigars, or pipes; using or chewing tobacco and dipping snuff; drink alcohol; human papillomavirus (HPV) infection; exposure to the sun, and a personal history of head and neck cancer (26).

Key Points

- **Oral cavity and pharynx cancer accounted for 4.0% of all male cancers and 1.6% of all female cancers between 2006 and 2010.**
- **It accounted for 3.6% of all male cancer deaths and 1.0% of female cancer deaths during 2006-2010.**
- **An average of 290 men and 93 women were diagnosed with oral cavity and pharynx cancer each year during the period 2006-2010.**
- **An average of 101 men and 22 women died from oral cavity and pharynx cancer each year during the period 2006-2010.**
- **During 2006-2010, the risk of developing oral cavity and pharynx cancer was 3.7 times higher in men than in women (95% CI: 3.3, 4.1).**
- **For the same period, the risk of death due to oral cavity and pharynx cancer was 5.7 times higher in men than in women (95% CI: 4.6, 7.1).**

Between 1987 and 2010, the incidence rate among men and women decreased an average of 2.9% ($p<0.05$) and 1.8% ($p<0.05$) annually, respectively (Figure 13). While, mortality decreased by an average of 3.9% ($p<0.05$) in men, and 4.6% ($p<0.05$) in women per year during the same period (Figure 14). Throughout the years of analysis, the rates of incidence and mortality among men are greater than among women. By the end of the time period the rates in men have decreased such that the differences with women rates have also decreased.

During the period 2006-2010, the median age at diagnosis for oral cavity and pharynx cancer in men was 64 years; while in women it was 66 years. For the same period, the median age at death for oral cavity and pharynx cancer in men was 67 years; while in women it was 80 years. The age-specific incidence and mortality rates by sex are shown in Figures 15 and 16, respectively.

Based on the incidence rates for 2006-2010, 1.0% of men and women born today in Puerto Rico will be diagnosed with cancer of the oral cavity and pharynx during their lifetime. This number can also be expressed as: 1 in 99 men and women born today will be diagnosed with cancer of the oral cavity and pharynx during their lifetime.

FIGURE 13: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF ORAL CAVITY AND PHARYNX CANCER BY SEX, PUERTO RICO 1987-2010

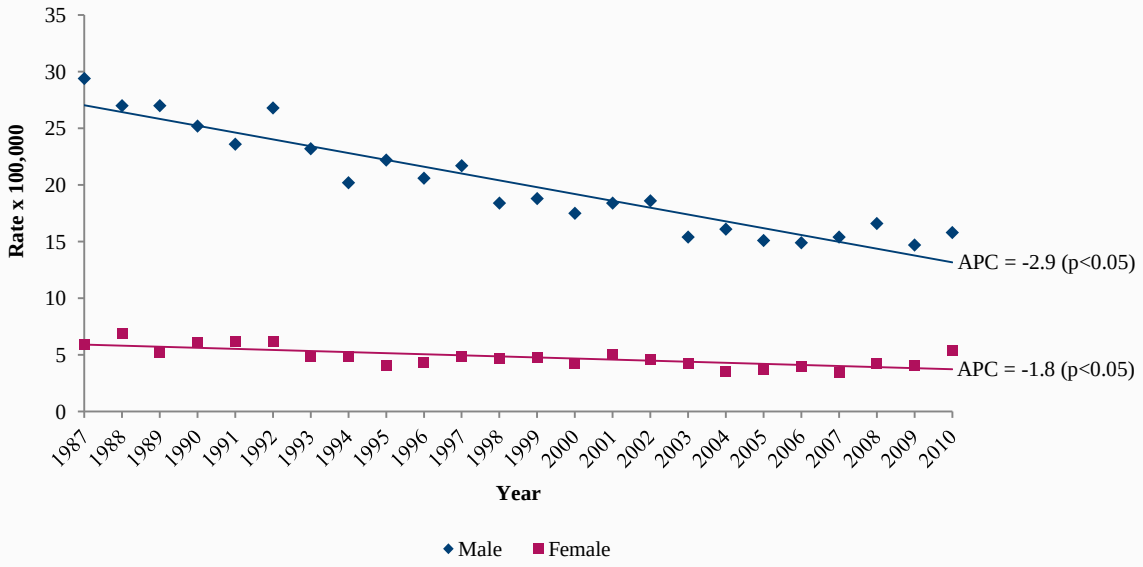


FIGURE 14: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF ORAL CAVITY AND PHARYNX CANCER BY SEX, PUERTO RICO 1987-2010

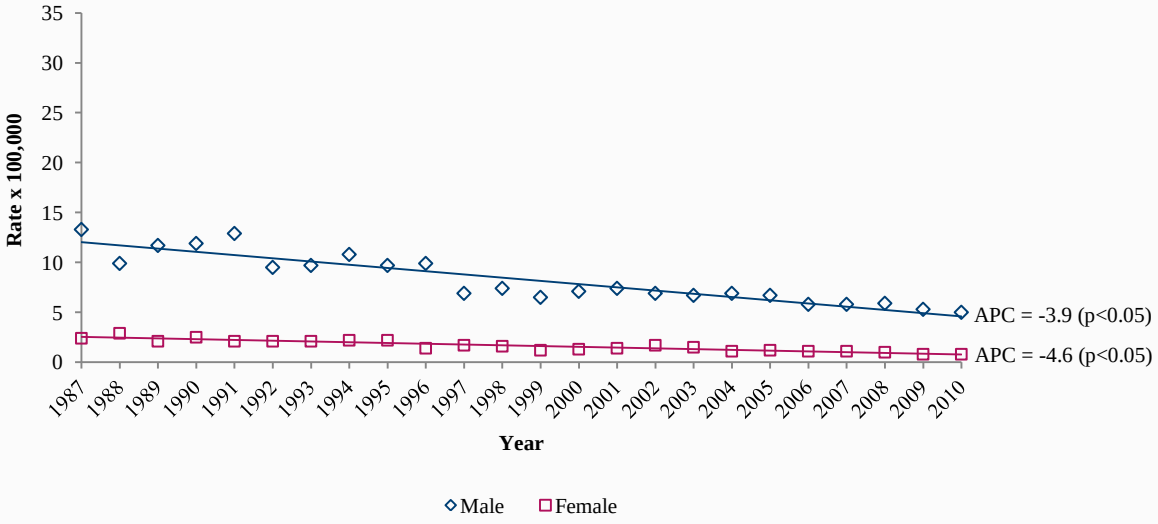


FIGURE 15: AGE-SPECIFIC INCIDENCE RATES OF ORAL CAVITY AND PHARYNX CANCER BY SEX, PUERTO RICO 2006-2010

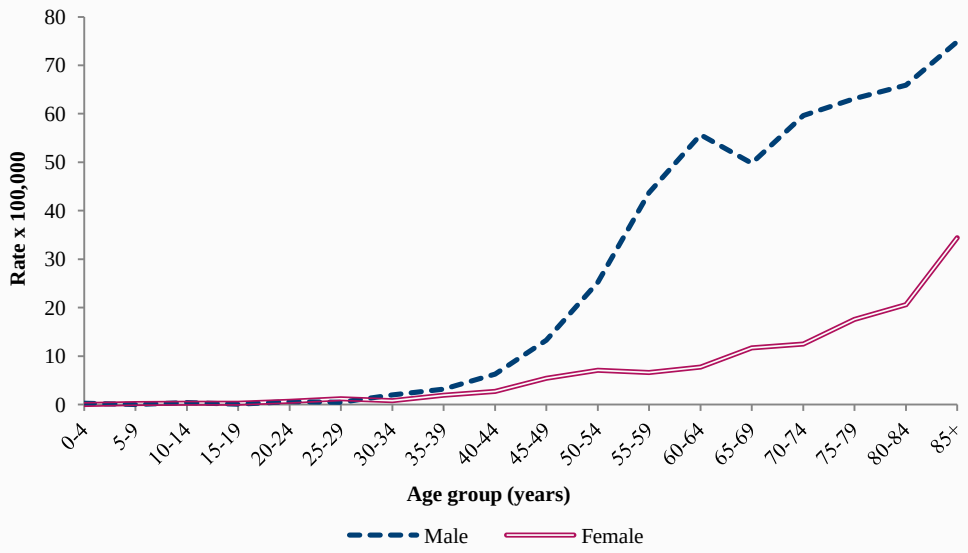


FIGURE 16: AGE- SPECIFIC MORTALITY RATES OF ORAL CAVITY AND PHARYNX CANCER BY SEX, PUERTO RICO 2006-2010

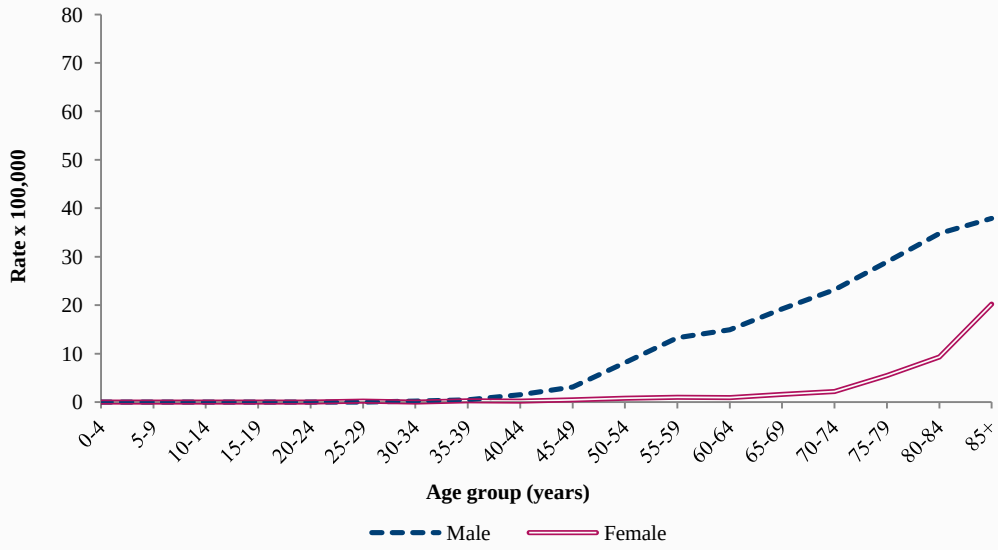
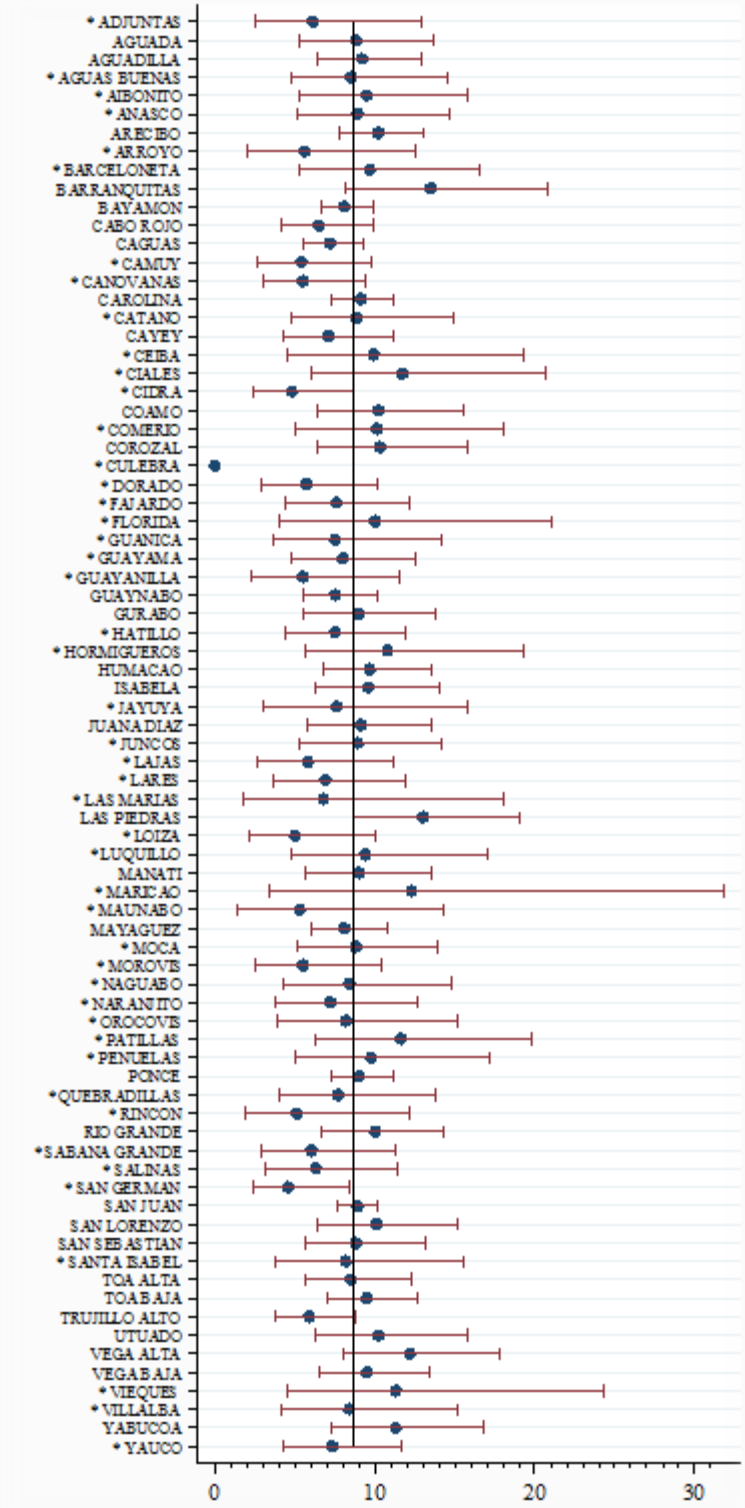
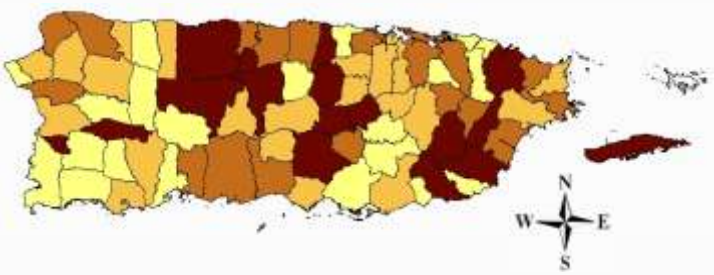


FIGURE 17: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF ORAL CAVITY AND PHARYNX CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
8.6 per 100,000



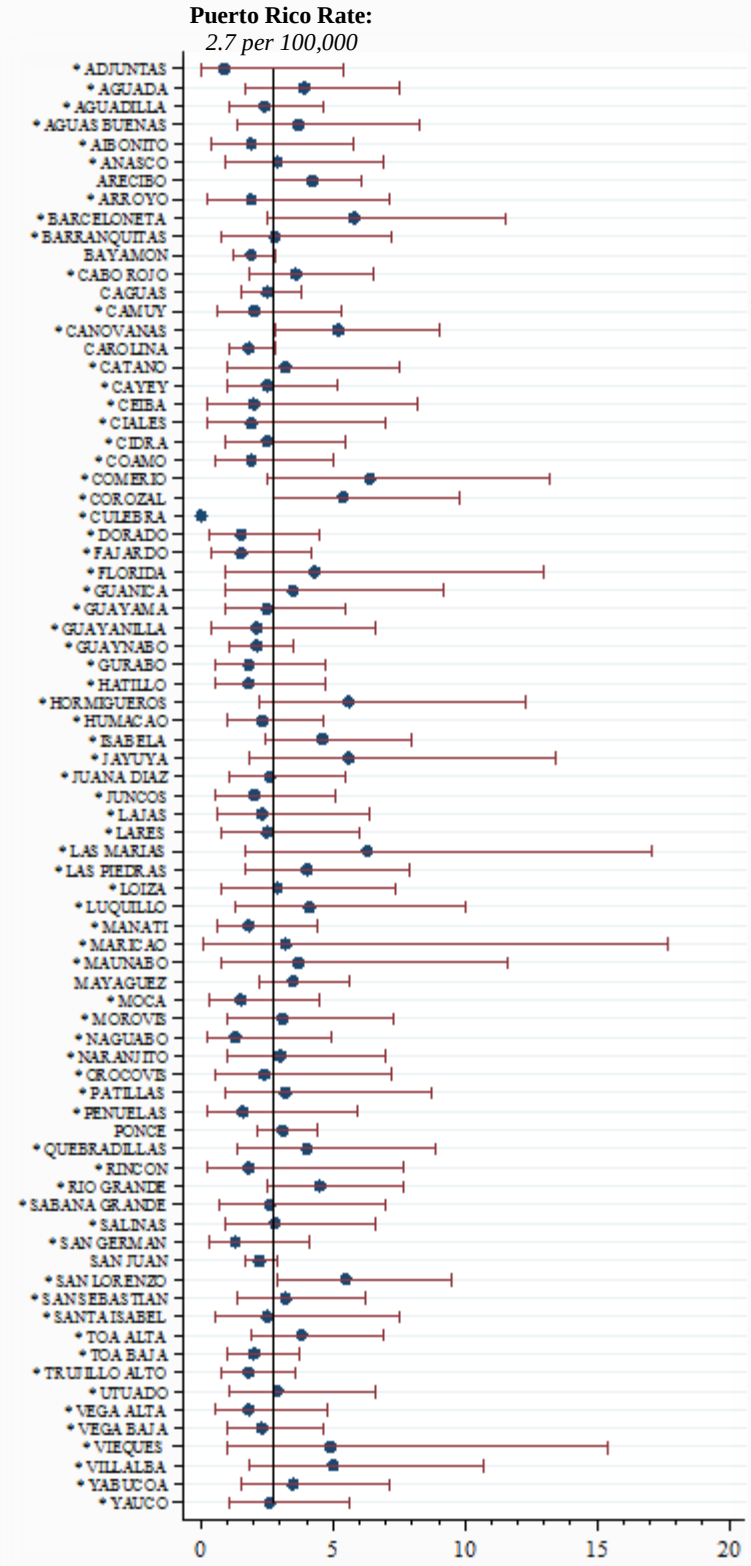
Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases



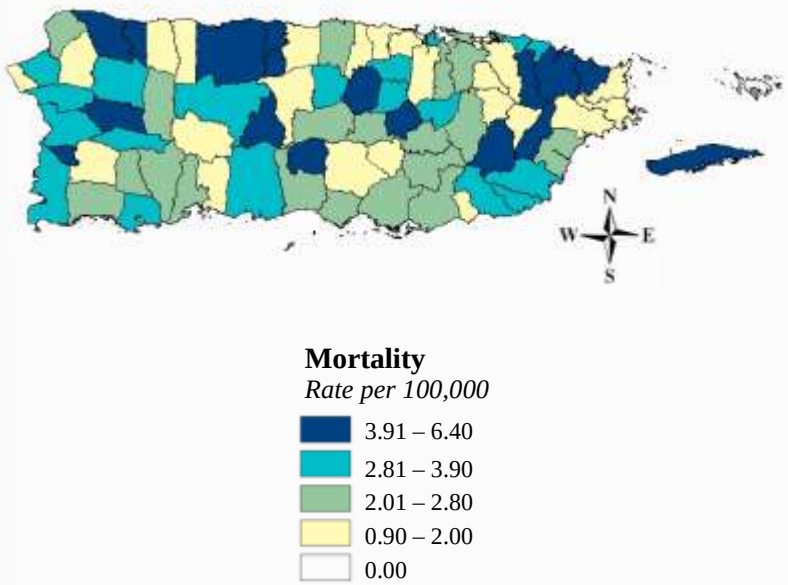
Incidence
Rate per 100,000

- 9.91 – 13.50
- 8.81 – 9.90
- 7.11 – 8.80
- 4.60 – 7.10
- 0.00

FIGURE 18: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF ORAL CAVITY AND PHARYNX CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010



***Municipality with less than 20 cases**



Cancer of the Stomach

Stomach cancer was the eight most common cancer diagnosed in men and the ninth in women in Puerto Rico during the period 2006-2010. It was the fifth and eighth cause of death from cancer among men and women, respectively, during this period. Factors associated with an increase in the risk of stomach cancer includes: infection with *Helicobacter pylori*, having an inflammatory disease in the stomach for a long time (such as *pernicious anemia*), smoking, family history of stomach cancer, poor diet, lack of physical activity, and obesity (26).

Between 1987 and 2010, the incidence rate among men and women decreased annually by an average of 4.1% ($p<0.05$) and 2.8% ($p<0.05$), respectively (Figure 19). Cancer mortality rates also decreased an average of 4.5% ($p<0.05$) in men, and 3.7% ($p<0.05$) in women per year (Figure 20).

Key Points

- **Stomach cancer accounted for 2.8% of all male cancers and 2.5% of all female cancers between 2006 and 2010.**
- **It also accounted for 4.7% of all male cancer deaths and 3.9% of female cancer deaths between 2006 and 2010.**
- **An average of 202 men and 150 women were diagnosed with stomach cancer each year during the period 2006-2010.**
- **An average of 134 men and 85 women died from stomach cancer each year during the period 2006-2010.**
- **During 2006-2010, the risk of developing stomach cancer was 1.7 times higher in men than in women (95% CI: 1.6, 1.9).**
- **For the same period, the risk of death due to stomach cancer was 2.1 times higher in men than in women (95% CI: 1.8, 2.4).**

During the period 2006-2010, the median age at diagnosis for stomach cancer in men was 72 years; while in women it was 73 years. For the same period, the median age at death for stomach cancer in men was 75 years; while in women it was 76 years. The age-specific incidence and mortality rates by sex for this period are shown in Figures 21 and 22.

Based on the incidence rates for 2006-2010, 1.1% of men and women born today in Puerto Rico will be diagnosed with cancer of the stomach during their lifetime. This number can also be expressed as: 1 in 89 men and women will be diagnosed with cancer of the stomach during their lifetime.

FIGURE 19: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF STOMACH CANCER BY SEX, PUERTO RICO 1987-2010

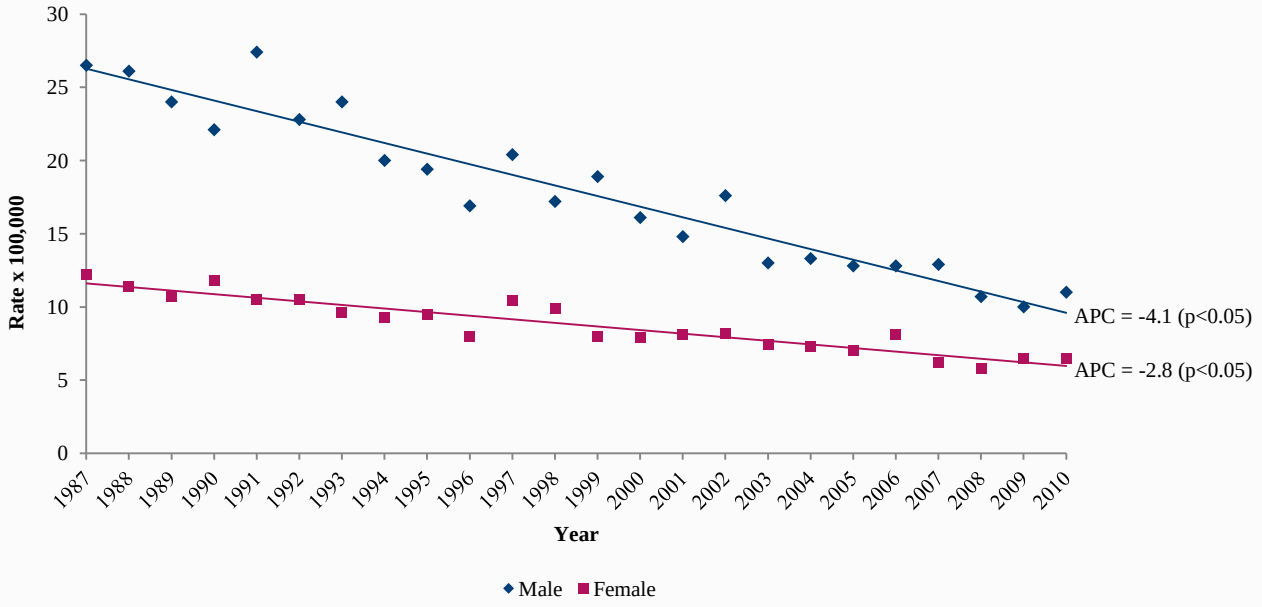


FIGURE 20: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF STOMACH CANCER BY SEX, PUERTO RICO 1987-2010

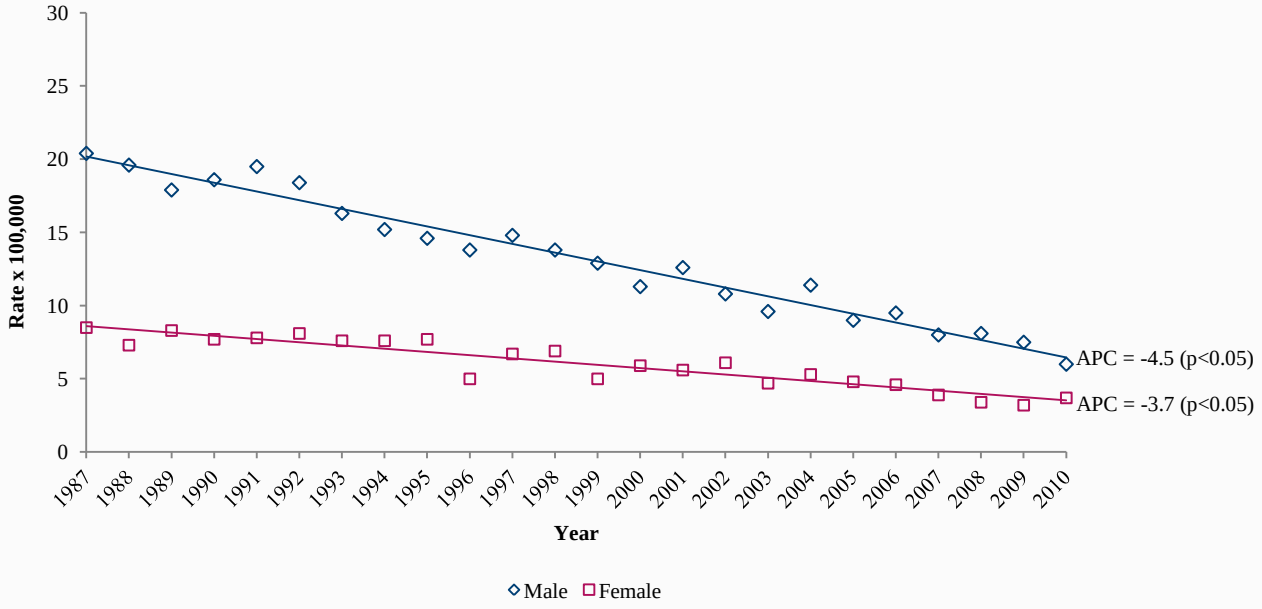


FIGURE 21: AGE-SPECIFIC INCIDENCE RATES OF STOMACH CANCER BY SEX, PUERTO RICO 2006-2010

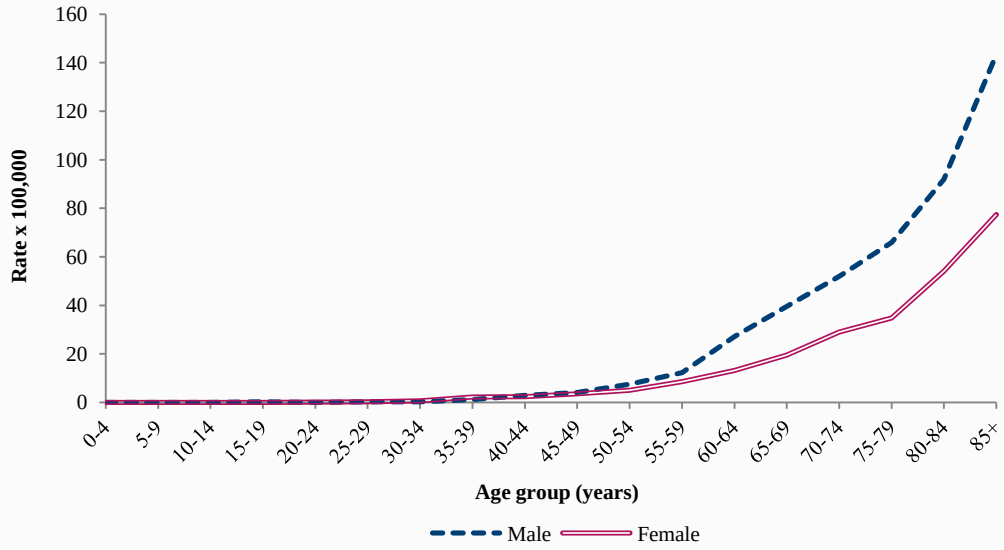


FIGURE 22: AGE-SPECIFIC MORTALITY RATES OF STOMACH CANCER BY SEX, PUERTO RICO 2006-2010

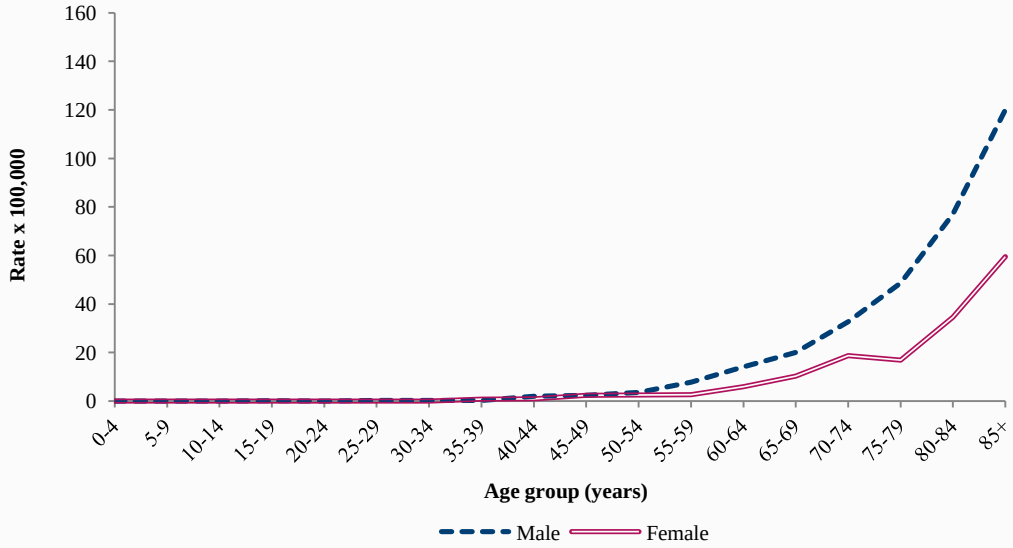
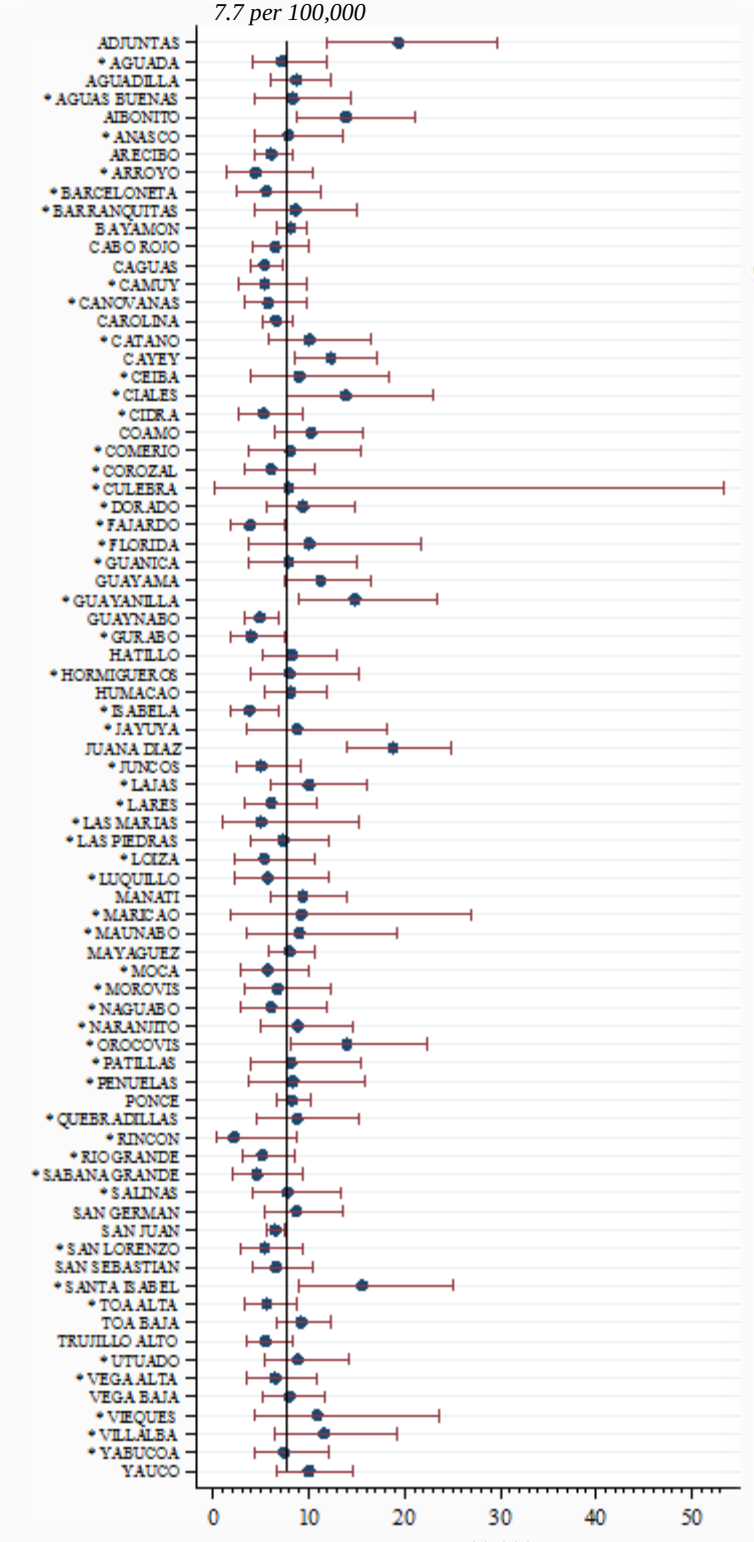
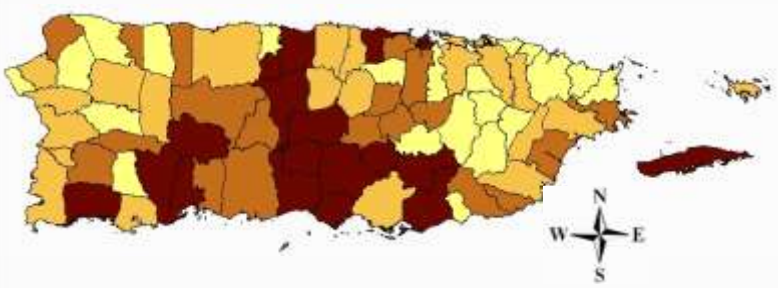


FIGURE 23 AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF STOMACH CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
7.7 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

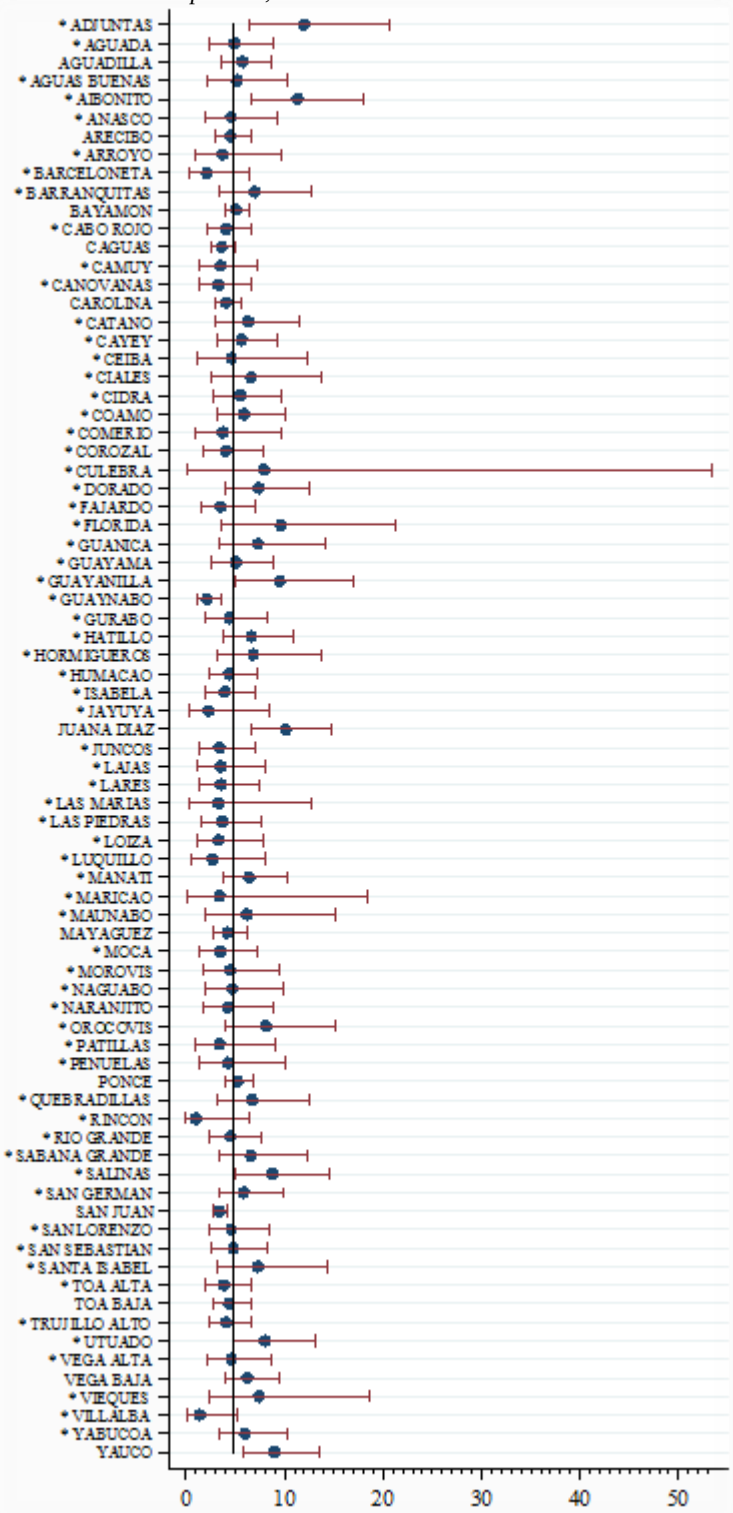


Incidence
Rate per 100,000

- 9.21 – 19.40
- 8.01 – 9.20
- 5.71 – 8.00
- 2.20 – 5.70

FIGURE 24: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF STOMACH CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
4.8 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

Mortality
Rate per 100,000

- 6.61 – 12.00
- 4.61 – 6.60
- 3.71 – 4.60
- 1.00 – 3.70

Cancer of the Colon and Rectum

Colorectal cancer was the second most commonly diagnosed cancer among men and women in Puerto Rico during the period 2006-2010. Colorectal cancer is the leading cause of death for cancer among the Puerto Rican population (men and women combined). However, when analyzed by sex, colorectal cancer is the third cause of cancer death in men and the second cause of death by cancer on women during this period. Factors associated with an increase in the risk of developing colorectal cancer include: personal or family history of polyps, ulcerative colitis, Crohn's disease, a diet high in fat and calories and low in fruits and vegetables, cigarette smoking, and physical inactivity (26).

Key Points

- **Colorectal cancer accounted for 13.1% of all male cancers and 13.2% of all female cancers between 2006 and 2010.**
- **It also accounted for 13.1% of all male cancer deaths and 13.6% of female cancer deaths between 2006 and 2010.**
- **An average of 948 men and 788 women were diagnosed with colorectal cancer each year during the period 2006-2010.**
- **An average of 372 men and 296 women died from colorectal cancer each year for the period 2006-2010.**
- **During 2006-2010, the risk of developing colorectal cancer was 1.5 times higher in men than in women (95% CI: 1.4, 1.6).**
- **For the same period, the risk of death due to colorectal cancer was 1.6 times higher in men than in women (95% CI: 1.5, 1.7).**

Between 1987 and 2010, the incidence rate among men and women increased annually an average of 1.9% ($p<0.05$) and 1.3% ($p<0.05$), respectively (Figure 25). Cancer mortality rates for colon and rectum also increased annually an average of 1.6% ($p<0.05$) in men, and 0.2% ($p>0.05$) in women (Figure 26).

During the period 2006-2010, the median age at diagnosis for colon and rectum cancer in men was 68 years; while in women it was 69 years. For the same period, the median age at death for colon and rectum cancer in men was 71 years; while in women it was 75 years. Figures 27 and 28 show the age-specific incidence and mortality rates by sex for this period.

Based on the incidence rates for 2006-2010, 4.9% of men and women born today in Puerto Rico will be diagnosed with cancer of the colon and rectum during their lifetime. This number can also be expressed as: 1 in 20 men and women will be diagnosed with cancer of the colon and rectum during their lifetime.

FIGURE 25: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF COLON AND RECTUM CANCER BY SEX, PUERTO RICO 1987-2010

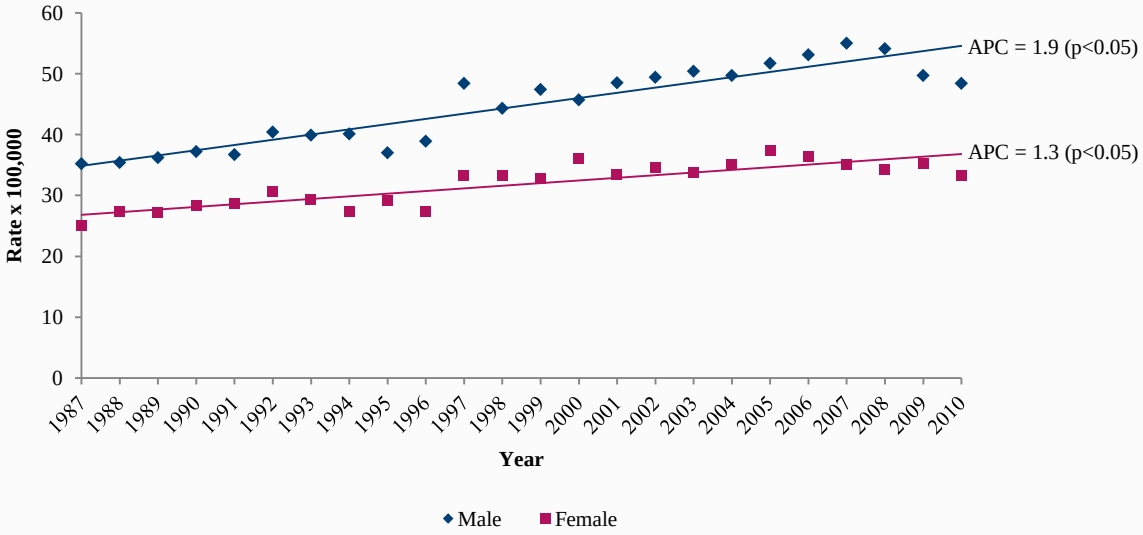


FIGURE 26: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF COLON AND RECTUM CANCER BY SEX, PUERTO RICO 1987-2010

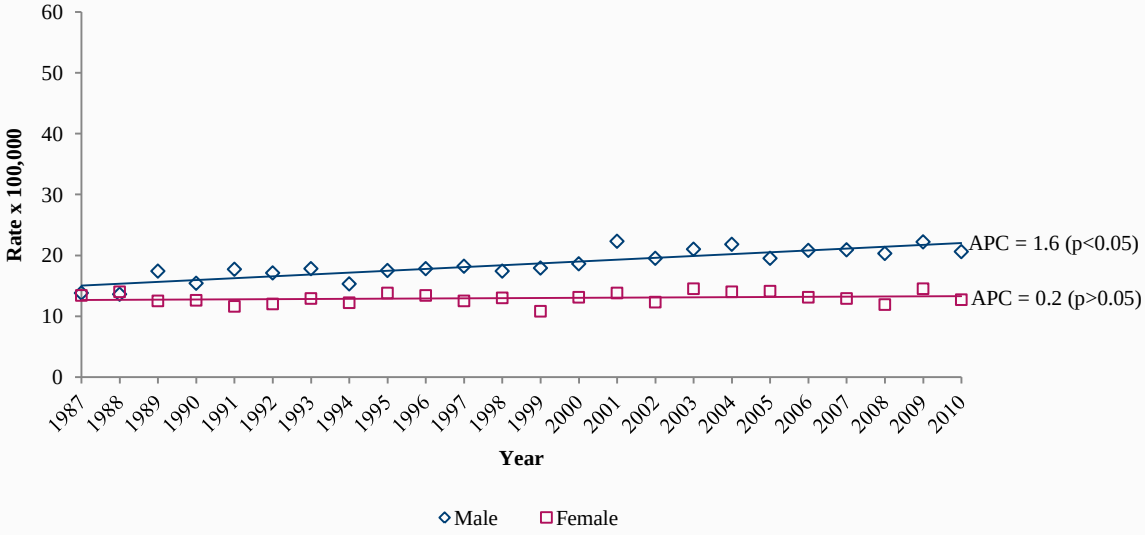


FIGURE 27: AGE-SPECIFIC INCIDENCE RATES OF COLON AND RECTUM CANCER BY SEX, PUERTO RICO 2006-2010

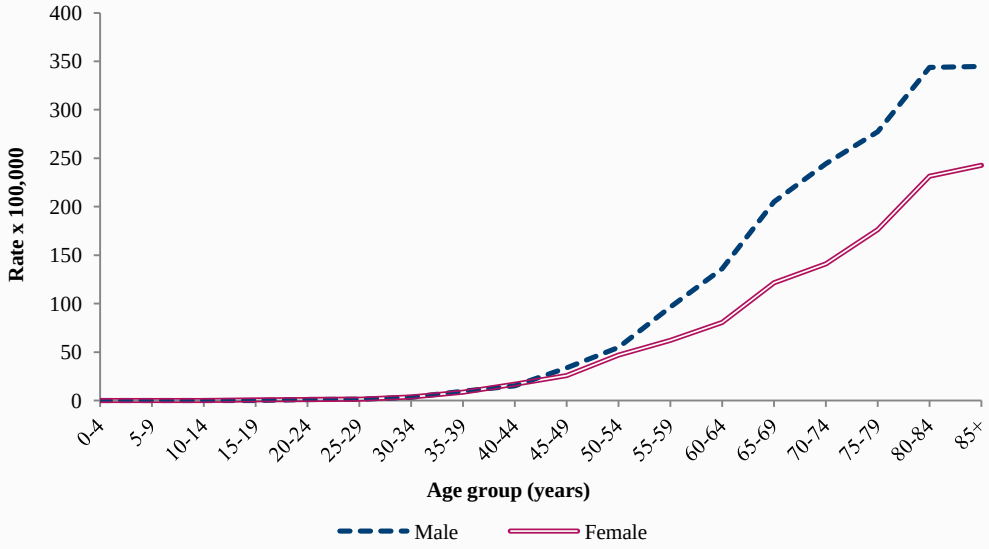


FIGURE 28: AGE-SPECIFIC MORTALITY RATES OF COLON AND RECTUM CANCER BY SEX, PUERTO RICO 2006-2010

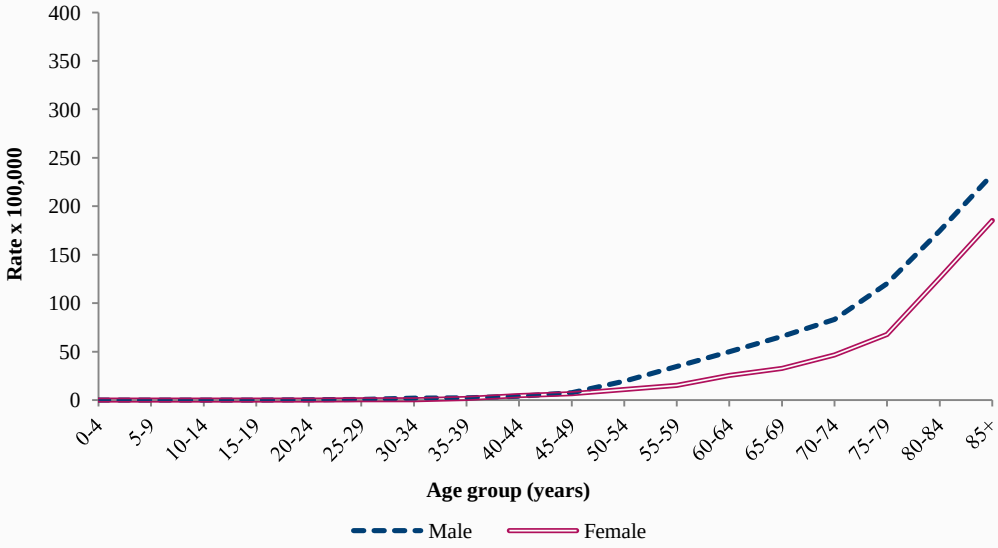
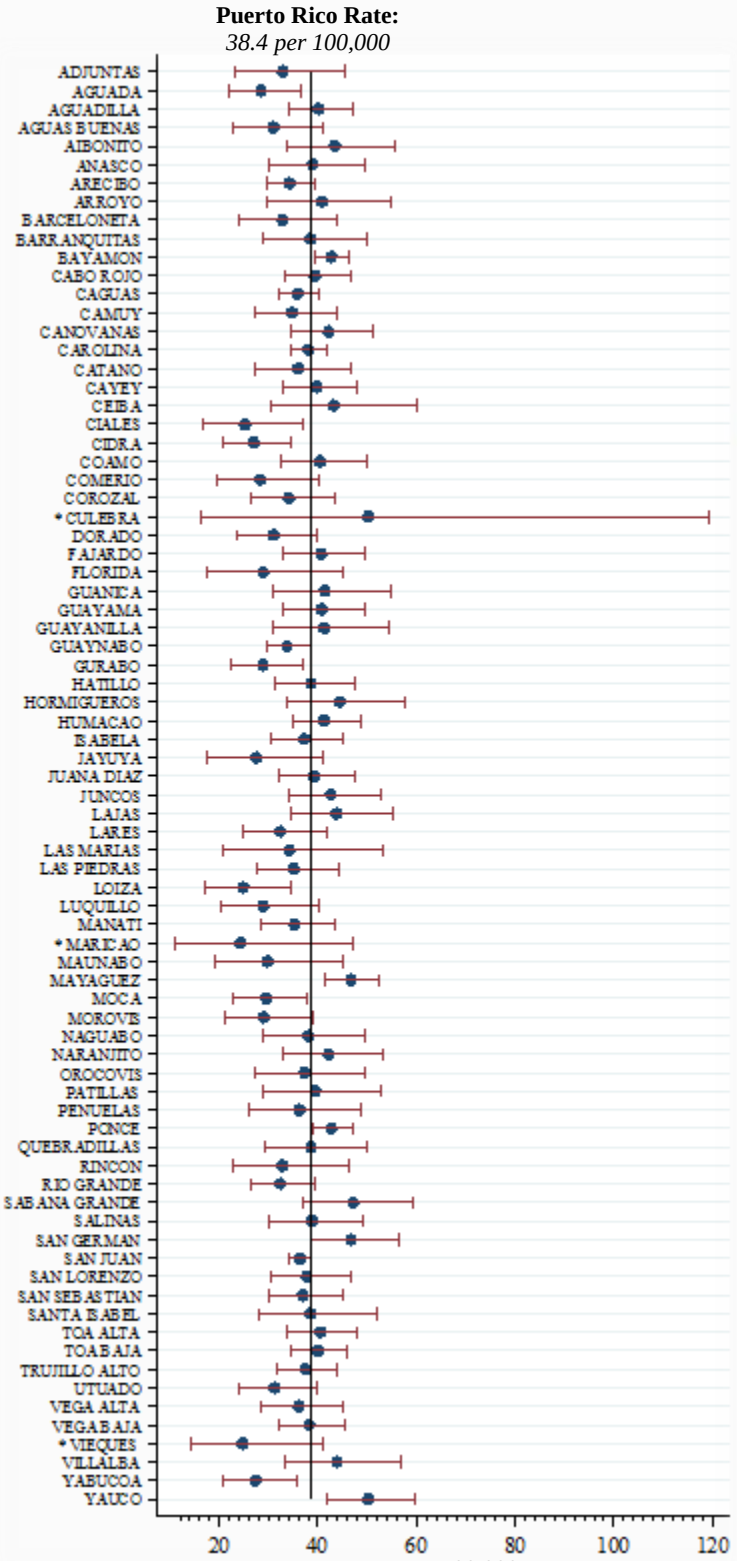
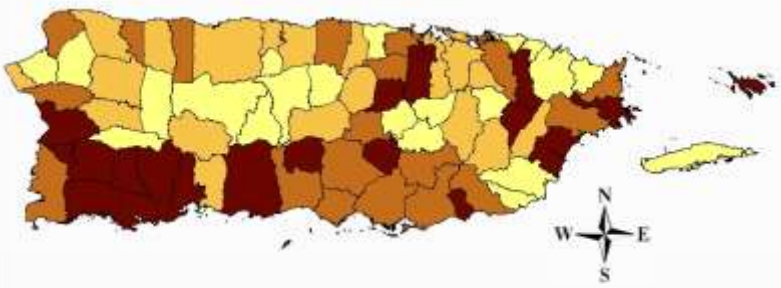


FIGURE 29: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF COLON AND RECTUM CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010



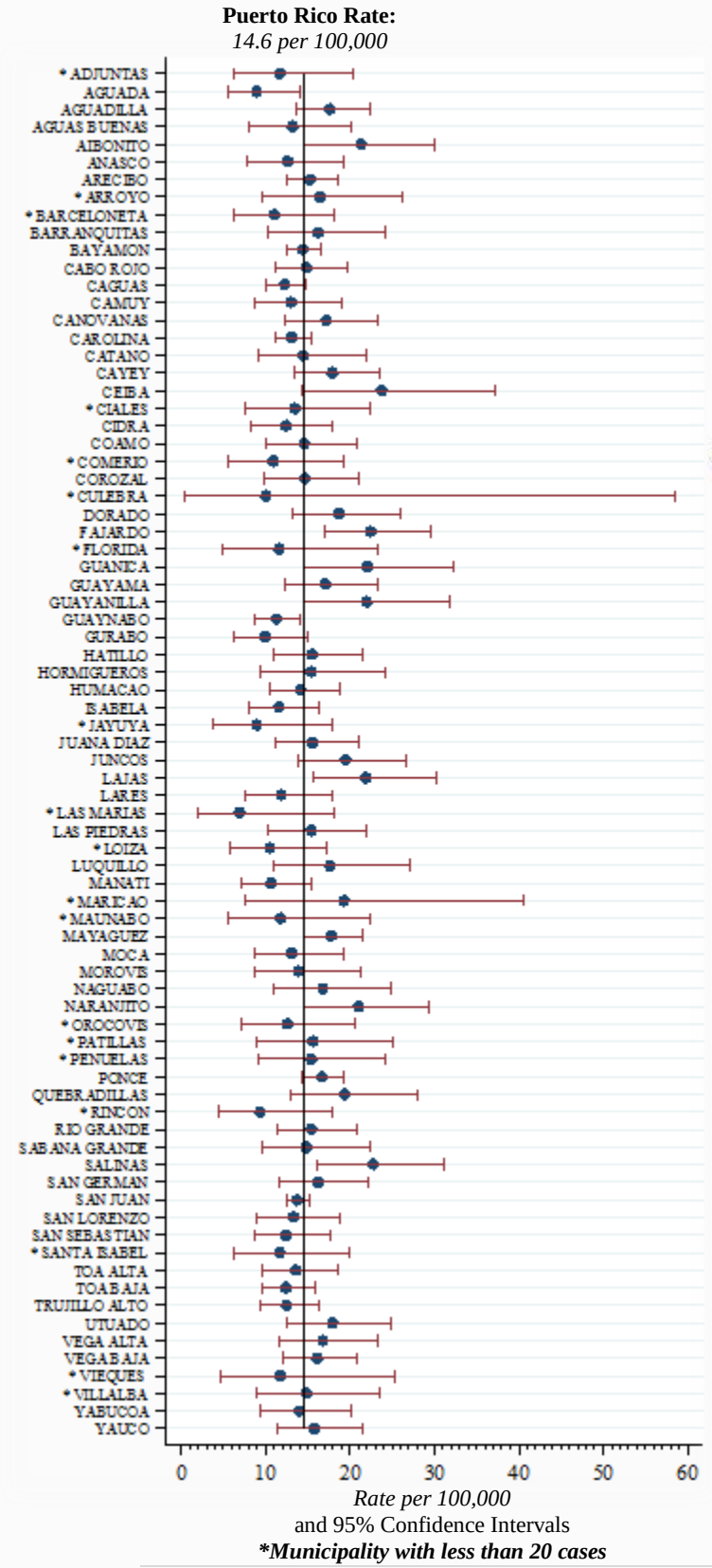
Municipality with less than 20 cases



Incidence
Rate per 100,000

- 40.71 – 50.20
- 37.81 – 40.70
- 32.41 – 37.80
- 24.30 – 32.40

FIGURE 30: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF COLON AND RECTUM CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010



Mortality
Rate per 100,000

- 17.21 – 23.80
- 14.91 – 17.20
- 12.41 – 14.90
- 6.90 – 12.40

Cancer of the Liver and Intrahepatic Bile Duct

Liver and intrahepatic bile duct cancer was the seventh and thirteenth most commonly diagnosed cancer among men and women in Puerto Rico during 2006-2010, respectively. Liver and intrahepatic bile duct cancer was also one of the leading causes of cancer deaths in Puerto Rico. During 2006-2010, liver and intrahepatic bile duct cancer was the fourth and the fifth cause of death in men and women, respectively. There are two main types of primary liver cancer: hepatocellular carcinoma, and cholangio-carcinoma; but hepatocellular carcinoma is the most common (26). Factors associated with an increase in the risk of developing liver and intrahepatic bile duct cancer include: infection with hepatitis B virus (HBV) or hepatitis C virus (HCV); heavy alcohol use; aflatoxin (a harmful substance made by certain types of mold); iron storage disease; cirrhosis; obesity; and diabetes.

Key Points

- **Liver and intrahepatic bile duct cancer accounts for 2.9% of all male cancers and 1.7% of all female cancers between 2006 and 2010.**
- **It accounted for 6.5% of all male cancer deaths and 4.8% of female cancer deaths between 2006 and 2010.**
- **An average of 211 men and 99 women were diagnosed with liver and intrahepatic bile duct cancer each year during the period 2006-2010.**
- **An average of 184 men and 105 women died from liver and intrahepatic bile duct cancer each year during the period 2006-2010.**
- **During 2006-2010, the risk of developing liver and intrahepatic bile duct cancer was 2.7 times higher in men than in women (95% CI: 2.4, 3.0).**
- **For the same period, the risk of death due to liver and intrahepatic bile duct cancer was 2.2 times higher in men than in women (95% CI: 2.0, 2.4).**

Between 1987 and 2010, the incidence rate of cancer of the liver and intrahepatic bile duct among men and women increased annually an average of 2.1% ($p<0.05$) and 1.2% ($p<0.05$) respectively (Figure 31). Whereas, mortality rates decreased annually an average of 0.5% ($p>0.05$) in men, and decreased an average of 1.9% ($p<0.05$) in women (Figure 32).

During the period 2006-2010, the median age at diagnosis for liver and intrahepatic bile duct cancer in men was 66 years; while in women it was 74 years. For the same period, the median age at death for liver and intrahepatic bile duct cancer in men was 71 years; while in

women it was 75 years. The age-specific incidence and mortality rates by sex for this period are shown in Figures 33 and 34.

Based on the incidence rates for 2006-2010, 0.9% of men and women born today in Puerto Rico will be diagnosed with cancer of the liver and intrahepatic bile duct during their lifetime. This number can also be expressed as: 1 in 111 men and women born today will be diagnosed with cancer of the liver and intrahepatic bile duct during their lifetime.

FIGURE 31: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF LIVER AND INTRAHEPATIC BILE DUCT CANCER BY SEX, PUERTO RICO 1987-2010

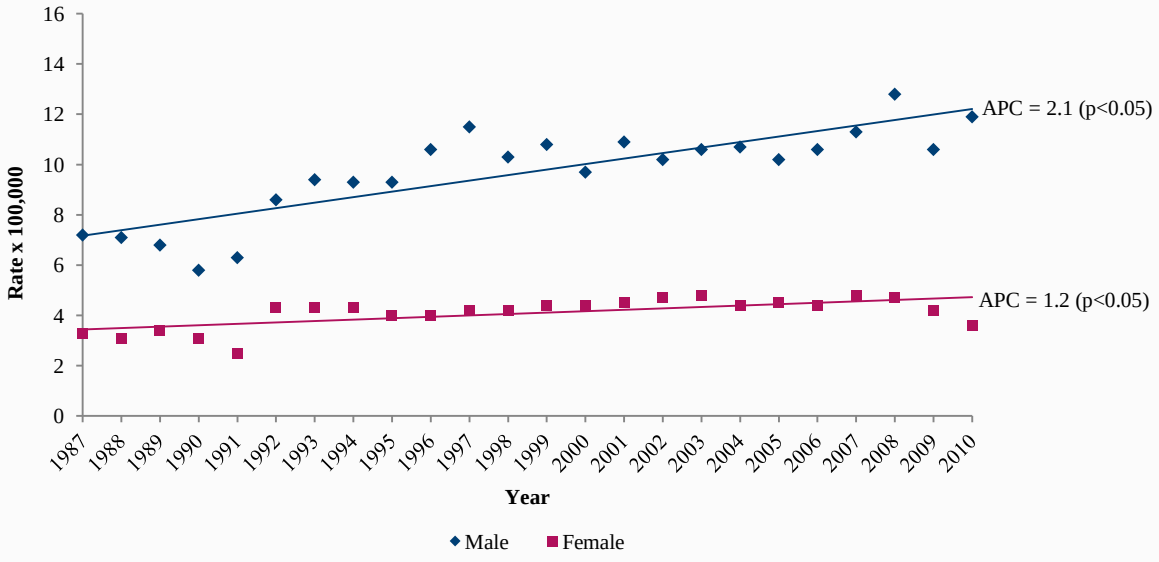


FIGURE 32: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF LIVER AND INTRAHEPATIC BILE DUCT CANCER BY SEX, PUERTO RICO 1987-2010

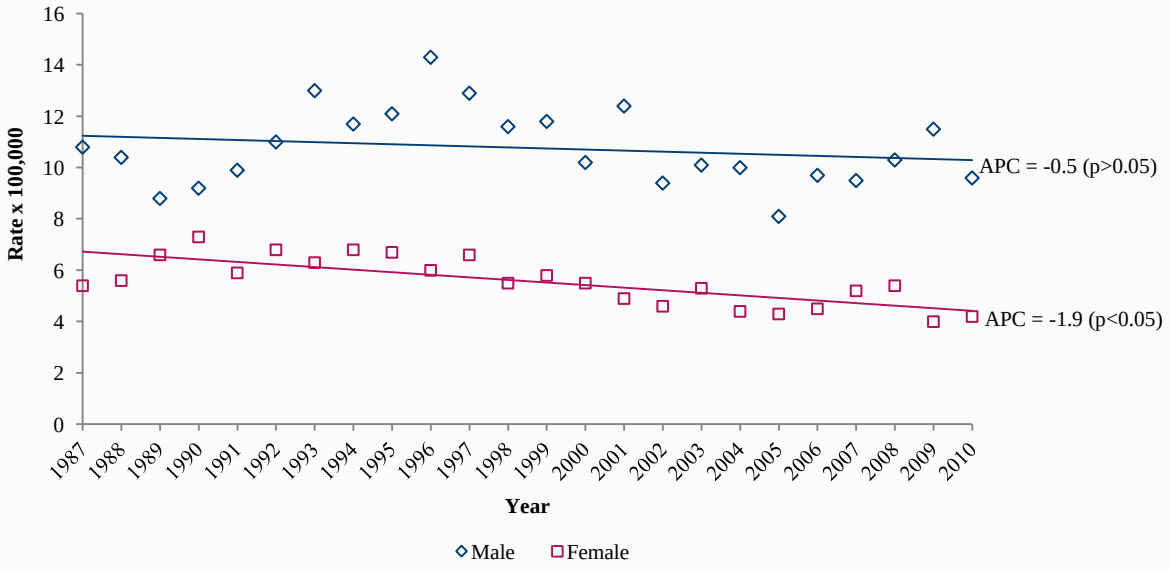


FIGURE 33: AGE-SPECIFIC INCIDENCE RATES OF LIVER AND INTRAHEPATIC BILE DUCT CANCER BY SEX, PUERTO RICO 2006-2010

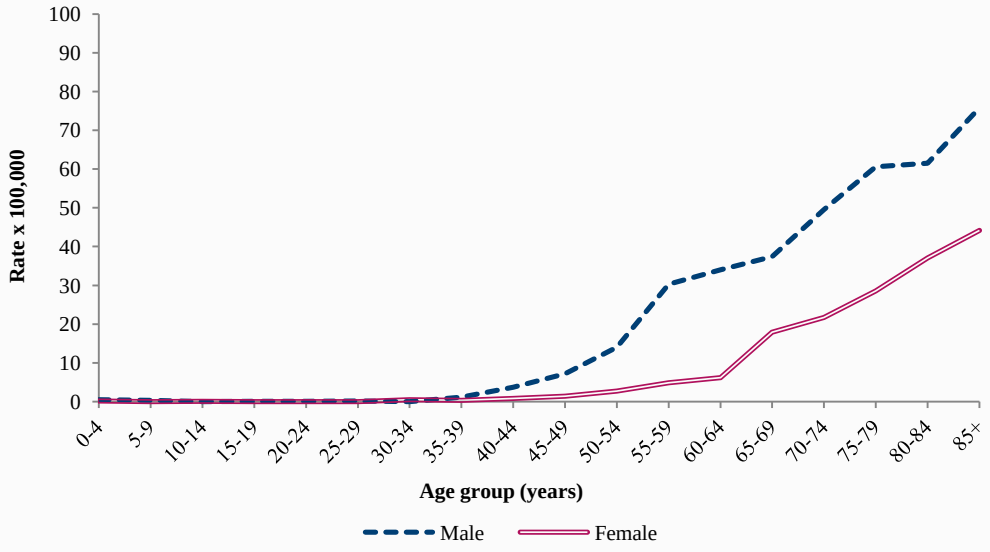


FIGURE 34: AGE-SPECIFIC MORTALITY RATES OF LIVER AND INTRAHEPATIC BILE DUCT CANCER BY SEX, PUERTO RICO 2006-2010

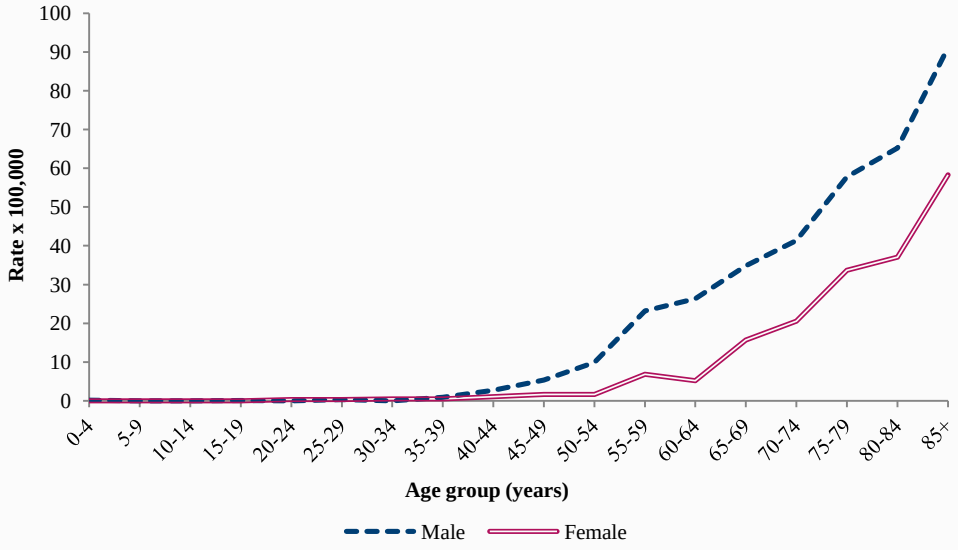
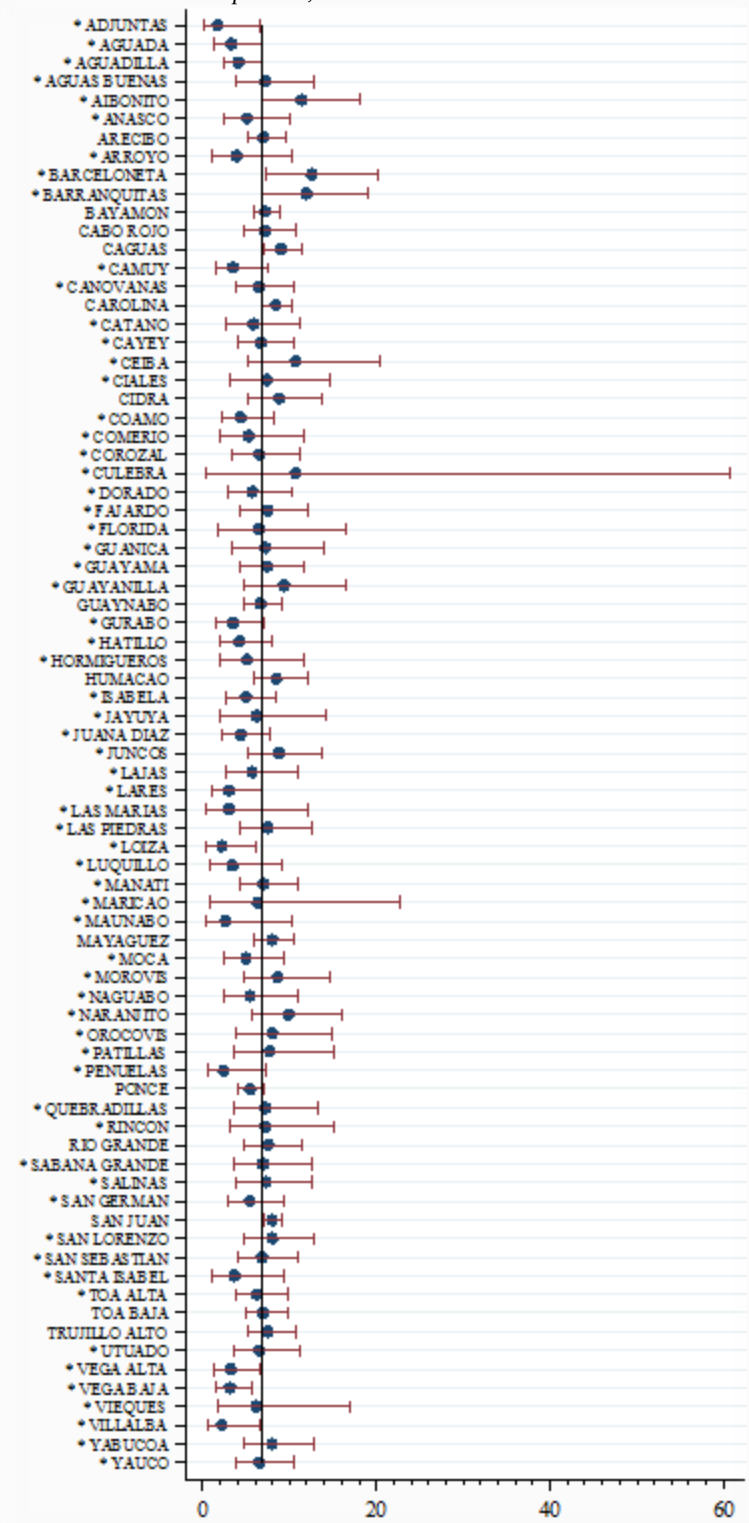
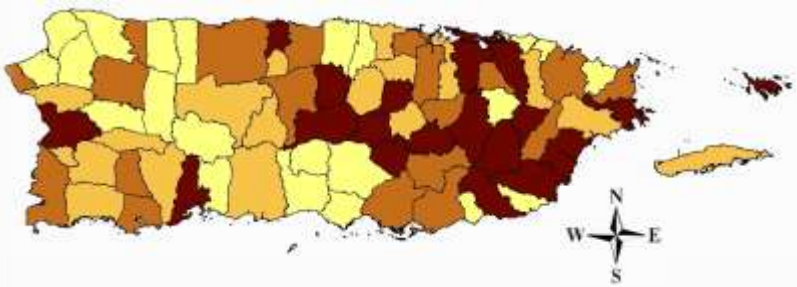


FIGURE 35: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF LIVER AND INTRAHEPATIC BILE DUCT CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
6.8 per 100,000



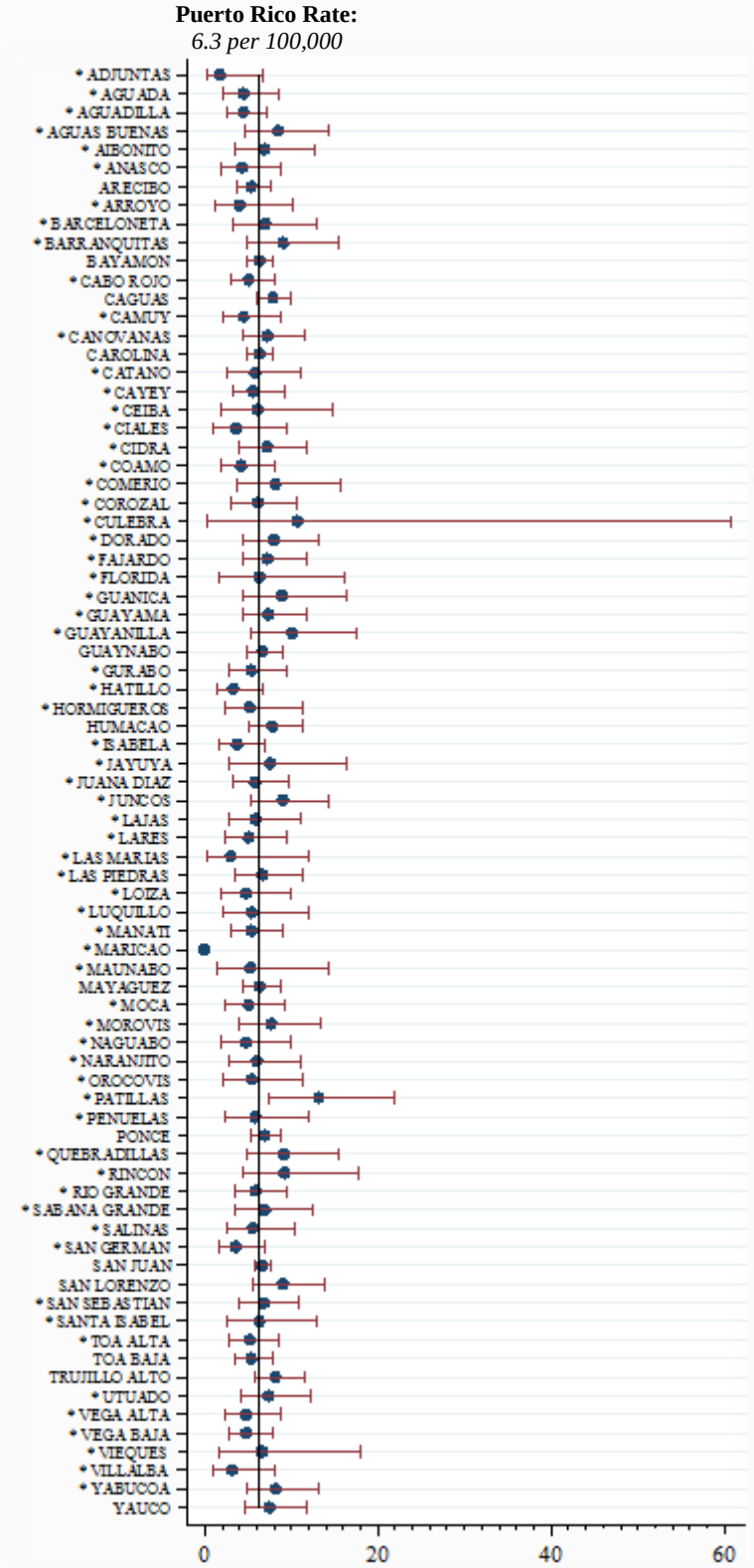
Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

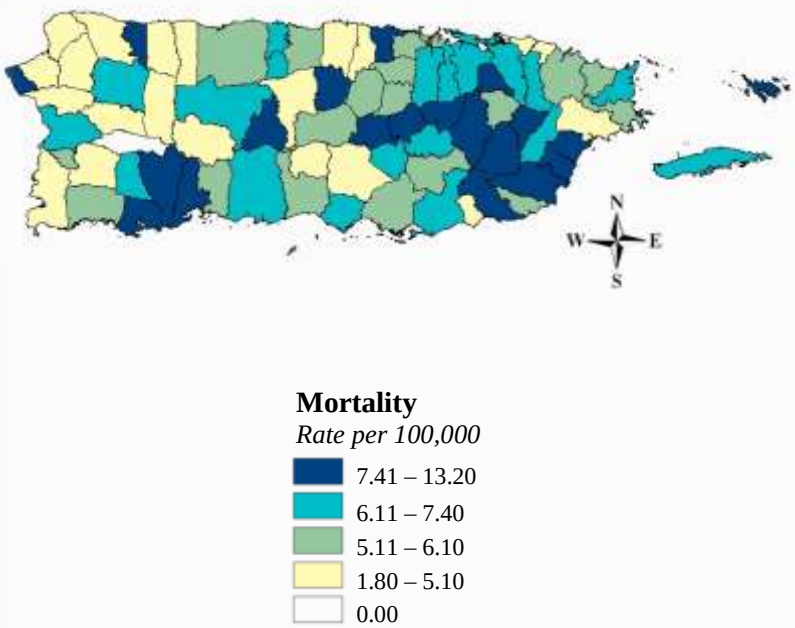


Incidence
Rate per 100,000

- 7.61 – 12.50
- 6.61 – 7.60
- 5.01 – 6.60
- 1.70 – 5.00

FIGURE 36: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF LIVER AND INTRAHEPATIC BILE DUCT CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010





Cancer of the Lung and Bronchus

For the period 2006-2010 in Puerto Rico, lung and bronchus cancer was the third and fifth most commonly diagnosed cancer among men and women respectively, and the second cause of death in both men and women. Cigarette smoking is the major cause of lung and bronchus cancer. The likelihood that a smoker will develop lung cancer is affected by the age at which smoking began, how long the person has smoked, the number of cigarettes smoked per day, and how deeply the smoker inhales. Smoking cessation greatly reduces a person's risk for developing lung cancer. Additional risk factors for lung and bronchus cancer include smoking cigars and pipes; environmental tobacco smoke (second hand smoke); exposure to radon gas, asbestos, and pollution; lung diseases such as tuberculosis, and having a personal history of lung cancer (26).

Key Points

- **Lung and bronchus cancer accounted for 6.1% of all male cancers and 4.1% of all female cancers between 2006 and 2010.**
- **It accounted for 13.8% of all male cancer deaths and 9.6% of female cancer deaths between 2006 and 2010.**
- **An average of 444 men and 246 women were diagnosed with lung and bronchus cancer each year during the period of 2006-2010.**
- **An average of 392 men and 211 women died from lung and bronchus cancer each year during the period 2006-2010.**
- **During 2006-2010, the risk of developing lung and bronchus cancer was 2.3 times higher in men than in women (95% CI: 2.1, 2.4).**
- **For the same period, the risk of death due to lung and bronchus cancer was 2.4 times higher in men than in women (95% CI: 2.2, 2.6).**

Between 1987 and 2010, the incidence rate for cancer of the lung and bronchus among men decreased an average of 1.1% per year ($p<0.05$), while in women it remained constant (Figure 37). Cancer mortality rates also decreased in men an average of 1.5% per year ($p<0.05$), and in women, an average of 1.1% annually ($p<0.05$) (Figure 88).

During the period 2006-2010, the median age at diagnosis for lung and bronchus cancer in both men and women was 71 years. For the same period, the median age at death for lung and bronchus cancer in men was 71 years; while in women it was 73 years. The age-specific incidence and mortality rates by sex for this period are shown in Figures 39 and 40.

Based on the incidence rates from 2006-2010, 2.0% of men and women born today in Puerto Rico will be diagnosed with cancer of the lung and bronchus during their lifetime. This number can also be expressed as: 1 in 50 men and women will be diagnosed with cancer of the lung and bronchus during their lifetime.

FIGURE 37: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF LUNG AND BRONCHUS CANCER BY SEX, PUERTO RICO 1987-2010

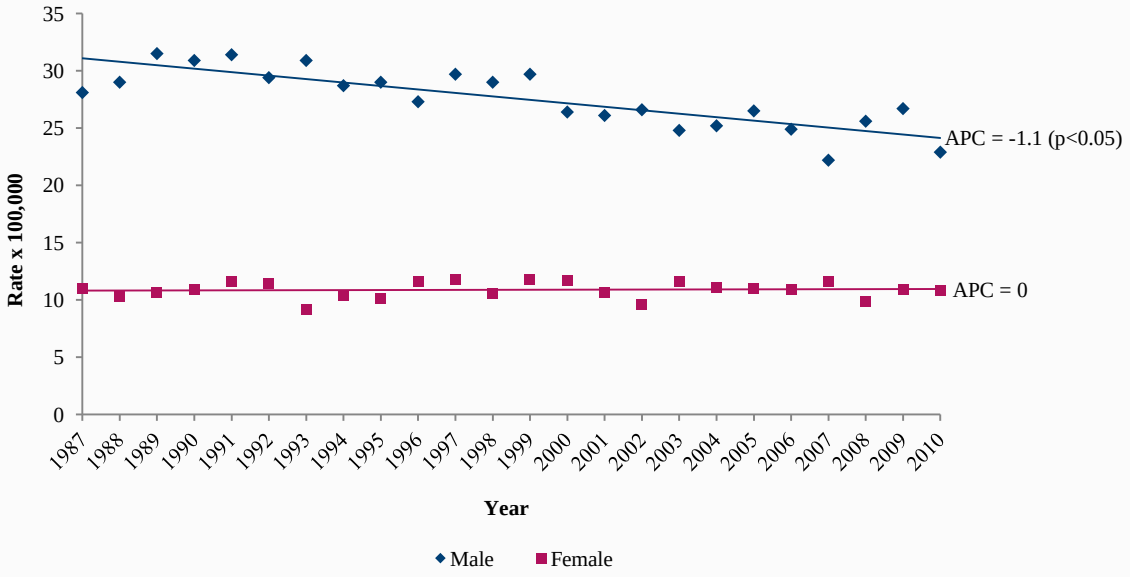


FIGURE 38: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF LUNG AND BRONCHUS CANCER BY SEX, PUERTO RICO 1987-2010

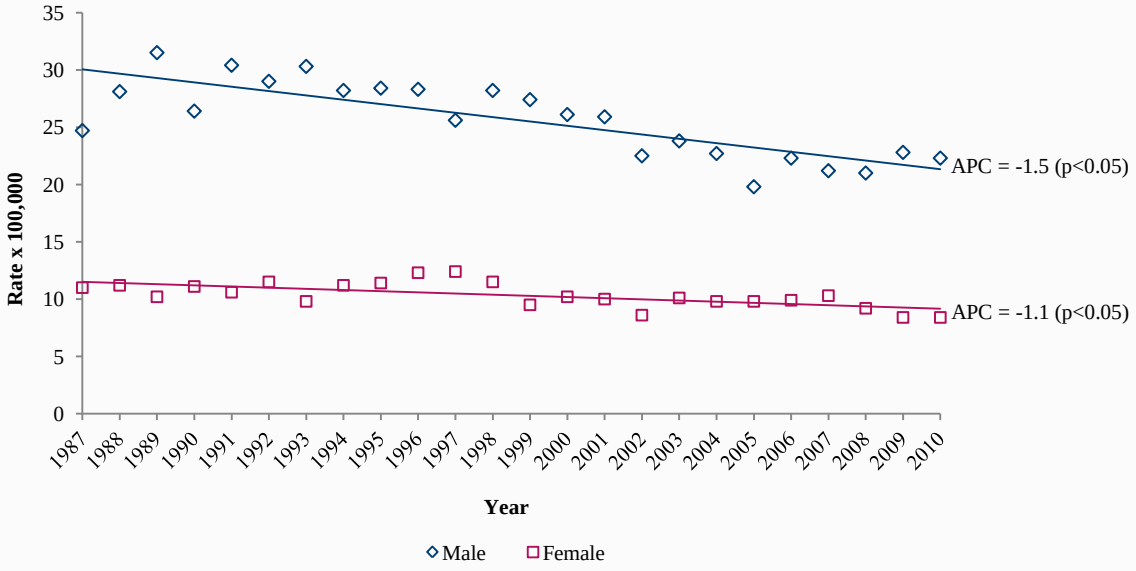


FIGURE 39: AGE-SPECIFIC INCIDENCE RATES OF LUNG AND BRONCHUS CANCER BY SEX, PUERTO RICO 2006-2010

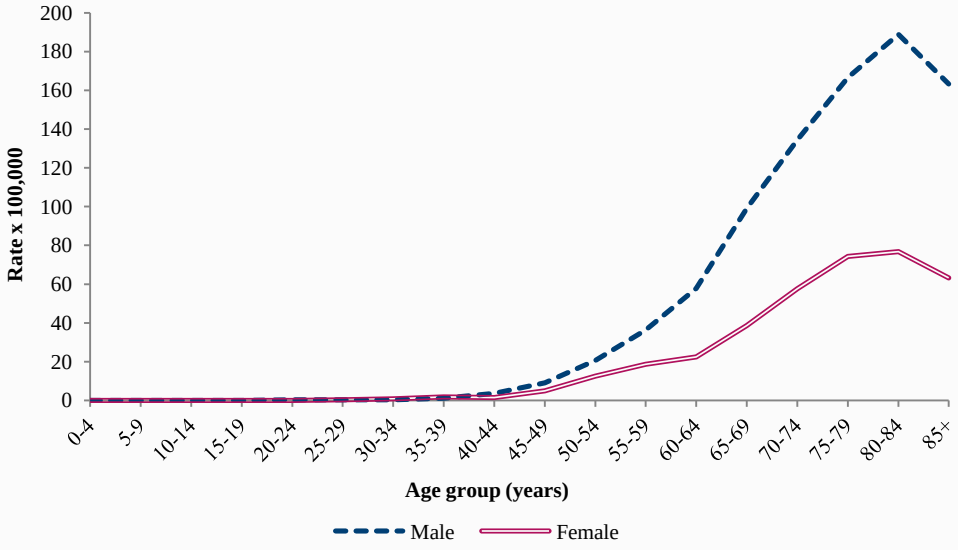


FIGURE 40: AGE-SPECIFIC MORTALITY RATES OF LUNG AND BRONCHUS CANCER BY SEX, PUERTO RICO 2006-2010

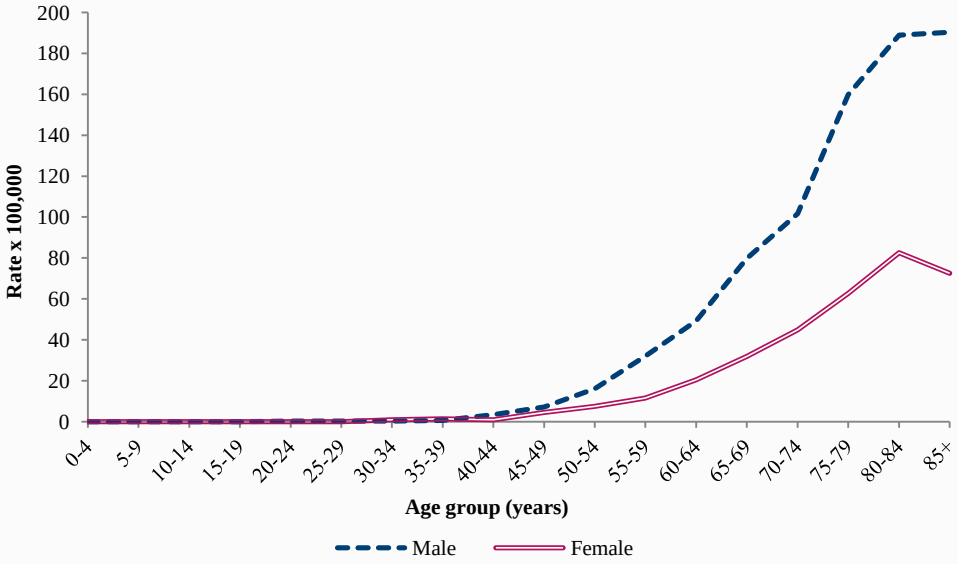
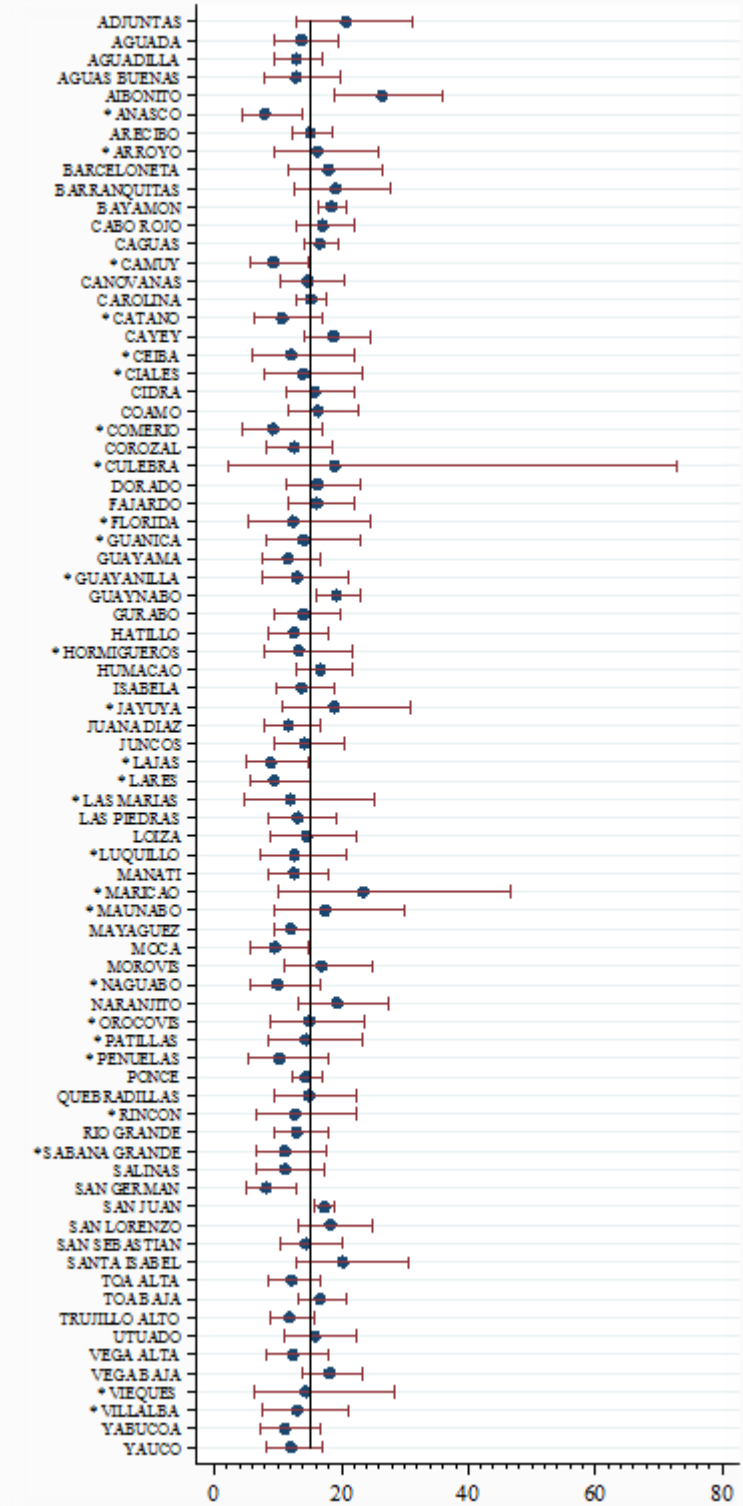


FIGURE 41: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF LUNG AND BRONCHUS CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
15.1 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

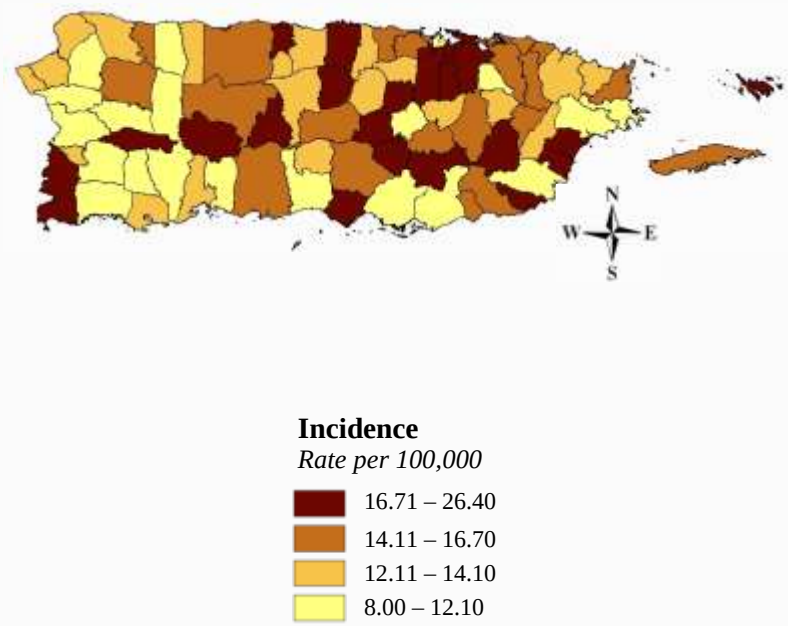
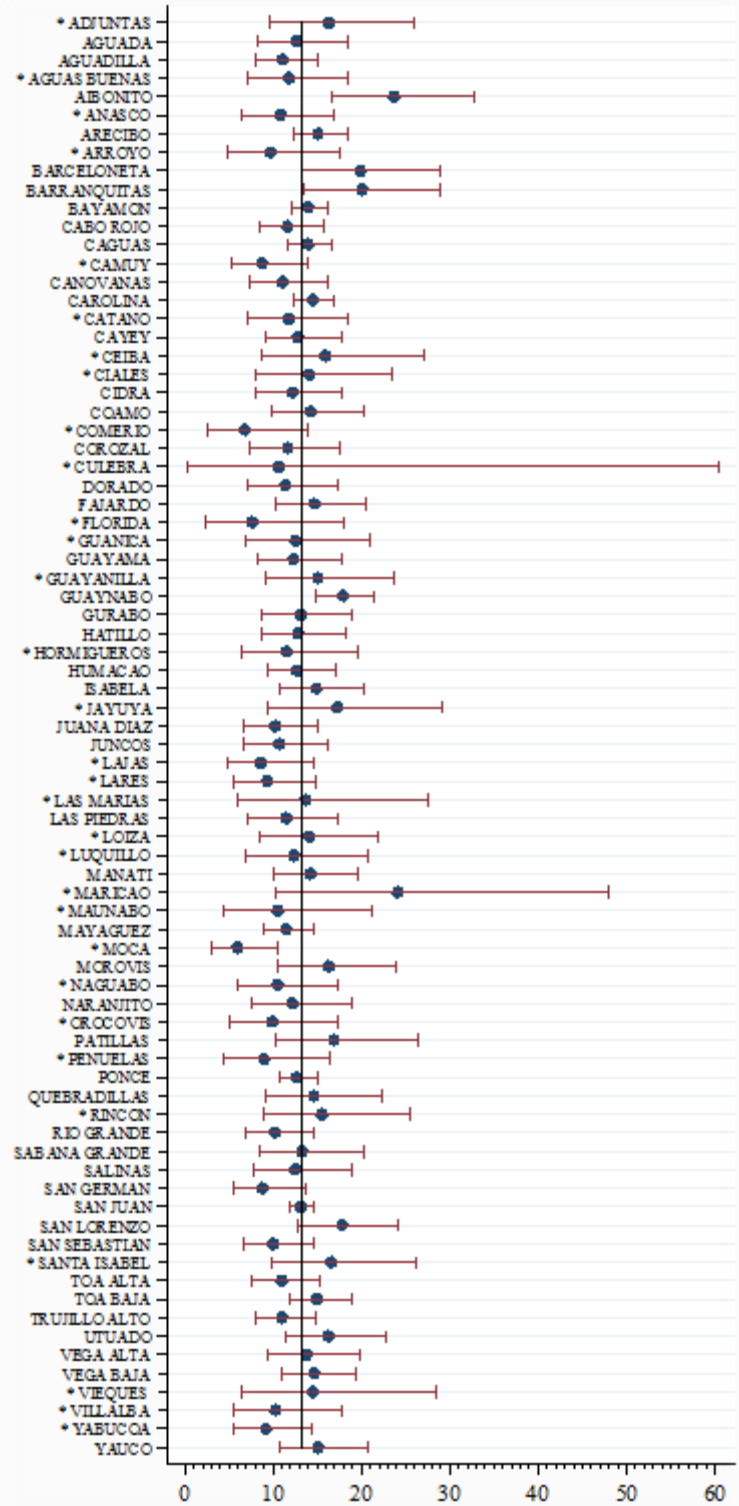


FIGURE 42: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF LUNG AND BRONCHUS CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
13.2 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

Mortality
Rate per 100,000

- 14.91 – 24.10
- 12.71 – 14.90
- 10.81 – 12.70
- 6.00 – 10.80

Cancer of the Thyroid

Thyroid gland is an organ at the base of the throat. The thyroid produces hormones that help control heart rate, blood pressure, body temperature, and weight. In Puerto Rico, for the period 2006-2010, thyroid cancer was the fourteenth and third most commonly diagnosed cancer among men and women, respectively. It ranked below the 20th position as a cause of cancer death for both men and women during the same period.

Factors associated with an increased risk of thyroid cancer include: exposure to radiation, family history of medullary thyroid cancer, family or personal history of goiters or benign thyroid nodules, history of familiar adenomatous polyposis, female gender, and age over 45 years. Exposure to iodine is being investigated as a possible risk factor for thyroid cancer (26).

Key Points

- **Thyroid cancer accounts for 1.6% of all male cancers and 9.1% of all female cancers between 2006 and 2010.**
- **It accounted for 0.1% of all male cancer deaths and 0.4% of female cancer deaths between 2006 and 2010.**
- **An average of 113 men and 542 women were diagnosed with thyroid cancer each year during the period 2006-2010.**
- **An average of 4 men and 9 women died from thyroid cancer each year for the period 2006-2010.**
- **During 2006-2010, the risk of developing thyroid cancer was 4.3 times higher in women than in men (95% CI: 3.9, 4.7).**
- **For the same period, the risk of death due to thyroid cancer was 2.0 times higher in women than in men (95% CI: 1.1, 3.7).**

Between 1987 and 2010, the incidence rate for thyroid cancer among men and women increased an average of 9.8% ($p<0.05$) and 11.4% ($p<0.05$) per year, respectively (Figure 43). By contrast, the cancer mortality rate in men decreased an average of 4.1% ($p<0.05$) per year, and in women decreased an average of 0.4% ($p>0.05$) annually (Figure 44). There has been an approximately seven-fold increased of thyroid cancer incidence among women in Puerto Rico from 1987 (4.9 x 100,000) to 2010 (34.0 x 100,000). This marked increase has also been noted in United States populations (27) and elsewhere (28). There are reports that suggest that the increase of thyroid cancer incidence may be due in part to improved detection of this tumor such as ultrasound and fine needle biopsy.

During the period 2006-2010, the median age at diagnosis for thyroid cancer in men was 54 years, while in women it was 50 years. For the same period, the median age at death for thyroid cancer in men was 71 years; while in women it was 73 years. The age-specific incidence and mortality rates by sex for this period are shown in Figures 45 and 46.

Based on the incidence rates from 2006-2010, less than 1.0% of men and 2.3% of women born today in Puerto Rico will be diagnosed with cancer of the thyroid during their lifetime. This number can also be expressed as: 1 in 201 men and 1 in 44 women will be diagnosed with cancer of the thyroid during their lifetime.

FIGURE 43: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF THYROID CANCER BY SEX, PUERTO RICO 1987-2010

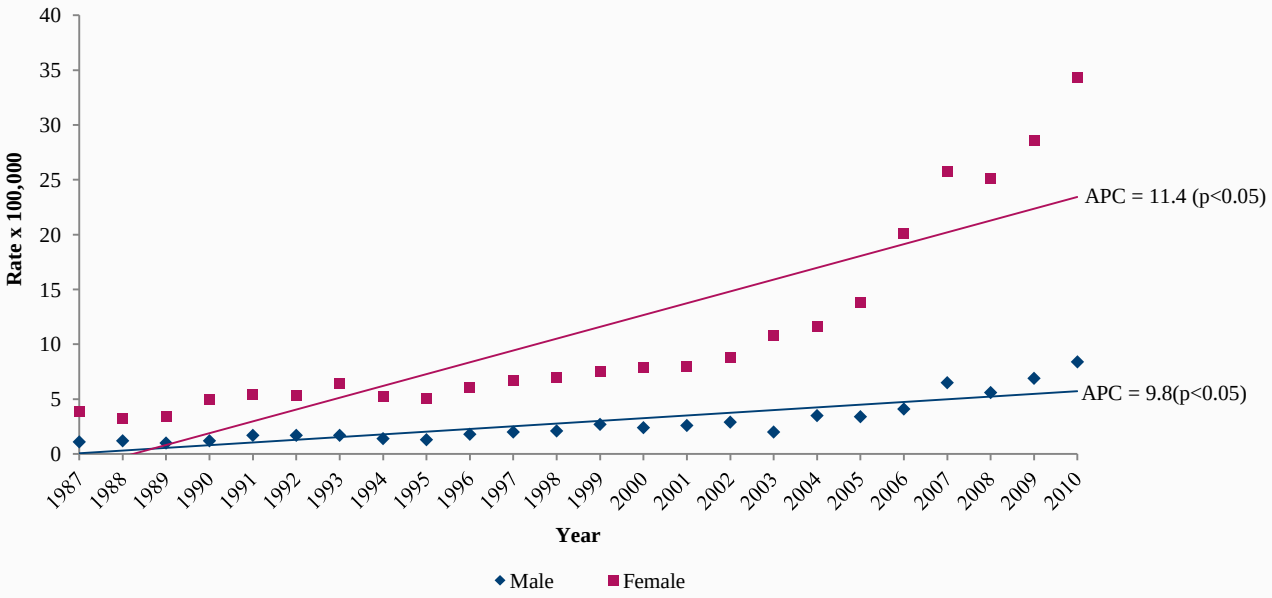


FIGURE 44: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF THYROID CANCER BY SEX, PUERTO RICO 1987-2010

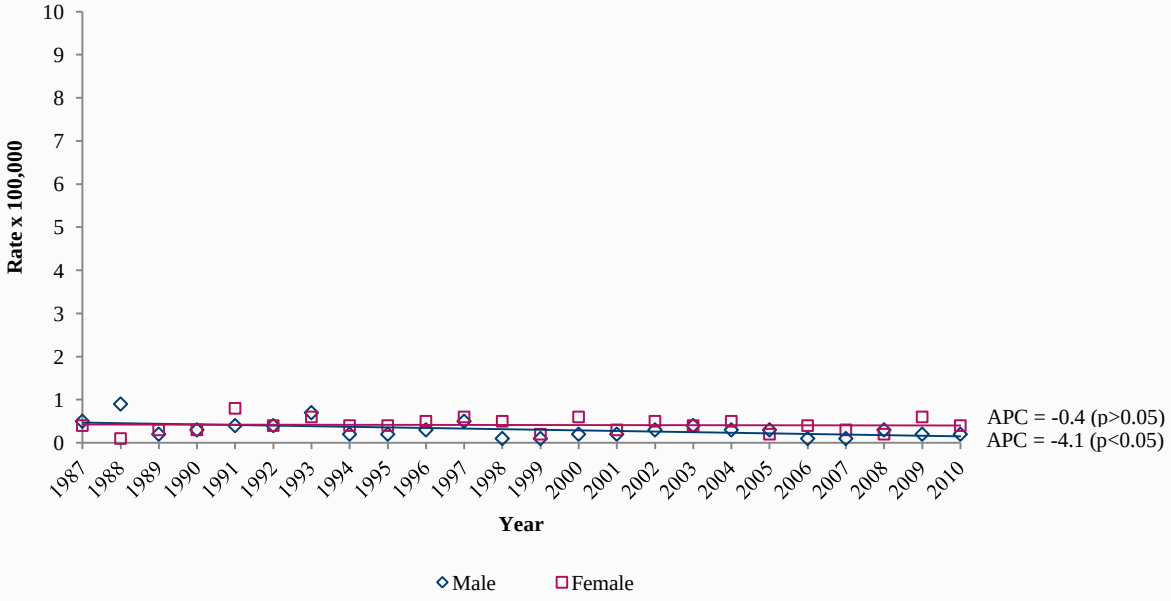


FIGURE 45: AGE-SPECIFIC INCIDENCE RATES OF THYROID CANCER BY SEX, PUERTO RICO 2006-2010

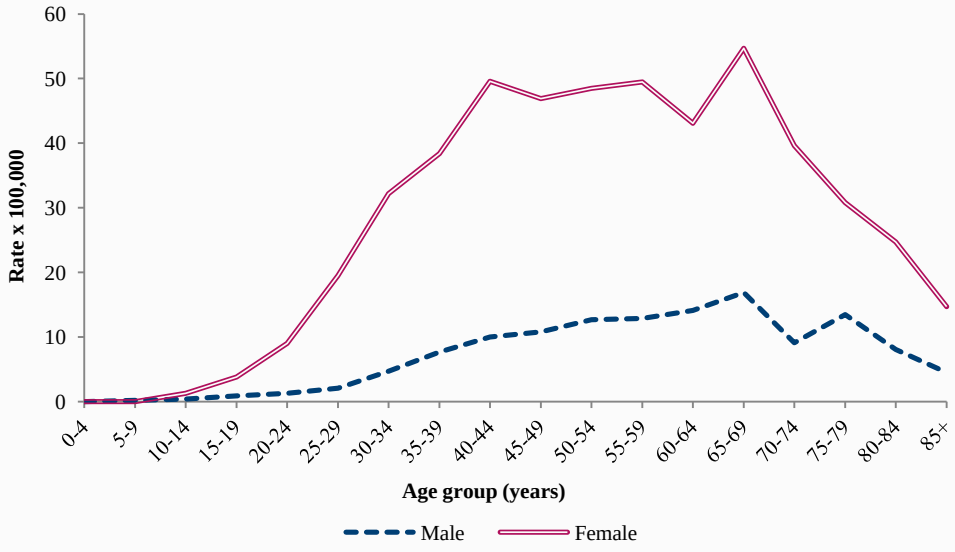


FIGURE 46: AGE-SPECIFIC MORTALITY RATES OF THYROID CANCER BY SEX, PUERTO RICO 2006-2010

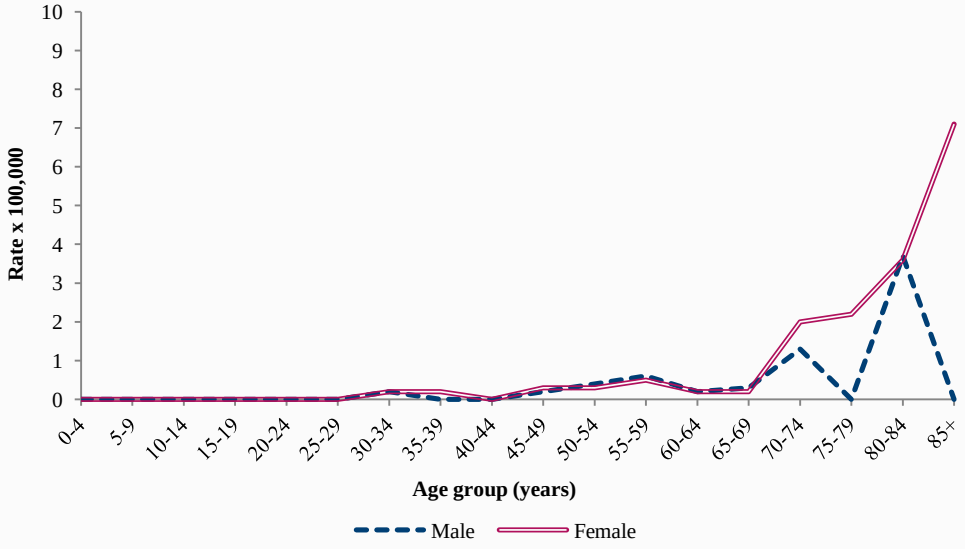
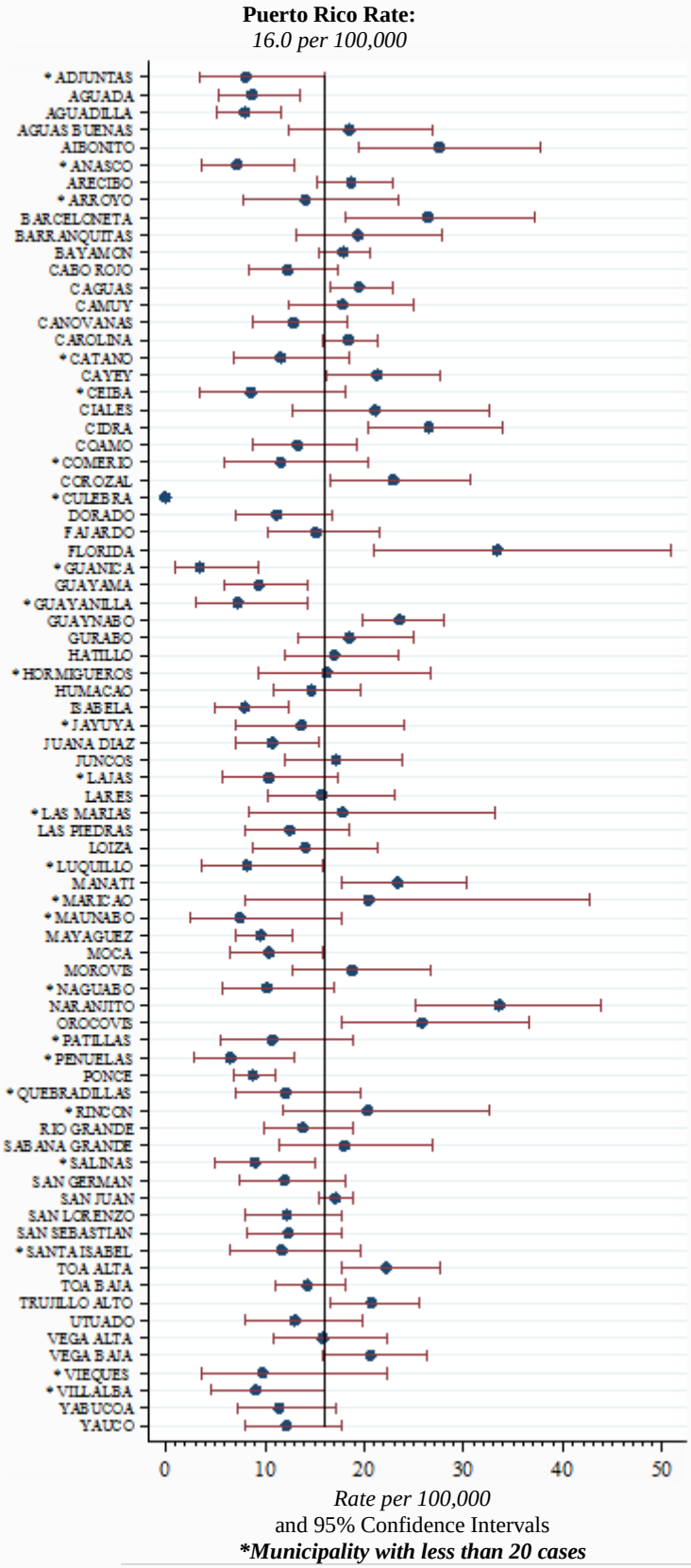
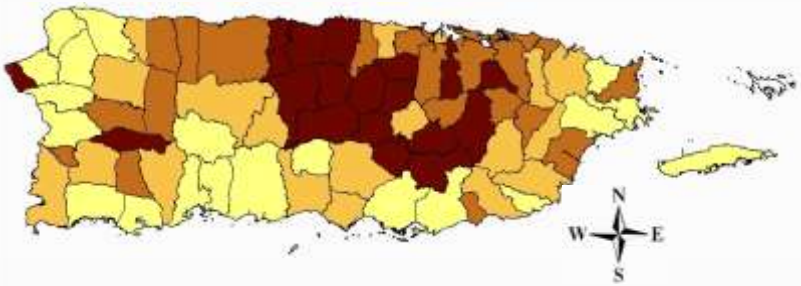


FIGURE 47: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF THYROID CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010





Incidence
Rate per 100,000

- 18.71 – 33.60
- 13.81 – 18.70
- 10.41 – 13.80
- 3.50 – 10.40
- 0.00

Note: Detailed municipality specific rates cannot be calculated for mortality because of the small number of cases in several municipalities.

Cancer of the Urinary Bladder

Urinary bladder cancer is most common in the urothelium, the epithelium that covers the bladder. There are three major histologic types of urinary bladder cancer: transitional cell carcinoma (most common type), squamous cell carcinoma, and adenocarcinoma (29). Urinary bladder cancer can be divided in two categories that describe the appearance of the cancer: a) nonpapillary (flat) carcinoma, high-grade in situ lesions, which typically are associated with a more aggressive tumor; and b) papillary lesions, which are also "in situ" (even though they are not designated as such) that can be low-grade or high-grade. For this reason in-situ and invasive papillary bladder cancer are combined.

During 2006-2010, urinary bladder cancer was the fourth and twelfth most commonly diagnosed cancer among men and women, respectively. It ranked as the eleventh and the thirteenth most common cause of death from cancer among men and women, respectively.

Key Points

- **Urinary bladder cancer accounted for 4.3% of all male cancers and 1.8% of all female cancers between 2006 and 2010.**
- **It accounted for 2.3% of all male cancer deaths and 1.7% of female cancer deaths between 2006 and 2010.**
- **An average of 313 men and 109 women were diagnosed with urinary bladder cancer each year during the period 2006-2010.**
- **An average of 67 men and 37 women died from urinary bladder cancer each year during the period 2006-2010.**
- **During 2006-2010, the risk of developing urinary bladder cancer was 3.7 times higher in men than in women (95% CI: 3.4, 4.1).**
- **For the same period, the risk of death due to urinary bladder cancer was 2.5 times higher in men than in women (95% CI: 2.0, 3.0).**

The most important risk factor for urinary bladder cancer is smoking but studies have found that some chemicals, certain cancer treatments, and personal or family history of bladder cancer might increase the chance of getting this cancer (26). Between 1987 and 2010, the urinary bladder cancer incidence rate in men increased an average of 0.3% ($p>0.05$) per year, while in women decreased an average of 0.4% ($p>0.05$) per year (Figure 48). The mortality rates of urinary bladder cancer have increased an average of 0.2% ($p>0.05$) per year in men and decreased an average of 0.3% ($p>0.05$) per year in women (Figure 49).

During the period 2006-2010, the median age at diagnosis for urinary bladder cancer in men was 73 years, while in women it was 74 years. For the same period, the median age at death for urinary bladder cancer in men was 78 years; while in women it was 80 years. The age-specific incidence and mortality rates by sex for this period are shown in Figures 50 and 51.

Based on the incidence rates from 2006 to 2010, 1.3% of men and women born today in Puerto Rico will be diagnosed with cancer of the urinary bladder during their lifetime. This number can also be expressed as: 1 in 75 men and women will be diagnosed with cancer of the urinary bladder during their lifetime.

FIGURE 48: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF URINARY BLADDER CANCER BY SEX, PUERTO RICO 1987-2010

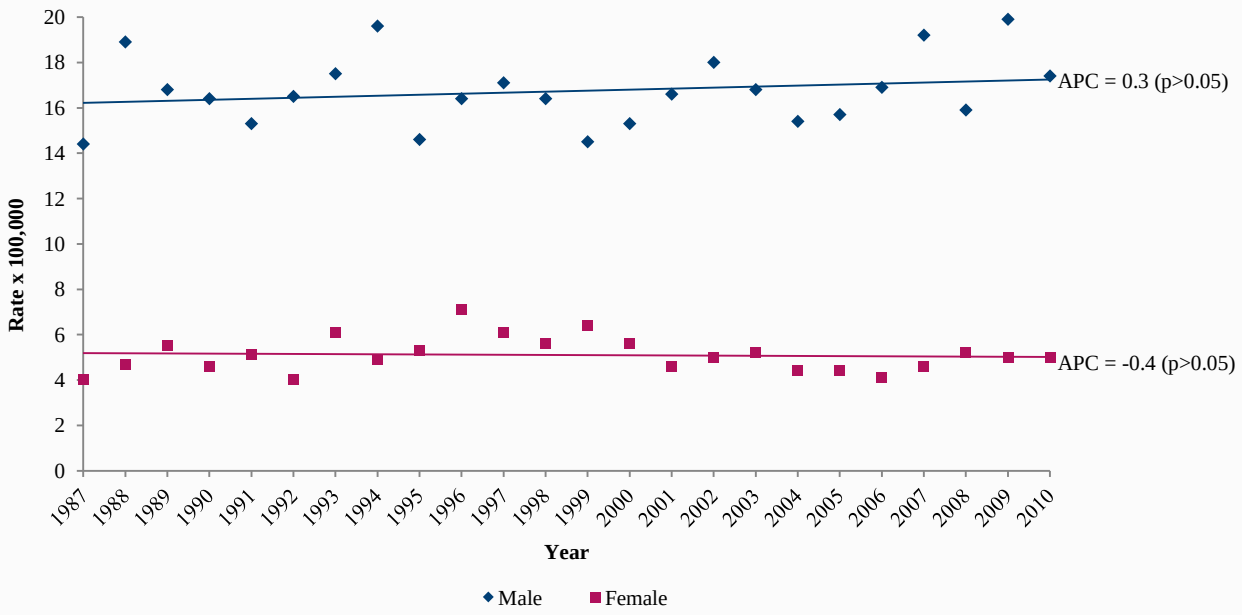


FIGURE 49: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF URINARY BLADDER CANCER BY SEX, PUERTO RICO 1987-2010

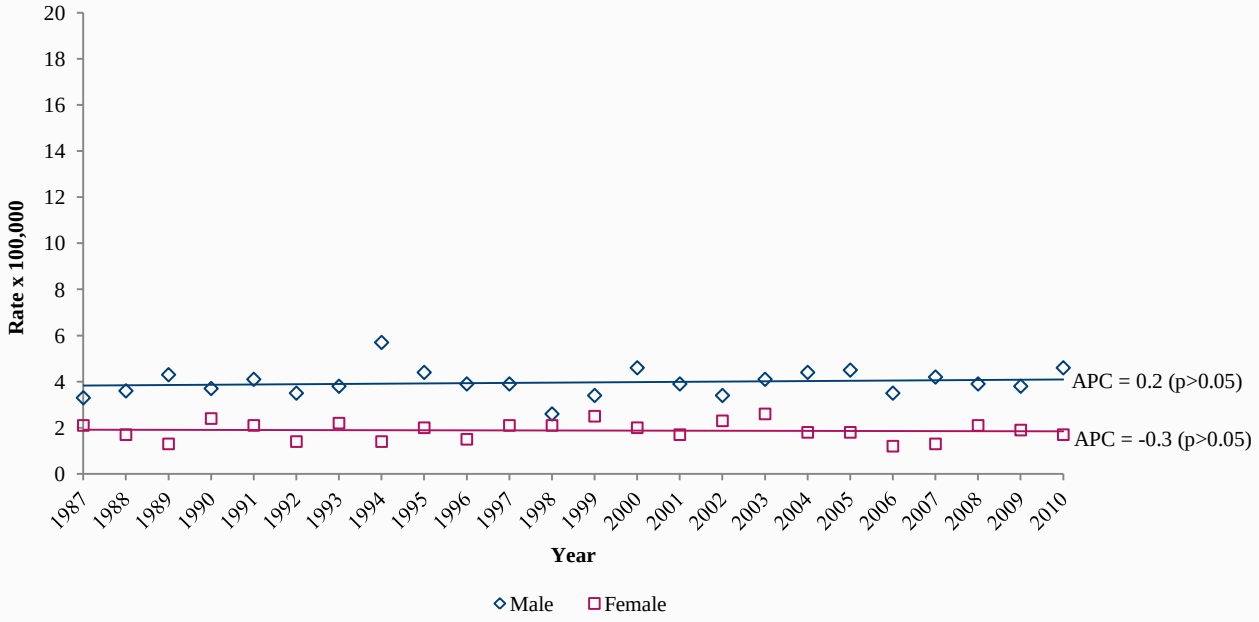


FIGURE 50: AGE-SPECIFIC INCIDENCE RATES OF URINARY BLADDER CANCER BY SEX, PUERTO RICO 2006-2010

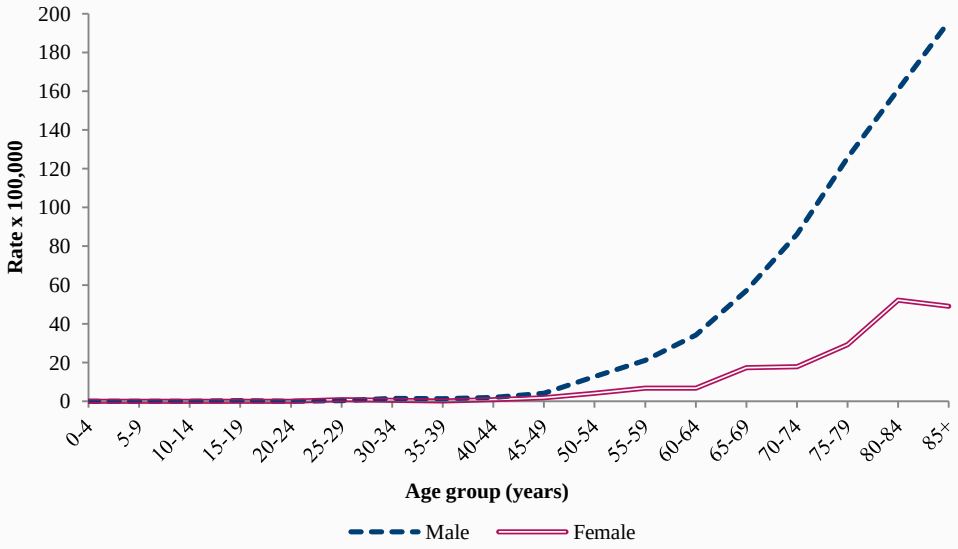


FIGURE 51: AGE-SPECIFIC MORTALITY RATES OF URINARY BLADDER CANCER BY SEX, PUERTO RICO 2006-2010

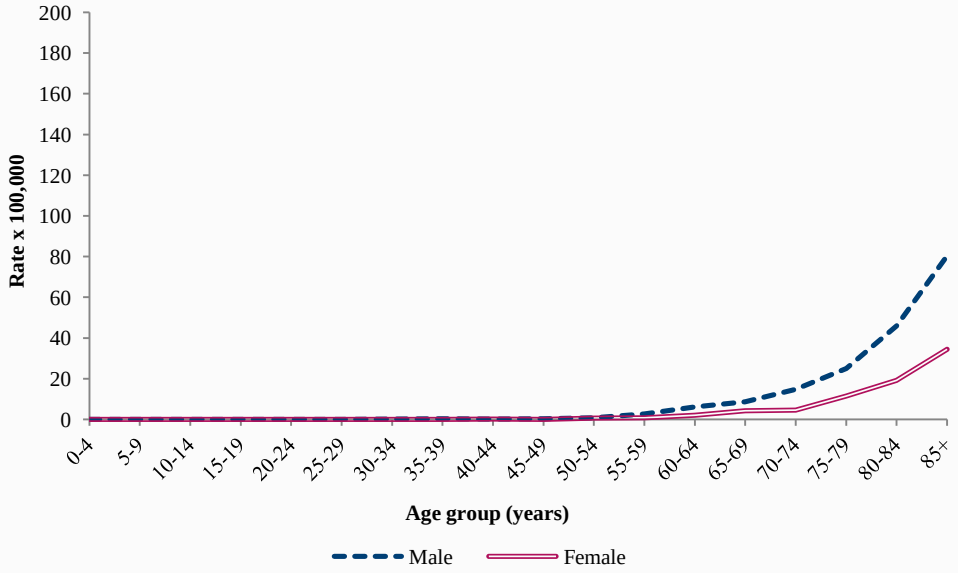
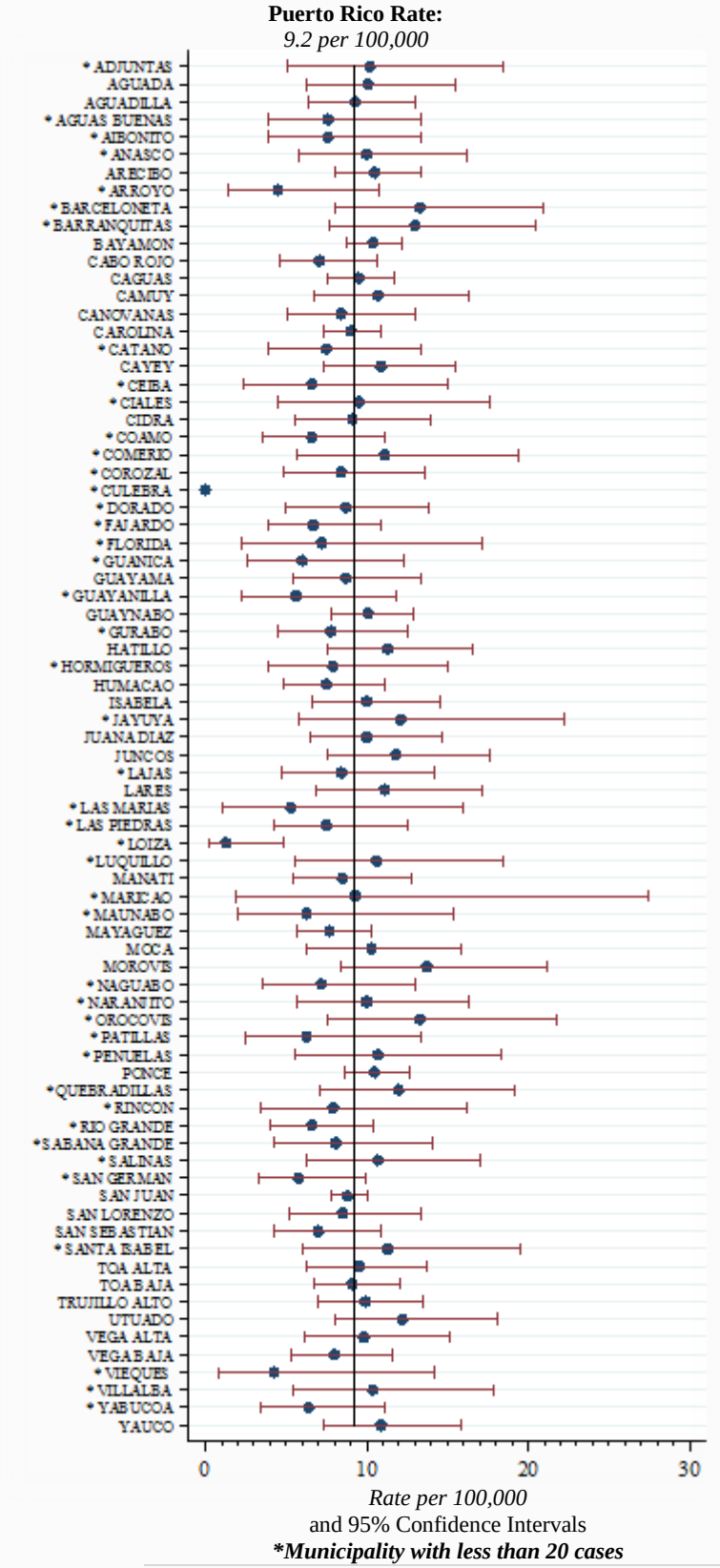


FIGURE 52: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF URINARY BLADDER CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010



Municipality with less than 20 cases

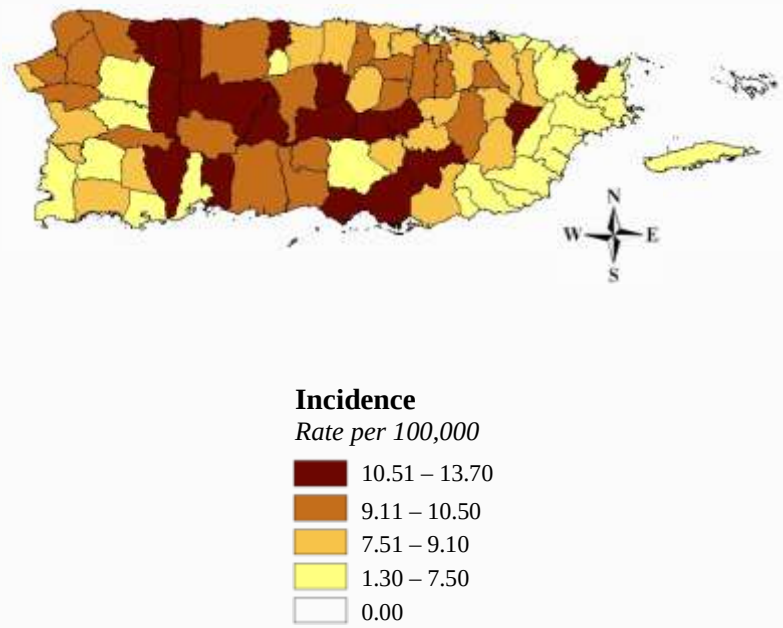
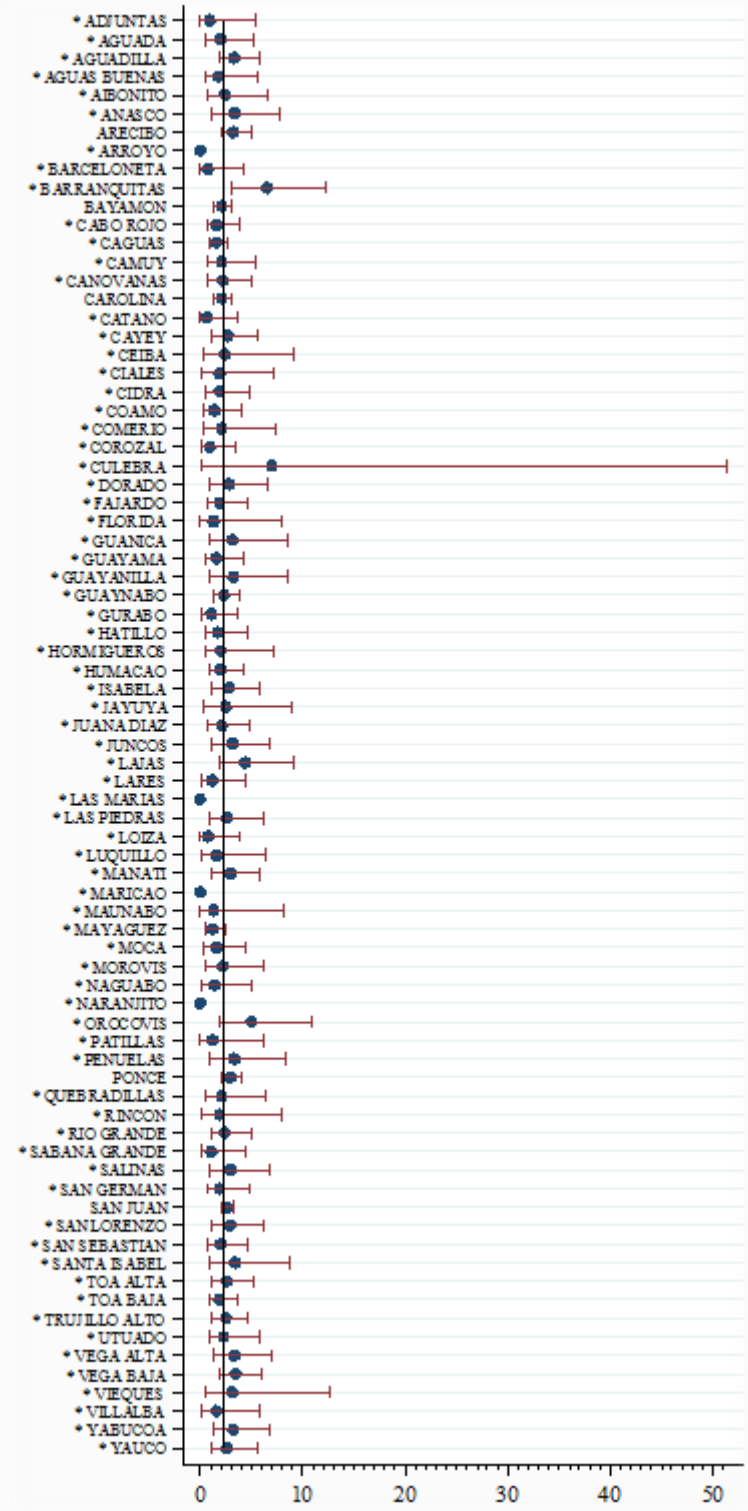


FIGURE 53: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF URINARY BLADDER CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
2.2 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

Mortality
Rate per 100,000

- 2.91 – 7.00
- 2.11 – 2.90
- 1.61 – 2.10
- 0.60 – 1.60
- 0.00

Cancer of the Prostate

During the period 2006-2010, prostate cancer was the most commonly diagnosed cancer among men in Puerto Rico, accounting for 40.6% of all cancers diagnosed in men. Also for this period, prostate cancer was the leading cause of death by cancer in men accounting for 18.3% of all cancer deaths in men. Prostate cancer usually occurs in older men. Factors associated with an increased risk of prostate cancer include: age (> 45 years), having a family history of prostate cancer, men with history of high-grade prostatic intraepithelial neoplasia (PIN), and a diet high in animal fat or meat (26).

Key Points

- **Prostate cancer is the most commonly diagnosed cancer among men in Puerto Rico.**
- **It accounted for 40.6% of all male cancers between 2006 and 2010 and 18.4% of all male deaths from cancer in the same period.**
- **An average of 2,944 men were diagnosed with invasive prostate cancer between 2006 and 2010.**
- **An average of 522 men died from prostate cancer each year during the period of 2006-2010.**

Between 1987 and 2010, prostate cancer incidence rate in Puerto Rico increased an average of 1.5% ($p<0.05$) per year. By contrast, the mortality rates of prostate cancer have decreased an average of 0.8% ($p<0.05$) per year (Figure 54).

During the period 2006-2010, the median age at diagnosis for cancer of the prostate was 68 years and the median age at death was 82 years. Figure 55 shows the age-specific incidence and mortality rates for this period.

Based on the incidence rates from 2006-2010, 16.0% of men born today in Puerto Rico will be diagnosed with cancer of the prostate during their lifetime. This number can also be expressed as: 1 in 6 men will be diagnosed with cancer of the prostate during their lifetime.

FIGURE 54: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE AND MORTALITY RATES OF PROSTATE CANCER, PUERTO RICO 1987-2010

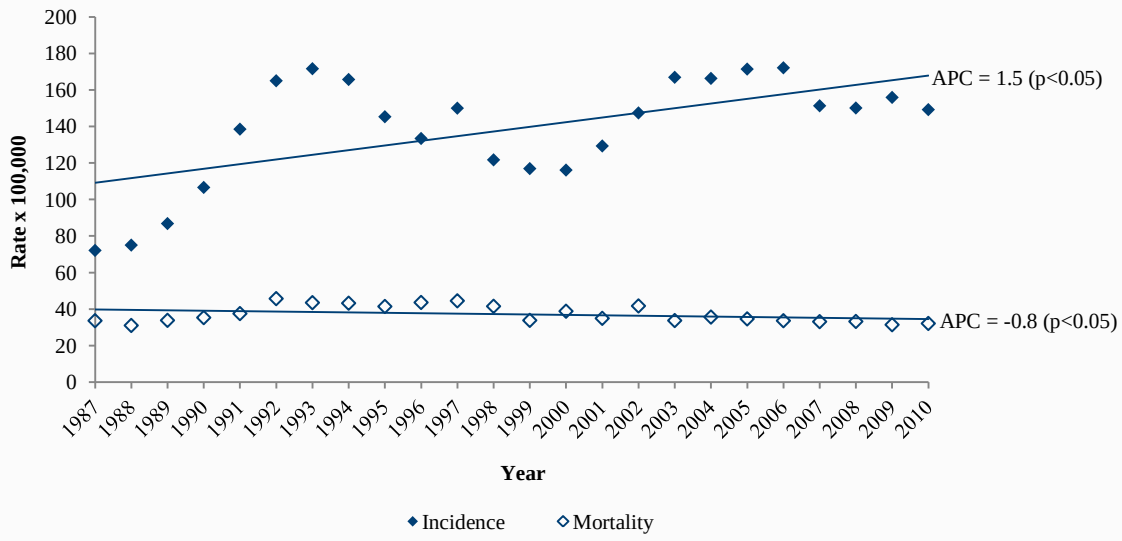


FIGURE 55: AGE-SPECIFIC INCIDENCE AND MORTALITY RATES OF PROSTATE CANCER, PUERTO RICO 2006-2010

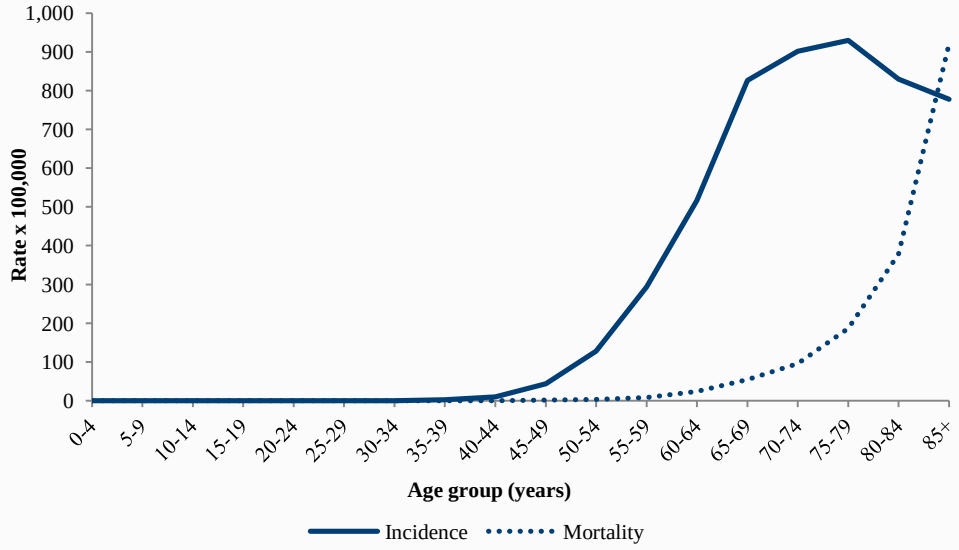
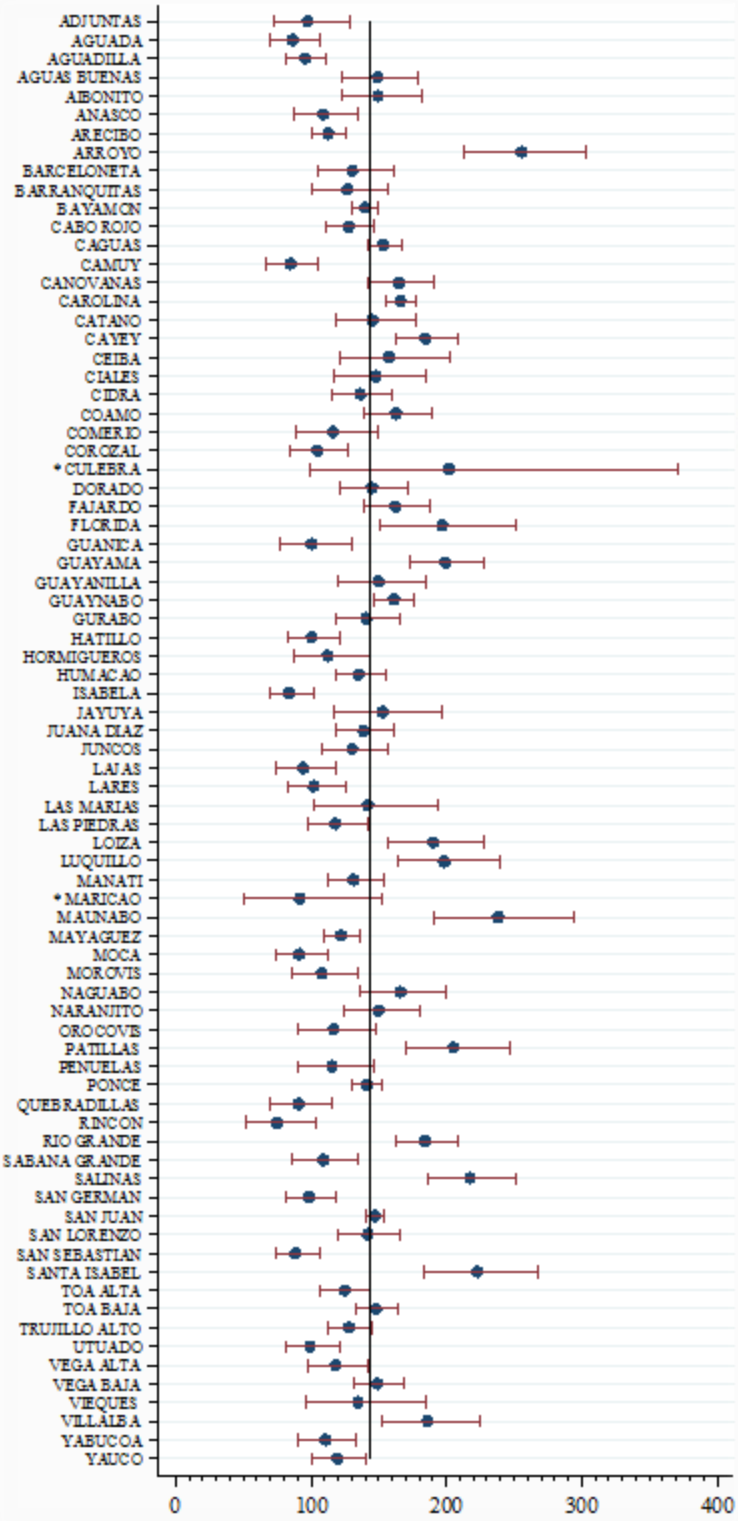
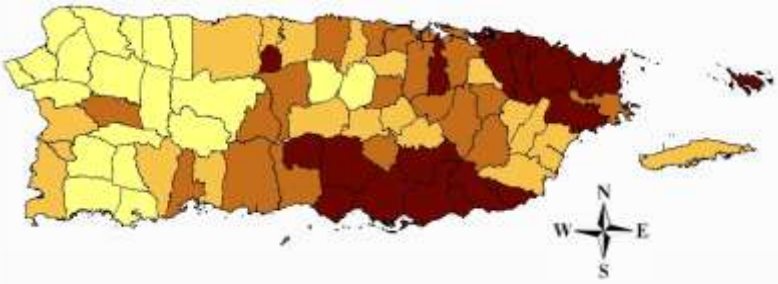


FIGURE 56: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF PROSTATE CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
143.8 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

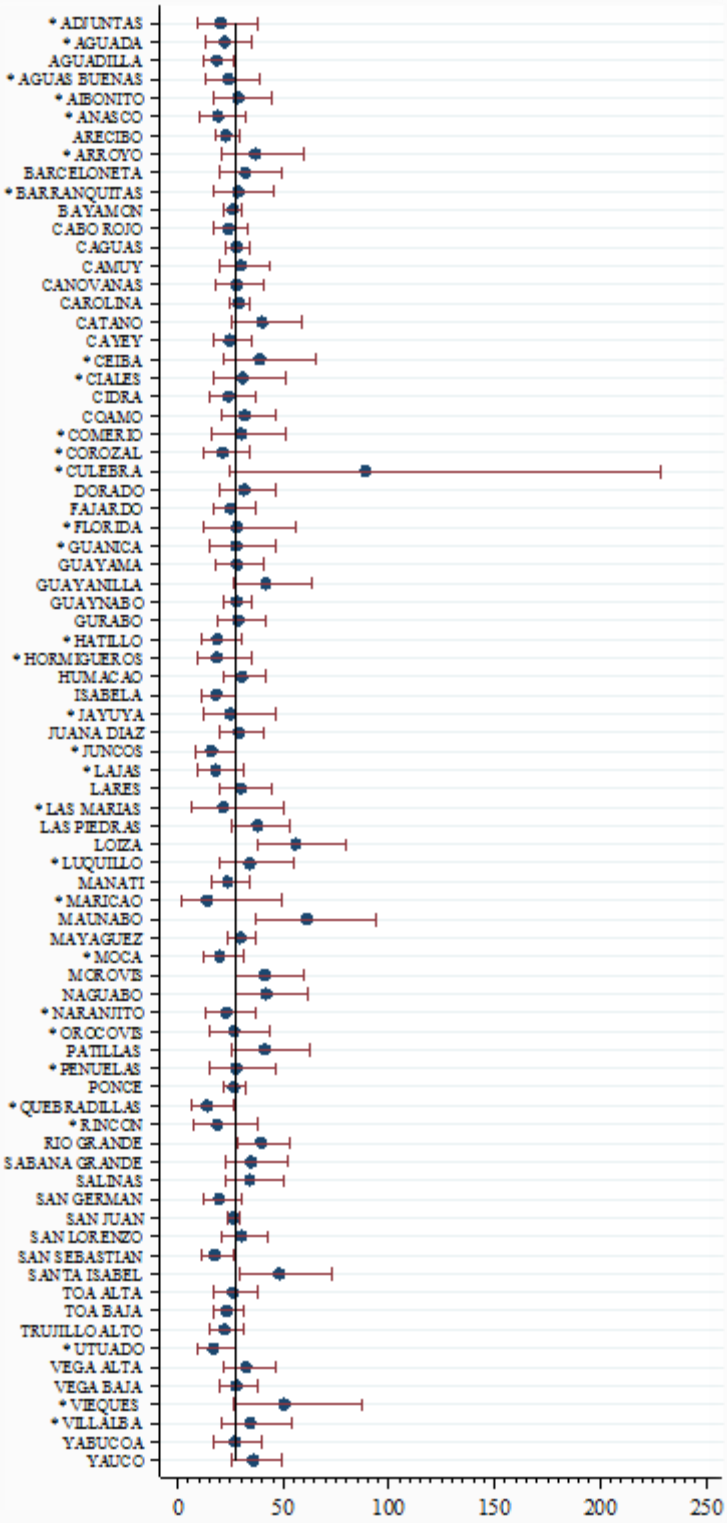


Incidence
Rate per 100,000

- 157.81 – 255.50
- 136.41 – 157.80
- 109.01 – 136.40
- 74.60 – 109.00

FIGURE 57: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF PROSTATE CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
27.3 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

Mortality
Rate per 100,000

- 32.31 – 89.00
- 28.01 – 32.30
- 23.11 – 28.00
- 14.10 – 23.10

Cancer of the Breast

During the period 2006-2010, breast cancer was the most commonly diagnosed cancer and the leading cause of cancer death among women in Puerto Rico. Many factors have been associated with the risk of developing breast cancer. Both genetic and environmental factors are believed to play a role in the development of breast cancer. Breast cancer is a disease predominantly influenced by risk factors related to lifestyle; approximately only 15% of all breast cancer cases can be attributed to familial and genetic influences. Most of these factors can be linked to hazardous effects of hormonal exposures (26).

Key Points

- **Breast cancer was the most commonly diagnosed cancer among women in Puerto Rico.**
- **It accounted for 29.7% of all female cancers between 2006 and 2010 and 18.9% of all female cancer deaths between 2006 and 2010.**
- **An average of 1,766 women were diagnosed with invasive breast cancer between 2006 and 2010.**
- **An average of 412 women died from breast cancer each year between 2006 and 2010.**

The term *"in-situ"* is commonly used to describe an early stage of cancer, when it is confined to the layer of the cells where it began. "*In-situ"* also means that it has not invaded the tissue thus it is not life-threatening. However, having it can increase the risk of developing an invasive breast cancer later on (30) (31). Between 1987 and 2010, the incidence rate of invasive breast cancer among women in Puerto Rico increased an average of 1.3% ($p<0.05$) per year; while, in-situ breast cancer rates increased an average of 8.5% ($p<0.05$) per year (Figure 58). The increase in in-situ breast cancer rates might be an indication of improved detection efforts of breast cancer over time by screening mammography among women in Puerto Rico. On the other hand, mortality rates of female breast cancer have decreased an average of 0.1% ($p>0.05$) (Figure 59).

During the period 2006-2010, the median age at diagnosis for invasive female breast cancer was 61 years, for in-situ female breast cancer was 60 years, and the median age at death was 65 years. Figure 60 shows the age-specific incidence and mortality rates for this period.

Based on the incidence rates from 2006-2010, 8.6% of women born today in Puerto Rico will be diagnosed with cancer of the breast during their lifetime. This number can also be expressed as: 1 in 12 women will be diagnosed with cancer of the breast during their lifetime.

FIGURE 58: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF INVASIVE AND IN-SITU FEMALE BREAST CANCER, PUERTO RICO 1987-2010

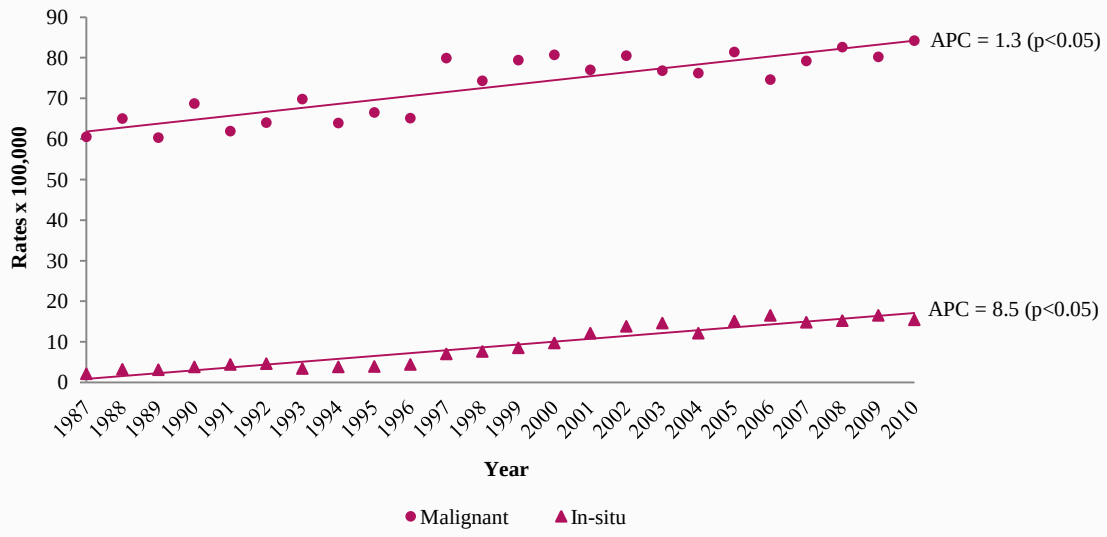


FIGURE 59: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF INVASIVE FEMALE BREAST CANCER, PUERTO RICO 1987-2010

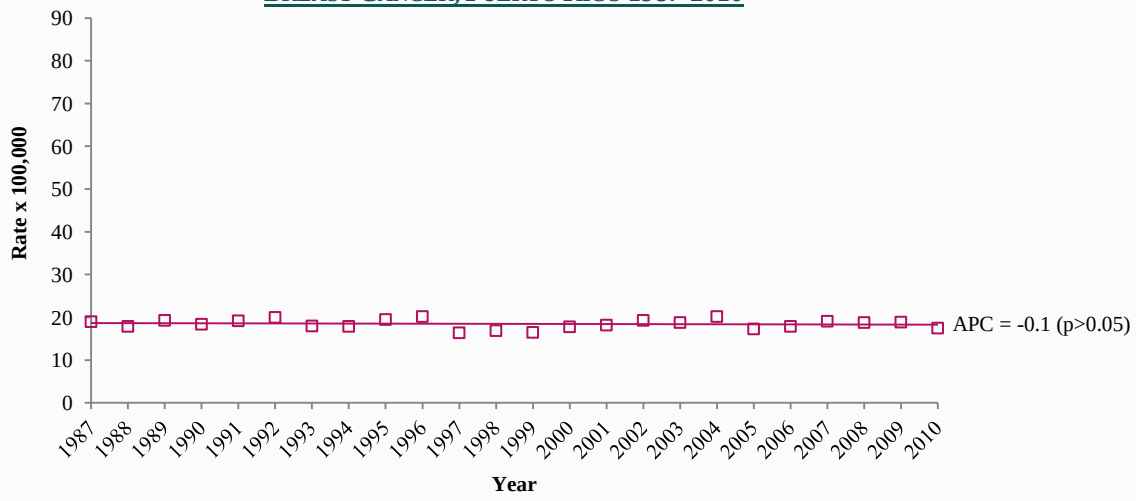


FIGURE 60: AGE-SPECIFIC INCIDENCE AND MORTALITY RATES OF INVASIVE FEMALE BREAST CANCER, PUERTO RICO 1987-2010

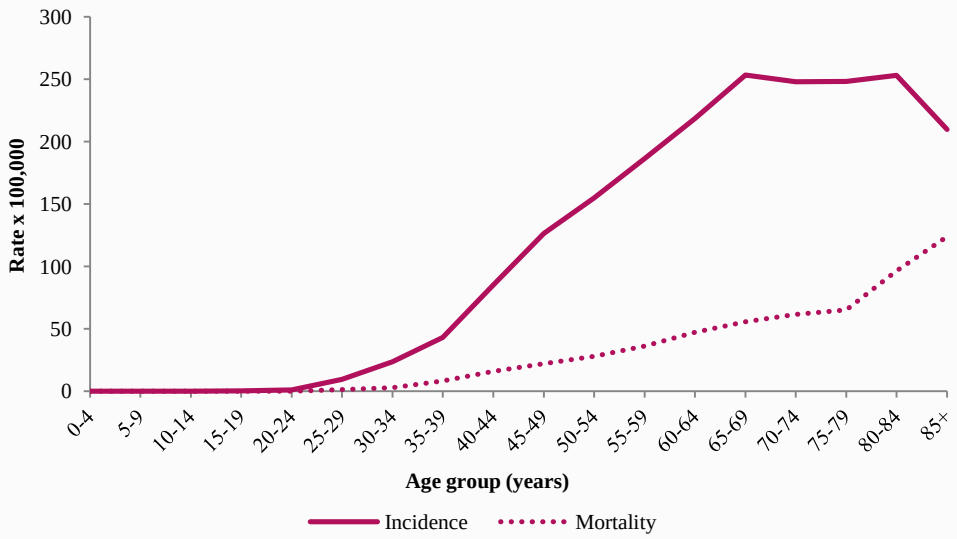
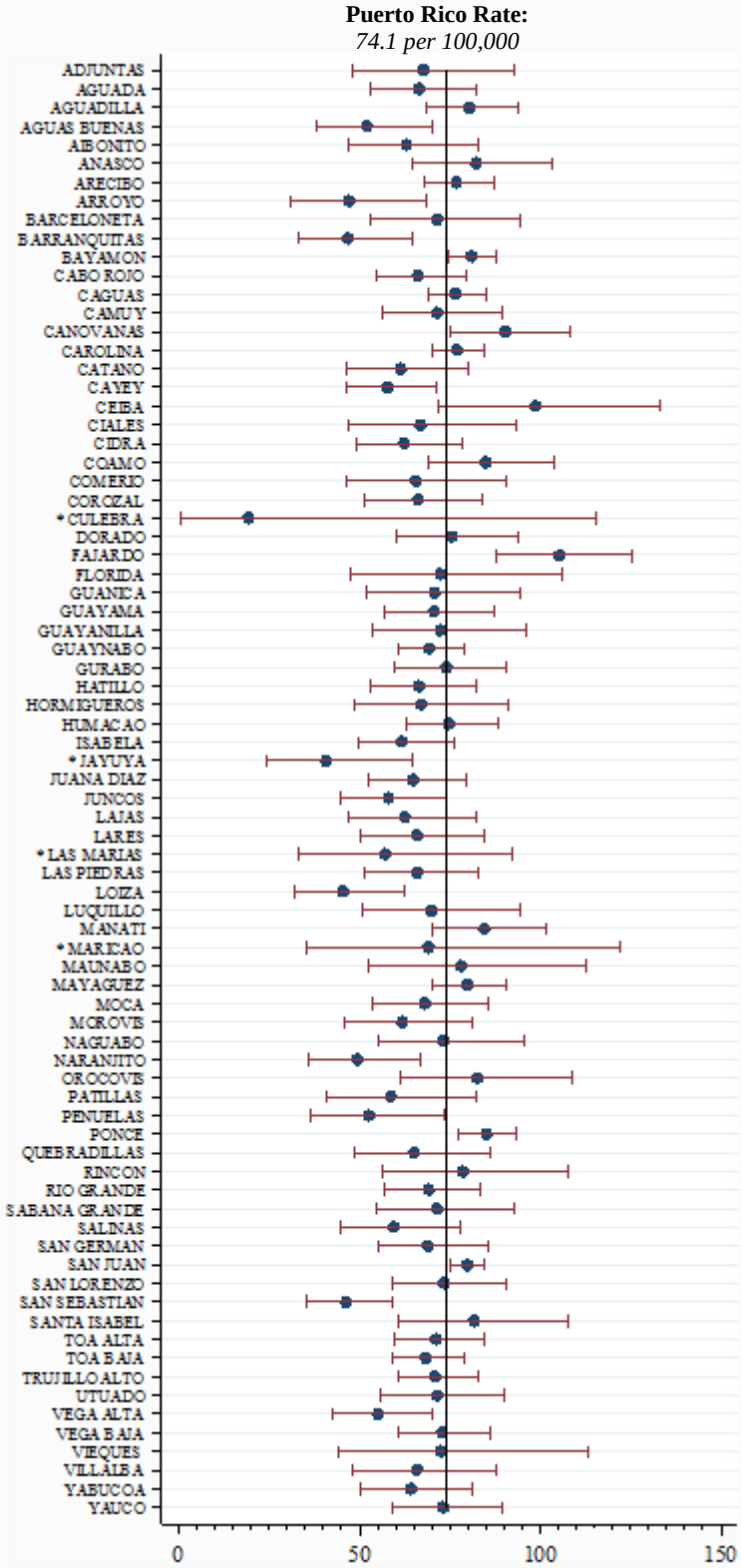
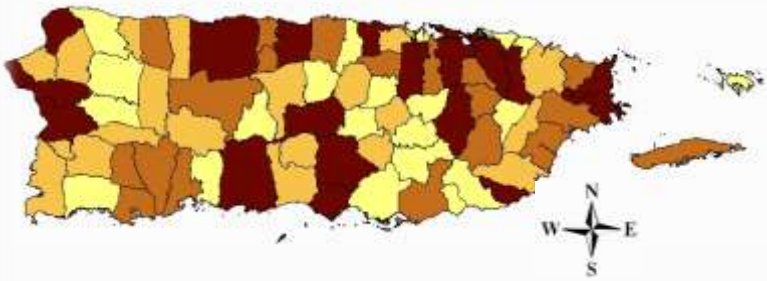


FIGURE 61: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF INVASIVE FEMALE BREAST CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

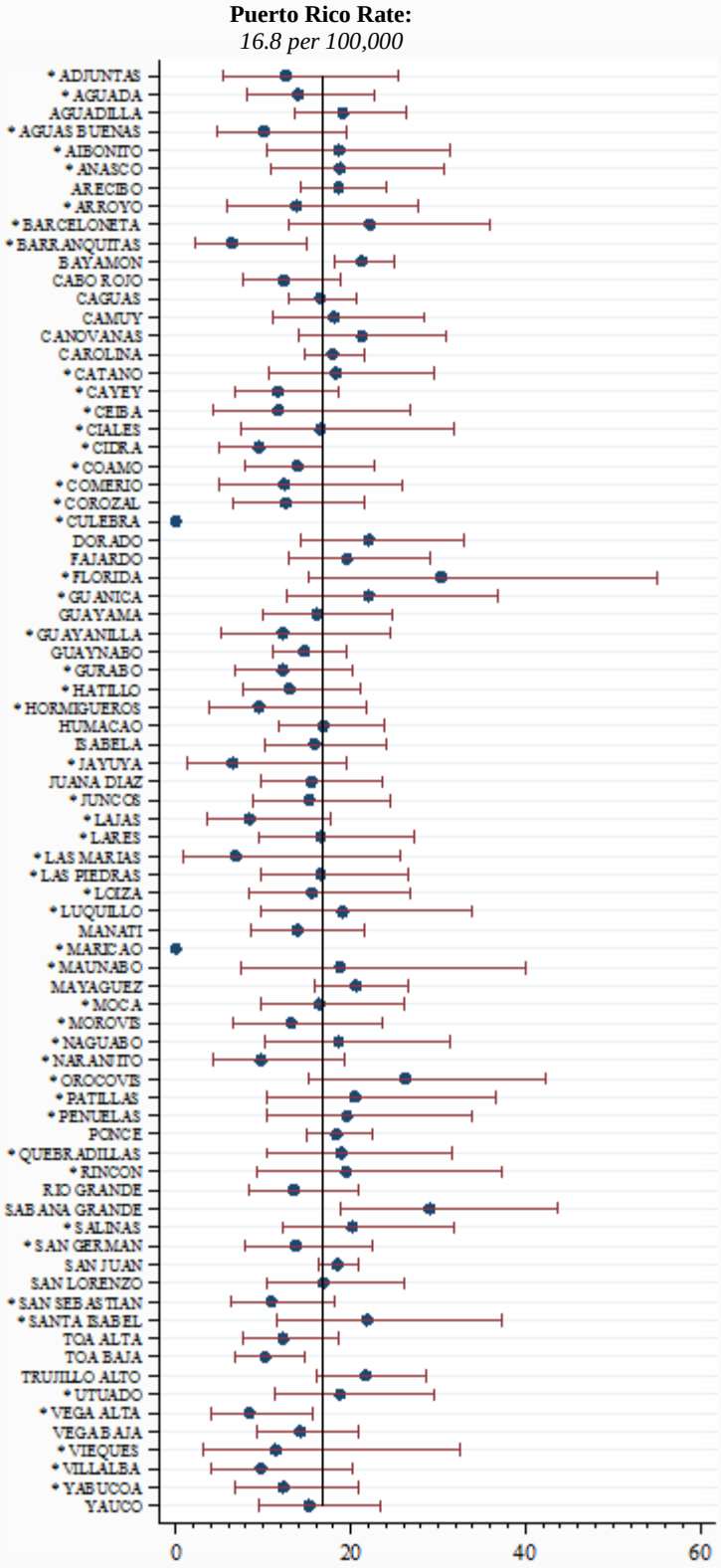




Incidence
Rate per 100,000

- 74.81 – 105.30
- 69.21 – 74.80
- 62.61 – 69.20
- 19.30 – 62.60

FIGURE 62: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF FEMALE BREAST CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010



Mortality
Rate per 100,000

- 18.91 – 30.40
- 16.11 – 18.90
- 12.31 – 16.10
- 6.40 – 12.30
- 0.00

Cancer of the Cervix Uteri

For the period 2006-2010, cervical cancer was the seventh most commonly diagnosed cancer among women in Puerto Rico representing approximately 3.9% of all female cancers. Cervical cancer is a disease in which malignant (cancer) cells form in the tissues of the cervix. Infection of the cervix with human papillomavirus (HPV) is the major risk factor for cervical cancer. Certain sexual behavior increase the risk of infection with HPV such as first sexual intercourse at a young age, numerous lifetime sexual partners, history of sexually transmitted infections, no use of protection during sexual intercourse, and high parity. Other risk factors for cervical cancer include: long-term oral contraceptive use, history of cigarette smoking, low socioeconomic status, and dietary factors (26).

Key Points

- **Cervix Uteri cancer was the seventh most common diagnosis of cancer among women in Puerto Rico during the period 2006-2010.**
- **It accounted for 3.9% of all female cancers between the years of 2006-2010 and 2.3% of all female cancer deaths between the years of 2006-2010.**
- **An average of 230 women were diagnosed with invasive cervix uteri cancer each year during 2006-2010.**
- **An average of 50 women died from cervix uteri cancer each year for the period of 2006-2010.**

Between 1987 and 2010, the incidence rate of cervix uteri cancer among women in Puerto Rico decreased an average of 0.9% ($p<0.05$) per year, while the mortality rates decreased an average of 1.8% ($p<0.05$) (Figure 63).

During the period 2006-2010, the median age at diagnosis for cancer of the cervix uteri was 49 years and the median age at death for cervix uteri cancer was 60 years. Figure 64 shows the age-specific incidence and mortality rates for this period.

Based on the incidence rates from 2006-2010, 1.0% of women born today in Puerto Rico will be diagnosed with cancer of the cervix during their lifetime. This number can also be expressed as: 1 in 98 women will be diagnosed with cancer of the cervix during their lifetime.

FIGURE 63: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE AND MORTALITY RATES OF CERVIX UTERI CANCER, PUERTO RICO 1987-2010

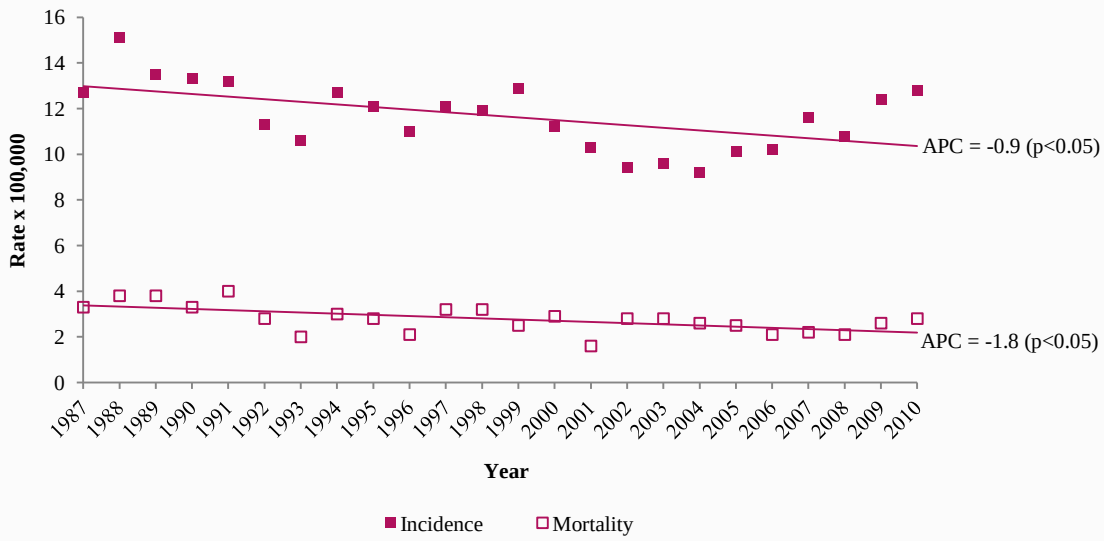
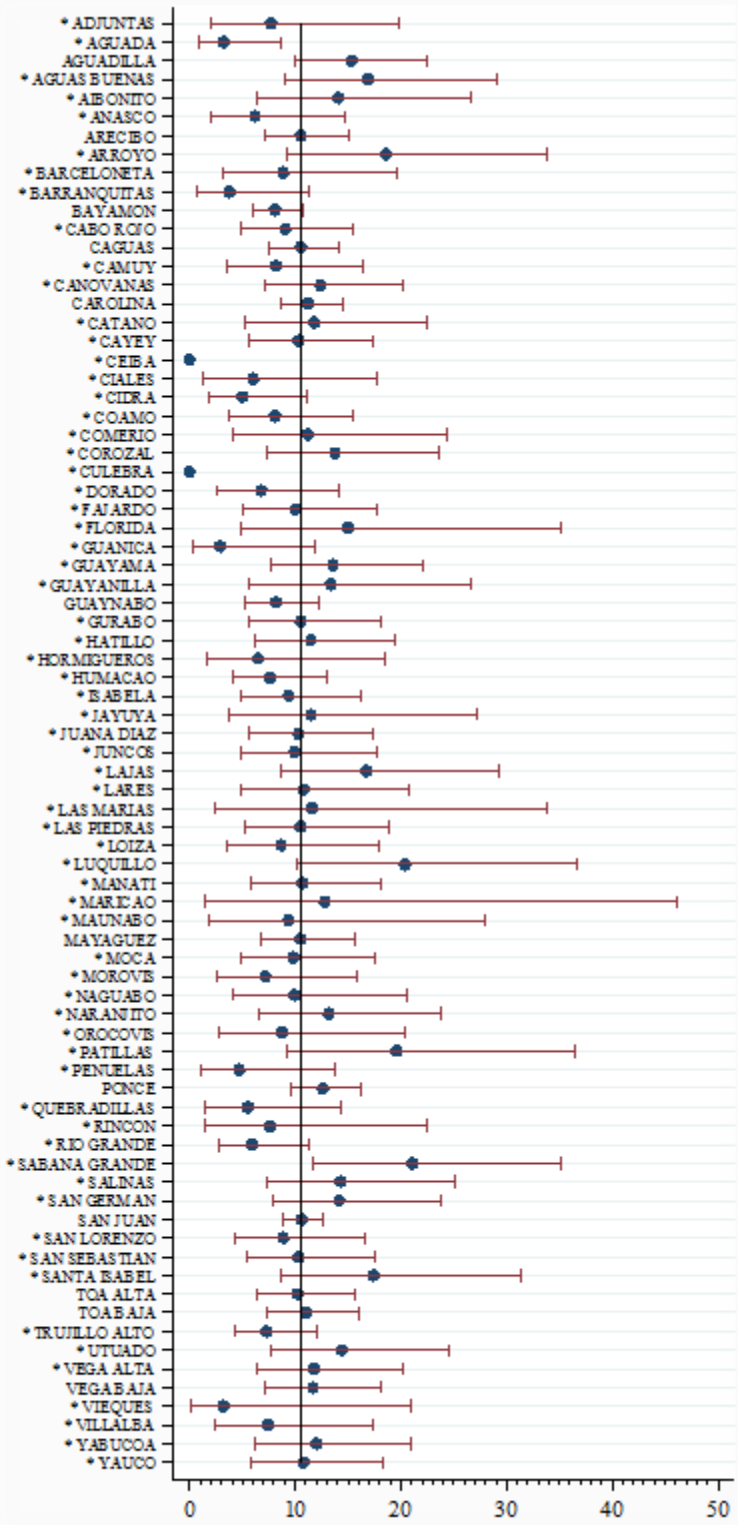


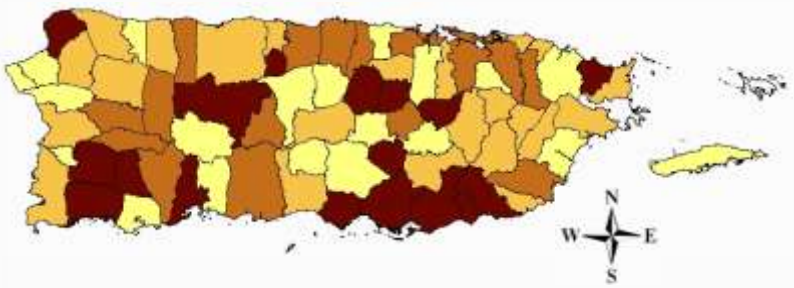
FIGURE 64: AGE-SPECIFIC INCIDENCE AND MORTALITY RATES OF CERVIX UTERI CANCER, PUERTO RICO 2006-2010

FIGURE 65: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF CERVIX UTERI CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
10.6 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

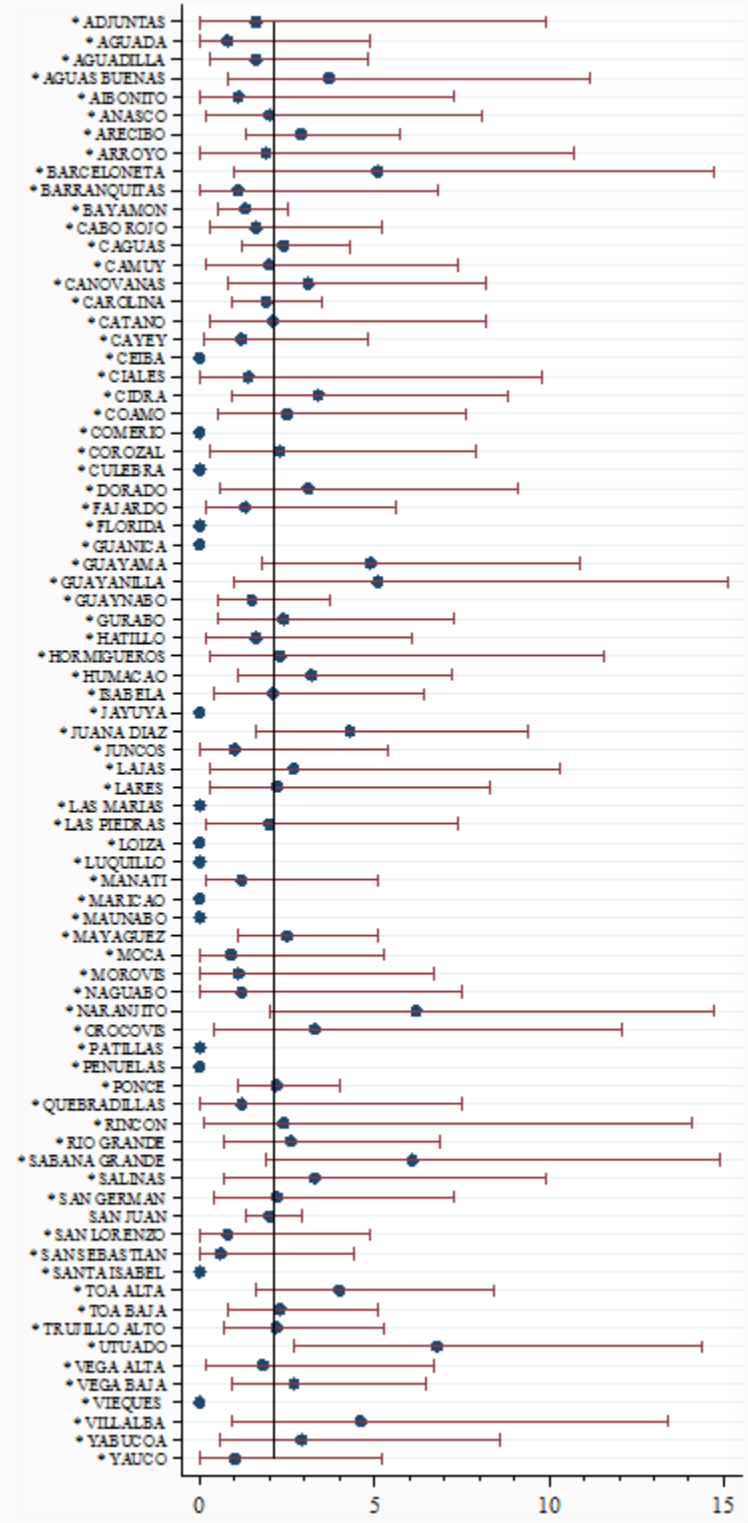


Incidence
Rate per 100,000

- 12.81 – 21.10
- 10.51 – 12.80
- 8.11 – 10.50
- 2.90 – 8.10
- 0.00

FIGURE 66: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF CERVIX UTERI CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
2.1 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

Mortality
Rate per 100,000

- 3.11 – 6.80
- 2.21 – 3.10
- 1.41 – 2.20
- 0.60 – 1.40
- 0.00

Cancer of the Corpus Uterus

Corpus and Uterus, Not Other Specified (NOS) cancer was the fourth most commonly diagnosed cancer among women in Puerto Rico and the most common malignancy of the woman genital tract. In Puerto Rico, nearly 90% of women with corpus and uterus (NOS) cancer are classified as endometrial cancer.

Key Points

- **Corpus uterus cancer was the fourth most commonly diagnosed cancer among women in Puerto Rico for the period 2006-2010.**
- **It accounted for 7.5% of all female cancers between 2006 and 2010 and 4.6% of all cancer deaths among female during the same period.**
- **An average of 443 women were diagnosed with invasive corpus uterus cancer during the period 2006-2010.**
- **An average of 99 women died from corpus uterus cancer each year during the period 2006-2010.**

Factors associated with an increased risk for corpus uterus cancer include: age; endometrial hyperplasia; hormone replacement therapy; obesity, and related conditions; tamoxifen use, and colorectal cancer. Other factors related to the length of estrogen exposure such as nulliparity, early first menstrual period, and late age at menopause are also associated with an increased risk of endometrial cancer (26).

Between 1987 and 2010, the incidence rate of corpus uterus cancer in Puerto Rico increased an average of 2.5% per year ($p<0.05$), while the mortality rate decreased an average of 0.8% per year ($p>0.05$) (Figure 67).

During the period 2006-2010, the median age at diagnosis for cancer of the corpus uterus was 62 years and the median age at death for corpus uterus cancer was 69 years. Figure 68 shows the age-specific incidence and mortality rates for this period.

Based on the incidence rates from 2006-2010, 2.1% of women born today in Puerto Rico will be diagnosed with cancer of the corpus uterus during their lifetime. This number can also be expressed as: 1 in 47 women will be diagnosed with cancer of the corpus uterus during their lifetime.

FIGURE 67: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE AND MORTALITY RATES OF CORPUS UTERUS CANCER, PUERTO RICO 1987-2010

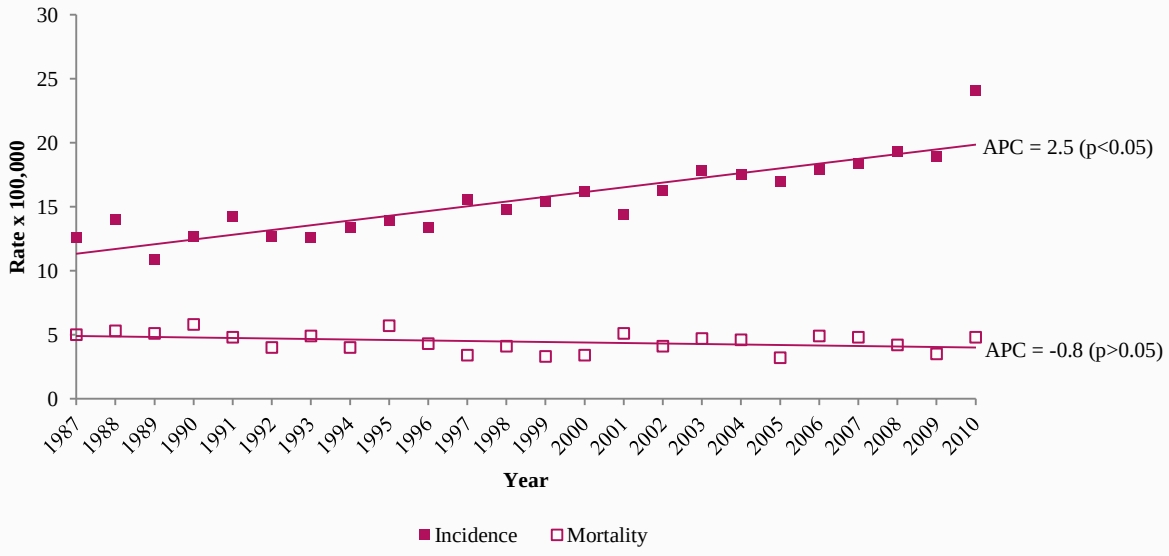


FIGURE 68: AGE-SPECIFIC INCIDENCE AND MORTALITY RATES OF CORPUS UTERUS CANCER, PUERTO RICO 2006-2010

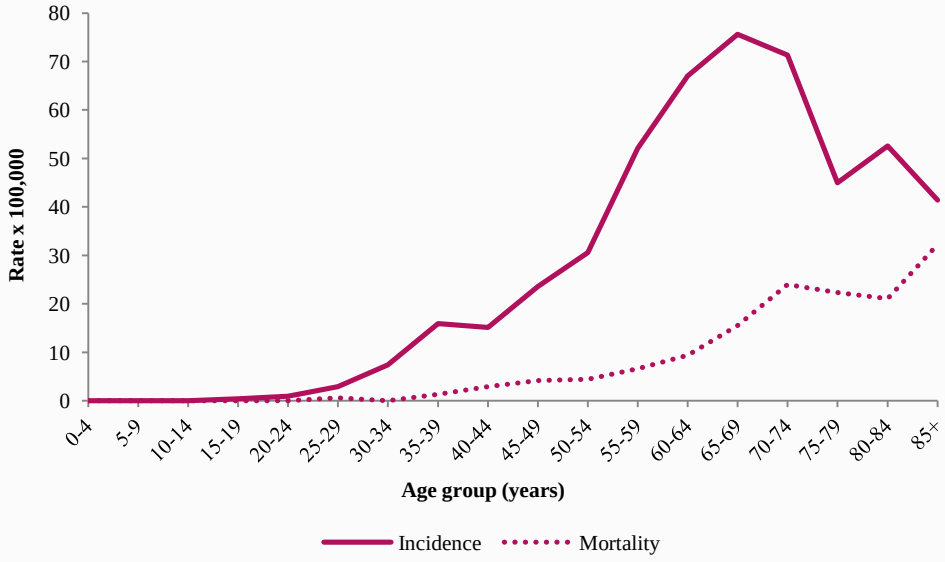
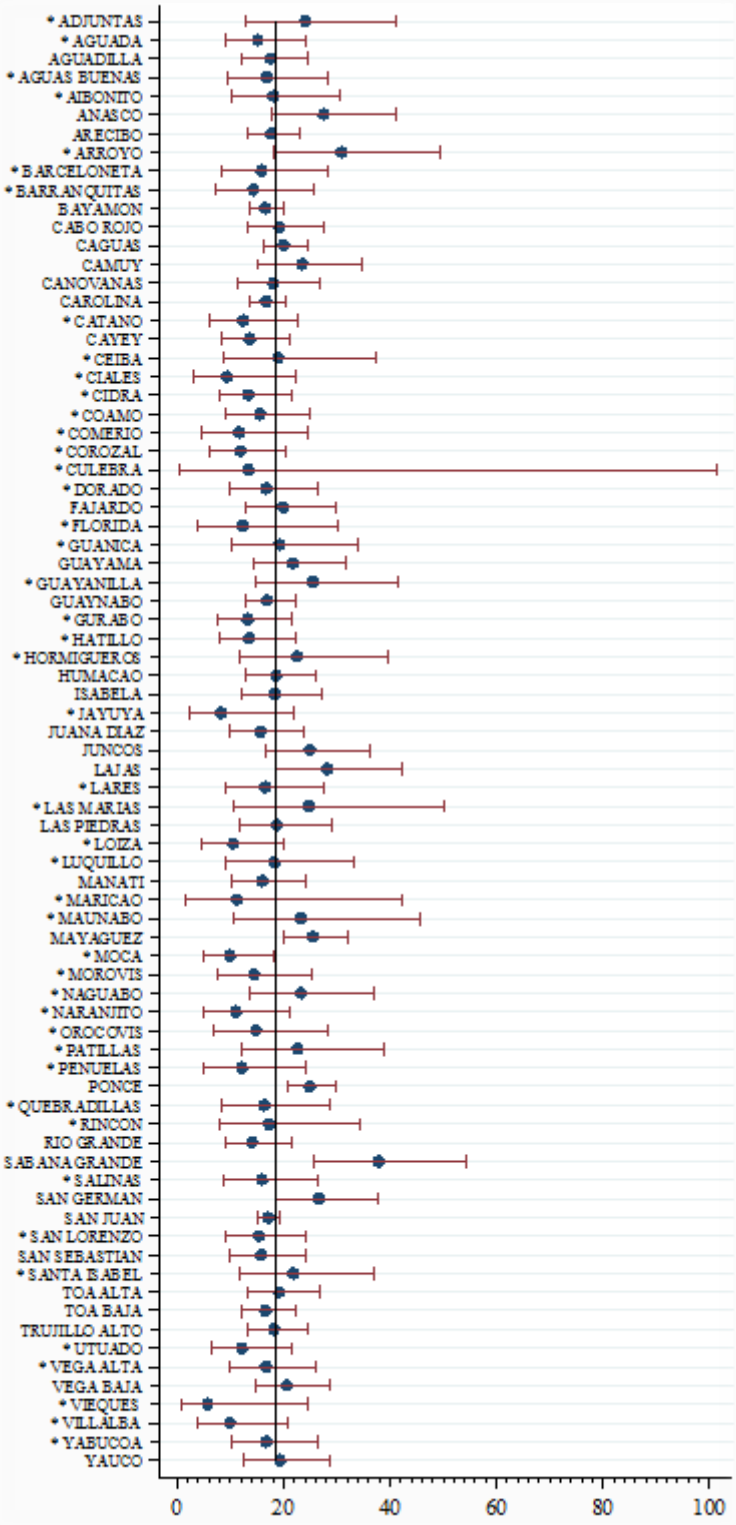


FIGURE 69: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF CORPUS UTERUS CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
18.5 per 100,000



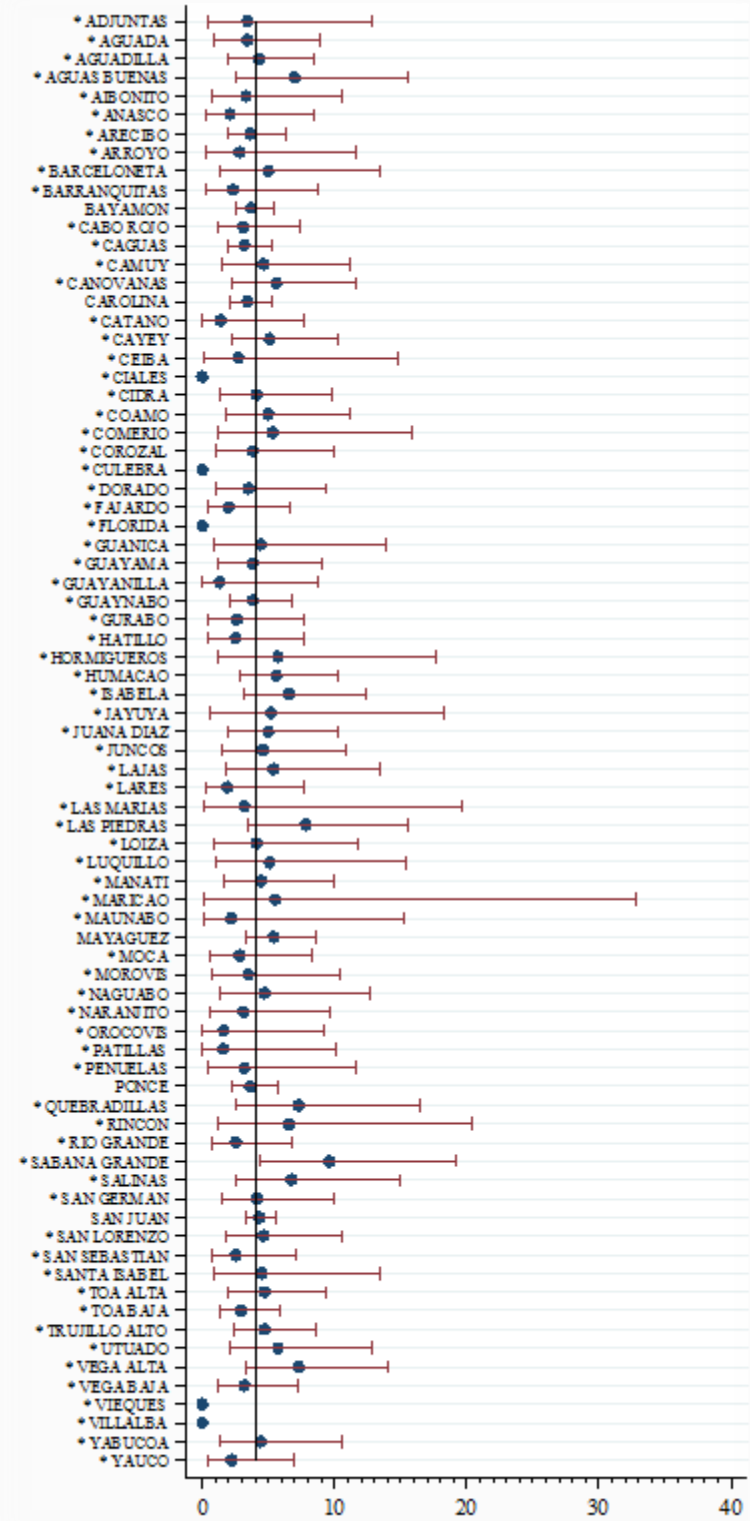
Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

Incidence
Rate per 100,000

- 20.71 – 37.90
- 16.91 – 20.70
- 14.21 – 16.90
- 5.80 – 14.20

FIGURE 70: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF CORPUS UTERUS CANCER BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
4.0 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

Mortality
Rate per 100,000

- 5.11 – 9.60
- 4.11 – 5.10
- 3.11 – 4.10
- 1.30 – 3.10
- 0.00

Non-Hodgkin Lymphoma

Lymphomas are cancers that affect the white blood cells of the immune system, and are usually classified as either Hodgkin lymphoma or non-Hodgkin lymphoma. Non-Hodgkin lymphoma is by far the most common of the two types, accounting for 83.7% of the cases. In Puerto Rico, non-Hodgkin lymphoma is the sixth most commonly diagnosed cancer among men and women for the period of 2006-2010. Non-Hodgkin lymphoma is the tenth cause of death by cancer among men and women for the same time period. The causes of non-Hodgkin lymphoma are unknown; however, exposure to certain industrial and agricultural chemicals, infections, and immune system deficiency and autoimmune disorders may increase the risk (26).

Key Points

- **Non-Hodgkin lymphoma accounted for 3.4% of all male cancers and 3.9% of all female cancers between 2006 and 2010.**
- **It also accounted for 3.2% of all male cancer deaths and 3.4% of female cancer deaths between 2006 and 2010.**
- **An average of 245 men and 232 women were diagnosed with non-Hodgkin lymphoma between 2006 and 2010.**
- **An average of 91 men and 75 women died from non-Hodgkin lymphoma per year during the period 2006-2010.**
- **During 2006-2010, the risk of developing non-Hodgkin lymphoma was 1.3 times higher in men than in women (95% CI: 1.2, 1.4).**
- **For the same period, the risk of death due to non-Hodgkin lymphoma was 1.5 times higher in men than in women (95% CI: 1.3, 1.7).**

Between 1987 and 2010, the incidence rate in both men and women increased an average of 1.3% per year ($p<0.05$) (Figure 71). Cancer mortality rate in men increased an average of 0.3% per year ($p>0.05$), while in women it decreased an average of 0.8% annually ($p<0.05$) (Figure 72).

During the period 2006-2010, the median age at diagnosis for non-Hodgkin lymphoma in men was 64 years; while in women it was 65 years. For the same period, the median age at death for non-Hodgkin lymphoma in men was 69 years; while in women it was 72 years. The age-specific incidence and mortality rates by sex for this period are shown in Figures 73 and 74.

Based on the incidence rates from 2006-2010, 1.3% of men and women born today in Puerto Rico will be diagnosed with non-Hodgkin lymphoma during their lifetime. This number

can also be expressed as: 1 in 79 men and women will be diagnosed with non-Hodgkin lymphoma during their lifetime.

FIGURE 71: AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF NON-HODGKIN LYMPHOMA BY SEX, PUERTO RICO 1987-2010

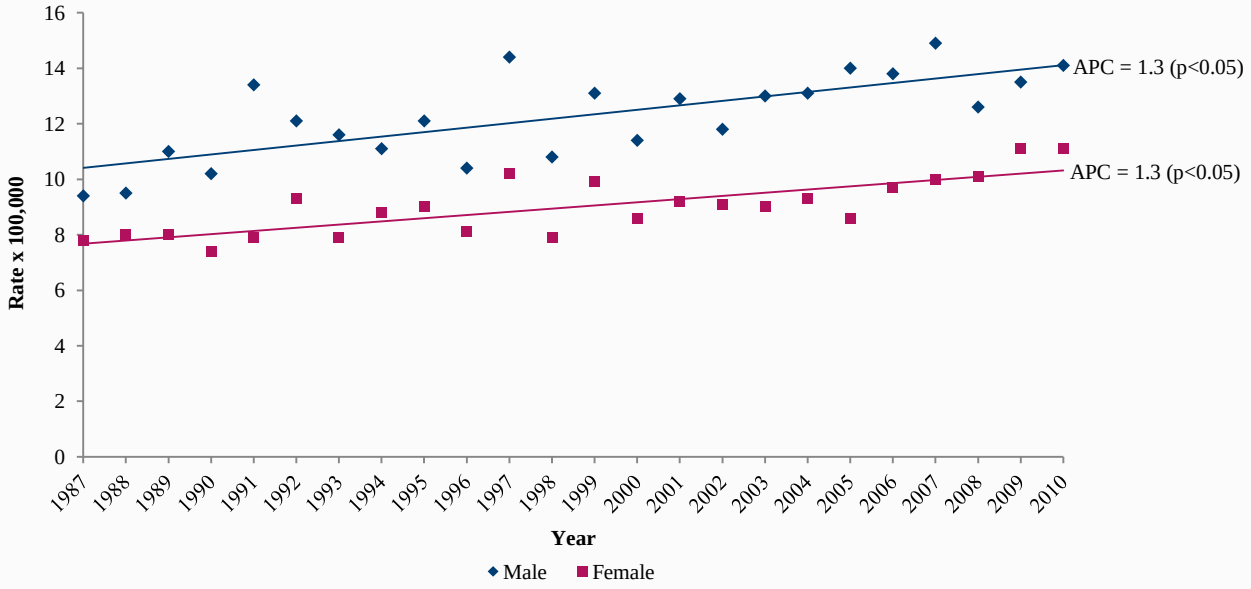


FIGURE 72: AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF NON-HODGKIN LYMPHOMA BY SEX, PUERTO RICO 1987-2010

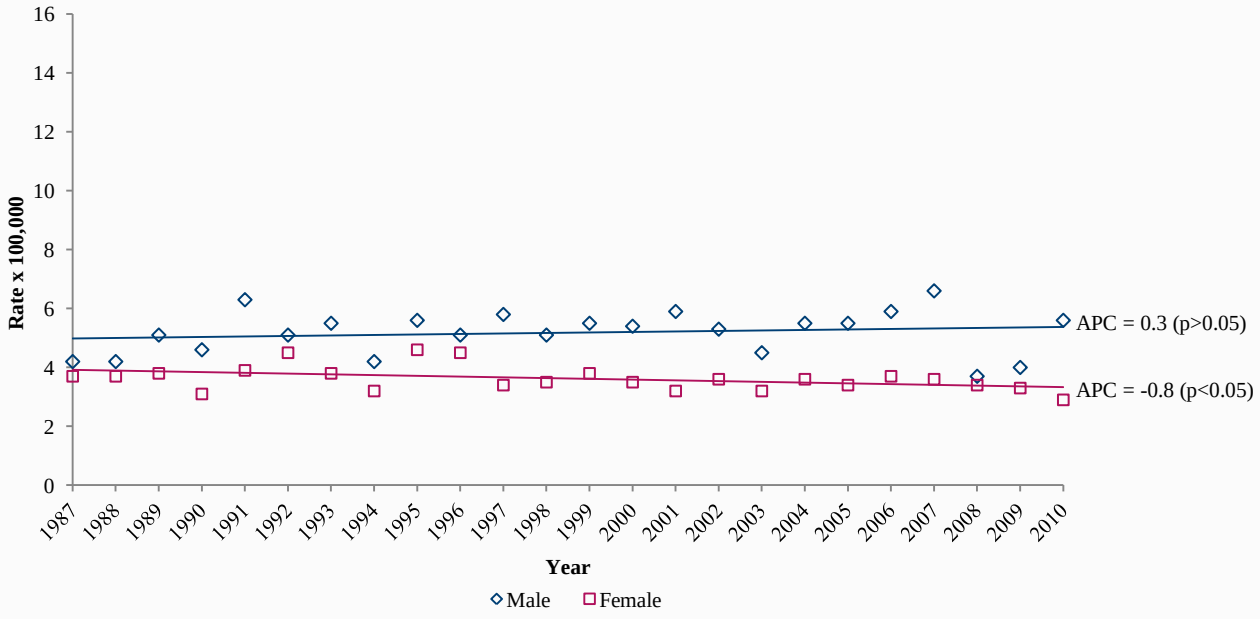


FIGURE 73: AGE-SPECIFIC INCIDENCE RATES OF NON-HODGKIN LYMPHOMA BY SEX, PUERTO RICO 1987-2010

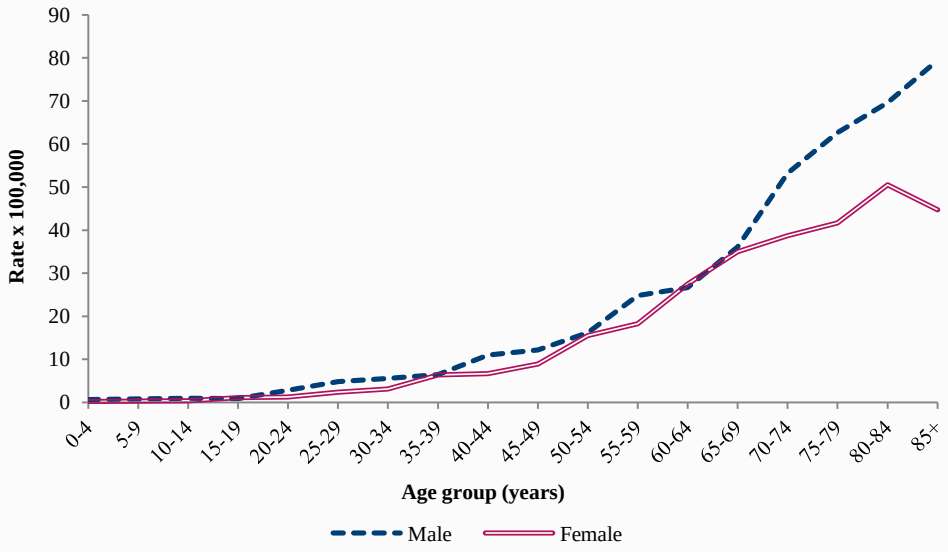


FIGURE 74: AGE-SPECIFIC MORTALITY RATES OF NON-HODGKIN LYMPHOMA BY SEX, PUERTO RICO 1987-2010

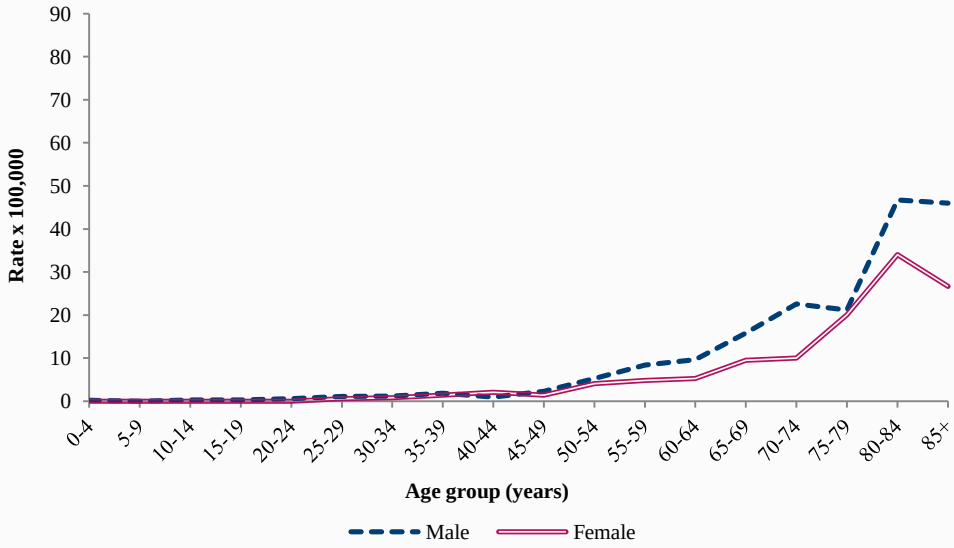
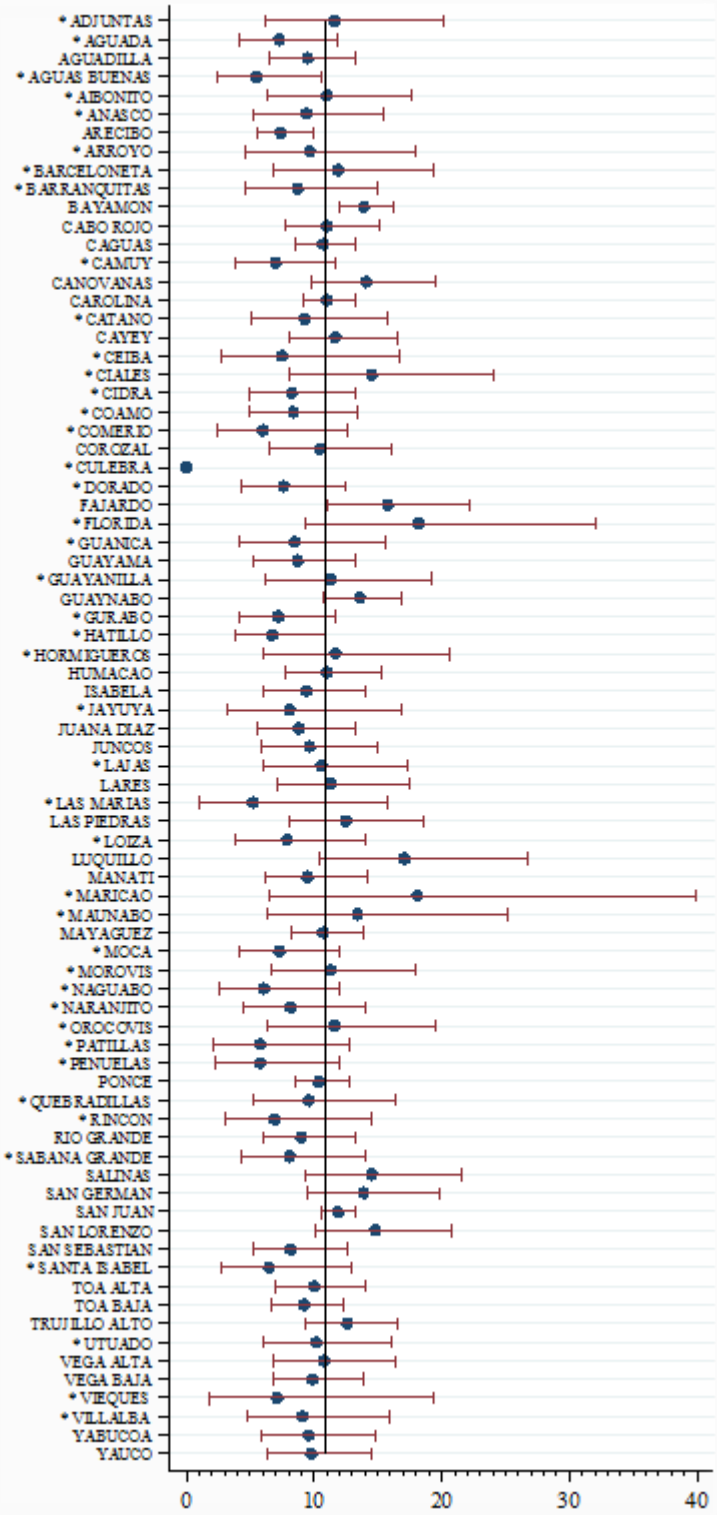


FIGURE 75: AGE-ADJUSTED (2000 PR STD. POP.) INCIDENCE RATES OF NON-HODGKIN LYMPHOMA BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
10.9 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases

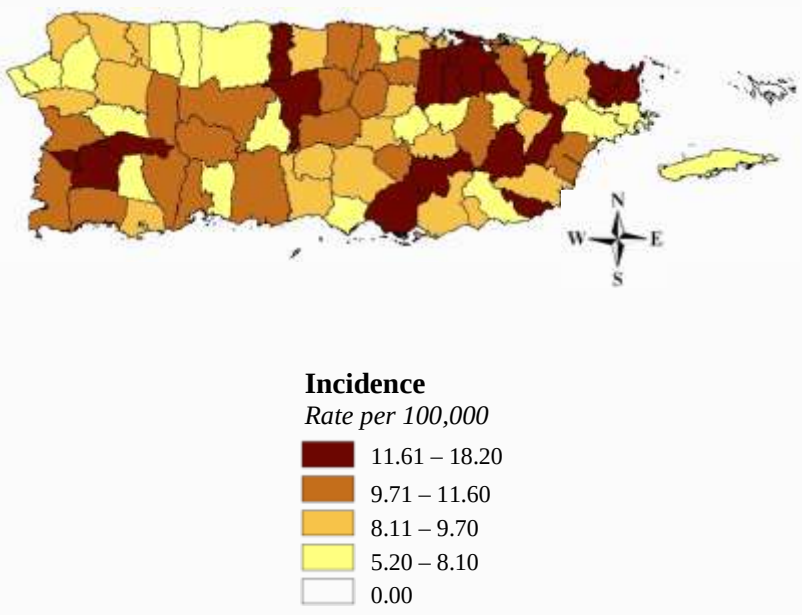
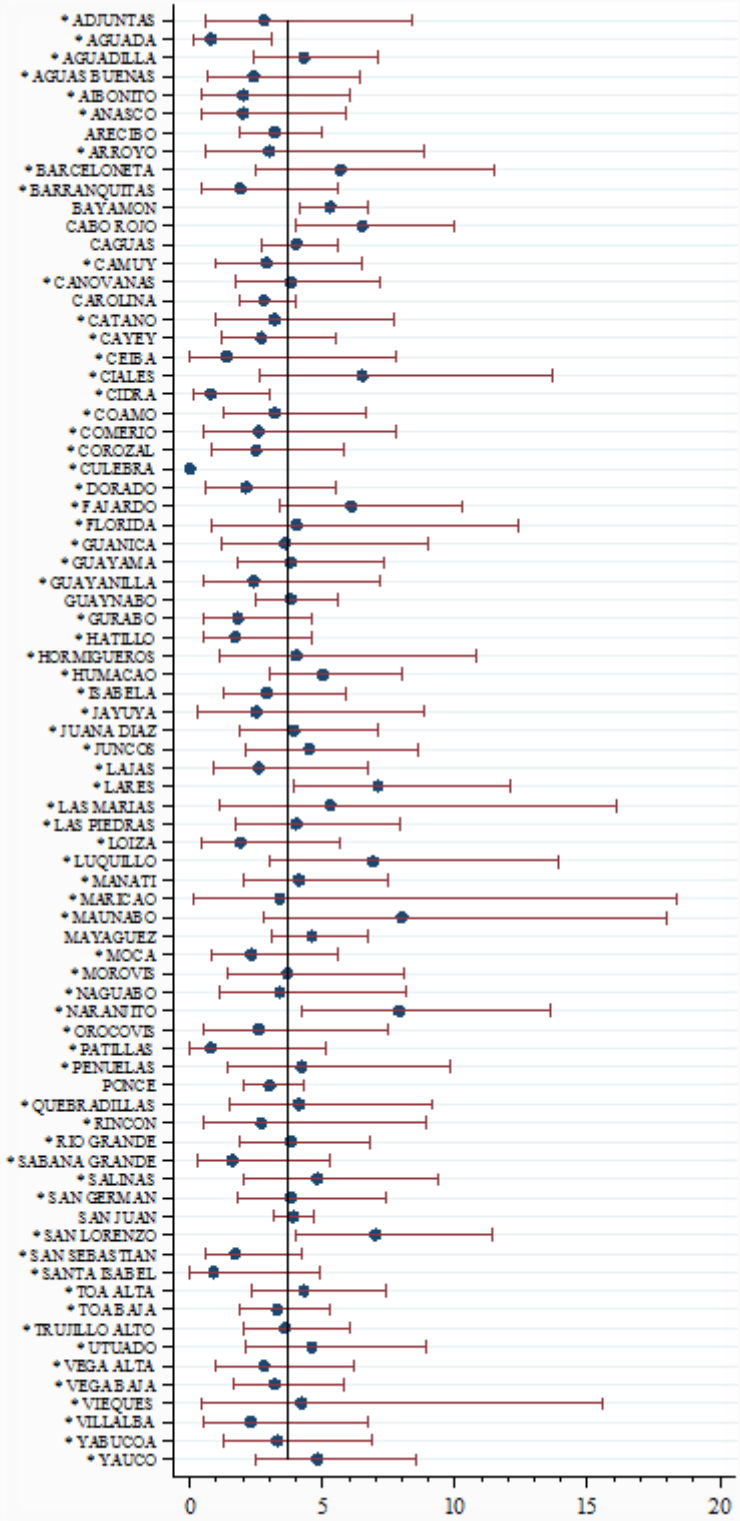
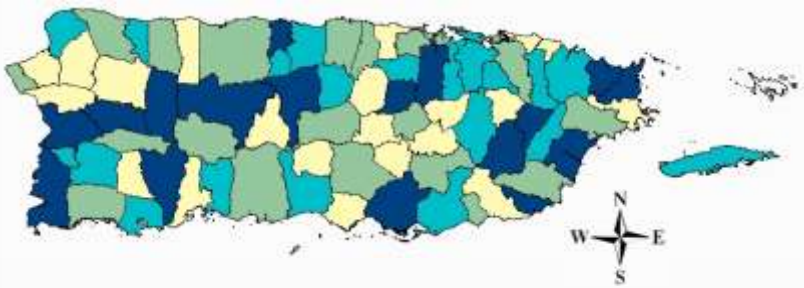


FIGURE 76: AGE-ADJUSTED (2000 PR STD. POP.) MORTALITY RATES OF NON-HODGKIN LYMPHOMA BY MUNICIPALITY IN PUERTO RICO, 2006-2010

Puerto Rico Rate:
3.7 per 100,000



Rate per 100,000
and 95% Confidence Intervals
Municipality with less than 20 cases



Mortality
Rate per 100,000

- 4.31 – 8.00
- 3.41 – 4.30
- 2.51 – 3.40
- 0.80 – 2.50
- 0.00

Childhood Cancer

Childhood cancer is a diverse spectrum of different rare malignancies, varying widely in histology and anatomical site. In this report, childhood is defined as < 20 years of age. Childhood cancers are different from adult cancers with respect to diagnosis, risk factors, cancer sites, treatments, and prognosis. The causes of childhood cancers are largely unknown. Only a small percentage of cases can be explained by few conditions such as specific chromosomal/genetic abnormalities (e.g., Down's syndrome) and ionizing radiation exposure. Environmental exposures have long been suspected of increasing the risk of certain childhood cancers. Researchers continue to examine environmental influences on childhood cancer (32). Cancer in children is much less common than cancers in adults, representing less than 1.1% of all cancers diagnosed in Puerto Rico. From 2006 to 2010, a total of 701 new cancer cases were diagnosed among Puerto Rican children. This corresponds to an average of 140 cases per year of invasive cancer among children; approximately 75 males and 65 females were newly diagnosed with cancer from 2006 to 2010. For the period 2006-2010, a total of 97 deaths due to cancer occurred in children less than 20 years, corresponding to an average of 19 deaths per year. Cancer is the fifth leading cause of death among Puerto Rican children. Leukemia, lymphomas, and cancers of the central nervous system are the three most frequently diagnosed cancers, accounting 59.6% of all childhood cancers (Table 5).

Key Points

- **Childhood cancer is less common than cancer in adults, representing 1.1% of all cancers in Puerto Rico.**
- **An average of 701 children under the age of 20 were diagnosed with cancer during the period 2006-2010 and about 194 deaths from the disease were reported during the same period.**
- **Between 2006 and 2010, the age-adjusted incidence cancer rate for pediatric cancers was 131.8 per million and the age-adjusted mortality rates was 17.8 per million for all cancers combined.**
- **Leukemia (26.5%), lymphomas (15.1%), and cancers of the central nervous system (18.0%) are the three most frequently diagnosed cancers in children.**
- **Incidence rates for childhood cancer remained stable during the period of 1987-2010; being similar for males and females.**
- **Mortality rates of childhood cancer decreased 2.7% ($p<0.05$) per year during the period 1987-2010; it decreased for both males (APC=-1.7%, $p<0.05$) and females (APC=-4.1%, $p<0.05$).**

Between 1987 and 2010, the incidence rate of childhood cancer remained stable (p>0.05); and similar for males and females (Figure 77). During the same period, the mortality rate of childhood cancer decreased 2.7% (p<0.05) per year; 1.7% (p<0.05) among males and 4.1% (p<0.05) among females (Figure 78).

Children in the oldest age group (15-19 years) have significantly higher incidence rates (p<0.05) for all cancers combined than the age groups between 5 and 14 years old but does not differ statistically from the rates of the youngest age group (0-4 years) (Figure 79). Children in this age group (15-19 years) also have higher mortality rates (p<0.05) than the age groups between 0 and 9 years old but does not differ statistically from the rates of the 10-14 years age group (Figure 80).

TABLE 5: INCIDENCE FOR SPECIFIC CHILDHOOD CANCER TYPES BY SEX, PUERTO RICO: 2006-2010

Sex →	Overall					Male					Female				
Cancer Types ↓	Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*			Count	Crude Rate*	Age-Adjusted Rate*		
			PR	US	World			PR	US	World			PR	US	World
All Cancer Combined	701	131.8	131.8	131.4	132.9	377	138.7	139.1	138.6	141.3	324	124.6	124.1	123.8	124.2
Leukemias	186	35.0	35.7	35.6	37.7	105	38.6	39.4	39.3	41.8	81	31.2	31.8	31.7	33.4
Lymphomas	106	19.9	19.4	19.3	18.5	67	24.6	24.1	24.0	22.9	39	15.0	14.6	14.4	13.8
CNS Neoplasms	126	23.7	24.0	24.0	24.5	71	26.1	26.6	26.5	27.6	55	21.2	21.2	21.3	21.2
SNS Tumors	27	5.1	5.4	5.4	6.2	13	4.8	5.0‡	5.0‡	5.7‡	14	5.4	5.8‡	5.8‡	6.8‡
Retinoblastoma	11	2.1	2.2‡	2.2‡	2.7‡	§	1.5	1.6‡	1.6‡	2.0‡	§	2.7	2.9‡	2.9‡	3.5‡
Renal tumors	24	4.5	4.7	4.7	5.2	12	4.4	4.6‡	4.6‡	5.1‡	12	4.6	4.8‡	4.8‡	5.2‡
Hepatic tumors	8	1.5	1.6‡	1.6‡	1.7‡	§	2.2	2.3‡	2.3‡	2.6‡	§	0.8	0.8‡	0.8‡	0.9‡
Bone Tumors	39	7.3	7.1	7.1	6.7	19	7.0	6.8‡	6.8‡	6.3‡	20	7.7	7.5	7.5	7.1
Soft tissue Sarcomas	41	7.7	7.7	7.7	7.7	22	8.1	8.0	8.0	7.8	19	7.3	7.4‡	7.4‡	7.5‡
Germ Cell Neoplasm	40	7.5	7.3	7.2	6.8	24	8.8	8.5	8.4	7.8	16	6.2	6.0‡	6.0‡	5.7‡
Carcinomas	83	15.6	14.8	14.7	13.3	28	10.3	9.9	9.9	9.1	55	21.2	19.9	19.7	17.7
Other and unspecified	10	1.9	1.9‡	1.9‡	2.0‡	§	2.2	2.3‡	2.3‡	2.5‡	§	1.5	1.5‡	1.5‡	1.5‡

*Rates are per 1,000,000.
Statistics were generated using the International Classification of Childhood Cancer (ICCC).
‡ Counts < 20 are too few to calculate a stable age-adjusted rate.
§ Counts are not presented to avoid potential identification of cancer patients.
Data Source: Incidence Case File of Puerto Rico from the Puerto Rico Central Cancer Registry (August 09, 2013).
Population Source: Vintage 2012 estimates series from the Population Division of the United States Census Bureau.
PR = Puerto Rico; US = United States

FIGURE 77: CHILDHOOD AGE-ADJUSTED (2000 US STD. POP.) INCIDENCE RATES OF ALL CANCER SITES BY SEX, PUERTO RICO 1987-2010

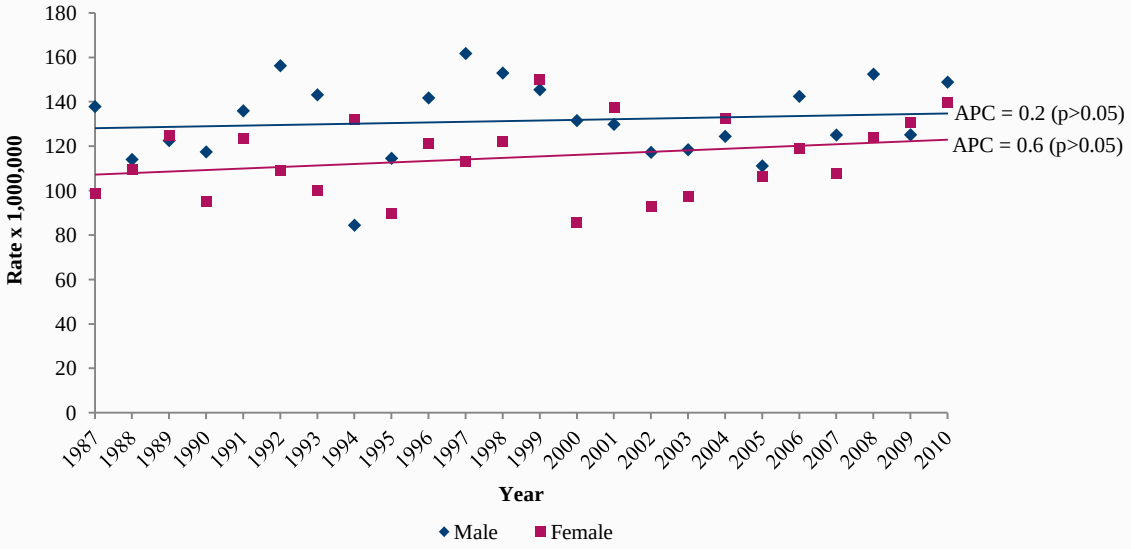


FIGURE 78: CHILDHOOD AGE-ADJUSTED (2000 US STD. POP.) MORTALITY RATES OF ALL CANCER SITES BY SEX, PUERTO RICO 1987-2010

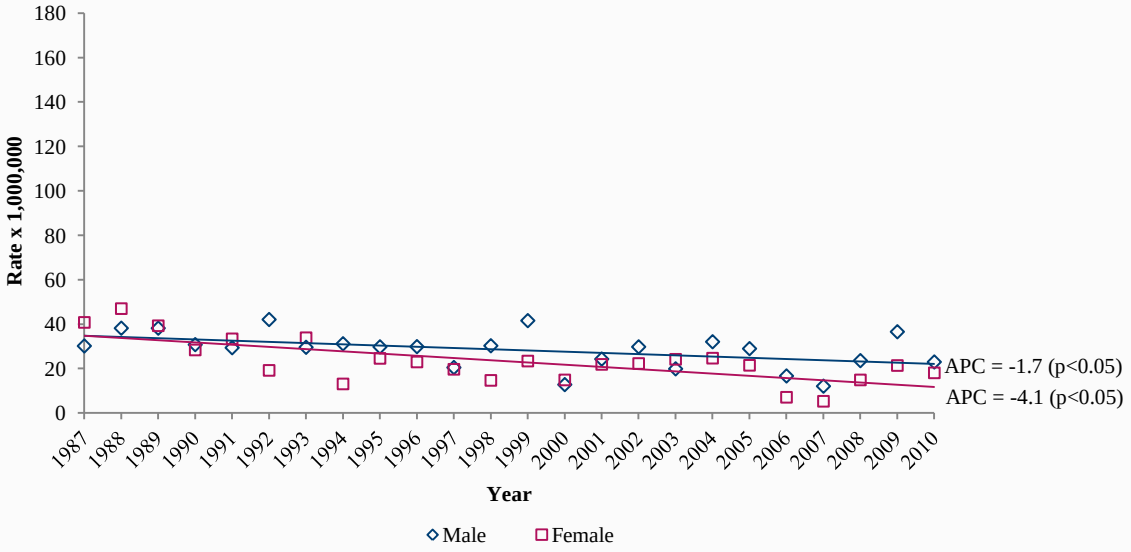


FIGURE 79: CHILDHOOD INCIDENCE RATES OF ALL CANCER SITES BY AGE GROUP, PUERTO RICO 2006-2010

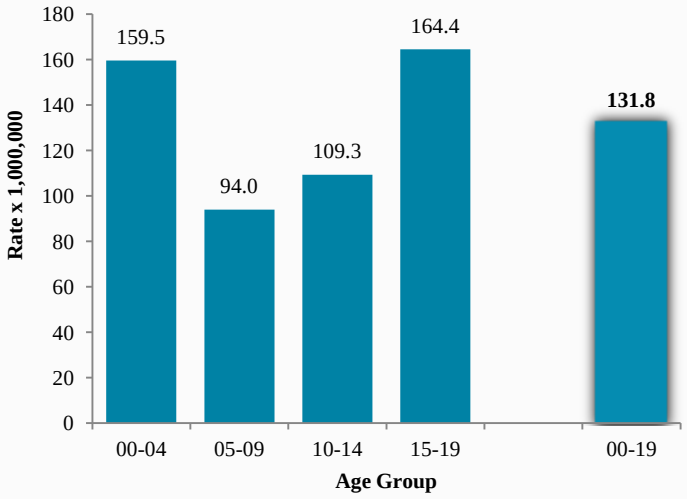
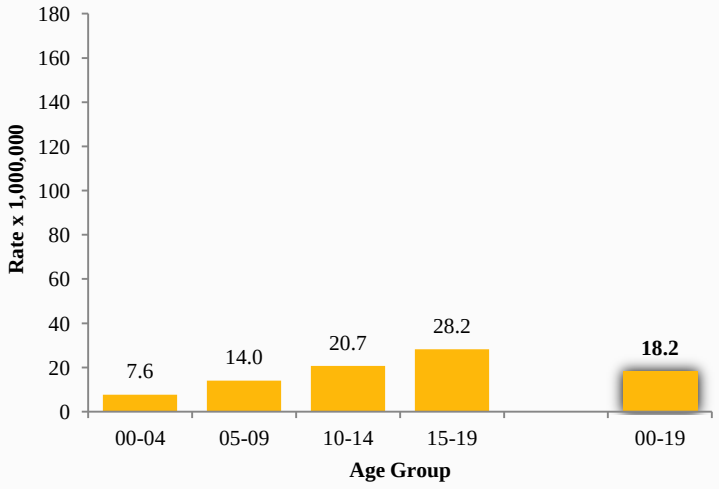


FIGURE 80: CHILDHOOD MORTALITY RATES OF ALL CANCER SITES BY AGE GROUP, PUERTO RICO 2006-2010



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1. Colón-López V, Ortiz AP, Soto-Salgado M, Torres-Cintrón M, Pettaway CA, Puras-Báez A, Martínez-Ferrer M, Suárez E. **Penile cancer disparities in Puerto Rican men as compared to the United States population**. *Int Braz J Urol*, 2012, Nov-Dec, 38(6): 728-738. [PubMed]
2. González L, Magno P, Ortiz AP, Ortiz-Ortiz K, Hess K, Nogueras-González GM, Suárez E. **Esophageal cancer incidence rates by histological type and overall: Puerto Rico versus the United States Surveillance, Epidemiology, and End Results population, 1992-2005.** *Cancer Epidemiol*, 2013, 37(1): 5-10. [PubMed]
3. Ho GY, Figueroa-Vallés NR, De La Torre-Feliciano T, Tucker KL, Tortolero-Luna G, Rivera WT, Jiménez-Velázquez IZ, Ortiz-Martínez AP, Rohan TE. **Cancer Disparities Between Mainland and Island Puerto Ricans**. *Rev Panam Salud Publica*. 2009 May; 25(5):394-400. [PubMed]
4. Morse D, Psoter W, De la Torre Feliciano T, Cruz G, Figueroa N. **Detection of Very Early Oral Cancers in Puerto Rico**. *Am J Public Health*. 2008 Jul; 98(7):1200-2. [PubMed]
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6. Murray G, Jiménez L, Báez F, Colón-Castillo LE, Brau RH. **Descriptive Profile of Surgically-Confirmed Adult Central Nervous System Tumors in Puerto Rico.** *PR Health Sci J*. 2009 Dec; 28(4):317-28. [PubMed]
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8. Ortiz AP, Otero Y, Svensson K, García-Rodríguez O, Garced S, Santiago E, Umpierre S, Figueroa N, Ortiz-Ortiz KJ. **Racial and Ethnic Disparities in Lifetime Risk of Corpus Uterine Cancer: A Comparative Study of Puerto Rico and the United States SEER Population**. *Ethn Dis.* 2012 Winter; 22(1): 90-5. [PubMed]
9. Ortiz AP, Perez J, Escalera F, Garced S, Garcia O, Gaud S, Otero Y, Santiago E, Ortiz K., Torres M, et al. **Endometrial Cancer in Puerto Rico: Incidence, Mortality and Survival (1992-2003).** *BMC Cancer.* 2010 Feb 3; 10:31. [PubMed]
10. Ortiz AP, Soto-Salgado M, Calo W, Nogueras G, Tortolero-Luna G, Hebl S, Figueroa-Vallés N, Suárez E**. Disparities in Breast Cancer in Puerto Rico and Among Hispanics, Non-Hispanic Whites and Non-Hispanics Blacks in the United States, 1992-2002**. *Breast J.* 2010 Nov-Dec; 16(6): 666-8. [PubMed]
11. Ortiz AP, Soto-Salgado M, Calo WA, Tortolero-Luna G, Pérez CM, Romero CJ, Pérez J, Figueroa-Vallés N, Suárez E. **Incidence and Mortality Rates of Selected Infection Related**

Cancers in Puerto Rico and the United States. *Infect Agent Cancer*. 2010 May 14;5: 10. [PubMed]

12. Ortiz-Ortiz KJ, Pérez-Irizarry J, Marín-Centeno H, Ortiz AP, Torres-Berríos N, Torres-Cintrón M, De la Torre-Feliciano T, Laborde-Rivera J, Calo WA, Figueroa-Vallés, NR. **Productivity Loss in Puerto Rico's Labor Market due to Cancer Mortality**. *PR Health Sci J*. 2010; 3:241-249. [PubMed]

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21. Soto-Salgado M, Suárez E, Calo W, Cruz-Correa M, Figueroa-Vallés N, Ortiz AP. **Incidence and Mortality Rates for Colorectal Cancer in Puerto Rico and among Hispanics, Non-Hispanic Whites and Non-Hispanics Blacks in the United States, 1998-2002**. *Cancer*. 2009; 115:3016-23. [PubMed]

22. Soto-Salgado M, Suarez E, Torres-Cintron M, Pettaway C, Colon V, Ortiz AP. **Prostate Cancer Incidence and Mortality among Puerto Ricans: An Updated Analysis Comparing Men in Puerto Rico with US Racial/Ethnic Groups**. *PR Health Sci J*, 2012, 3:107-113. [PubMed]

23. Torres-Cintrón M, Ortiz AP, Ortiz-Ortiz KJ, Figueroa-Vallés NR, Pérez-Irizarry J, Díaz-Medina G, De la Torre-Feliciano T, Suárez-Pérez E. **Using a Socioeconomic Position Index to Assess Disparities in Cancer Incidence and Mortality, Puerto Rico, 1995-2004.** *Prev Chronic Dis.* 2012; 9:E15. [PubMed]

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Other Information

Law No. 113 of July 30, 2010 (Law of the Puerto Rico Central Cancer Registry)

As of July 2008, the PRCCR administration was transferred to the Comprehensive Cancer Center of the University of Puerto Rico, Medical Sciences Campus. To improve cancer reporting timeliness and completeness, the Puerto Rico Legislature passed Law No. 113 of July 30, 2010 (Law of the Puerto Rico Central Cancer Registry), derogating Law No. 28 of 1951. The new law enforces cancer reporting to the PRCCR and facilitates obtaining accurate and complete information from the reporting facilities. This development is a huge step for the PRCCR toward achieving Gold Certification from the North American Association of Central Cancer Registries (NAACCR). For more information visit the following site:
http://www.lexjuris.com/lexlex/Leyes2010/lexl2010113.htm

Link to PRCCR Web Page

http://www.salud.gov.pr/RCancer/Pages/default.aspx

Requests for cancer data are welcome and should be sent to peticiones@rcpr.org.

Interest in potential research collaborations must be sent to nprios@rcpr.org .

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