Guam State Epidemiological Profile

2016 Update

Dr. Annette M. David, on behalf of the Guam State Epidemiological Outcomes Workgroup (SEOW)

ACKNOWLEDGEMENTS

This profile resulted from the collaborative efforts of the various agencies and institutions that comprise the Guam State Epidemiological Outcomes Workgroup (SEOW). The data contained in this profile were contributed by the members of the SEOW from primary sources within each institution. Dr. Annette M. David, SEOW Lead, oversaw the data analysis and was the primary author for this report. Ms. Tasha Tydingco from Guam Behavioral Health and Wellness Center (GBHWC) oversaw data collection, data entry and data management, and provided support for the SEOW. The GBHWC Prevention Education and Community Empowerment (PEACE) staff, under the supervision of Prevention and Training Branch Supervisor Ms. Linda Flynn provided administrative support.

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KEY FINDINGS

Substance Abuse

Tobacco

- Tobacco consumption remains higher in Guam than in the US, for both adults and youth. Males smoke more than females; adult female smoking in Guam is similar to male smoking in the US.
- Tobacco use displays marked disparities across socio-economic gradients; the poor and less educated tend to smoke more. Conversely the rich and well educated are more likely to have never smoked.
- Tobacco-related diseases are the major cause of death in Guam today.
- Smokeless tobacco use among adults is nearly double the US rate, and smokeless tobacco use is rising among Guam youth. Micronesians have the highest rates of smokeless tobacco consumption.
- Electronic cigarette use, or "vaping" is high among our youth: One in three (32.2%) of high school students and nearly one in four (23.1%) of middle school students reported current use.
- Tobacco control policies are closely associated with reductions in youth smoking prevalence.

Alcohol

- Current alcohol use is lower in Guam than in the US, but unsafe alcohol use (binge drinking and heavy drinking) among Guam adults surpasses the US rate.
- Current and binge drinking among Guam youth were increasing until alcohol taxes were increased in 2003. A further reduction was noted in 2011, following passage of the law that raised the minimum legal drinking age.
- Alcohol-related arrests comprised 19% of all arrests cleared in 2016. Alcohol was a factor in 17% of all traffic-related deaths in 2016.

Illicit Drugs

- About 12% of adults are current users of marijuana. Current and lifetime marijuana use among Guam students are higher than the US median.
- In 2016, 5.7% of adults reported illicit drug use other than marijuana. About 5% of adults reported taking prescription drugs that were not prescribed for them.
- About 4.5% of Guam high school students report having tried methamphetamines. About 11% reported taking a prescription drug without a doctor's prescription.
- In 2015, about 37% of high school youth reported they had been offered, sold or given an illicit drug on school property.

Suicide

- The age-adjusted 2016 suicide rate in Guam is 36.6 per 100,000, which is markedly higher than the US rate.
- Suicide deaths in Guam occurred predominantly among younger people. From 2008 to 2016, about 56% of all suicides occurred in those under 30 years of age.
- Chuukese and Japanese have the highest ethnicity-specific suicide rate.
- Most suicides in Guam occurred at home; hanging is the predominant method.
- Guam youth have an elevated likelihood of suicidal ideation and attempts than their US counterparts.

- Alcohol use, mental illness and exposure to violence have been linked to suicide deaths.

Mental Illness

- Almost 14% of Guam adults reported a debilitating mental condition or emotional problem in 2016, but only 6% reported receiving treatment for their condition.
- Symptoms of mental illness were more prevalent among Micronesians, those with lower income and lesser education.
- Persistent sadness among Guam high school students is significantly higher than the US median.

INTRODUCTION

Effective prevention requires a foundation of good data.

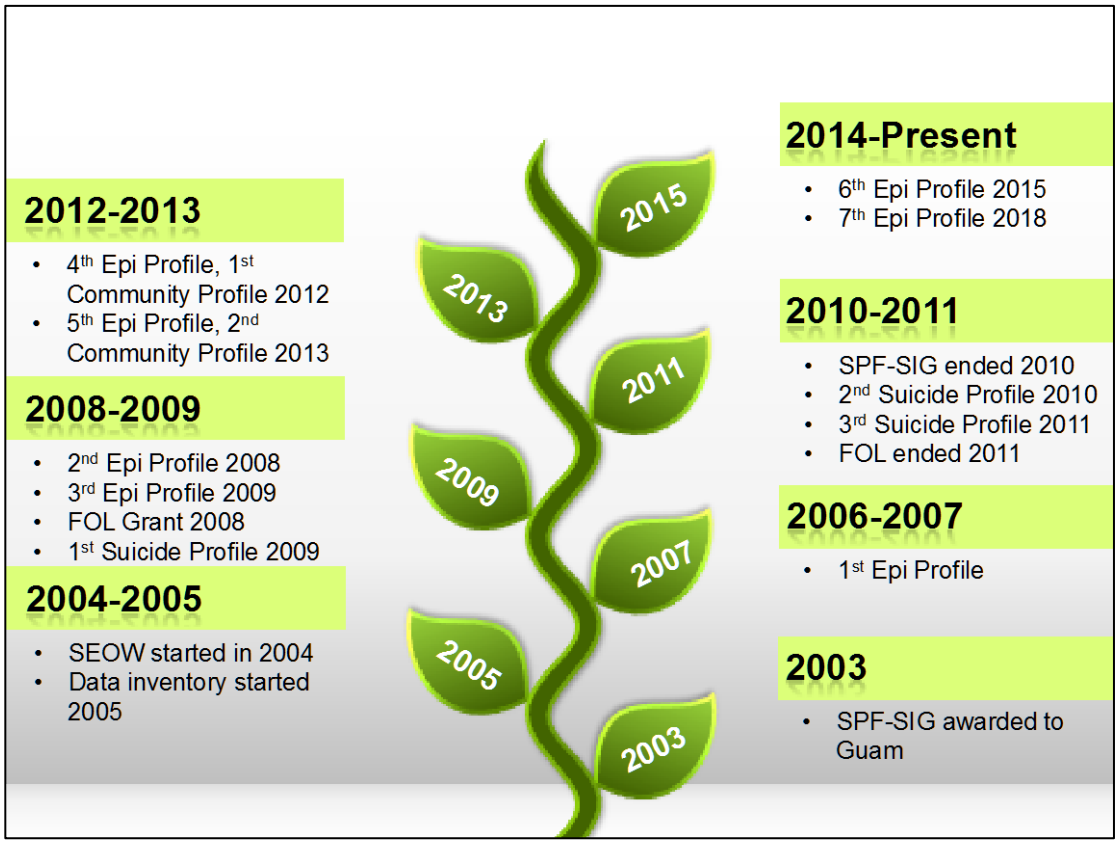
In 2003, Guam was awarded a Strategic Prevention Framework-State Incentive Grant (SPF-SIG) for substance abuse prevention and control by the Substance Abuse and Mental Health Services Administration's (SAMHSA) Center for Substance Abuse Prevention (CSAP). Utilizing the principles of outcomes-based prevention, the grant specified the creation of a State Epidemiological Outcomes Workgroup (SEOW), which would oversee the strategic use of data to inform and guide substance abuse prevention policy and program development on Guam. Guam's SEOW was subsequently established in 2004. Throughout 2005, the SEOW undertook a data inventory, and collated and reviewed data on substance abuse consumption patterns and consequences. The first Guam State Epidemiological Profile (Epi Profile) on substance abuse and consequences was published during the 3rd quarter of 2007. Subsequent updates to the profile were published in 2008 and 2009. The SPF-SIG formally ended in 2010.

In 2008, the Guam Behavioral Health and Wellness Center (GBHWC, formerly known as the Department of Mental Health and Substance Abuse or DMHSA) successfully applied for a SAMHSA GLS youth suicide prevention grant. The three-year grant, entitled *Focus on Life,* ran from September 2008 to September 2011. One of the grant's objectives was to strengthen and enhance suicide data collection, surveillance and analysis. This was assigned to the SEOW, which released Guam's first Suicide Profile in January 2009. Two updates were published in April 2010 and September 2011. The suicide prevention grant ended on September 2011. In late 2010, Synectics, a SAMHSA contractor, awarded a sub-grant to Guam to sustain the SEOW through 2014. The 4th Epi Profile and 1st Community Profile were published in 2012 followed by the 5th Epi Profile and 2nd Community Profile in 2013. Subsequently, the Partnerships for Success grant provided funding that permits the SEOW's work to continue to the present time (Figure 1).

The Guam SEOW is the longest-running data work group in Guam. It is considered the definitive authority on substance abuse epidemiology on the island. Its data products are readily acknowledged as comprehensive community resources, and its work has consistently influenced substance abuse policy and program development, prevention resource allocation, services delivery and decision-making at the State government level as well as within individual agencies, institutions, and community organizations.

This Profile represents the work done by the various SEOW members in conjunction with the Governor's PEACE Council and the GBHWC Prevention and Training staff. It documents an ongoing process of data collation and surveillance, with an expanded scope that includes not just data on tobacco, alcohol and other drugs of abuse but also suicide and mental health. Through this publication and its continuing work, the SEOW will continue to provide the local evidence base for effective substance abuse prevention and mental health promotion in Guam.

Figure 1. Growth of Guam's Prevention Data Products from SEOW



BACKGROUND

Geographic, Political, and Economic Context

Guam, "where America's day begins," is one of seventeen Non-Self-Governing Territories listed by the Special Committee on Decolonization of the United Nations. Located in the western North Pacific Ocean, it houses one of the most strategically important US military installations in the Pacific. Guam also serves as a critical crossroads and distribution center within Micronesia and the rest of the Pacific, as well as Asia, because of its air links (Figure 2). This plays a significant part in the movement of tobacco, alcohol and illicit drugs into the island.

The island has a land area of 549 sq. km., roughly three times the size of Washington, DC. The terrain is of volcanic origin, surrounded by coral reefs. The climate is tropical marine, with little seasonal temperature variation. There are frequent squalls during the rainy season and, occasionally, potentially very destructive typhoons from June to December.

Guam is an organized, unincorporated territory of the US with policy relations under the jurisdiction of the Office of Insular Affairs, US Department of the Interior. The island's Governor and Lieutenant Governor are elected on the same ticket by popular vote, and serve a term of four years. The legislative branch is served by a unicameral Legislature with 15 seats; the members are elected by popular vote to serve two-year terms. Currently, the Democratic Party holds 9 seats while the Republican Party holds 6. Guam also elects one nonvoting delegate to the US House of Representatives to serve a two-year term.The current representative, Congresswoman Madeleine Bordallo, belongs to the Democratic Party. The judicial branch was recently revamped to create the Unified Judiciary of Guam, consistent with the Organic Act. Guam has the District Court of Guam (federal) and the Supreme Court of Guam and the Superior Court of Guam (local).

Key Indicators

Population (2016 est.):
162,742

Ethnic groups:
Chamorro – 37%
Filipino – 26%
Chuukese – 7%
Caucasian – 7%

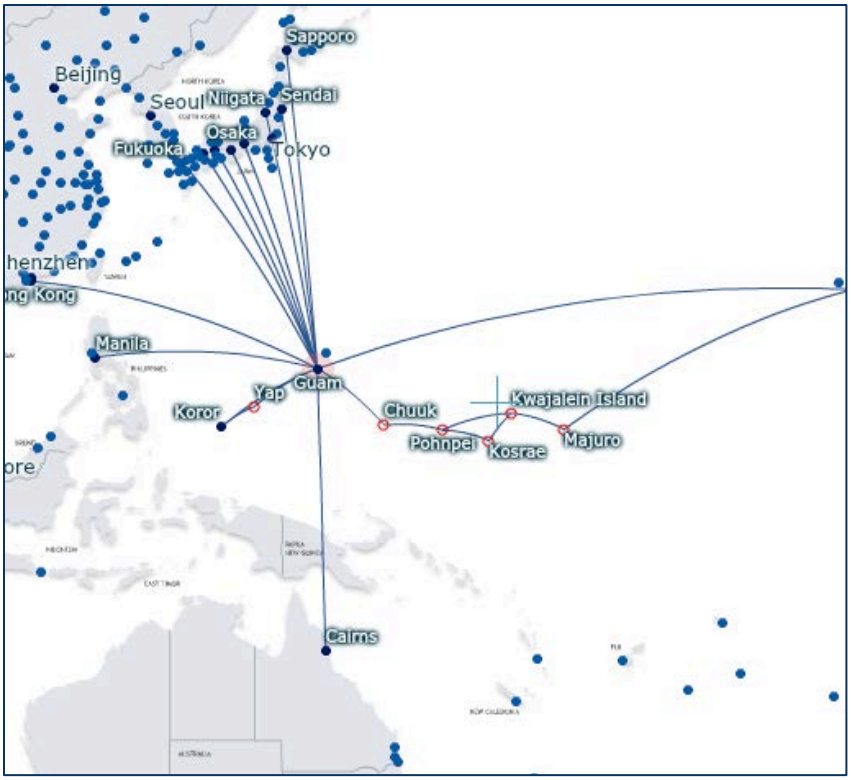
Age structure:
42% under 25 years
Median age:
29 years

Birth rate:
21 births/1000
Death rate:
6/1,000 (2014 est.)
Life expectancy (2016):
Male: 76.1 years
Female: 82.4 years

Unemployment rate:
5.4% (Sept 2016)
Population below poverty:
23% (2001)
GDP per capita:
$31,961 (2016 est.)
Household mean income:
$49,263 (2010)

Mobile phones in use:
181,000 (2016 est.)
Internet users: 125,328 - 77% of population (2016 est.)

Figure 2. Regional map showing Guam's air routes to key countries



Source: http://travelisfree.com/2013/03/09/the-pacific-hopper-with-miles/, last accessed 07 March 2018

Guam's economy relies heavily upon military spending and tourism. In 2016, 34% of the Gross Domestic Product (GDP) derived from US federal spending (defense and non-defense) in the amount of $1.988 billion. Service exports, mainly spending by foreign tourists while on Guam, amounted to $1.042 billion in 2016, and comprised 18% of GDP. In 2016, the island's economy grew by 1.6%. National defense spending cushions the island's economy against fluctuations in tourism. Federal grants amounted to $364.8 million as of Sept 2016, or 29% of Guam's total revenues for the fiscal year.

Tourism is a major industry. There were over 1.5 million tourist arrivals in 2016, a 9.0% increase from the previous year. Japan remains Guam's major tourist market, accounting for 49% of visitors (down from over 55% of tourist arrivals in 2015). Korea accounts for 36% of the market (up from 30% in 2015) (Table 1). Because much of the economy depends on tourism, the policy and program environment, especially in relation to tobacco and alcohol, is influenced by perceptions of acceptability by the tourist market.

Table 1. Visitor arrivals by country of residence, Guam, 2009-2016

Country	2016	2015	2014	2013	2012	2012	2010	2009
Total	1,517,432	1,400,397	1,330,721	1,328,761	1,298,641	1,150,201	1,187,831	1,044,491
Japan	745,680	773,019	808,856	893,118	929,229	824,005	893,716	825,129
United States	77,706	70,246	68,763	58,582	62,618	61,348	61,381	55,525
CNMI/Micronesia	34,710	29,046	27,943	29,810	31,357	33,184	35,521	31,927
Taiwan	42,229	41,905	49,136	48,653	49,144	45,086	31,320	22,088
Philippines	21,652	12,427	12,079	10,920	10,483	10,097	12,358	11,581
Korea	544,964	427,900	308,037	245,655	182,829	149,076	134,692	82,978
Hong Kong	9,377	8,406	8,180	8,857	8,609	8,903	6,890	2,872
Other	41,114	37,447	47,727	33,166	24,372	18,502	14,953	12,391

Source: Guam Visitors Bureau data as reported in Guam Statistical Yearbook 2016
Note: This includes military and civilian air arrivals.
CNMI/Micronesia = Commonwealth of the Northern Mariana Islands/Micronesia

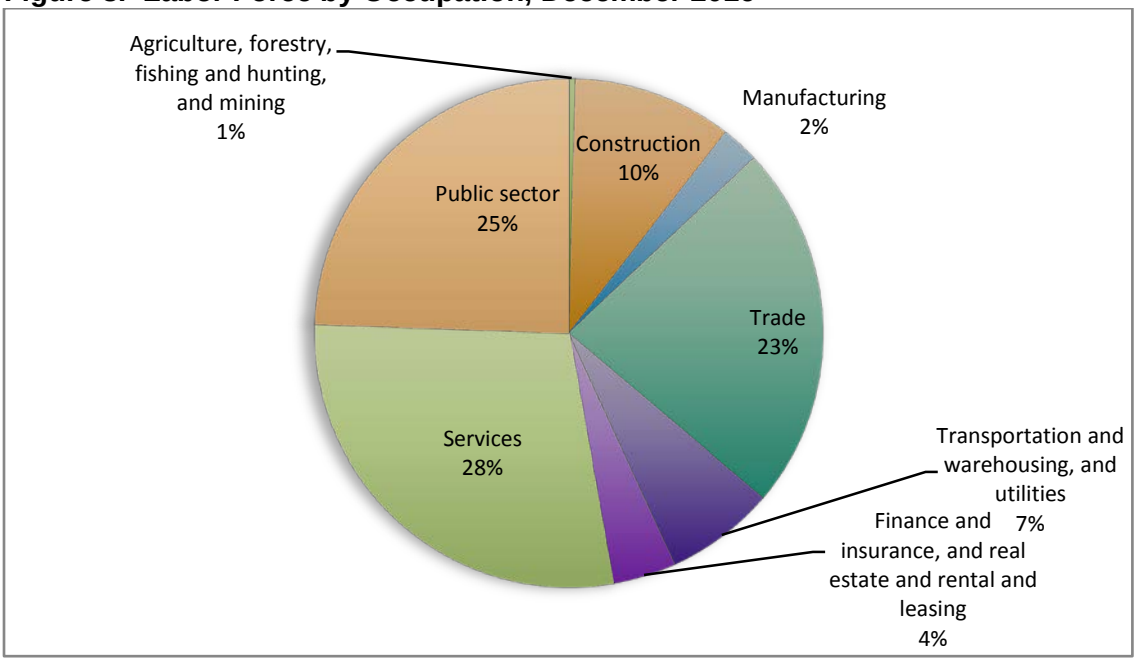
As of September 2016, there were 71,960 people in the civilian labor force, of whom 68,050 were employed. About 5% were unemployed in 2016 and 2015, as compared to 8% in 2014 (Table 2). Figure 3 shows the different sectors of employment and distribution of the labor force as of December 2016. Majority of the labor force are employed in services (28%), the public sector (25%) and trade (23%).

Table 2. Employment status, population 16 years and older, Guam, 2012-2016

EMPLOYMENT STATUS	2016	2015	2014	2013	2012
Total population 16+:	**122,170**	**121,600**	**121,580**	**121,570**	**121,340**
In labor force:	71,960	73,120	74,870	70,490	72,560
Employed:	68.050	69,660	69,110	64,550	64,770
Unemployed	3,910	3,550	5,760	5,940	7,800
Not in labor force:	50,210	48,390	46,710	51,080	48,780

Source: Bureau of Labor Statistics, Department of Labor as reported in the Guam Statistical Yearbook 2016

Figure 3. Labor Force by Occupation, December 2016



Source: Bureau of Labor Statistics, Department of Labor as reported in the Guam Statistical Yearbook 2016

In 2010, the year for which the latest data are available, there were 44,664 households on Guam. Median household income increased from 2008 to 2010 (Table 3). In 2010, 19.9% of Guam's households lived on $14,999 or less per year. This is unchanged from 2008, when nearly 20% of households made $14,999 or less per year. The poorest of the poor comprised 7% of all households on Guam, and lived on less than $3000 per year. In contrast, 11.6% of households made more than $100,000 per year.

Table 3. Household income, Guam, 2005-2010

Characteristic	2010	Percent	2008	Percent	2005	Percent
Households	44,664		46,246		40,298	
No Income	2,512	5.6	2,622	5.7	1,089	2.7
Less than $3,000	619	1.4	760	1.6	537	1.3
$3,000 to $4,999	728	1.6	874	1.9	459	1.1
$5,000 to $6,999	655	1.5	760	1.6	344	0.9
$7,000 to $8,999	692	1.5	798	1.7	573	1.4
$9,000 to $10,999	1,347	3.0	1,178	2.5	1,261	3.1
$11,000 to $12,999	1,128	2.5	1,064	2.3	917	2.3
$13,000 to $14,999	1,238	2.8	1,330	2.9	1,261	3.1
$15,000 to $19,999	3,130	7.0	3,420	7.4	2,350	5.8
$20,000 to $29,999	5,242	11.7	6,346	13.7	5,274	13.1
$30,000 to $39,999	5,569	12.5	5,130	11.1	5,331	13.2
$40,000 to $49,999	4,040	9.0	5,054	10.9	4,471	11.1
$50,000 to $59,999	3,567	8.0	3,914	8.5	3,497	8.7
$60,000 to $69,999	3,058	6.8	3,078	6.7	3,038	7.5
$70,000 to $79,999	1,966	4.4	2,280	4.9	2,178	5.4
$80,000 to $89,999	2,439	5.5	1,748	3.8	1,834	4.6
$90,000 to $99,999	1,565	3.5	1,102	2.4	1,720	4.3
$100,000 or more	5,169	11.6	4,788	10.4	4,127	10.2
Median Household Income	$39,052	…	$37,741	…	$40,373	…
Mean Household Income	$49,263	…	$45,786	…	$47,062	…
Average Household size	3.8	…	3.5	…	3.9	…
Average Earners per Household	1.7	…	1.5	…	2.2	…
Per Capita Income	$12,864	…	$13,089	…	$12,768	…

Source: Guam Department of Labor as reported by the Bureau of Statistics and Plans, Guam Statistical Yearbook 2016

The economy of the island is dependent upon and influenced by the telecommunications infrastructure. Guam is a transpacific communications hub for major carriers linking the US and Asia. The island's telephone network is integrated with US facilities for direct dialing, including free use of 800 numbers. This enables Guam to tap into US-based phone networks for its cessation quit line and suicide help line.

There are 125,328 estimated Internet users in Guam, or roughly 77% of the population with Internet access. The 2016 estimate for fixed line (land line) telephone subscriptions was 68,000, for a rate of 42 subscriptions per 100 inhabitants. In contrast, mobile or cellular subscriptions numbered about 181,000, for a rate of 113 subscriptions per 100 inhabitants. This implies that phone-based surveillance should include mobile telephones, and the use of mobile technology for prevention messaging would likely yield the greatest reach within the population.

Population Demographics

The latest data from the 2010 Guam census indicates that as of April 1, 2010, Guam's population totaled 159,358, representing an increase of 2.9% from the 2000 Census counts. The actual population count was 12% lower than the projected 2010 population based on the 2000 census. Thus, rates calculated using the projected population counts based on the earlier 2000 census likely resulted in underestimates.

Table 4. Population estimate: 2000 to 2010

Year	Population	Year	Population
2000	154,805		
2001	156,337	2006	158,711
2002	157,061	2007	158,967
2003	157,579	2008	159,169
2004	158,024	2009	159,323
2005	158,398	2010	159,358

Sources: 2000 and 2010 Guam Census, as reported by the Bureau of Statistics and Plans, Guam Statistical Yearbook 2013

Table 5. Population projection: 2010 to 2020

Year	Population	Year	Population
2010	159,358		
2011	159,600	2016	162,742
2012	159,914	2017	163,875
2013	160,378	2018	165,177
2014	161,001	2019	166,658
2015	161,785	2020	168,322

Source: 2010 Census of Guam as reported by the Bureau of Statistics and Plans, Guam Statistical Yearbook 2016
NOTE: Uses 2000 and 2010 population growth rate

Males slightly outnumber females, comprising 51% of the total population. Nearly 40% of the population is under the age of 21 years (Table 6 and Figure 4).

Guam's population is multi-ethnic/multi-racial. Chamorros remain the largest ethnic group, making up 37% of the island's population, and representing a 3.6% increase since 2000. Filipinos are the second largest group, comprising 26% of the total. The Yapese and Chuukese had the fastest rate of growth---the Yapese population grew by 84.1%, from 686 in 2000 to 1,263 in 2010, while the number of Chuukese grew by 80.3%, from 6,229 in 2000 to 11,230 in 2010. Majority of Guam residents identify themselves as being of one ethnic origin or race, representing an increase of 8.4% since 2000. Just 14,929 acknowledge 2 or more ethnic or racial origins, a decrease of 30.7% since 2000 (Table 7).

Table 6. Demographic composition of Guam population, sex by age, 2010

Age category	TOTAL	MALE	FEMALE
	159,358	81,568	77,790
Under 5 years	14,289	7,345	6,944
5 to 9 years	13,984	7,200	6,784
10 to 14 years	15,046	7,777	7,269
15 to 19 years	14,407	7,473	6,934
20 to 24 years	12,379	6,678	5,701
25 to 29 years	10,746	5,431	5,315
30 to 34 years	10,346	5,151	5,195
35 to 39 years	11,404	5,753	5,651
40 to 44 years	11,659	6,161	5,498
45 to 49 years	11,072	5,821	5,251
50 to 54 years	9,203	4,758	4,445
55 to 59 years	7,715	3,828	3,887
60 to 64 years	6,361	3,181	3,180
65 to 69 years	3,889	1,934	1,955
70 to 74 years	3,030	1,411	1,619
75 to 79 years	1,984	838	1,146
80 to 84 years	1,151	525	626

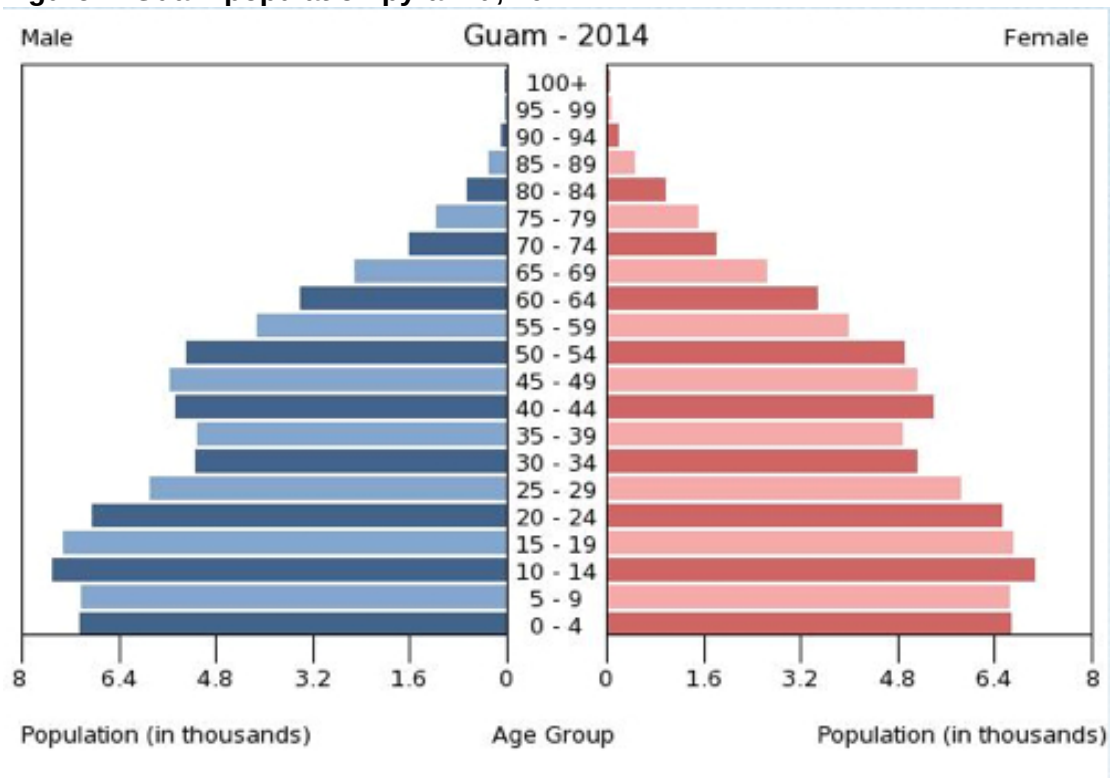
Source: 2010 Census for Guam as reported by the Bureau of Statistics and Plans, Guam Statistical Yearbook 2016

Table 7. Ethnic composition of Guam population, 2010 and 2000

ETHNICITY	2010	2000*
One Ethnic Origin or Race:	144,429	133,252
Native Hawaiian and Other Pacific Islander:	78,582	69,039
Carolinian	242	123
Chamorro	59,381	57,297
Chuukese	11,230	6,229
Kosraean	425	292
Marshallese	315	257
Palauan	2,563	2,141
Pohnpeian	2,248	1,366
Yapese	1,263	686
Other Native Hawaiian and Other Pacific Islander	915	648
Asian:	51,381	50,329
Chinese (except Taiwanese)	2,368	2,707
Filipino	41,944	40,729
Japanese	2,368	2,086
Korean	3,437	3,816
Taiwanese	249	991
Vietnamese	337	10,509
Other Asian	678	1,568
Black or African American	1,540	1,807
Hispanic or Latino	1,201	69,039
White	11,321	123
Other Ethnic Origin or Race	404	57,297
Two or More Ethnic Origins or Races	14,929	21,553
Native Hawaiian and Other Pacific Islander and other groups	11,656	
Chamorro and other groups	9,717	7,946
Asian and other groups	8,574	10,853
Total:	159,358	154,805

Source: US Census Bureau, 2010 Census for Guam, Bureau of Statistics and Plans, Guam Statistical Yearbook 2016;
*US Census Bureau, 2000 Census for Guam, Bureau of Statistics and Plans, 2005 Guam Statistical Yearbook

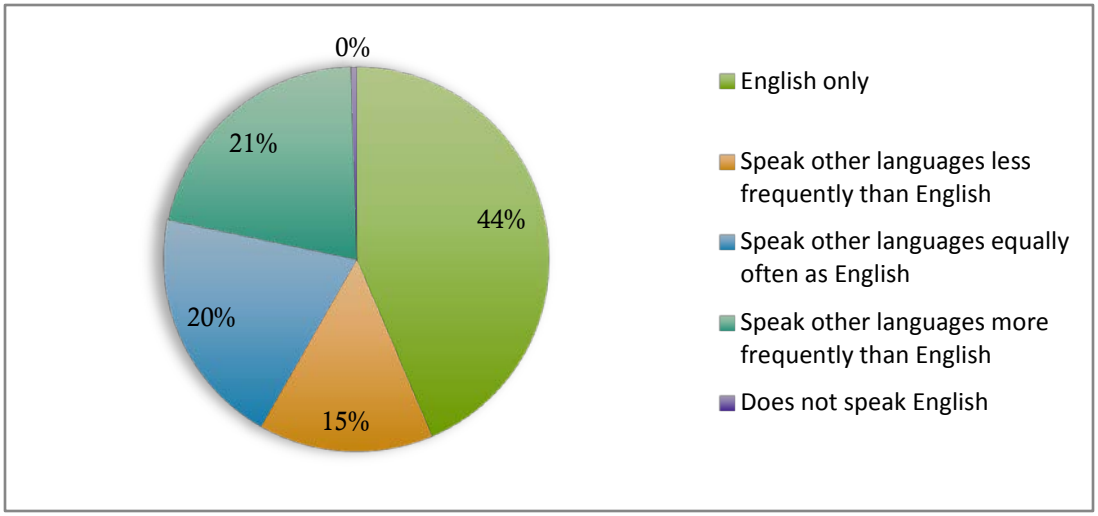
Figure 4. Guam population pyramid, 2014



Source: Central Intelligence Agency, The World Factbook, available at https://www.cia.gov/library/publications/the-world-factbook/geos/gq.html

The ethnic diversity is reflected in the languages spoken at home. Twenty percent of the population (over 5 years) speaks a language as frequently as English at home, another 21% speak a language more frequently than English, and 0.5% speaks no English at all. This has a significant implication for effective service delivery, highlighting the need for culturally competent communications and services for close to half of the island's population (Figure 5).

Figure 5. Population by language spoken at home, Guam, 2010



Source: 2010 Census for Guam as reported by the Bureau of Statistics and Plans, 2016
Note: These data were not reported in the 2013 Statistical Yearbook.

Impact of the military on population demographics

The US Military continues to play a significant role in Guam, and although substantial delays have impeded the Marine Corps relocation from Okinawa, Japan to Guam, preparatory work for the planned military build-up continues. As of 2016, military and family members comprised 7.9% of Guam's total population, down from 8.2% in the previous year (Table 8).

Table 8. Military active duty and family members on Guam, 2012 - 2016

Military and Family Members	2016	2015	2014	2013	2012
Active duty	5,572	6,115	6,006	5,819	5,315
Family members	7,235	7,211	6,648	7,252	5,389
Total Military and dependents	12,807	13,326	12,654	13,071	10,696
Resident population of Guam	162,472	161,785	161,001	160,378	159,914
% Military and dependents	7.9%	8.2%	7.9%	8.2%	6.7%

Source: COMNAVMAR, as reported by Bureau of Statistics and Plans, Guam Statistical Yearbook 2016

Data on school enrollment in the various categories of schools, including the Department of Defense (DoDEA) schools is available up to school year 2016-2017 (Table 9). Students enrolled in military schools made up 6% of total enrollment for school year 2016-2017, while students in Catholic and other private schools comprised 18%. These students are excluded from the Guam Youth Risk Behavior Surveillance (GYTS) System, which is the primary data source for tobacco, alcohol and drug use and other risky behavior among Guam youth.

Table 9. Fall term enrollment in Guam schools, Guam SY 2011-2012 to SY 2016-2017

School	2016-2017	2015-2016	2014-2015	2013-2014	2012-2013	2011-2012
Total School Enrollment	39,696	39,523	39,836	39,771	40,359	40,301
Private schools	7,188	7,048	7,077	6,581	6,948	7,029
DoDEA	2,264	2,168	2,139	2,235	2,238	2,439
Guam public school system	30,244	30,307	30,620	30,955	31,173	30,833

Source: Catholic Education Office; Department of Defense Education Activity (DoDEA); other Private Schools and Guam Department of Education, Government of Guam, as reported by the Bureau of Statistics and Plans, Guam Statistical Yearbook 2016

The Youth Risk Behavior Survey (YRBS), which is the primary data source for tobacco, alcohol and drug use and other risky behavior among Guam youth, covers 3 out of 4 students in Guam. The Guam Global Youth Tobacco Survey (GYTS) provides additional data for tobacco-related questions.

Prevention system context

The GBHWC is Guam's single state agency responsible for mental health promotion and service provision and substance abuse prevention and control. Its mandate is firmly established through Guam Public Law 17-21. GBHWC's Prevention and Training (P&T) Branch, under the umbrella of the Division of Clinical Services, directly oversees the prevention arm of the Department's core functions. The branch had 8 full-time prevention specialists.

GBHWC provides leadership in obtaining state and federal funding to support comprehensive prevention services on Guam. GBHWC's P&T Branch provides direct community-based prevention services that incorporate CSAP's six primary prevention strategies – (1) information dissemination, (2) problem identification and referral, (3) education, (4) alternatives, (5) community-based process, and (6) environmental strategies. The P&T Branch monitors GBHWC's prevention systems and processes as part of an ongoing quality control assessment of the Department's prevention service delivery. In addition, the P&T Branch maintains the Center's prevention website (www.peaceguam.org), conducts information dissemination and mass media campaigns, manages the various prevention grants of the GBHWC and provides community-based and stakeholder training and technical assistance. Current resources for prevention programs include the Government of Guam "state" legislative appropriations and the SAMHSA Substance Abuse Prevention and Treatment Block Grant funds.

GBHWC works in collaboration with other partner agencies and community-based organizations to develop, implement and assess prevention policies and programs. The P&T Branch is currently supported by the Governor's Prevention Education and Community Empowerment (PEACE) Council - a multi-sectoral, state-level advisory group representative of the three branches of government and key prevention stakeholders from the private sector, including cultural, faith-based and non-governmental/community-based organizations. The Council's composition reflects the ethnic and cultural make-up of the Guam community and provides direction and guidance for prevention priorities and approaches. Guam's State Epidemiological Outcomes Workgroup (SEOW) serves as a technical working group that supports GBHWC with local data on substance abuse consumption and consequences, suicide epidemiology, and selected mental health indicators.

The P&T Branch employs a community-based participatory approach to strategic planning. The first PEACE Strategic Prevention Framework-State Incentive Grant (SPF/SIG), Guam Comprehensive Strategic Plan (2006-2009) focused on prevention of tobacco use and harmful alcohol use, reduction in underage drinking and substance abuse-related problems and enhancement of community capacity and infrastructure for prevention. The current State Prevention Enhancement (SPE) Plan 2014-2018 expands prevention goals to include:

- Preventing/reducing consequences of underage drinking and adult problem drinking;
- Preventing suicides and attempted suicides among populations at risk, including military families and LGBTQ youth;
- Reducing prescription drug misuse and abuse;
- Preventing substance abuse and mental illness (promote positive mental health);

- Enhancing policy and augmenting funding to support needed services for behavioral health system improvements on Guam; and
- Strengthening behavioral health workforce development initiatives.

DATA SOURCES AND METHODS

In 2005, Guam's SEOW members began by identifying a set of indicators specific to Guam that delineated alcohol, tobacco and other drug consumption patterns and the consequences related to the use of these substances. The criteria for selection of indicators included the following:

- Relevance
- Availability of data
- Validity of data
- Frequency/regularity of data collection
- Consistency in measurement
- If possible, existence of data disaggregated geographically, by age, sex and/or ethnicity/race

The SEOW also compiled a list of existing datasets from which to extract the data for the selected indicators. Indicators from well-established population-based surveillance systems---such as the Behavioral Risk Factor Surveillance System (BRFSS) and the Youth Risk Behavior Surveillance System (YRBS)---were given the greatest weight.

There are serious data gaps for Guam, and through the years, the SEOW has worked to address these gaps.

- **Adult illicit drug use:** Guam had no data on adult illicit drug use from a population-based survey prior to the SEOW. As a stopgap measure, in 2007 and 2008, GBHWC (formerly DMHSA) commissioned a population-based phone survey of drug use among youth and adults, but this could not be sustained because of the expense. In 2009, the SEOW facilitated a Memorandum of Understanding (MOU) between GBHWC and DPHSS to incorporate selected questions on illicit drug use in the BRFSS. This ongoing MOU (renewed annually since 2010) now provides population-based adult data on illicit drug consumption.
- **Betel/areca nut use with tobacco:** In 2016, adult data on betel/areca nut use, with and without tobacco, was collected from State-added questions in the BRFSS.
- **Guam ethnicity categories**: Earlier adult tobacco and alcohol data from the BRFSS could not be disaggregated using Guam-specific ethnic categories. The SEOW requested DPHSS to add island-specific ethnic categories as a State-added question in 2008.
- **Expanded youth data**:
  - **Out of school youth** - To expand the coverage of youth data, the SEOW also facilitated an agreement between GBHWC and the Department of Youth Affairs (DYA) and Sanctuary, Inc. (a private sector provider of youth drug rehabilitation services) to administer a subset of YRBS questions to all of their clients, representing court-involved youth outside of the school

system. Through this agreement, data on drug consumption is now available for out-of-school high-risk youth. However, no new data for this group were available for the current edition of the Epi Profile.
    - **Private school students** - The P&T Branch and SEOW are negotiating similar agreements with the private schools to administer the YRBS to their students.
    - **Additional tobacco-related youth data** - Data on smoking and smokeless tobacco use, cessation, secondhand smoke exposure, pro- and anti-tobacco media and advertising, access to and availability of tobacco products and knowledge and attitudes regarding tobacco use are collected through the Guam Global Youth Tobacco Survey (GYTS), which, to date, has been conducted in 2011, 2014 and 2016.
- **Suicide-related data** - The SEOW undertook a working agreement with the Office of Guam's Chief Medical Examiner to obtain suicide mortality data and with the Guam Memorial Hospital to access suicide-related hospital and Emergency Room admissions data.
- **Mental health indicators** – The SEOW has gradually expanded the scope of its data analysis and now includes information on depression, violence, sexual violence and bullying among youth, and depression among adults. It also includes some questions on risk and protective factors for tobacco, alcohol and substance abuse.
- **LGBTQ population** – In 2015, the SEOW incorporated data from the Guam's Alternative Lifestyle Association (GALA), a PEACE Partnerships for Success Partner, into the Profile. However, no new data is available from this population subgroup for the current edition of the Profile.

It is anticipated that over time more behavioral health indicators will be incorporated into the Epi Profile. Currently, selected indicators for the expanded Epi Profile include:

Table 10. SEOW selected indicators

ALCOHOL	Consumption	Consequences
Indicators	Lifetime use of alcohol by Middle School students Current use of alcohol by High School students Current use of alcohol by 18 and older Current binge drinking by High School students Current binge drinking by 18 and older Current heavy use of alcohol by 18 and older Current binge drinking by LGBTQ Current heavy use of alcohol by LGBTQ Early initiation of alcohol use Drinking and driving among High School students Consumption patterns among court-involved youth Use of alcohol on school property by High School students	Chronic liver disease death rate Suicide death rate Homicide deaths % Fatal motor vehicle crashes that are alcohol-related Violent crime rate Property crime rate Alcohol abuse or dependence Alcohol-related confinement % Alcohol-related participation in treatment programs

TOBACCO	Consumption	Consequences
Indicators	Current smoking by Middle School students Current smoking by High School students Current smoking by 18 and older Current smoking by LGBTQ Current smokeless tobacco use by Middle School students Current smokeless tobacco use by High School students Current smokeless tobacco use by adults Lifetime daily cigarette use by Middle School students Current daily cigarette use by High School students Current daily cigarette use, 18 and older Early initiation of tobacco use % vendors selling to minors Quit attempts in the past year Use of cigarettes and smokeless tobacco products on school property	Deaths from lung cancer Deaths from chronic obstructive pulmonary disease (COPD) and emphysema Deaths from cardiovascular and cerebrovascular diseases Tobacco-related cancer prevalence

DRUGS	Consumption	Consequences
Indicators	Lifetime use of marijuana by Middle School students Lifetime and current use of marijuana by High School students Early initiation of marijuana use Lifetime and current use of marijuana by adults Lifetime and current use of marijuana by LGBTQ Lifetime use of cocaine by Middle School students Lifetime and current use of cocaine by High School students Lifetime use of inhalants by Middle School students Lifetime use of inhalants by High School students Lifetime use of methamphetamines or “ice” by Middle School students Lifetime and current use of methamphetamines or “ice” by adults Lifetime and current use of other drugs by adults Lifetime and current use of other drugs by LGBTQ	Property crime rate Violent crime rate Drug abuse or dependence Drug-related arrests

	Lifetime use of steroids or other prescription drugs by High School students Illegal drug use on school property Other drug use patterns among court-involved youth % US Probation Office drug testing positive for any drug Drug seizures per year by type and amount of drug	

SUICIDE	Vital Statistics	Related Data
Indicators	Suicide mortality rate Demographic characteristics of suicide deaths % of suicide deaths involving alcohol use % of suicide deaths involving other drug use	Suicidal ideation among school youth Suicidal ideation among LGBTQ Suicidal attempts among school youth Suicidal attempts among LGBTQ % of school youth reporting persistent sadness % of school youth identifying themselves as bi- or homosexual

MENTAL HEALTH	Prevalence
Indicators	Prevalence of depressive symptoms among High School students Prevalence of depressive symptoms among adults % students threatened or injured by a weapon in school in the past 12 months % students in a physical fight in the past 12 months % students forced to have sexual intercourse, lifetime % students subjected to partner violence in the past 12 months % students bullied on school property in the past 12 months % students electronically bullied in the past 12 months % LGBTQ bullied for their sexual preference, lifetime

At present, Guam's SEOW tracks data on substance abuse consumption and consequences and suicide from the following data sources:

Table 11. Data sources

Data Source	Frequency	Agency	Data Type
Behavioral Risk Factor Surveillance System (BRFSS)	annual	DPHSS	Adult tobacco and alcohol use, illicit drug use, depression
Youth Risk Behavior Surveillance System (YRBS)	biannual	Guam Dept. of Education (GDOE)	Youth tobacco, alcohol and drug use; suicidal ideation and attempts; bullying, sexual violence, violence
Modified YRBS	annual	DYA	Youth tobacco, alcohol and illicit drug use
Synar annual tobacco vendors' compliance survey	annual	GBHWC	Vendor compliance to prohibition of tobacco sales to minors
Vital Statistics	annual	DPHSS	Leading Causes of Mortality
Guam Cancer Facts and Figure, Cancer Registry	2008-2012	DPHSS	Cancer prevalence and mortality
Guam Uniform Crime Report	annual	Guam Police Department	Alcohol and drug-related crime
US Probation Office Client Random Drug Testing Statistics	annual	Guam US Probation Office	Adult drug offenders random drug testing results
Suicide Mortality Report	quarterly	Chief Medical Examiner's Office	Suicide deaths and associated data
GALA, Inc. Assessment Report	2014	GALA, Inc.	Tobacco, alcohol and drug use among LGBTQ; suicidal ideation and attempts; physical violence

Organization and structure of the 2016 Guam Epi Profile

The Profile follows the format of previous Profiles and is divided into an introductory section with background information on the island, a section on data sources and methods, and separate sections on alcohol, tobacco, illicit drugs, and suicide. For 2016, an additional section on mental health indicators is included. Each section provides trends, comparisons with the US national average, and when data is available, among population sub-groups. Key highlights are summarized in problem statements that appear at the beginning of each chapter. A text description of the essential findings for every indicator is supplemented with tables and charts.

In general, summary statistics for Guam are compared with nationwide averages. Whenever possible, data is disaggregated by sex, age group, income, education and ethnicity/racial group. As much as possible, ethnicity categories are reflective of the various ethnic groups that make up the Guam population. For several indicators, the numbers of observations are small (e.g. suicide deaths, numbers of specific ethnic groups) and caution is required when interpreting changes across time or across groups; in these cases, a footnote alerting the reader is provided.

One question that is frequently asked is: "How can Guam's statistics be compared to the mainland when Guam's population is so much smaller than that of the United States?" For this reason, the statistics describing tobacco, alcohol and illicit drug consumption are in percentages, and data on suicide are in rates per 100,000 to allow comparisons across populations. That is, the consumption of these substances is reported as a fixed proportion of the total population. Thus, even if the absolute numbers of individuals reporting the use of these substances are much smaller than the US numbers, the magnitude of the problem in relation to the total population can be compared.

Because the projected audience of this report is a diverse one, we have purposely attempted to keep the language as simple as possible, and to avoid highly technical terms. When technical language is used, the definitions are provided as notes within the text.

Data Issues and Limitations

Youth Data

Data on youth smoking is largely provided through the Guam Department of Education (GDOE) Youth Risk Behavior Survey (YRBS), for which biennial information is available for the years 1995-2007, and 2011-2015.

Data from the YRBS for the years 1999, 2001, 2003 and 2005 were not reported in national databases because the data were not weighted. The withdrawal of several private schools from the survey, after sampling was already carried out, resulted in low overall response rates for 1999-2003. In 2005, a number of sites failed to comply with the sampling methodology. This profile uses the unweighted data from those years. Therefore, care must be taken when comparing the results from 1999 – 2005 with US national medians. In 2009, a shift in school policy regarding the procedure for parental consent resulted in a significantly lower turnout in respondents, leading the GDOE to invalidate the survey. Hence, no data are available for 2009.

An additional challenge is the change in coding categories for ethnicity/race over the different survey years. For this profile, categories were collapsed to: Filipino, Other

Asian, Chamorro, Micronesian Islanders, White and Others. However, only Chamorro, Filipino and Micronesian Islanders were retained consistently throughout the various survey years.

Adult Data

With regards to adult data, the US Centers for Disease Control and Prevention (CDC), which administers the BRFSS, introduced a new weighting methodology, replacing the "poststratification" method with "raking" or iterative proportional fitting in 2011. This more sophisticated method for weighting survey data makes adjustments for each variable individually in a series of data processing-intensive iterations. As each variable in the weighting process is included, the weights are adjusted until the sample weights are representative of the population (CDC 2012).

These changes resulted in an upward shift of prevalence trends for certain risk factors, such as smoking. To avoid misinterpretation of trend line shifts artificially resulting from improved methods of measuring risk factors, CDC recommends caution in interpreting 2011 prevalence data. The Guam SEOW concurs with this recommendation, and no longer uses pre-2011 BRFSS data for trend analysis. Instead, 2011 BRFSS data now serves as the baseline for forward trend analysis. Thus trends for adult data begin with 2011 data.

Small numbers

Some of the data categories, especially for ethnicity, have small numbers (n<50). Hence, caution is needed when interpreting year-to-year variations, and cross-category differences.

SUBSTANCE ABUSE

TOBACCO

Consumption: Adults

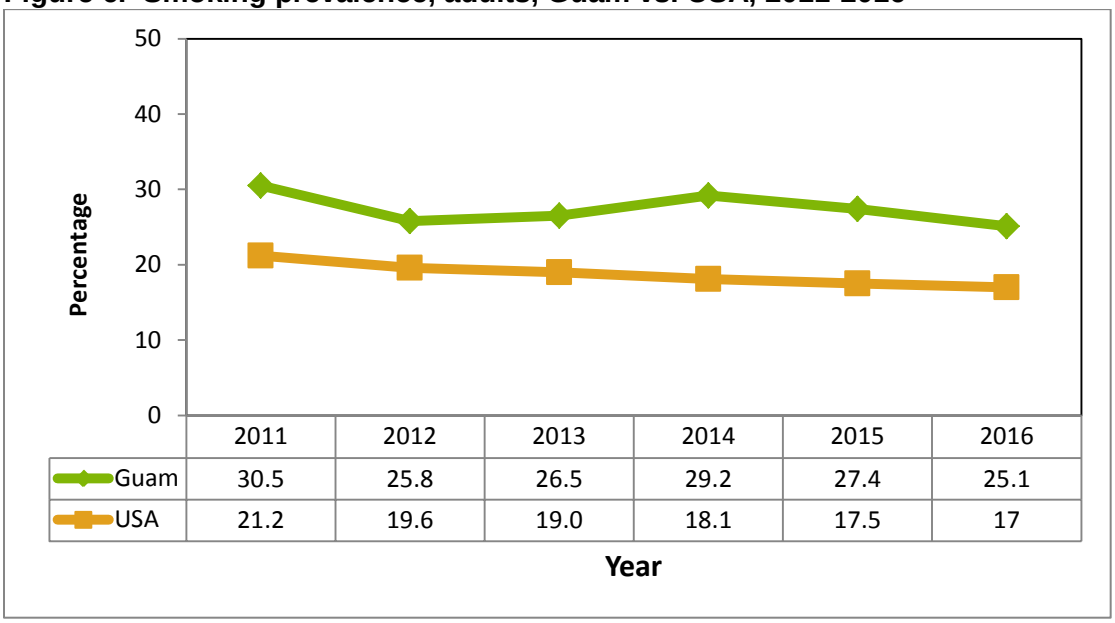
Smoking

TREND

The BRFSS defines current smokers as adults who have smoked at least 100 cigarettes in their entire life and who currently smoke, either everyday or some days.

Adult smoking in Guam has decreased gradually since 2011. However, for all years where data are available, the prevalence in Guam is higher than the median smoking prevalence of all US States and Territories (Figure 6).

Figure 6. Smoking prevalence, adults, Guam vs. USA, 2011-2016



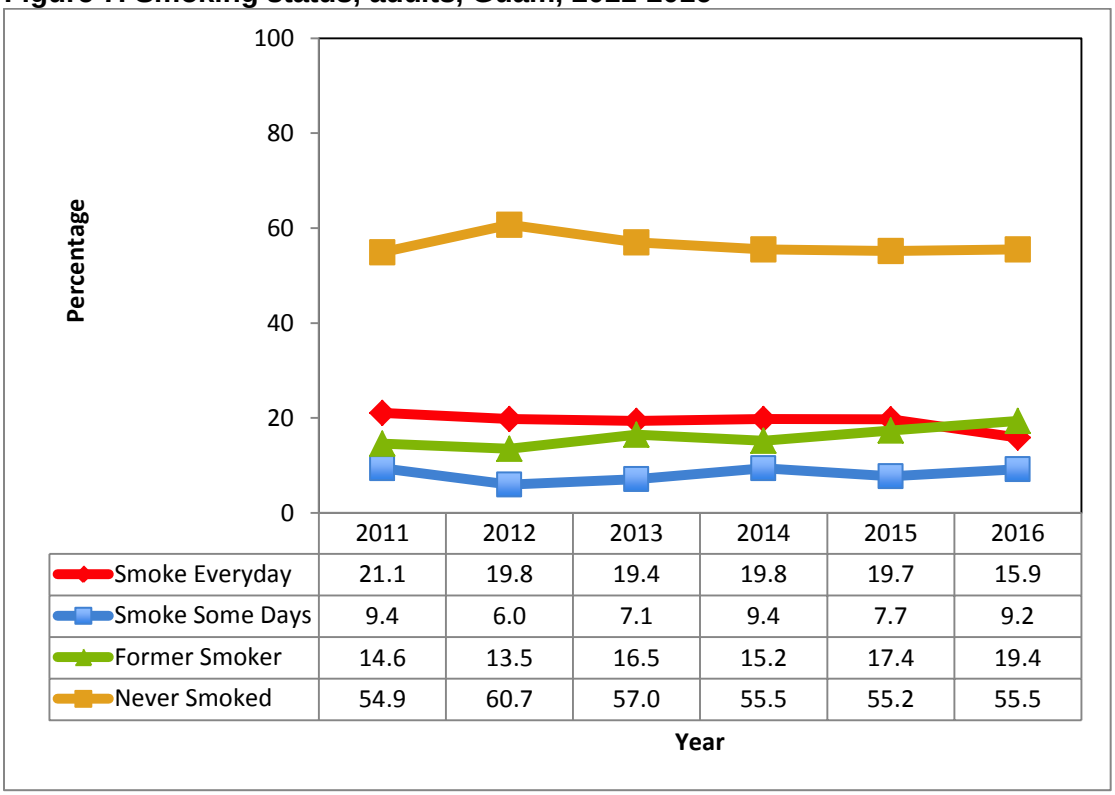
Source: Guam DPHSS, BRFSS, 2011-2016; CDC, BRFSS 2011-2016

PREVALENCE

Tobacco consumption remains prevalent in Guam. At present, about 1 in 4 adults smoke in Guam.

Daily smoking is associated with nicotine addiction. In Guam, daily smoking decreased for the first time since 2011, while the percentage of former smokers (successful quitters) increased (Figure 7). Currently, 1 in 5 adults in Guam is a former smoker; 16% smoke every day, 9% smoke some days, and 56% have never smoked (Figure 8). Among those aged 18-24 years, 75% have never smoked.

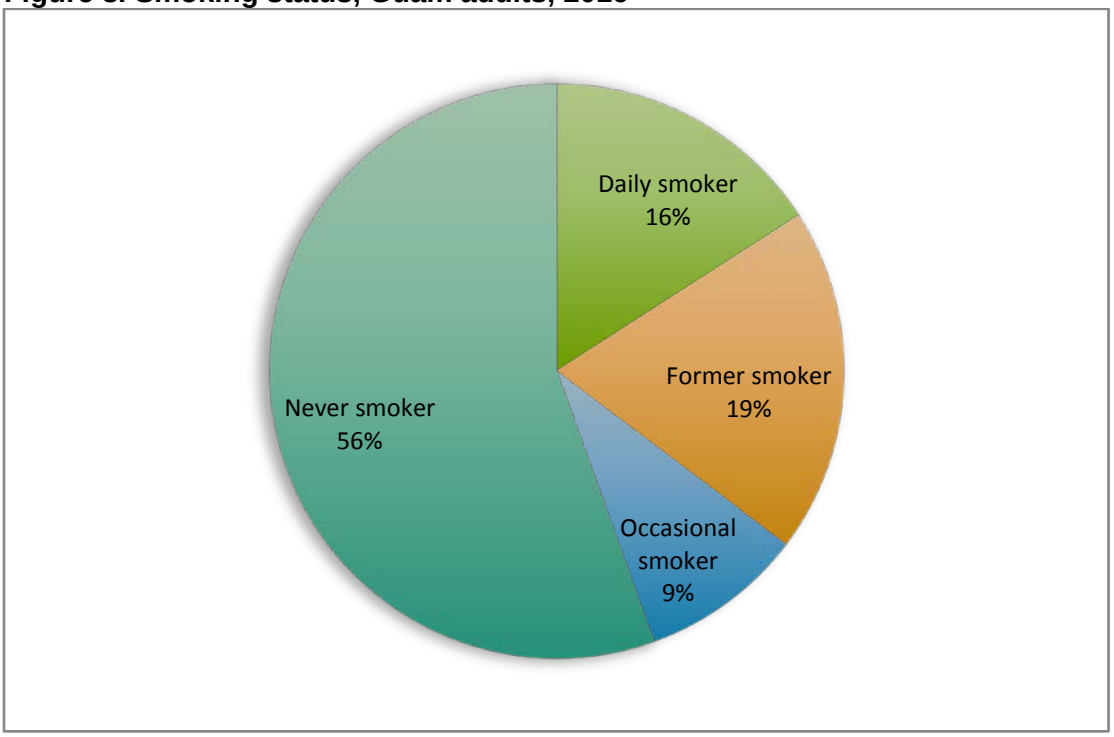
Figure 7. Smoking status, adults, Guam, 2011-2016



	2011	2012	2013	2014	2015	2016
Smoke Everyday	21.1	19.8	19.4	19.8	19.7	15.9
Smoke Some Days	9.4	6.0	7.1	9.4	7.7	9.2
Former Smoker	14.6	13.5	16.5	15.2	17.4	19.4
Never Smoked	54.9	60.7	57.0	55.5	55.2	55.5

Source: Guam DPHSS, BRFSS, 2011-2016; CDC, BRFSS 2011-2016

Figure 8. Smoking status, Guam adults, 2016



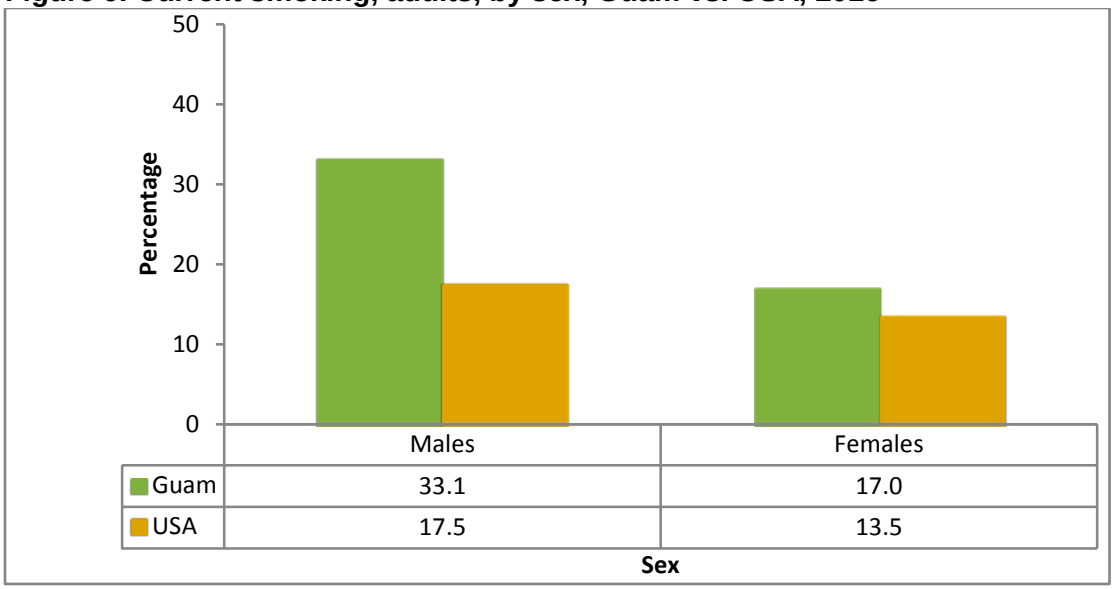
Source: Guam DPHSS, BRFSS, 2016

CORRELATES OF ADULT SMOKING

Sex

Men smoke more than women in Guam (33% vs. 17%), but female smoking in Guam is higher than that of US women (17% vs. 13.5%). In 2016, female smoking in Guam was similar to male smoking in the USA (Figure 9).

Figure 9. Current smoking, adults, by sex, Guam vs. USA, 2016

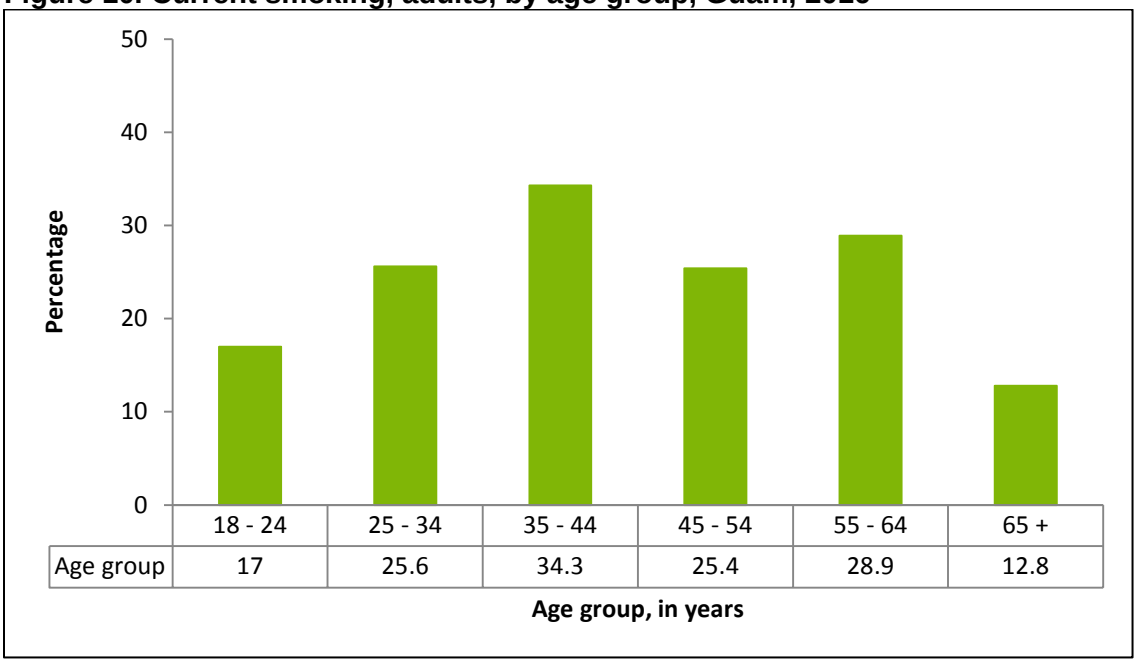


Source: Guam DPHSS, BRFSS, 2016; USA data from Centers for Disease Control and Prevention. Current Cigarette Smoking Among Adults—United States, 2016. Morbidity and Mortality Weekly Report 2018;67(2):53-9 [accessed 2018 Feb 22].

Age

Adults aged 35 to 44 have the highest smoking prevalence. Smoking rates decline progressively in those aged 45 years and older, partly reflecting the loss of smokers due to tobacco-related mortality (Figure 10).

Figure 10. Current smoking, adults, by age group, Guam, 2016

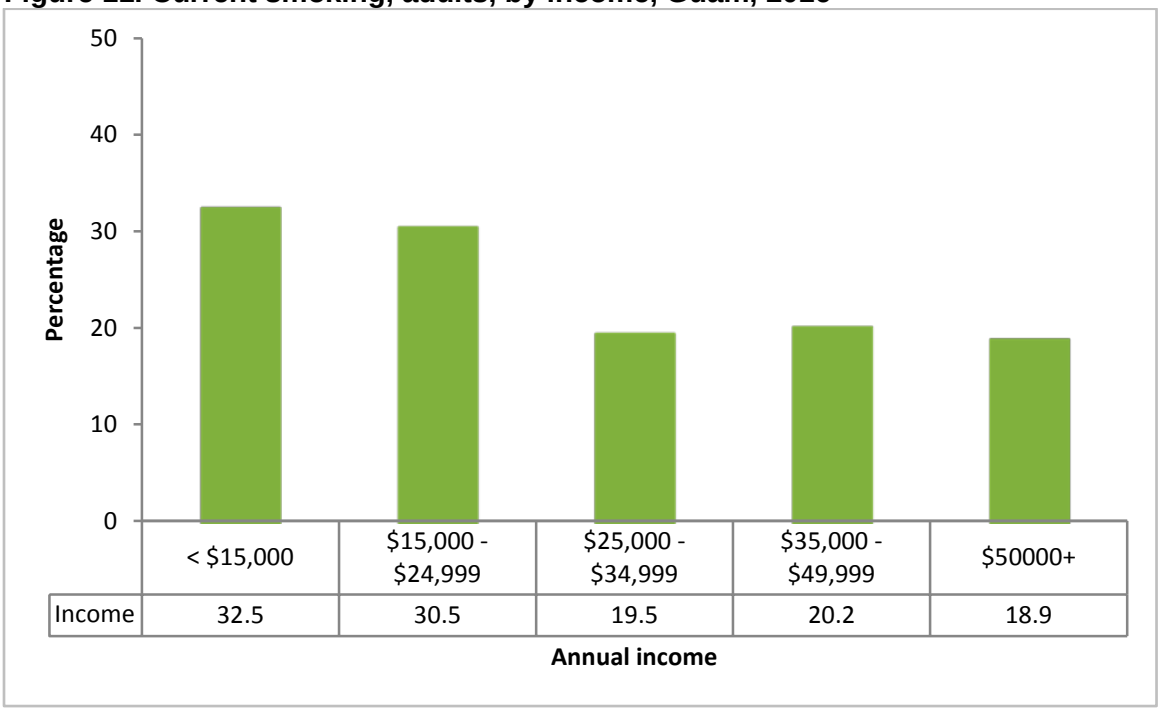


Source: Guam DPHSS, BRFSS, 2016

Income

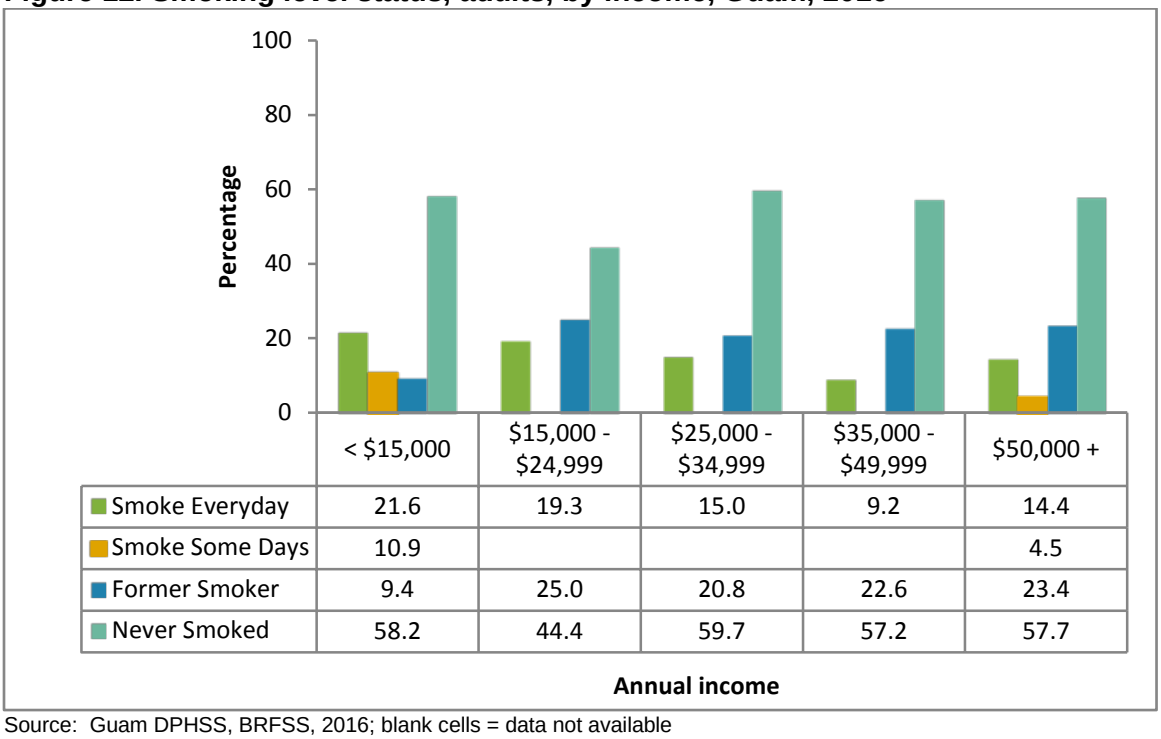
Smoking prevalence declines with increasing income (Figure 11). Those with lower incomes are more likely to be daily smokers; in contrast, those with higher incomes are more likely to have never smoked or have quit successfully (former smokers) (Figure 12). This finding is consistent across the years for which data is available, and reflects the disparity in tobacco consumption due to socio-economic class.

Figure 11. Current smoking, adults, by income, Guam, 2016



Source: Guam DPHSS, BRFSS, 2016

Figure 12. Smoking level status, adults, by income, Guam, 2016

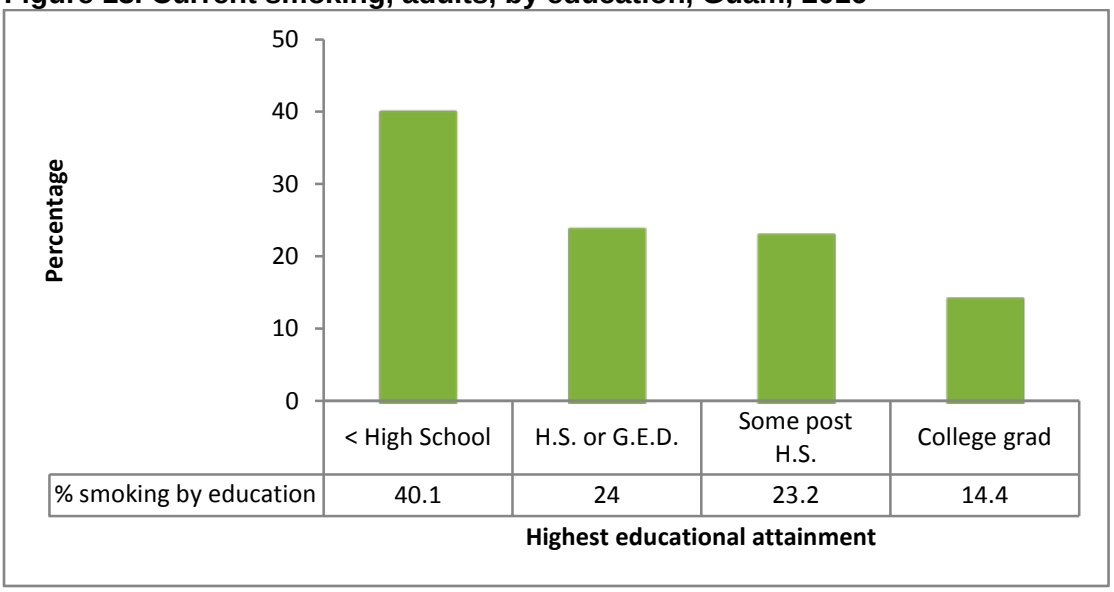


Source: Guam DPHSS, BRFSS, 2016; blank cells = data not available

Education

Smoking is inversely related to educational attainment (Figure 13), with current smoking reported more frequently by those with less years of education. This is consistent with global findings that link smoking with socio-economic status and education as social determinants of health. The disparities in smoking and education are reflected in the data on four-level smoking status (Figure 14).

Figure 13. Current smoking, adults, by education, Guam, 2016

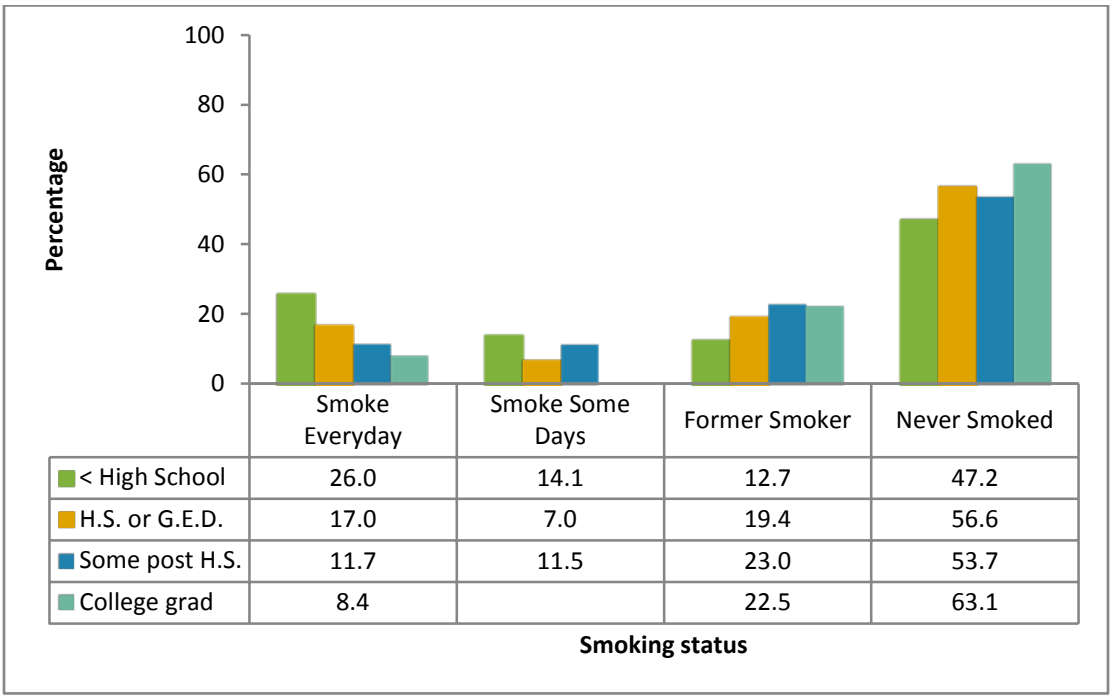


	< High School	H.S. or G.E.D.	Some post H.S.	College grad
% smoking by education	40.1	24	23.2	14.4

Highest educational attainment

Source: Guam DPHSS, BRFSS, 2016

Figure 14. Four-level smoking status, adults, by education, Guam, 2016



	Smoke Everyday	Smoke Some Days	Former Smoker	Never Smoked
< High School	26.0	14.1	12.7	47.2
H.S. or G.E.D.	17.0	7.0	19.4	56.6
Some post H.S.	11.7	11.5	23.0	53.7
College grad	8.4		22.5	63.1

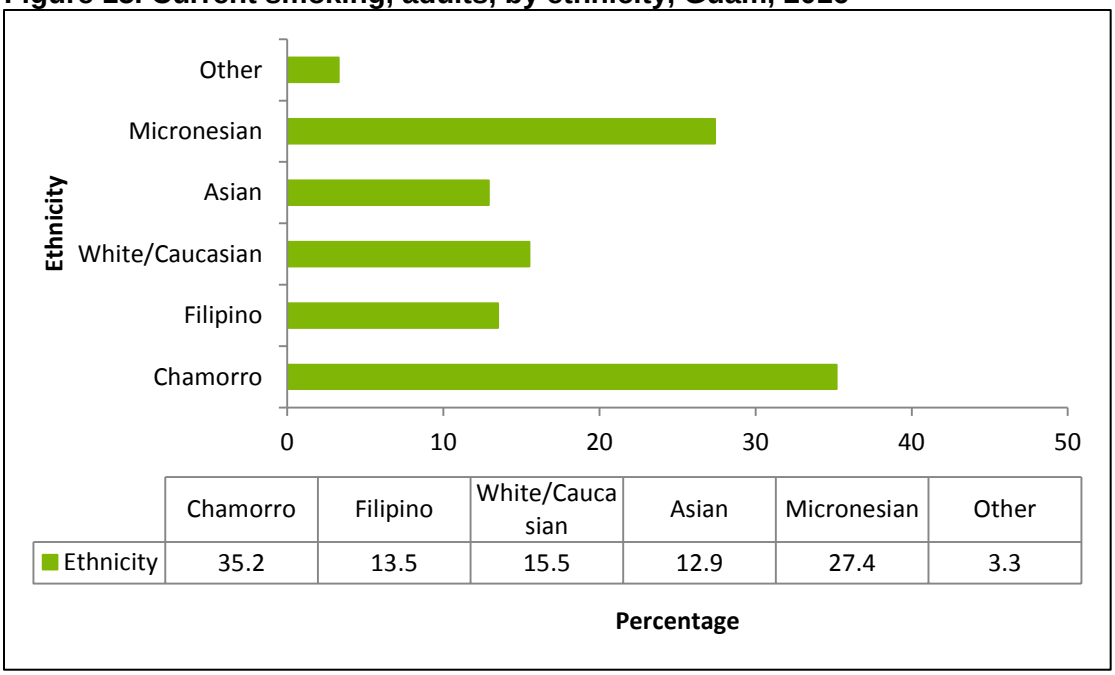
Smoking status

Source: Guam DPHSS, BRFSS, 2016; blank cells = data not available

Ethnicity

There is a marked variation in current smoking rates across the various ethnic groups in Guam. Chamorros have the highest rates – 35% of Chamorro adults are current smokers. Filipinos have the lowest rates, with 13.5% of adults reporting current smoking (Figure 15). This difference may explain, in part, the disparity in lung cancer and cardiovascular prevalence and morbidity amongst these groups.

Figure 15. Current smoking, adults, by ethnicity, Guam, 2016



	Chamorro	Filipino	White/Caucasian	Asian	Micronesian	Other
Ethnicity	35.2	13.5	15.5	12.9	27.4	3.3

Source: Guam DPHSS, BRFSS, 2016

Age at initiation

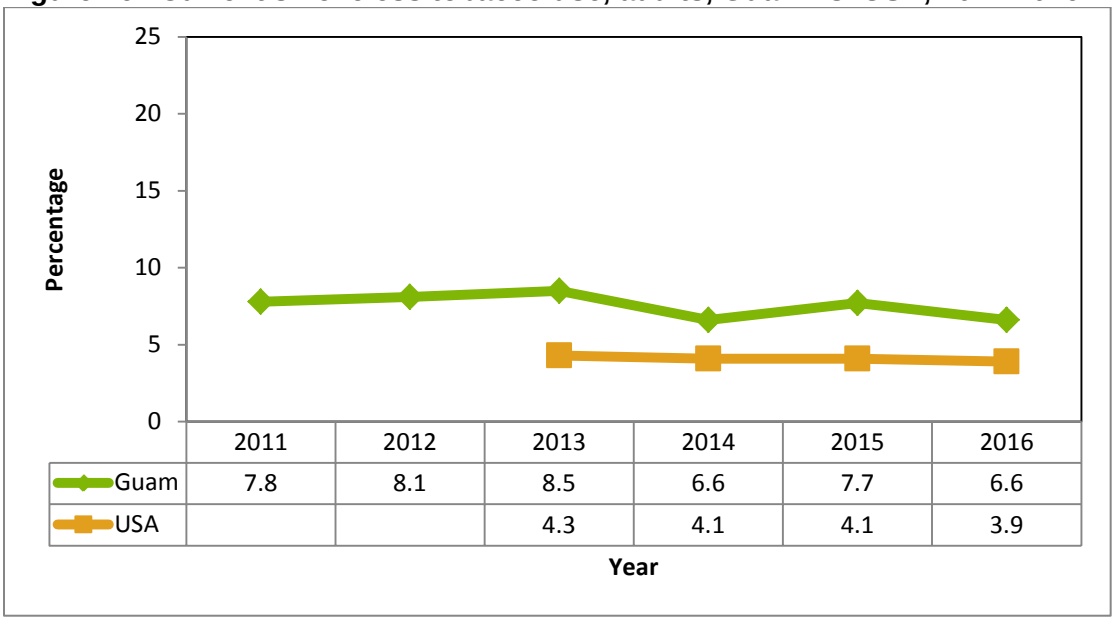
One in 10 (11%) of current adult smokers in Guam started at the age of 13 or younger; 17% began using tobacco between the ages of 18 and 20 years. Over half (56%) of today's adult smokers began using tobacco before the legal age of 21 years. This underscores the importance of demand and supply reduction measures that are known to be most effective in preventing tobacco use initiation among younger tobacco users, such as tobacco tax increases, graphic package warnings and total advertising bans.

Smokeless Tobacco

TREND and PREVALENCE

Current smokeless tobacco use remained unchanged from 2011, but Guam's prevalence is nearly double that of the US median (Figure 16).

Figure 16. Current smokeless tobacco use, adults, Guam vs. USA, 2011-2016



	2011	2012	2013	2014	2015	2016
Guam	7.8	8.1	8.5	6.6	7.7	6.6
USA			4.3	4.1	4.1	3.9

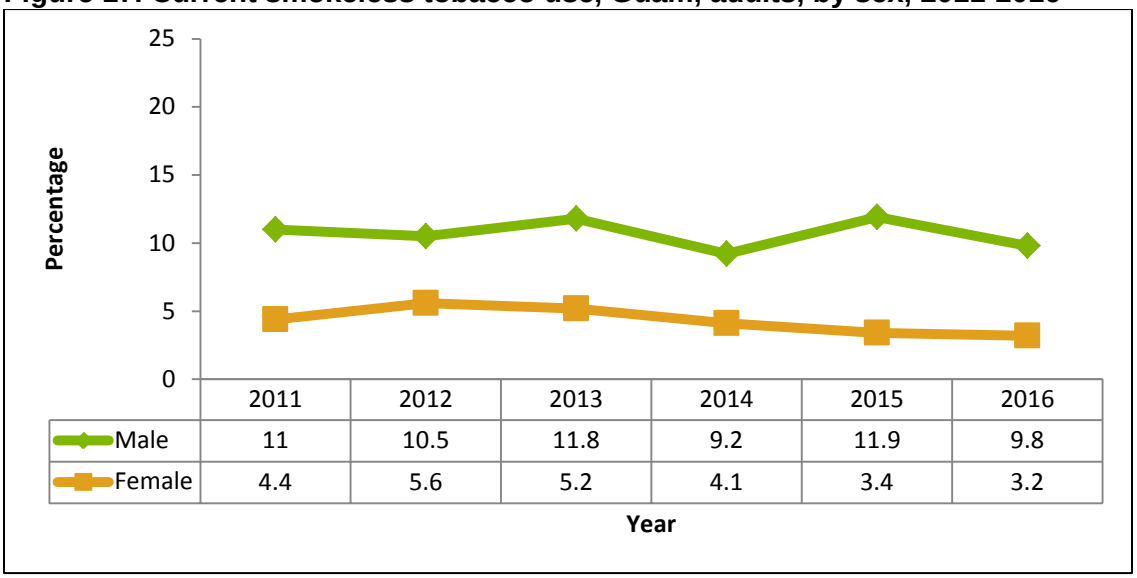
Source: DPHSS and GBHWC, BRFSS State-added question, 2011-2016; CDC, BRFSS, 2013-2016; blank cells = data not available

CORRELATES OF ADULT SMOKELESS TOBACCO USE

Sex

Males were thrice as likely as females (Figure 17) to report currently using smokeless tobacco in 2016.

Figure 17. Current smokeless tobacco use, Guam, adults, by sex, 2011-2016



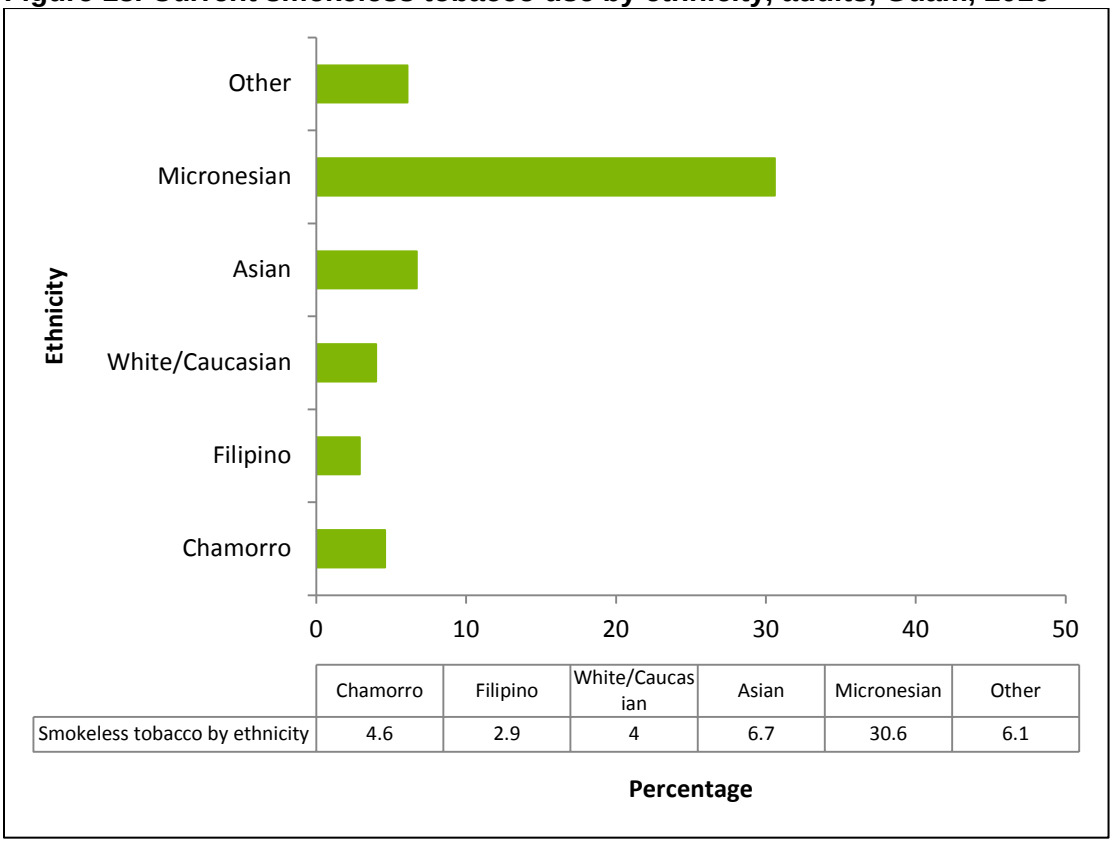
	2011	2012	2013	2014	2015	2016
Male	11	10.5	11.8	9.2	11.9	9.8
Female	4.4	5.6	5.2	4.1	3.4	3.2

Source: DPHSS and GBHWC, BRFSS State-added question, 2011-2016

Ethnicity

Smokeless tobacco use was highest among Micronesians (Figure 18).

Figure 18. Current smokeless tobacco use by ethnicity, adults, Guam, 2016



	Chamorro	Filipino	White/Caucasian	Asian	Micronesian	Other
Smokeless tobacco by ethnicity	4.6	2.9	4	6.7	30.6	6.1

Source: DPHSS and GBWHC, BRFSS State-added question, 2016

Betel/Areca nut use, with and without tobacco

In 2016, the Guam BRFSS provided data on betel/areca nut consumption, with and without tobacco, among Guam adults, as a set of State-added questions.

PREVALENCE

43% of Guam adults have ever tried chewing betel/areca nut, and 1 in 3 (33%) are current chewers. Of these, 7.8% chew daily, while 25.2% chew on some days. Among current chewers, 1 in 4 (26.7%) add tobacco to their chew.

CORRELATES OF ADULT BETEL/ARECA NUT CONSUMPTION

Sex

Among adults, current chewing appears similar across the sexes (32.6% males vs. 33.7% females). However, men are more likely to be daily chewers than women (10.7% vs. 4%). Men are also more likely to add tobacco to their chew (29% vs. 23.7%).

Education and Income

Chewers with less than a high school diploma are thrice as likely to add tobacco to their chew as chewers with a college degree. Similarly, those making under $15,000 a year are three times as likely to add tobacco to their chew as those earning $50,000 or more annually.

Ethnicity

Micronesians and Chamorros are most likely to be current chewers. Among current chewers, Micronesians and Asians are more likely to add tobacco to their chew.

Age at initiation

Over half of chewers (54%) started chewing tobacco with betel/areca nut at the age of 18 or younger, and 7% started at the age of 13 or younger.

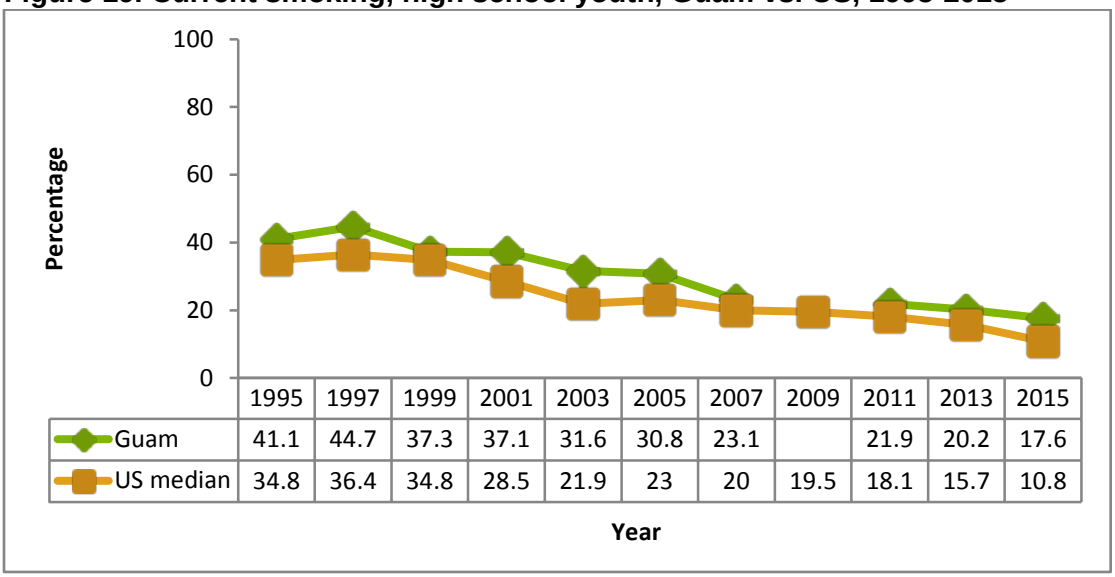
Consumption: Youth

Smoking

TREND

Youth smoking prevalence has been declining in the US mainland and on Guam. Lifetime smoking and current smoking have been decreasing steadily since 1995. However, Guam rates remain higher than the US median (Figures 19-20). The percent of youth who smoked their first cigarette for the first time before the age of 13 years was declining until 2011, but has remained unchanged since, and is currently three times the US median (Figure 21).

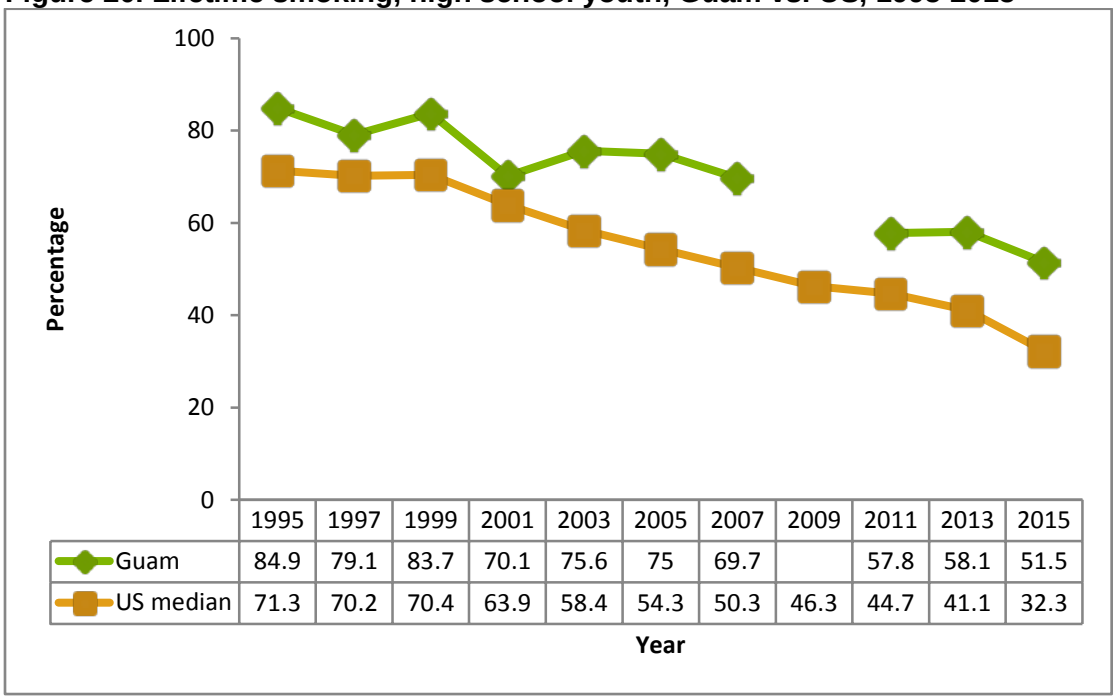
Figure 19. Current smoking, high school youth, Guam vs. US, 1995-2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	41.1	44.7	37.3	37.1	31.6	30.8	23.1		21.9	20.2	17.6
US median	34.8	36.4	34.8	28.5	21.9	23	20	19.5	18.1	15.7	10.8

Source: GDOE, YRBS 1995-2015; blank cells = data not available

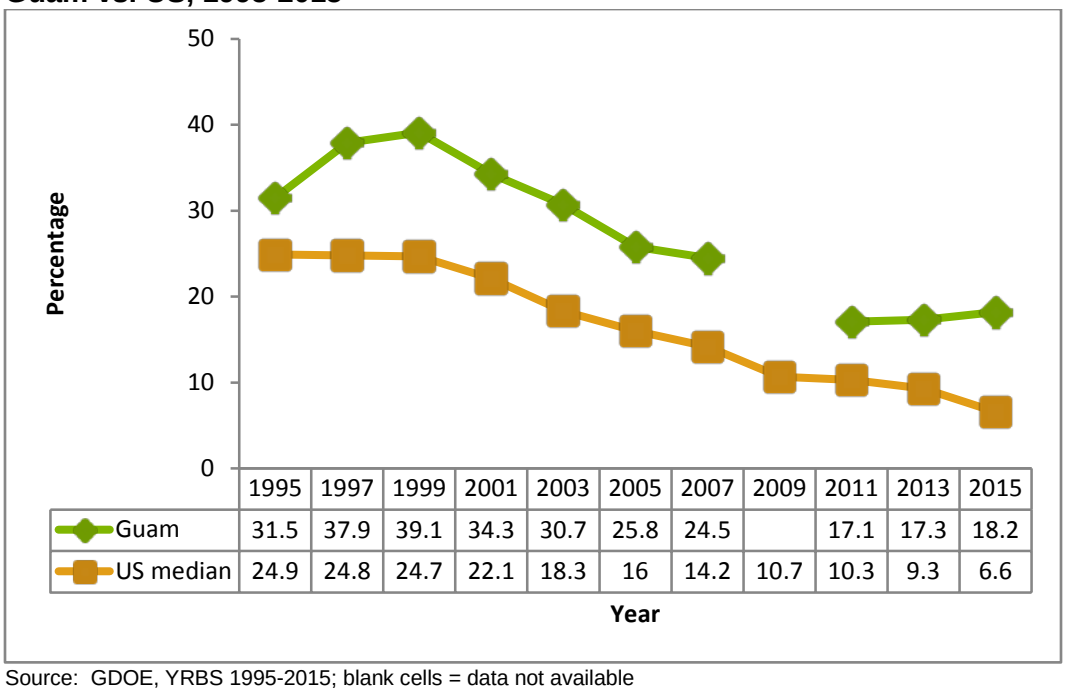
Figure 20. Lifetime smoking, high school youth, Guam vs. US, 1995-2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	84.9	79.1	83.7	70.1	75.6	75	69.7		57.8	58.1	51.5
US median	71.3	70.2	70.4	63.9	58.4	54.3	50.3	46.3	44.7	41.1	32.3

Source: GDOE, YRBS 1995-2015; blank cells = data not available

Figure 21. Smoked a whole cigarette before age 13 years, high school youth, Guam vs. US, 1995-2015

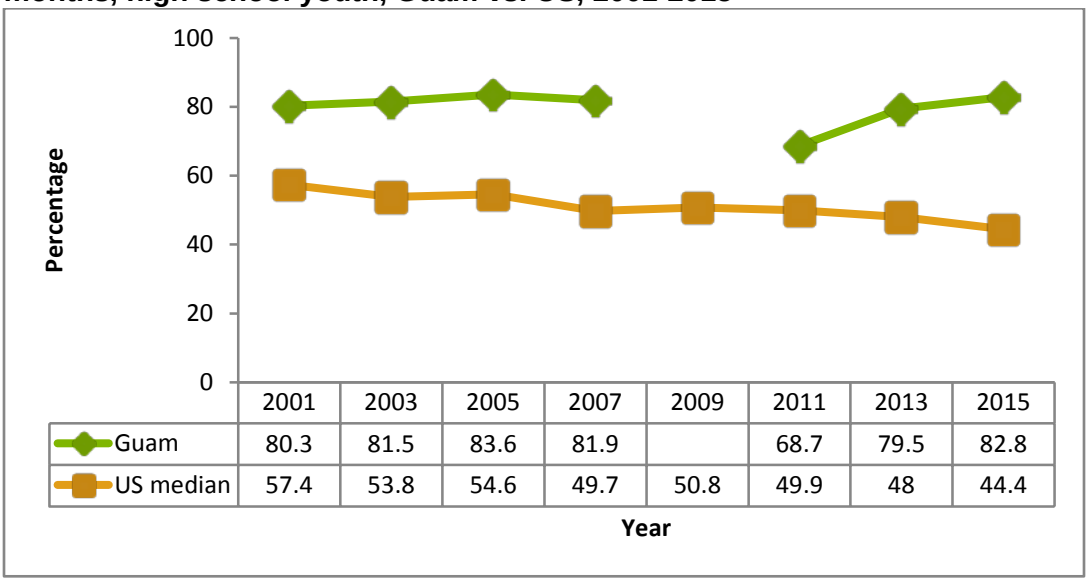


	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	31.5	37.9	39.1	34.3	30.7	25.8	24.5		17.1	17.3	18.2
US median	24.9	24.8	24.7	22.1	18.3	16	14.2	10.7	10.3	9.3	6.6

Source: GDOE, YRBS 1995-2015; blank cells = data not available

The percentage of youth smokers wanting to quit in the past year has always been higher in Guam than in the US. In 2011, the Guam rate for quit attempts decreased, narrowing the gap, but it rose in 2013 and 2015, while the US rate remained unchanged (Figure 22). Clearly, majority of youth smokers in Guam want to quit, signaling the need to continue providing cessation services for this population. Preliminary data from formative research on text-based cessation indicate this may be a viable alternative to the currently available telephone and web-based services.

Figure 22. Percentage of current smokers who attempted to quit in the past 12 months, high school youth, Guam vs. US, 2001-2015



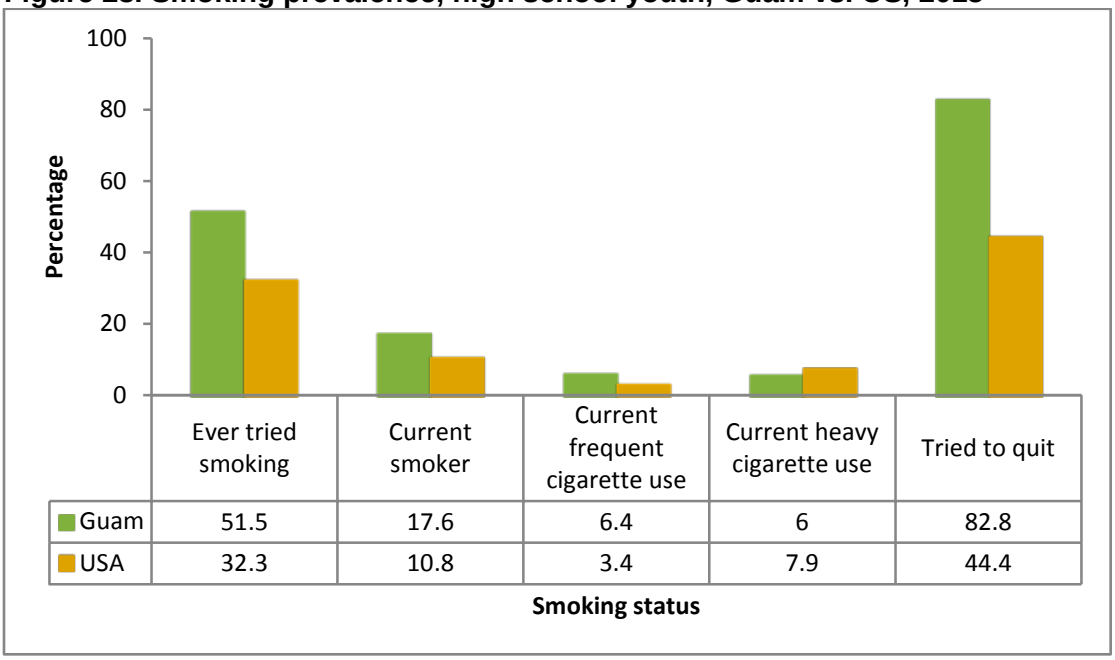
	2001	2003	2005	2007	2009	2011	2013	2015
Guam	80.3	81.5	83.6	81.9		68.7	79.5	82.8
US median	57.4	53.8	54.6	49.7	50.8	49.9	48	44.4

Source: GDOE, YRBS 2001-2015; blank cells = data not available

PREVALENCE

In 2015, over half of high school students in Guam had tried smoking. One in six were current smokers. Eight out of ten smokers tried to quit in the past year. Guam youth were more likely than US youth to try smoking and be current smokers, but they were also more likely to have tried quitting and less likely to be heavy cigarette users (Figure 23).

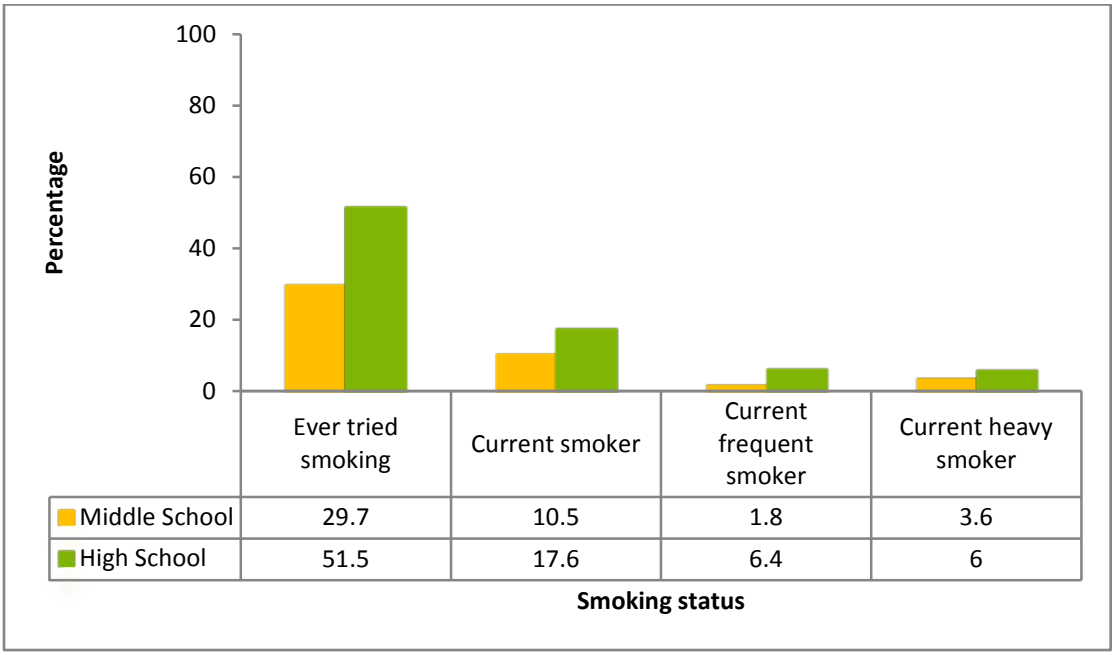
Figure 23. Smoking prevalence, high school youth, Guam vs. US, 2015



Source: GDOE, YRBS 2015

Three out of ten middle school students had tried smoking in 2015, and one in ten were current smokers (Figure 24).

Figure 24. Smoking prevalence, middle school vs. high school students, Guam, 2015



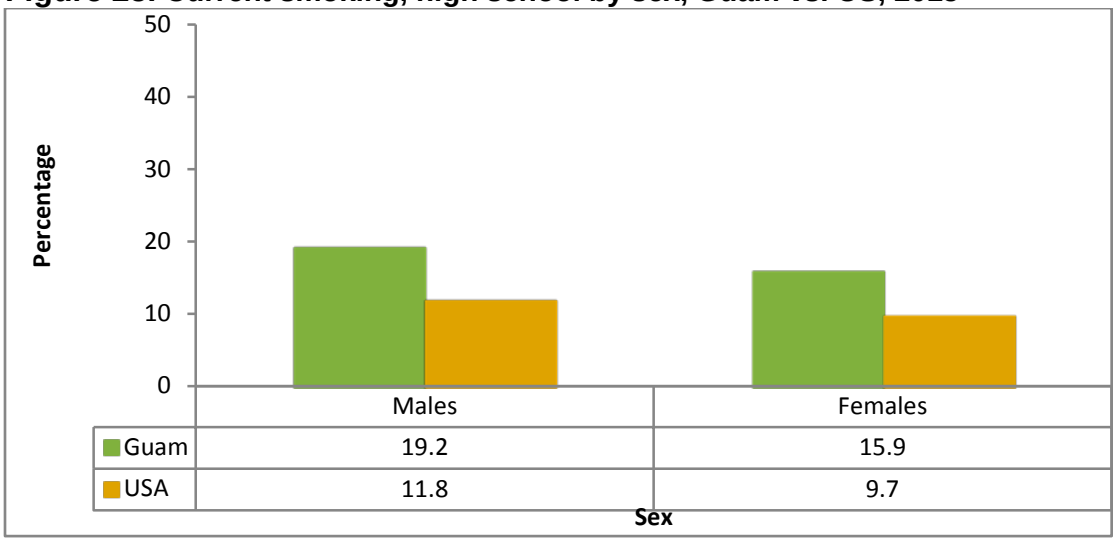
Source: GDOE, YRBS 2015

CORRELATES OF YOUTH SMOKING

Sex

In 2015, male high school students in Guam had a significantly higher smoking rate than females. Regardless of sex, smoking prevalence among high school students is markedly higher in Guam compared to the US. Female youth in Guam smoke more than male youth in the US (Figure 25).

Figure 25. Current smoking, high school by sex, Guam vs. US, 2015

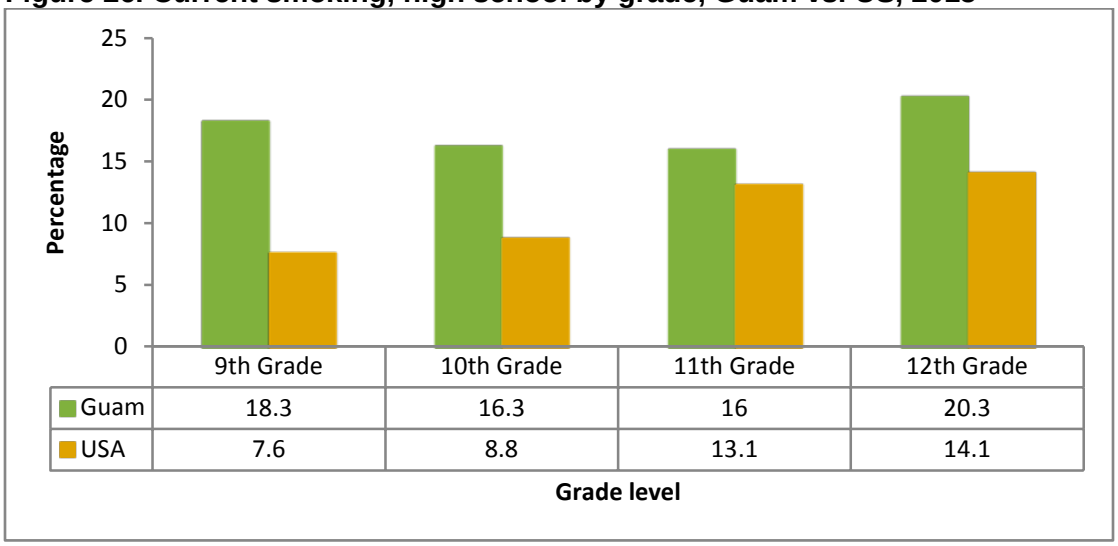


Source: GDOE, YRBS 2015

Grade

Smoking increases with grade level for US youth, but smoking is fairly evenly distributed across Grades 9 to 12 in Guam; for every grade level, smoking prevalence is higher among Guam students (Figure 26). Together with data showing Guam youth are much more likely to start before the age of 13 years, this indicates that tobacco uptake begins long before the 9th Grade, and tobacco prevention interventions need to target lower Grade levels.

Figure 26. Current smoking, high school by grade, Guam vs. US, 2015

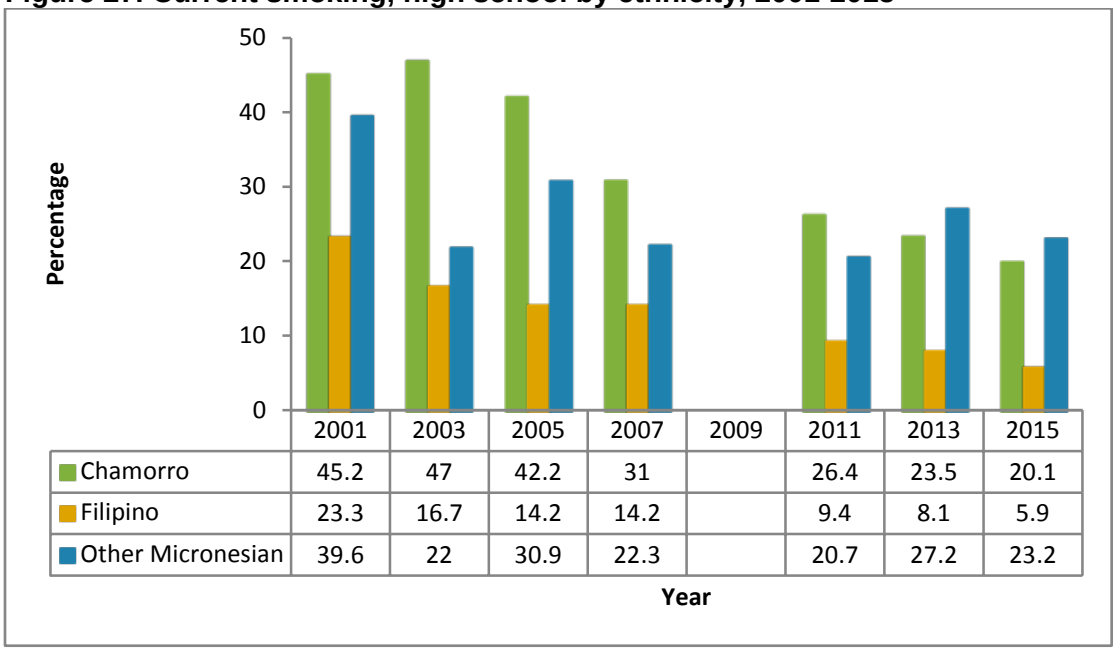


Source: GDOE, YRBS 2015

Ethnicity

Chamorros and other Micronesians surpass Filipinos in all smoking parameters. This disparity has persisted throughout the entire period of data collection for the survey, despite the decline in overall youth smoking (Figures 27-28).

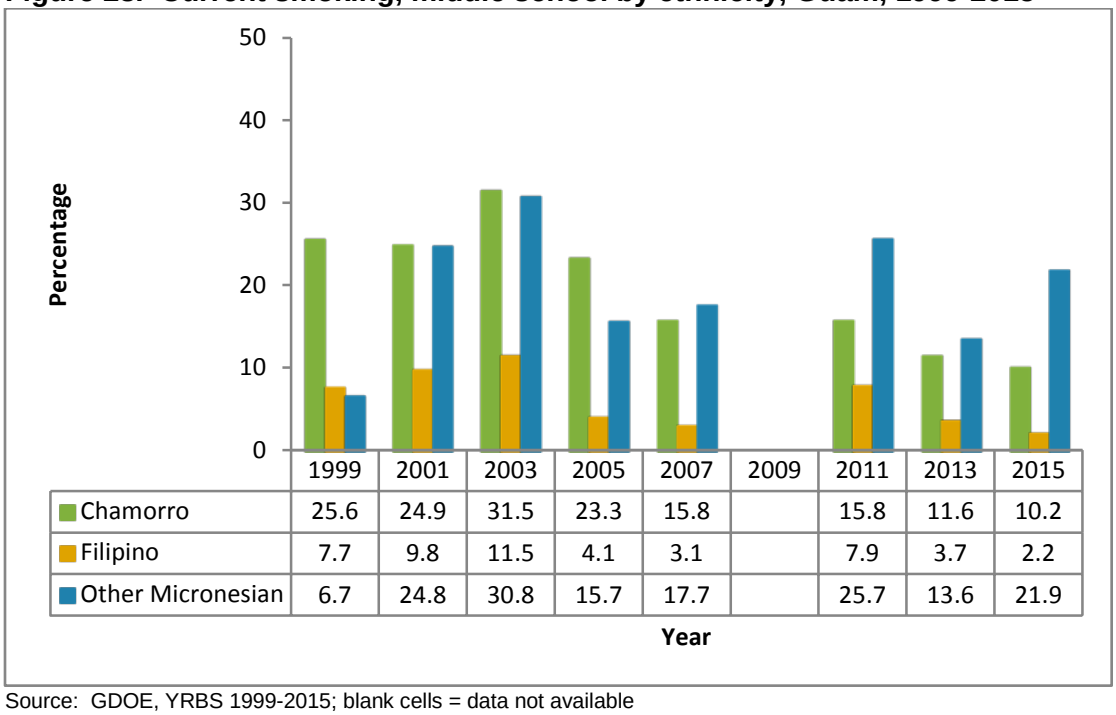
Figure 27. Current smoking, high school by ethnicity, 2001-2015



	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	45.2	47	42.2	31		26.4	23.5	20.1
Filipino	23.3	16.7	14.2	14.2		9.4	8.1	5.9
Other Micronesian	39.6	22	30.9	22.3		20.7	27.2	23.2

Source: GDOE, YRBS 2001-2015; blank cells = data not available

Figure 28. Current smoking, middle school by ethnicity, Guam, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	25.6	24.9	31.5	23.3	15.8		15.8	11.6	10.2
Filipino	7.7	9.8	11.5	4.1	3.1		7.9	3.7	2.2
Other Micronesian	6.7	24.8	30.8	15.7	17.7		25.7	13.6	21.9

Source: GDOE, YRBS 1999-2015; blank cells = data not available

Age at initiation
Eighteen percent (18%) of Guam high school students smoked a whole cigarette for the first time before the age of 13 years, and 8% of middle school students smoked their first whole cigarette before the age of 11 years. Males were as likely as females to start tobacco use early (High school: 18.9% vs. 17.4%; Middle school: 8.5% vs. 7.6%).

Risk and protective Factors
In 2013, Guam added several questions to the YRBS to determine youth's exposure to pro-cessation messaging. In 2015, one in five (21%) high school students were aware of the Guam Youth Quitline for tobacco cessation, and 13% had seen messages promoting the Guam Youth Quitline through social media in the past 30 days before the survey. About 1 in 3 (30%) saw one or more messages advising them to quit tobacco use in a website or through social media in the past 30 days.

In 2015, a question on the perception of harm from smoking was included in the survey. Over half (52.1%) of high school students believed people greatly risked harming themselves by smoking one or more packs of cigarettes a day. Filipino youth were more likely to perceive harm with tobacco use than Chamorro or Micronesian youth (64% vs. 50% and 44% respectively).

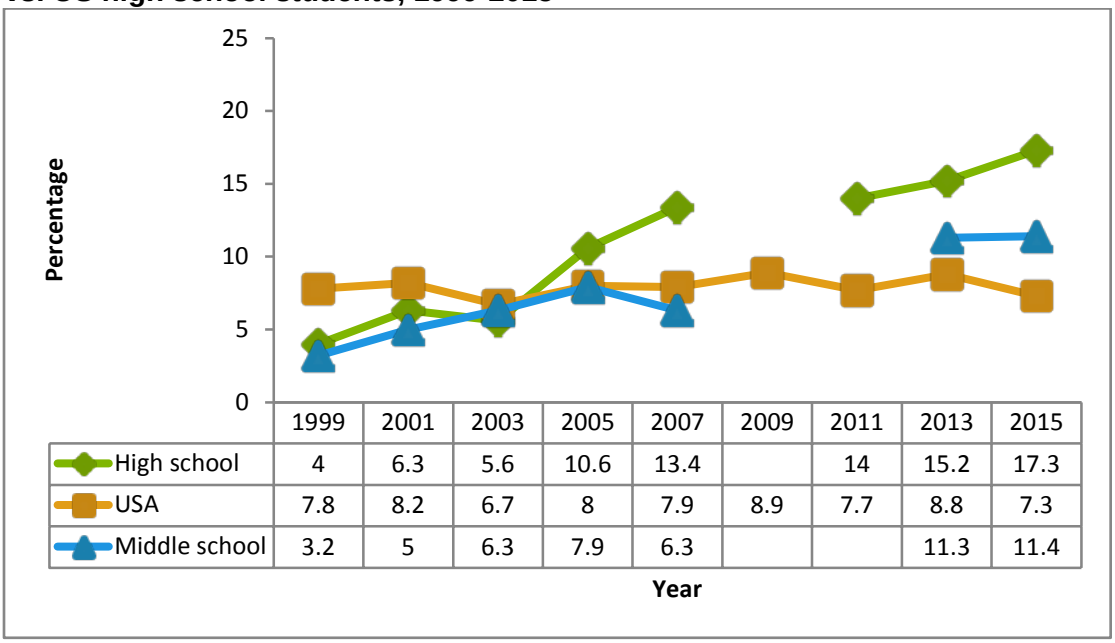
Smokeless Tobacco

TREND
Previous editions of the Guam Epi Profile have flagged youth smokeless tobacco use for close monitoring.

The use of smokeless tobacco products with or without betel nut (areca nut/betel quid) is less prevalent than cigarette smoking among Guam's youth. However, while the actual numbers of users are small, the rate of smokeless tobacco use is increasing among both high school and middle school youth (Figure 29).

The rates for high school youth doubled between 2003 and 2005, and increased further in from 2011 to 2015. The YRBS dropped the question on smokeless tobacco use for middle school students in 2011, but reinstated it in 2013. Data indicated that middle school smokeless tobacco use in Guam surpassed the US high school rate in 2013 and 2015. The use of other tobacco products deserves careful tracking, and prevention and early intervention efforts are needed to offset any further increases.

Figure 29. Smokeless tobacco use, Guam high school and middle school students vs. US high school students, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
High school	4	6.3	5.6	10.6	13.4		14	15.2	17.3
USA	7.8	8.2	6.7	8	7.9	8.9	7.7	8.8	7.3
Middle school	3.2	5	6.3	7.9	6.3			11.3	11.4

Source: GDOE, YRBS 1999-2015; blank cells = data not available

PREVALENCE

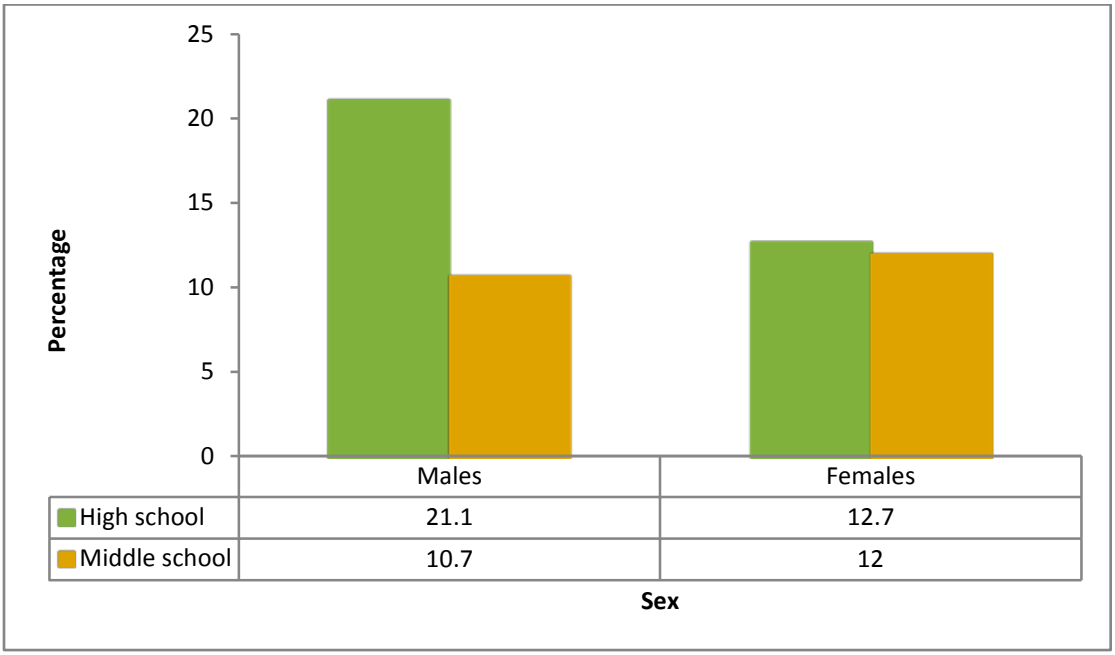
In 2015, 17% of high school students and 11% of middle school students reported smokeless tobacco use. The prevalence of smokeless tobacco use among Guam middle school students is nearly 50% higher than the rate among US high school students.

CORRELATES OF YOUTH SMOKELESS TOBACCO USE

Sex

Among high school students, males have a higher prevalence of using smokeless tobacco products than females. However, there is no sex difference among middle school students. About one in eight (12%) middle school girls were current users of smokeless tobacco in 2015; the rate is similar the prevalence among high school females (Figure 30).

Figure 30. Smokeless tobacco use, by sex, high school vs. middle school, Guam, 2015

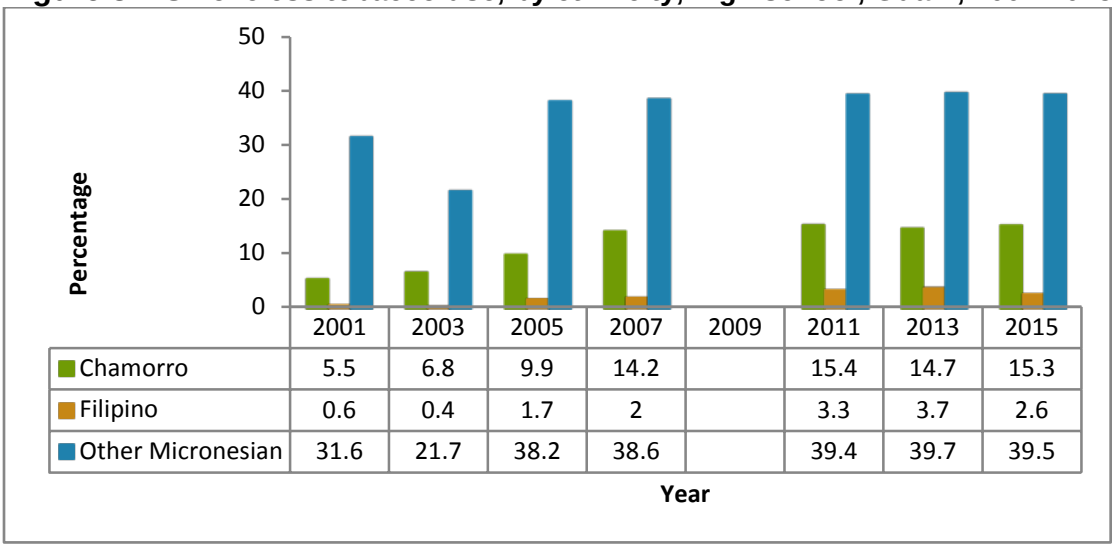


Source: GDOE, YRBS 2015

Ethnicity

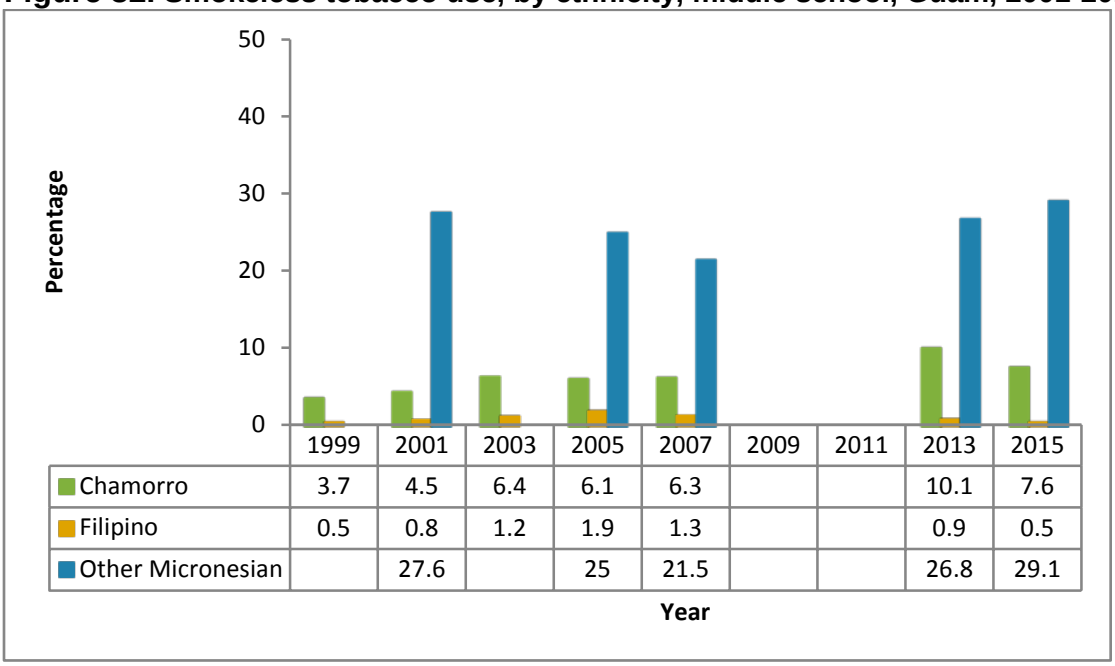
The use of smokeless tobacco products is highest among Micronesian Islanders. The difference between Micronesians and all other ethnic categories is remarkable (Figures 31 and 32). It is unclear what proportion of youth is using smokeless tobacco products as is, and what proportion are using these as additives to betel nut (areca nut/betel quid). In future iterations of the YRBS on Guam, it will be important to ask specific questions about the use of chewing tobacco, with and without betel nut (areca nut/betel quid).

Figure 31. Smokeless tobacco use, by ethnicity, high school, Guam, 2001-2015



Source: GDOE, YRBS 2001-2015; blank cells = data not available

Figure 32. Smokeless tobacco use, by ethnicity, middle school, Guam, 2001-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	3.7	4.5	6.4	6.1	6.3			10.1	7.6
Filipino	0.5	0.8	1.2	1.9	1.3			0.9	0.5
Other Micronesian		27.6		25	21.5			26.8	29.1

Source: GDOE, YRBS 2001-2015; blank cells = data not available

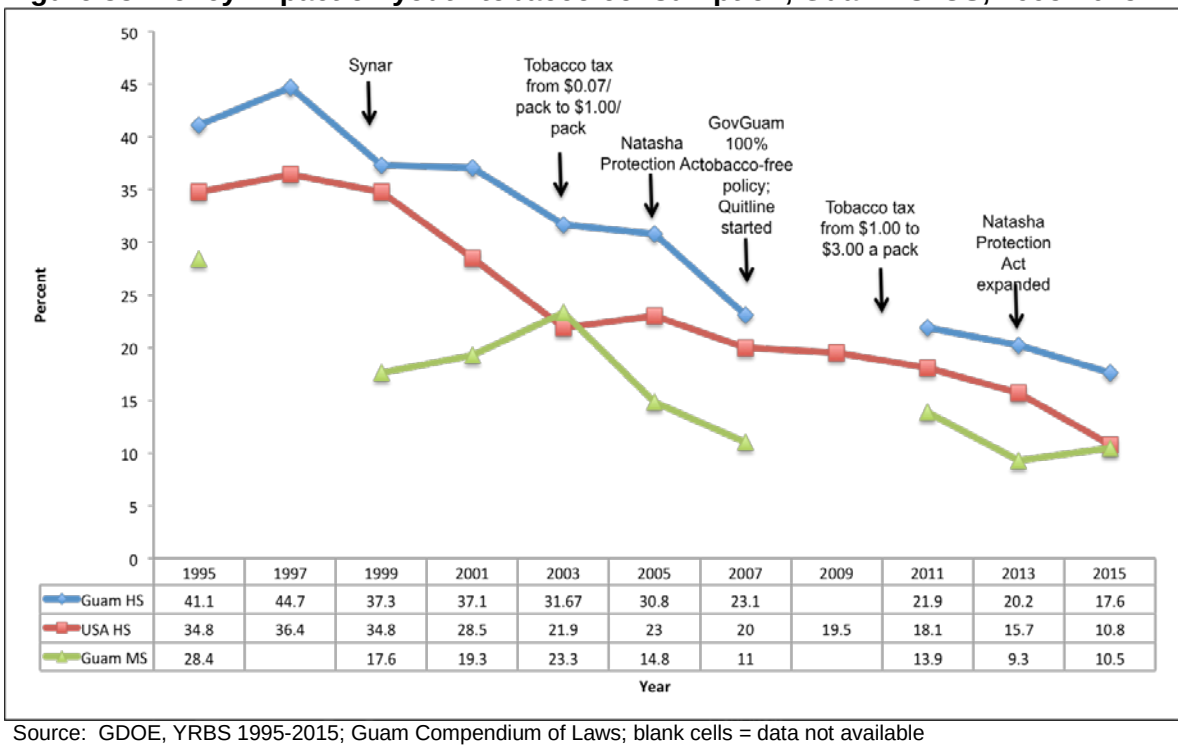
Electronic Vapor Products (E-cigarettes and other Electronic Nicotine Delivery Systems)

In 2015, questions on electronic vapor products (e-cigarettes, e-cigars, e-pipes, etc.) were added to the Guam YRBS, for both high school and middle school. Lifetime use of these products was 59.9% among high school students and 38.5% among middle school students. One in three (32.2%) of high school students and nearly one in four (23.1%) of middle school students reported current use. Males were more likely to report current use; Chamorros had the highest rates of current use for both middle school and high school.

Policy impact on tobacco consumption

Youth tobacco use in Guam is responsive to policy changes. Large declines in youth smoking prevalence coincide or follow the establishment of evidence-based tobacco control policies. SYNAR inspections started on Guam in 1999, tobacco taxes were increased on Guam in 2003, and a sustained tobacco control program was launched by the GBHWC since 2003. In 2005, Guam's Natasha Act, making public places smoke-free, was enacted. In 2007, the Governor's Executive Order mandating all GovGuam premises and vehicles to become 100% tobacco free came into effect, and the DPHSS Quitline was established. Tobacco taxes were raised further in 2010, from $1.00/pack to $3.00/pack; to date, this represents the largest single tax increase among all US States and Territories. Guam's smoke-free public places policy was expanded in 2013 (Figure 33).

Figure 33. Policy impact on youth tobacco consumption, Guam vs. US, 1995-2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	41.1	44.7	37.3	37.1	31.67	30.8	23.1		21.9	20.2	17.6
USA HS	34.8	36.4	34.8	28.5	21.9	23	20	19.5	18.1	15.7	10.8
Guam MS	28.4		17.6	19.3	23.3	14.8	11		13.9	9.3	10.5

Source: GDOE, YRBS 1995-2015; Guam Compendium of Laws; blank cells = data not available

The Synar law and cigarette purchases by youth

Guam initiated its annual unannounced tobacco vendors' inspections in 1999, in compliance with the Synar law. Compliance rates reached federal targets in 2003, and have remained better than the target since then. Guam's retail violation rate went below 5% in 2013, and remained below 5% in 2016.

The YRBS provides information on youth smokers who purchase their cigarettes from stores (Table 12). The data indicates that 6.5% of high school smokers and less than 5% of middle school smokers purchased cigarettes from a store in 2015. The percentage of high school smokers who bought their cigarettes from a store has been declining since 2001, but the middle school percentage rose from 2007 to 2013, despite low retailer violation rates during the annual tobacco retailers' inspection. The middle school rate decreased in 2015.

These data highlight the importance of consistent enforcement of the Synar law and the need and effectiveness of a comprehensive approach to tobacco use prevention among youth, utilizing both price and non-price measures to reduce demand for tobacco products, to complement the restriction in youth access to tobacco.

Table 12. Tobacco retailer violation rates and percent of youth purchasing cigarettes from a store, Guam, 2000-2016

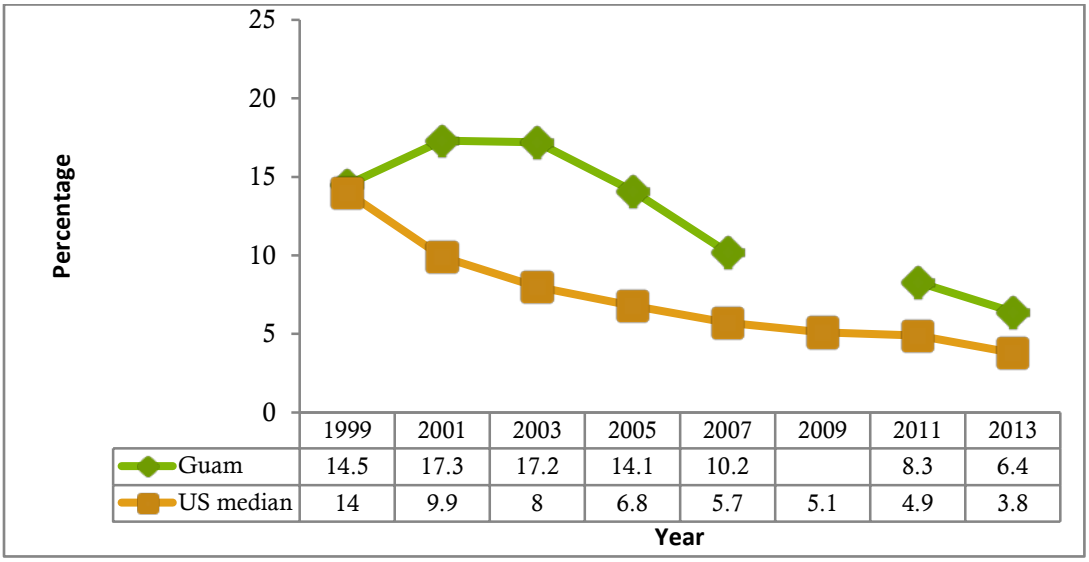
Year	Retailer violation rate (%)	MS Bought Cigarettes (%)	HS Bought Cigarettes (%)
2000	33.0	---	---
2001	42.0	1.1	30.0
2002	20.2	---	---
2003	11.0	0.8	27.9
2004	18.3	---	---
2005	14.9	3.6	24.5
2006	5.0	---	---
2007	9.4	3.8	17.3
2008	6.0	---	---
2009	8.9	N/A	N/A
2010	11.6	---	----
2011	7.8	7.0	13.0
2012	7%	---	---
2013	5%	8.4	10.5
2014	4%	---	---
2015	4.4%	3.9	6.5
2016	4.7%	---	---

Source: GBHWC PEACE Office, Synar reports, 2000-2016; GDOE, YRBS 2001-2015;
Note: "---" = data not collected for that year; "N/A" = data not available

The Natasha Protection Act (smoke-free public places) and youth tobacco use on school property

The YRBS queried students about smoking and the use of smokeless tobacco products on school property within the past 30 days in 2013. Both Guam and the US had declining rates of students smoking on school property over time. The percentage of Guam students smoking on school property remained consistently higher than that of the US mainland from 2001 to 2013 (Figure 34).

Figure 34. Smoking on school property, high school students, Guam vs. US, 1999-2013



Source: GDOE, YRBS 1999-2013; blank cells = data not available

Tobacco: Consequences

Four of the top ten causes of death---diseases of the heart, malignant neoplasms (cancer), cerebrovascular disease (stroke) and diseases of the respiratory system---are directly caused by tobacco. An additional two---pneumonia, and septicemia---are worsened by tobacco use (Table 13).

Table 13. Top Ten Causes of Death: Guam, 2016

Rank	Cause of Death	# of deaths	% of all deaths	Death rate
1	Diseases of the Heart	360	31.1	221.2
2	Malignant Neoplasms	171	16.7	105.1
3	Pneumonia	56	5.5	34.4
4	Cerebrovascular Disease	47	4.6	28.9
5	Septicemia	46	4.5	28.3
6	Suicide	43	4.2	26.4
7	Diseases of the genitourinary system	39	3.8	24.0
8	Diseases of the digestive system	35	3.4	21.5
9	Other accidents	34	3.3	20.9
10	Diseases of the respiratory system	29	2.8	17.8

Source: Guam Department of Public Health and Social Services, Office of Vital Statistics Death Certificates, as reported in the Guam Statistical Yearbook 2016
NOTE: Death rate per 100,000 population (population projection for 2016 was 162,742 persons)

In relation to cancer, the Guam Comprehensive Cancer Control Program of the Department of Public Health and Social Services (DPHSS) released cancer registry data from 2008-2012. All of the top causes of cancer death on Guam are tobacco-related

(Table 14). Lung, colon, and liver cancer are related to smoking. Second hand smoke exposure has been implicated as a risk factor for breast cancer.

Lung cancer is now the major cause of cancer mortality on Guam for both males and females. Thus, cancer mortality data highlight the critical importance of further reducing tobacco use among Guam's people. Because second hand smoke also raises cancer risk, interventions to curb tobacco use will protect not only the tobacco users, but also all others who would have been exposed to tobacco smoke.

Table 14. Top causes of cancer death on Guam, by sex, 2008-2012

Top Causes of Cancer Death on Guam 2008-2012	
Males	**Females**
Lung and Bronchus*	Lung and bronchus*
Liver *	Breast**
Colon and Rectum*	Colon and Rectum*

Source: Guam Comprehensive Cancer Control Program, DPHSS, Guam Cancer Facts and Figures 2008-2012 *(David et al)*
Note: * related to smoking; ** related to second hand smoke exposure

Electronic Vapor Products: Consequences

To date, there has been one recorded case of traumatic injury due to an exploding electronic cigarette in Guam. The patient sustained severe injuries to his eyeball, face and hand and required facial reconstructive surgery to repair the damage (Pacific Daily News, August 2016).

Reports from the Guam Department of Education indicate that there were at least 2 known cases of e-cigarettes exploding, leading the GDOE to request the Guam Police Department to handle and dispose of all e-cigarette and vape paraphernalia confiscated at the schools from students. (Personal communication with GDOE Chris Anderson, February 2018).

Alcohol

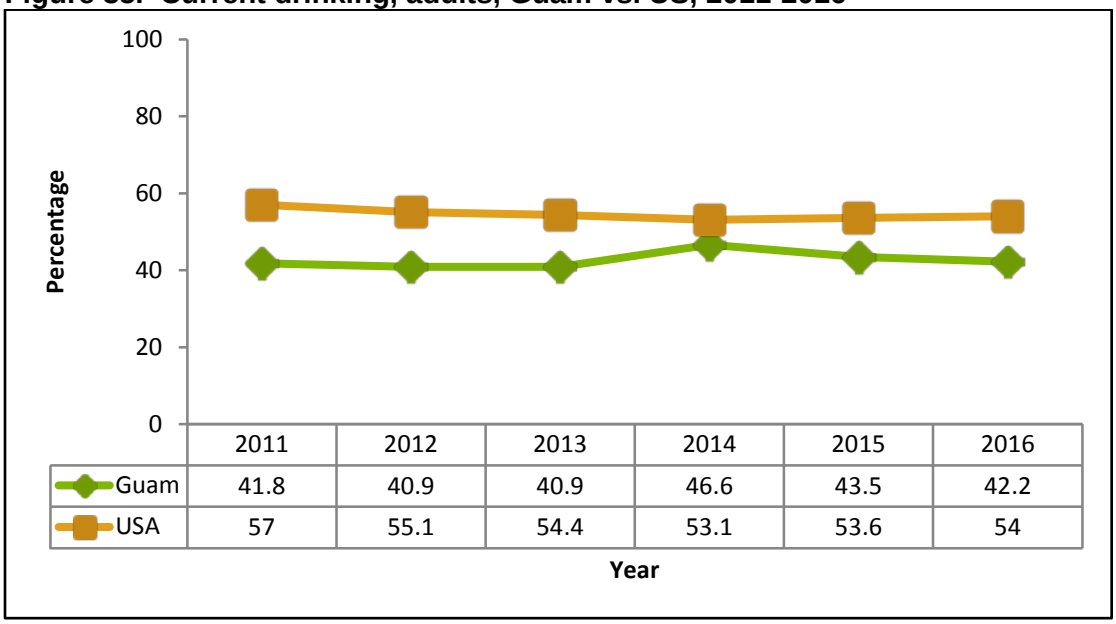
Consumption: Adults

Current Alcohol Use

TREND and PREVALENCE

The BRFSS defines current alcohol use as having had at least 1 drink of alcohol in the past 30 days. Current alcohol consumption in Guam remained unchanged from previous years. In 2016, 42% of adults on Guam reported having had at least one drink of alcohol within the past 30 days (Figure 35). Current drinking among adults is lower in Guam than in the US.

Figure 35. Current drinking, adults, Guam vs. US, 2011-2016



	2011	2012	2013	2014	2015	2016
Guam	41.8	40.9	40.9	46.6	43.5	42.2
USA	57	55.1	54.4	53.1	53.6	54

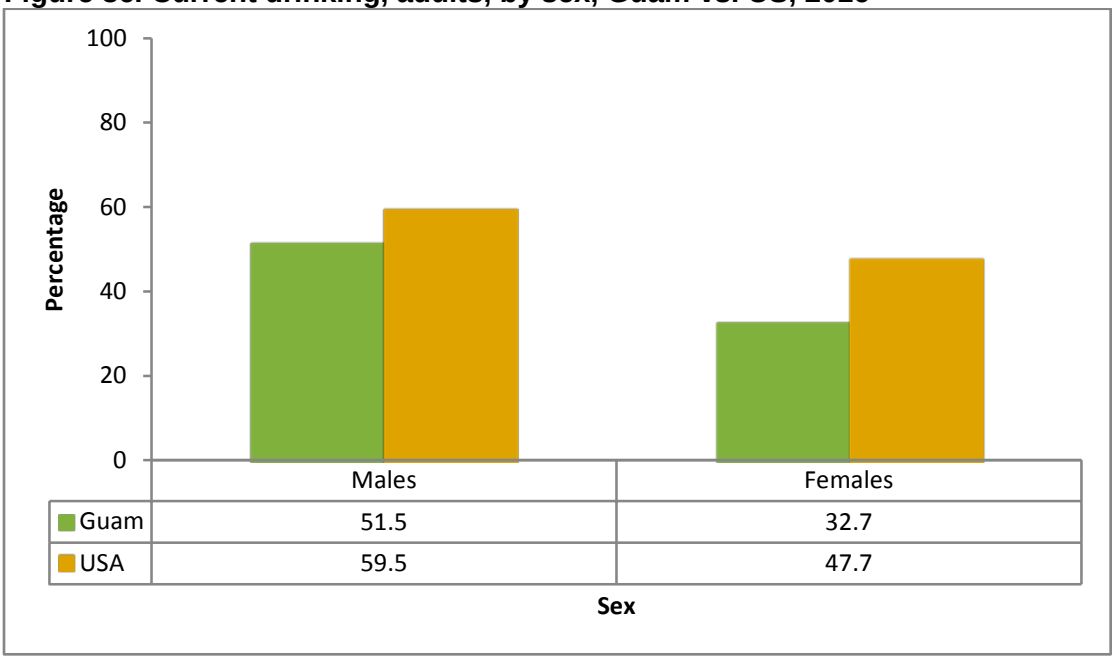
Source: Guam DPHSS, BRFSS, 2011-2016; CDC, BRFSS 2011-2016

CORRELATES

Sex

Overall, men drink more than women, but this sex difference is much more marked on Guam, where males were 40% more likely to report recent consumption of alcohol as females (Figure 36).

Figure 36. Current drinking, adults, by sex, Guam vs. US, 2016



Source: Guam DPHSS, BRFSS, 2016; CDC, BRFSS 2011-2016

Other Correlates

There were no clearly delineated associations between educational attainment, income and current drinking. Whites/Caucasians had the highest prevalence of current drinking (51%), followed by Chamorros (44%).

Age at First Use of Alcohol

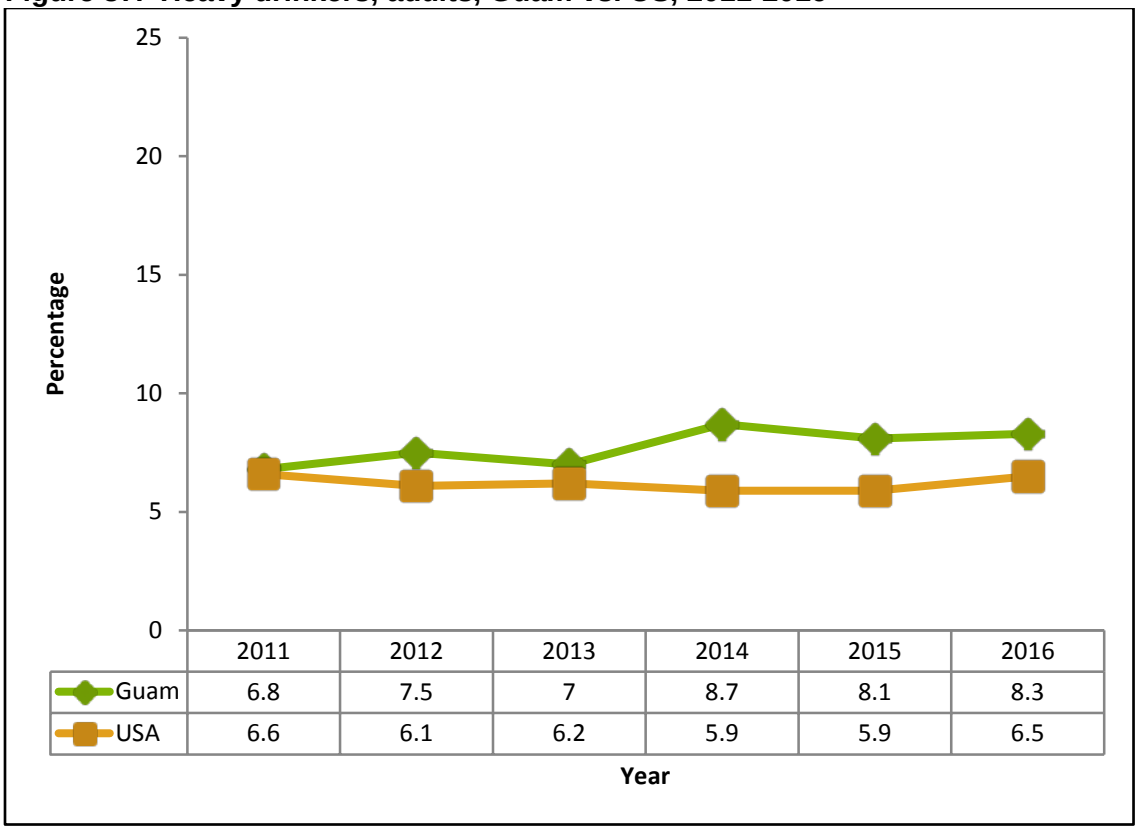
Nearly 60% of Guam adults reported first using alcohol before the age of 21, which is currently the legal age for consumption. One-third (32%) had their first drink between the ages of 10 to 17. Three percent (3%) of the adults surveyed reported trying alcohol for the first time at or before the age of 12 years.

Heavy Alcohol Use

TREND and PREVALENCE

Heavy drinking is defined in the BRFSS as adult men having more than two drinks per day and adult women having more than one drink per day. The prevalence of heavy drinking on Guam is higher than the US average (Figure 37).

Figure 37. Heavy drinkers, adults, Guam vs. US, 2011-2016



	2011	2012	2013	2014	2015	2016
Guam	6.8	7.5	7	8.7	8.1	8.3
USA	6.6	6.1	6.2	5.9	5.9	6.5

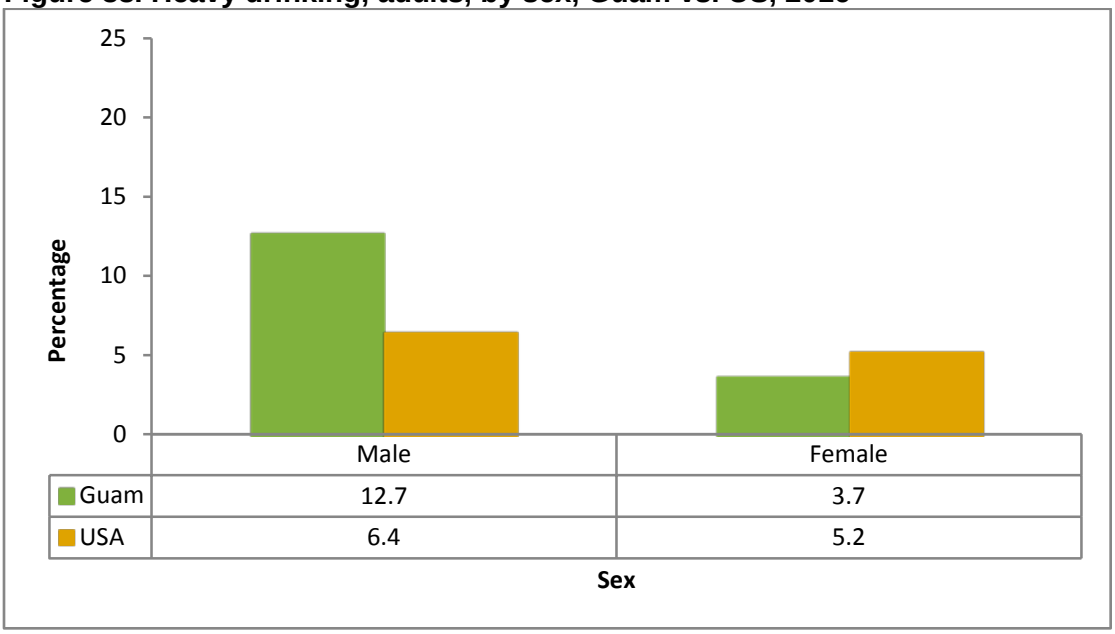
Source: Guam DPHSS, BRFSS, 2011-2016; CDC, BRFSS 2011-2016

CORRELATES

Sex

Males were more likely to report heavy drinking than females (Figure 38). Heavy drinking among males on Guam was almost twice the US median, while heavy drinking among women on Guam was lower than the US median. The sex difference in heavy drinking was more marked in Guam, where men reported heavy drinking at a rate that was thrice that of women.

Figure 38. Heavy drinking, adults, by sex, Guam vs. US, 2016

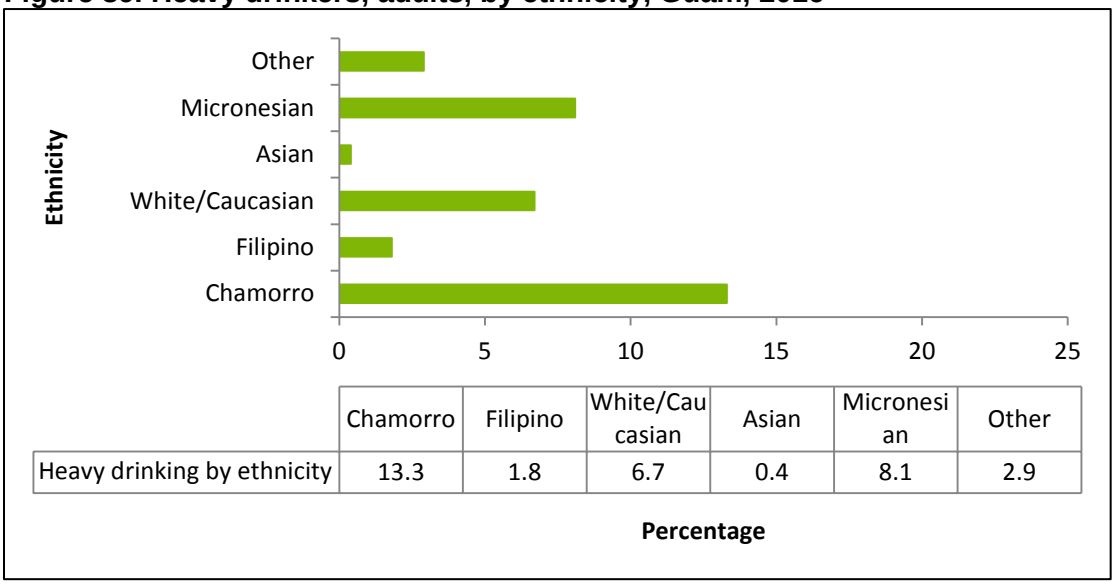


Source: Guam DPHSS, BRFSS, 2016; CDC, BRFSS, 2016

Ethnicity

Data disaggregated for Guam ethnic categories is available for 2016. Heavy drinking is most prevalent among Chamorros (Figure 39).

Figure 39. Heavy drinkers, adults, by ethnicity, Guam, 2016



Source: Guam DPHSS, BRFSS, 2016

Other correlates

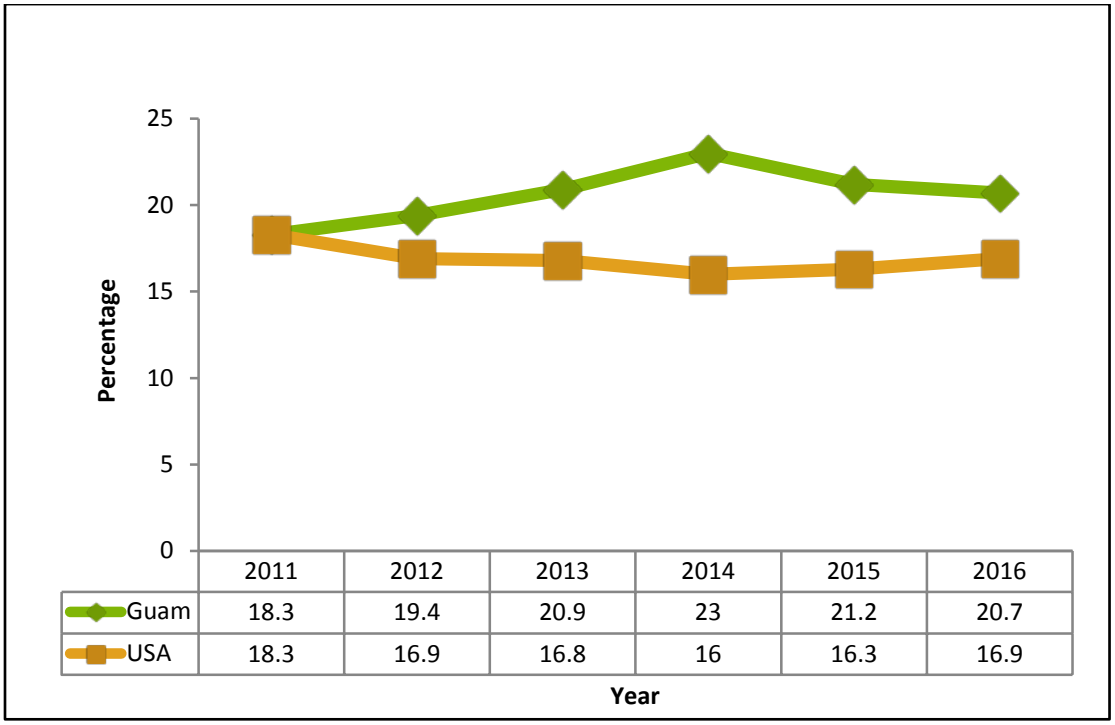
Because of the small numbers of respondents reporting heavy drinking, it is difficult to ascertain relationships between heavy drinking and education or income.

Binge Drinking

TREND and PREVALENCE

Binge drinking, defined as having five or more drinks on one occasion, was reported by 21% of adults on Guam in 2016 (Figure 40). The trend appeared to be increasing for Guam until 2014; since then, binge drinking prevalence has been trending downwards. Of note, Guam passed its "Responsible Alcohol Sales and Service Act" in 2013, with implementation started in 2014; this law mandates training of all licensed alcohol servers in preventing the sale of alcoholic beverages to persons under 21 years of age, recognizing falsified identification documents, denial of service to an intoxicated or unruly person and enforcement of hours of service and sale of alcoholic beverages.

Figure 40. Binge drinking, adults, Guam vs. US, 2011-2016



	2011	2012	2013	2014	2015	2016
Guam	18.3	19.4	20.9	23	21.2	20.7
USA	18.3	16.9	16.8	16	16.3	16.9

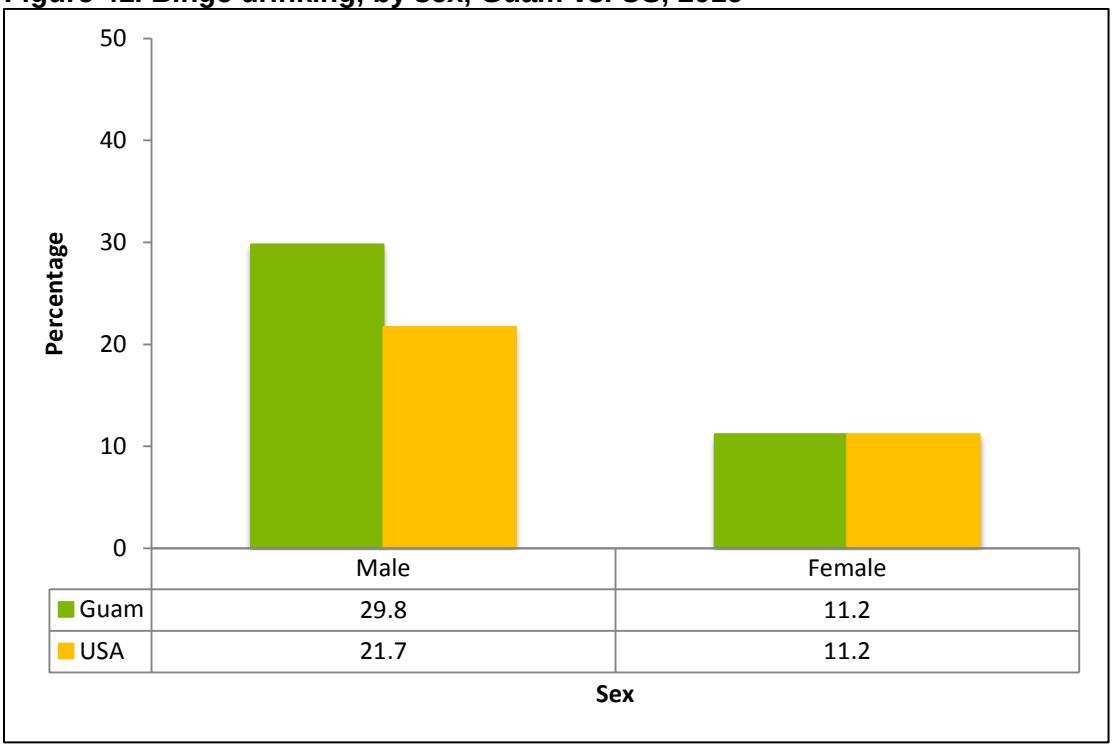
Source: Guam DPHSS, BRFSS, 2011-2016; CDC, BRFSS, 2011-2016

CORRELATES

Sex

Males on Guam had a binge-drinking rate that was three times higher than their female counterparts, and about 50% higher than men in the US (Figure 41). Females on Guam had a rate of binge drinking that was similar to that of females in the US.

Figure 41. Binge drinking, by sex, Guam vs. US, 2016

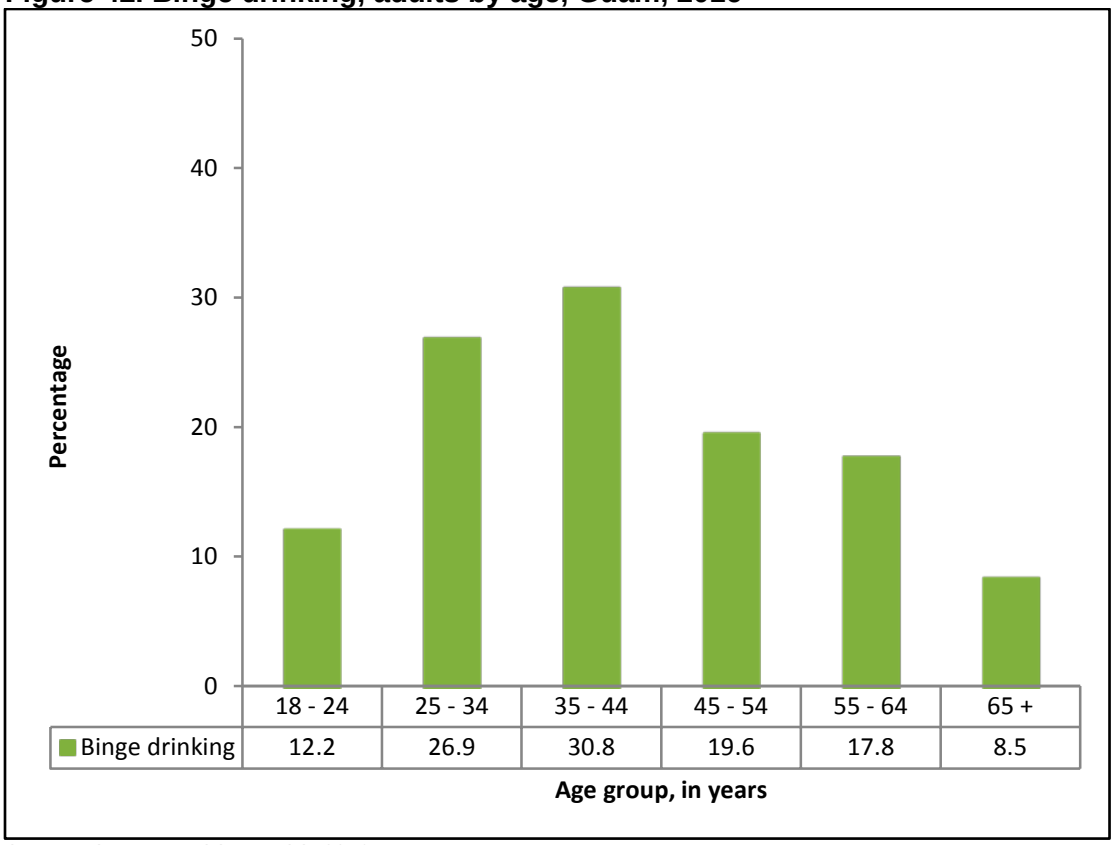


Source: Guam DPHSS, BRFSS, 2016; CDC, BRFSS, 2016

Age

Adults aged 35-44 years had the highest rates of binge drinking (Figure 42).

Figure 42. Binge drinking, adults by age, Guam, 2016

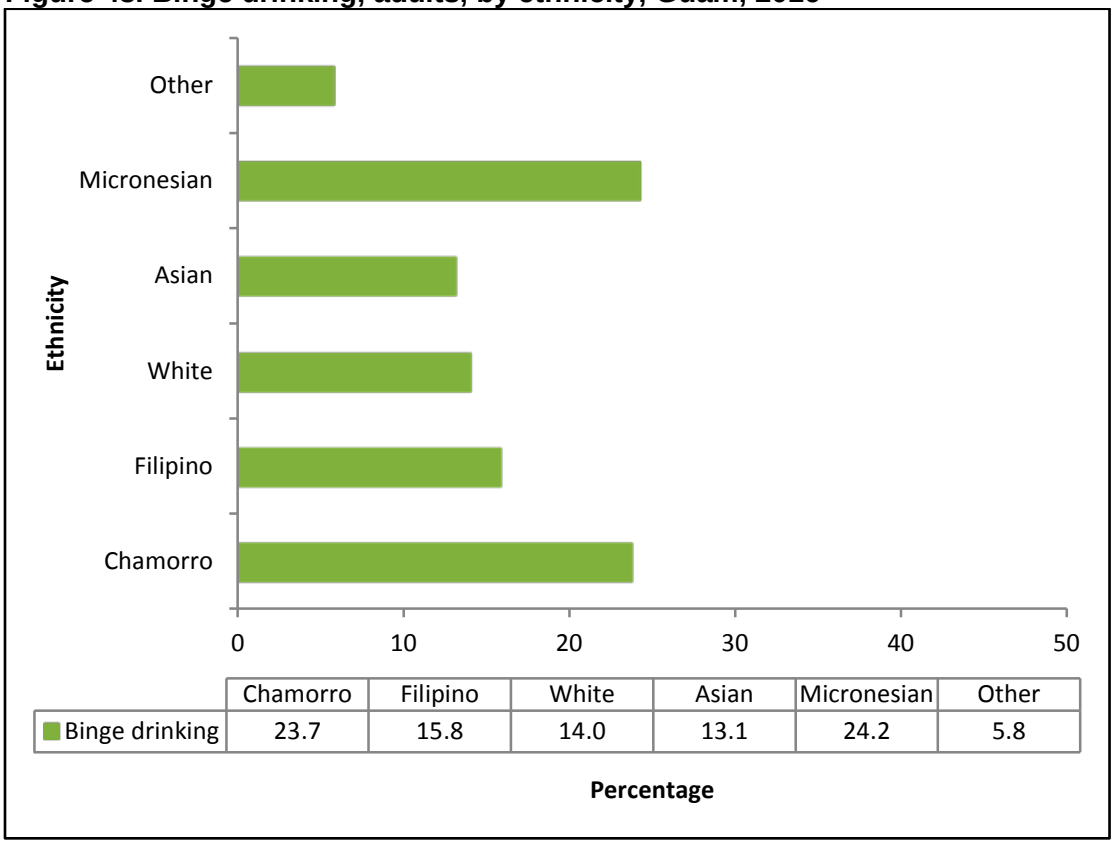


Source: Guam DPHSS, BRFSS, 2016

Ethnicity

Binge drinking is highest among Micronesians and Chamorros. In 2016, 1 in 4 Micronesians (24%) and Chamorros (24%) reported binge drinking (Figure 43). This may explain the higher percentages of alcohol-related arrests among these two ethnic groups.

Figure 43. Binge drinking, adults, by ethnicity, Guam, 2016



	Chamorro	Filipino	White	Asian	Micronesian	Other
Binge drinking	23.7	15.8	14.0	13.1	24.2	5.8

Source: Guam DPHSS, BRFSS, 2016

Perception of harm

About 3 in 4 (74%) adults think binge drinking carries moderate to great risk of physical and other forms of harm, while 10% reported they felt binge drinking carried no risk of harm. Females were more likely to report binge drinking as causing great risk of harm (51% vs. 37%). College graduates were less likely to report no risk of harm compared to those with less than a high school diploma (4.1% vs. 14%). Over 1 in 5 Micronesians reported no risk of harming themselves or others with binge drinking, compared to 9% of Chamorros and 10% of Filipinos.

Drinking and driving

In 2016, 8.8% of adults reported having driven a vehicle while under the influence of alcohol. Men were much more likely to report driving under the influence (16% vs. 2%). Those with less than a high school education were more likely to report drinking and driving compared to college graduates (14% vs. 6%). Eighteen percent of Micronesians and 11% of Chamorros admitted to driving while under the influence of alcohol.

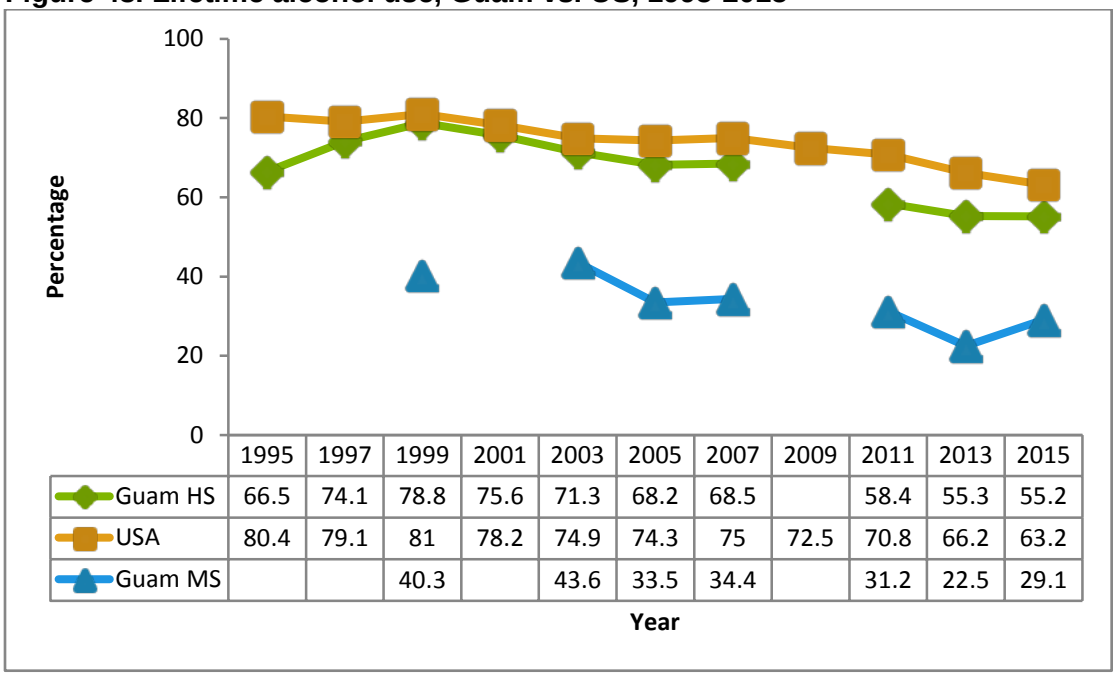
Consumption: Youth

Current and Lifetime Alcohol Use

TREND and PREVALENCE

Lifetime alcohol use among Guam high school students closely parallels the US rates (Figure 43). Current alcohol use in Guam was increasing until 2001, declines were noted over time until 2013 (Figure 44). In 2015, current alcohol use among high school students in Guam remained unchanged from 2013.

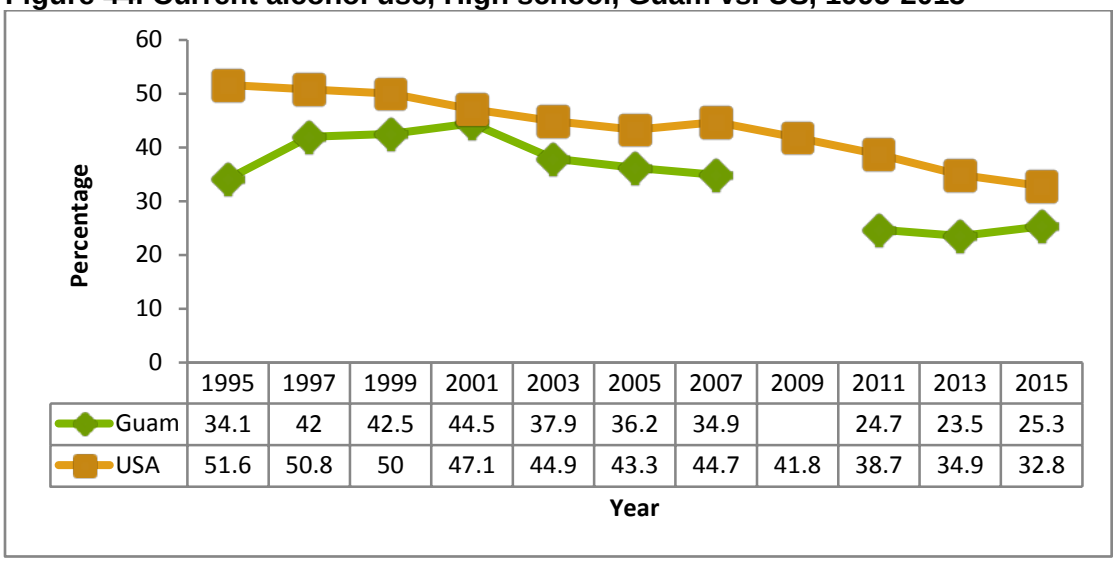
Figure 43. Lifetime alcohol use, Guam vs. US, 1995-2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	66.5	74.1	78.8	75.6	71.3	68.2	68.5		58.4	55.3	55.2
USA	80.4	79.1	81	78.2	74.9	74.3	75	72.5	70.8	66.2	63.2
Guam MS			40.3		43.6	33.5	34.4		31.2	22.5	29.1

Source: GDOE, YRBS 1995-2015
Note: blank cells = data not available

Figure 44. Current alcohol use, High school, Guam vs. US, 1995-2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	34.1	42	42.5	44.5	37.9	36.2	34.9		24.7	23.5	25.3
USA	51.6	50.8	50	47.1	44.9	43.3	44.7	41.8	38.7	34.9	32.8

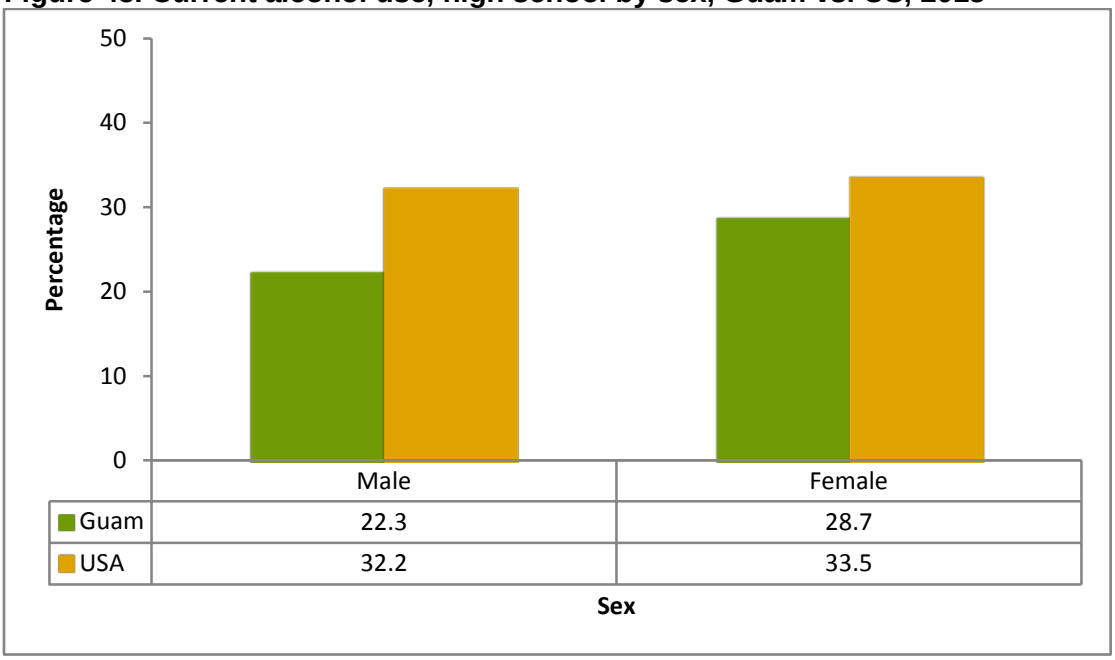
Source: GDOE, YRBS 1995-2015 Note: blank cells = data not available

CORRELATES

Sex

In contrast to adults, and unlike youth tobacco use among high school students in Guam, current drinking is similar across the sexes. Regardless of sex, current alcohol use is lower in Guam (Figure 45).

Figure 45. Current alcohol use, high school by sex, Guam vs. US, 2015

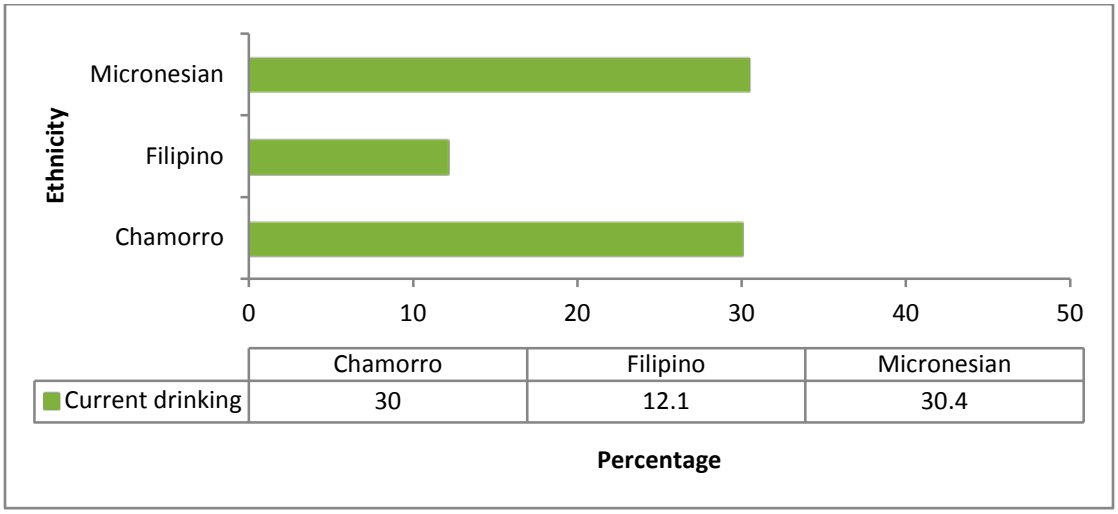


Source: GDOE, YRBS 2015

Ethnicity

When disaggregated by ethnicity/race, Filipino youth have the lowest rates for current alcohol use compared to Chamorro and other Micronesian youth (Figure 46).

Figure 46. Current drinking, high school, by ethnicity, Guam, 2015



Source: GDOE, YRBS 2015

Age at First Use of Alcohol

In 2015, 16% of high school students in Guam reported that they had their first alcoholic drink before the age of 13 years, while 11% of middle school students stated they had their first drink of alcohol before the age of 11 years.

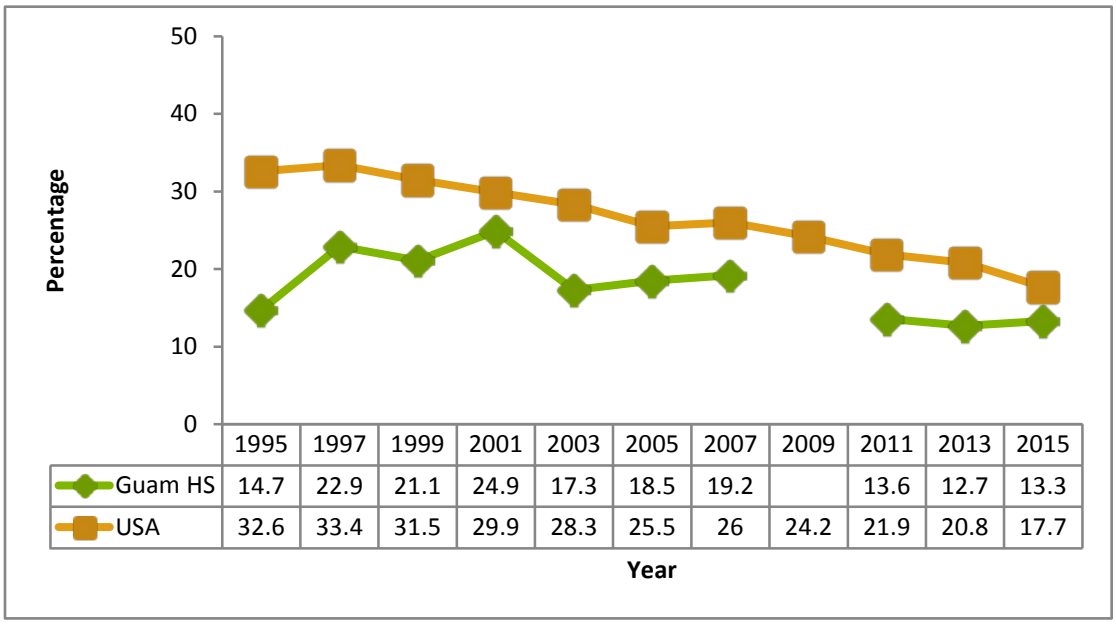
Binge Drinking

TREND and PREVALENCE

Binge drinking among youth is lower on Guam than on the US. In 2015, 13% of Guam high school students reported binge drinking, compared to 18% of high school students in the US (Figure 47).

From 1995 to 2001, US rates were decreasing while Guam rates were increasing. Thus, the difference between Guam and US rates was shrinking. In 2003, the binge-drinking rate decreased for the first time since 1995, followed by a further drop in 2011. However, the decrease in Guam binge drinking prevalence has not kept up with the declines in US rates; thus the gap is once again narrowing.

Figure 47. Binge drinking, high school: Guam vs. US, 1995 to 2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	14.7	22.9	21.1	24.9	17.3	18.5	19.2		13.6	12.7	13.3
USA	32.6	33.4	31.5	29.9	28.3	25.5	26	24.2	21.9	20.8	17.7

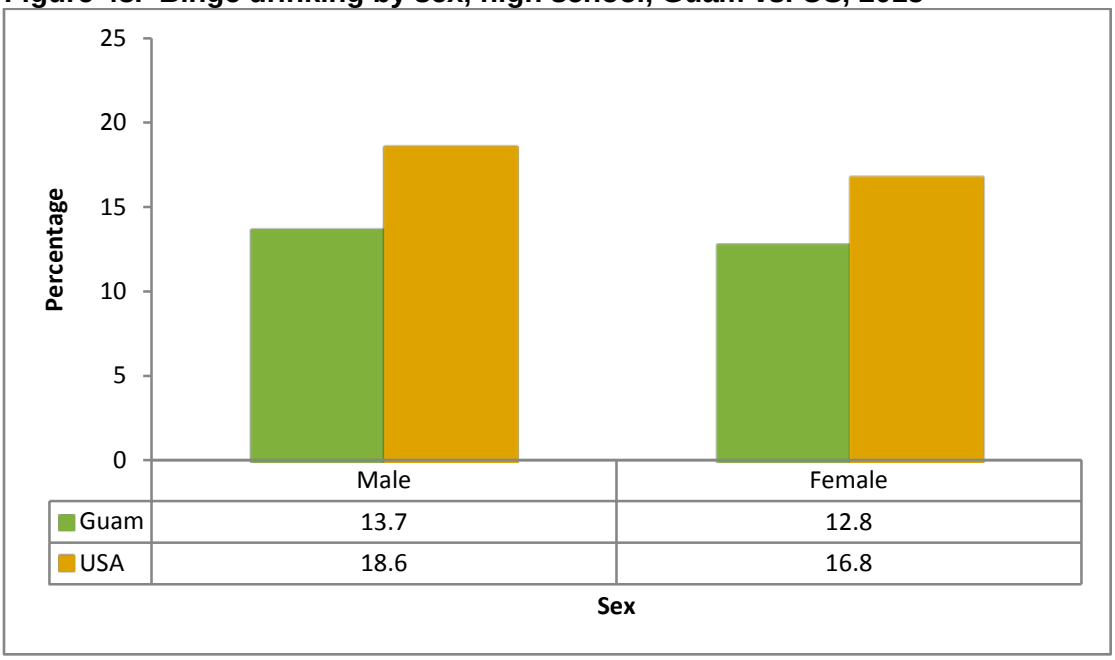
Source: GDOE, YRBS 1995-2015
Note: blank cells = data not available

CORRELATES

Sex

In 2015, there was no difference noted in binge drinking rates across the sexes in Guam. Binge drinking prevalence was higher among US students, regardless of sex (Figure 48).

Figure 48. Binge drinking by sex, high school, Guam vs. US, 2015

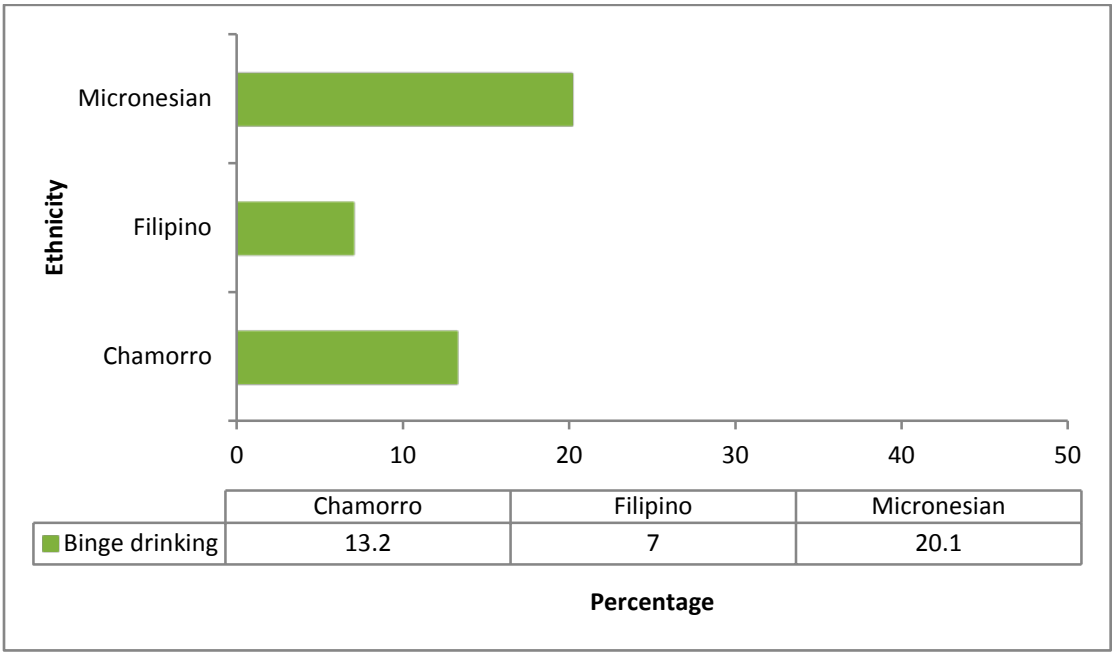


Source: GDOE, YRBS 2015

Ethnicity

Filipino youth have the lowest rates for binge drinking, while Micronesian youth have the highest (Figure 49).

Figure 49. Binge drinking, high school by ethnicity, Guam, 2015

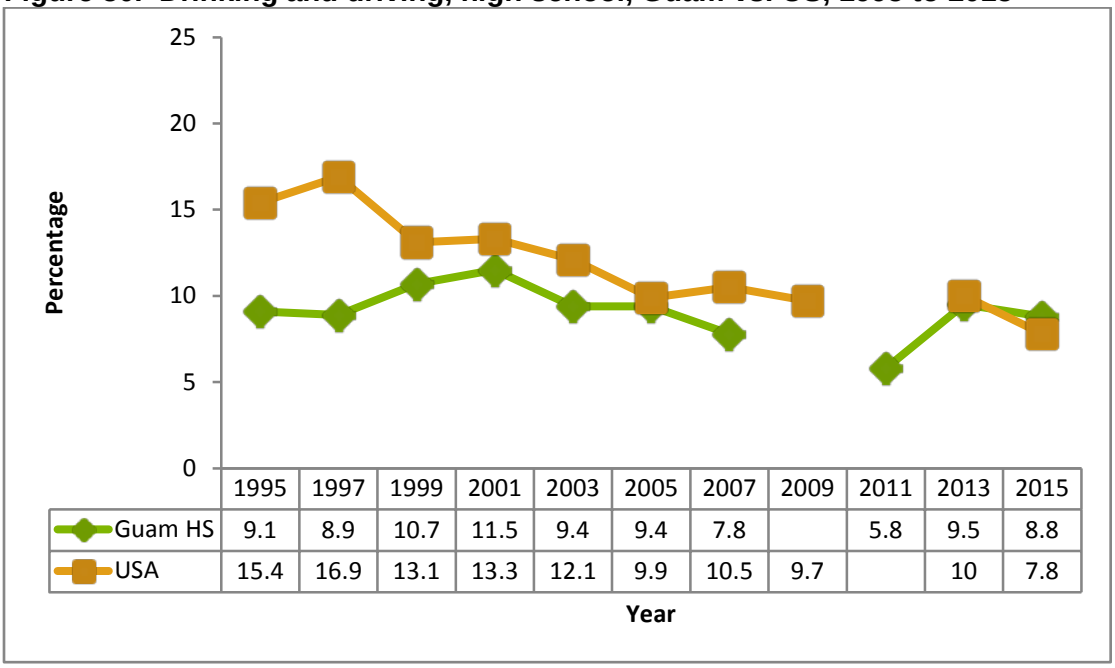


Source: GDOE, YRBS 2015

Drinking and Driving

Drinking and driving increased among Guam high school students between 2011 and 2013, with no change noted in 2015. Nearly one in eleven students reported they drove when drinking alcohol during the 30 days before the survey (Figure 50).

Figure 50. Drinking and driving, high school, Guam vs. US, 1995 to 2015

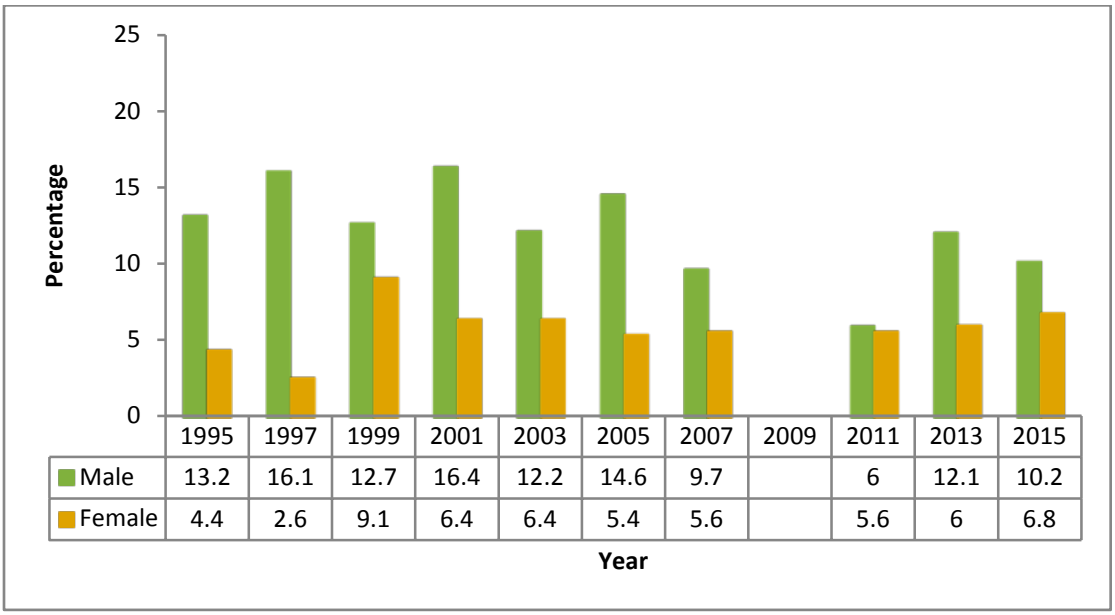


	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	9.1	8.9	10.7	11.5	9.4	9.4	7.8		5.8	9.5	8.8
USA	15.4	16.9	13.1	13.3	12.1	9.9	10.5	9.7		10	7.8

Source: GDOE, YRBS 1995-2015
Note: blank cells = data not available

In 2015, males were more likely than females to drink and drive (Figure 51).

Figure 51. Drinking and driving, high school, by sex, Guam, 1995-2015



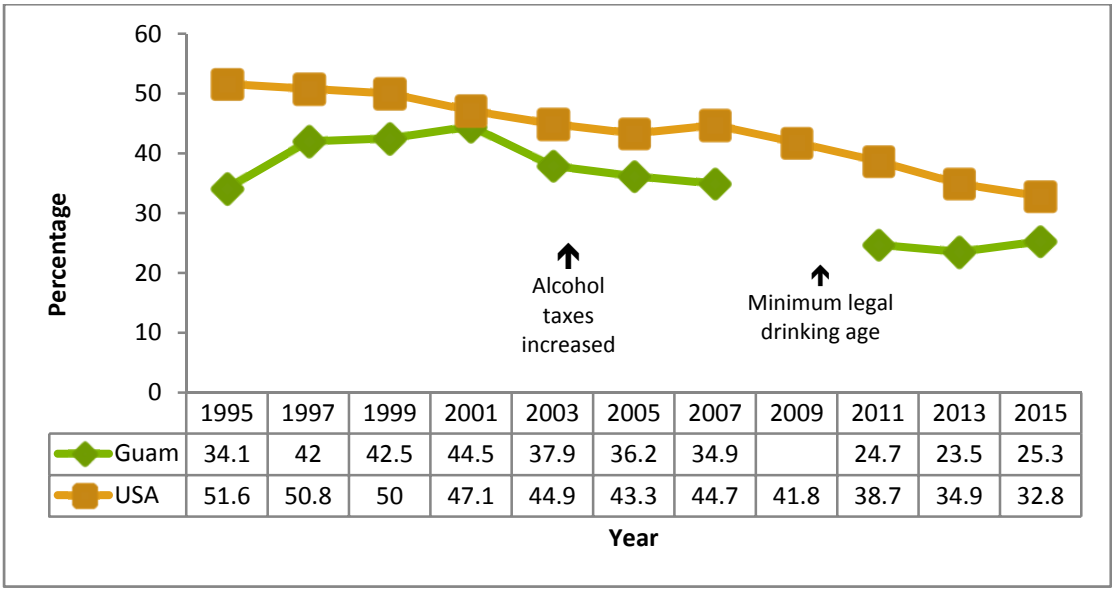
	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Male	13.2	16.1	12.7	16.4	12.2	14.6	9.7		6	12.1	10.2
Female	4.4	2.6	9.1	6.4	6.4	5.4	5.6		5.6	6	6.8

Source: GDOE, YRBS 1995-2015 Note: blank cells = data not available

Policy impact on alcohol consumption

Guam raised taxes on alcohol products in 2003. In 2010, the minimum legal age for alcohol consumption was raised from 18 to 21 years. These policy milestones were accompanied or followed by significant declines in youth current alcohol use and binge drinking. Of note, the youth current alcohol use and binge drinking rates were rising steadily from 1995 to 2001; this upward trend was reversed after the increase in alcohol taxes in 2003 (Figures 52 and 53).

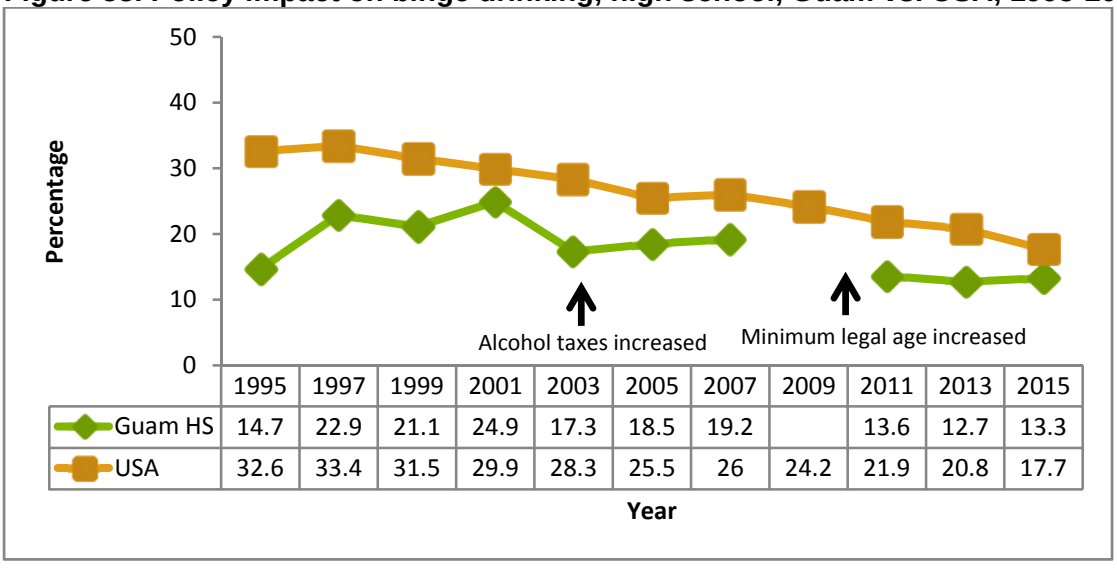
Figure 52. Policy impact on current alcohol use, high school, Guam vs. USA, 1995-2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	34.1	42	42.5	44.5	37.9	36.2	34.9		24.7	23.5	25.3
USA	51.6	50.8	50	47.1	44.9	43.3	44.7	41.8	38.7	34.9	32.8

Source: GDOE, YRBS 1995-2015
Note: blank cells = data not available

Figure 53. Policy impact on binge drinking, high school, Guam vs. USA, 1995-2015



	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	14.7	22.9	21.1	24.9	17.3	18.5	19.2		13.6	12.7	13.3
USA	32.6	33.4	31.5	29.9	28.3	25.5	26	24.2	21.9	20.8	17.7

Source: GDOE, YRBS 1995-2015; CDC, YRBS, 1995-2015
Note: blank cells = data not available

Alcohol: Consequences

Health Consequences

Alcohol directly contributes to cancer, the 2nd leading cause of death on Guam (see Table 13). In addition, alcohol is implicated in some types of heart disease, stroke, suicide, and accidents and chronic alcoholism can worsen the prognosis of persons with pneumonia, septicemia and diseases of the digestive system (liver cirrhosis).

Alcohol is a major risk factor for liver cancer. Liver cancer has risen in rank from being the 5th cause of cancer death in Guam in 2003-2007, to being the 2nd in 2008-2012. Previously, liver cancer accounted for 7% of cancer deaths; however, in 2008-2012, it comprised 11% of all cancer deaths. In 2008-2012, Guam had a liver cancer incidence rate (age-adjusted rate = 16.72 per 100,000) that was more than double the US rate (7.3 per 100,000). The mortality rate from live cancer in Guam (age-adjusted rate = 13.13 per 100,000) was also more than twice the US rate (5.9 per 100,000). The liver cancer mortality rate for Micronesians in Guam was nearly 5 times higher than the US rate (Table 14).

Table 14. Top cancer cases and deaths, selected cancer sites, Guam, 2008-2012

	Cancer Sites	Incidence Counts (New Cases)	Percent of Total Cancer Incidence		Cancer Sites	Mortality Counts (Death)	Percent of Total Cancer Mortality
1	Breast (Female)	292	15.3%	1	Lung and Bronchus	213	28.9%
2	Lung and Bronchus	281	14.8%	2	Liver	81	11.0%
3	Prostate	201	10.6%	3	Colon and Rectum	78	10.6%
4	Colon, Rectum & Anus	190	10.0%	4	Prostate	40	5.4%
5	Cervix	130	6.8%	5	Breast (Female)	37	5.0%
6	Liver	105	5.5%	6	Leukemia	35	4.8%
7	Thyroid	86	4.5%	7	Non-Hodgkin Lymphoma	26	3.5%
8	Uterus	70	3.7%	8	Pancreas	24	3.3%
9	Leukemia	68	3.6%	9	Stomach	21	2.9%
10	Non-Hodgkin Lymphoma	55	2.9%	10	Nasopharynx	19	2.6%
	Other Cancer Sites	426	22.3%		Other Cancer Sites	162	22.0%
	All New Cancer Cases	**1904**	**100.0%**		**All Cancer Deaths**	**736**	**100.00%**

Source: DPHSS, Cancer Facts and Figures 2008-2012

Socio-economic Consequences

Two of the 12 (17%) traffic fatalities for 2016 were alcohol-related. Alcohol-related arrests comprised 19% of all cleared offenses in 2016 (Table 15).

Table 15. Alcohol-related offenses cleared, Guam, 2010 to 2016

Year	Total Offenses Cleared	DUI (Number of all arrests)	Liquor Laws (Number of all arrests)	Drunkenness (Number of all arrests)	Alcohol-related arrests, (% of arrests)
2010	2157	624	61	101	**36.4%**
2011	2079	492	28	0	**25.0%**
2012	2174	463	32	0	**22.8%**
2013	1846	226	78	18	**17.4%**
2014	2036	418	78	133	**30.9%**
2015	3568	531	180	139	**23.8%**
2016	2969	286	133	133	**18.6%**

Source: Guam Police Department, Uniform Crime Report, 2015; Bureau of Statistics and Plans, 2016 Guam Statistical Yearbook, 2017

There were 332 arrests for "Driving under the Influence" (DUI) in 2016, down from 531 arrests from the previous year (Table 16). DUI arrests are predominantly among males, consistent with data that show binge drinking occurs primarily among males. 177 (53%) of the 332 DUI arrests in 2016 were among Micronesians, and 87 (26%) were among Guamanians/Chamorros.

Table 16. Arrests for driving under the influence (DUI), Guam, 2010-2016

Year	Number of Arrests	Percent Change from Previous Year	Rate per 1,000 population
2010	695	-25.03	4.36
2011	294	-57.70	1.84
2012	278	-5.44	1.74
2013	230	-17.27	1.43
2014	443	+93.0	2.7
2015	531	+19.9	3.3
2016	332	-37.5	2.0

Source: Guam Police Department, Uniform Crime Report, 2015; Bureau of Statistics and Plans, 2016 Guam Statistical Yearbook, 2017

Alcohol-related offenses accounted for 12% of all juvenile arrests in 2016 (Table 17).

Table 17. Alcohol-related arrests, juvenile offenders: Guam, 2010 to 2016

Year	Total Arrests	DUI (n)	Liquor Laws (n)	Drunkenness (n)	Alcohol-related arrests, % of arrests (n)
2010	320	3	14	0	**5.3** (17)
2011	246	1	5	0	**2.4** (6)
2012	700	2	47	1	**7.4** (50)
2013	550	4	35	2	**7.4** (41)
2014	656	1	87	0	**13.4** (88)
2015	774	1	94	0	**12.3** (95)
2016	410	1	46	1	**11.7** (48)

Source: Guam Police Department, Uniform Crime Report, 2015; Bureau of Statistics and Plans, 2016 Guam Statistical Yearbook, 2017

Alcohol use has been implicated in property crime and violent crime including family violence and suicide. Violent crime decreased in 2016 by 50.4% from 2015 while property crimes remained unchanged from 2014 to 2015 (2016 data pending). Both crime categories were increasing annually from 2010-2013 (Table 18).

Table 18. Change in violent and property crimes, cleared offenses, Guam, 2010 to 2016

Year	Violent Crime, number of cases cleared	% Change from previous year	Property crime, number of cases cleared	% Change from previous year
2010	194		167	
2011	186	-4.1	198	+18.6
2012	191	+2.7	236	+19.2
2013	314	+64.4	436	+84.7
2014	296	-5.7	388	-11.0
2015	690	+133.1	383	-1.3
2016	342	-50.4	N/A	N/A

Source: Guam Police Department, Uniform Crime Report, 2015; Bureau of Statistics and Plans, 2016 Guam Statistical Yearbook, 2017

The Guam Police Department reported 463 DUI arrests and 12 traffic fatalities in 2016. Alcohol was a factor in 17% of all traffic-related deaths (Table 19).

Table 19. Traffic fatalities and alcohol-related fatalities, Guam, 2010-2016

Year	Traffic Accidents	DUI Arrests	Traffic fatalities (n)	Alcohol-related traffic fatalities (n)	Alcohol-related fatalities (%)
2010	7,165	681	21	6	28.6
2011	6,705	429	18	5	27.8
2012	6,604	442	13	9	69.2
2013	6,653	350	19	6	31.6
2014	6,477	292	19	7	36.8
2015	7,204	531	9	2	22.2
2016	7,566	463	12	2	16.7

Source: Guam Police Department, as reported in the Guam Statistical Yearbook 2015; Bureau of Statistics and Plans, 2016 Guam Statistical Yearbook, 2017

MARIJUANA

Consumption: Adults

TREND AND PREVALENCE

Data on marijuana use in Guam is available for the years 2011-2013, and 2016.

Participants who responded affirmatively to questions on either lifetime marijuana use (2011) or age at first use (2012, 2013) were asked about marijuana use in the past 30 days. Seventeen percent of ever-users of marijuana in 2011, and about 13% of those who reported age at first use in 2012 and 2013 admitted to having used marijuana within the past 30 days before the survey. We calculated the crude population prevalence of current marijuana use from the raw data; in 2013, about 4% of the adult population in Guam were current users of marijuana.

In 2016, CDC introduced an optional marijuana use module, which queried survey participants directly about 30-day past use. About 12% of adults admitted to using marijuana on one or more of the past 30 days. 3.7% of respondents reported using marijuana daily.

CORRELATES OF MARIJUANA USE

Sex

Men were twice more likely than women to have used marijuana recently. In 2016, 15% of adult men and 7% of adult women admitted to marijuana use within the past 30 days (Figure 54).

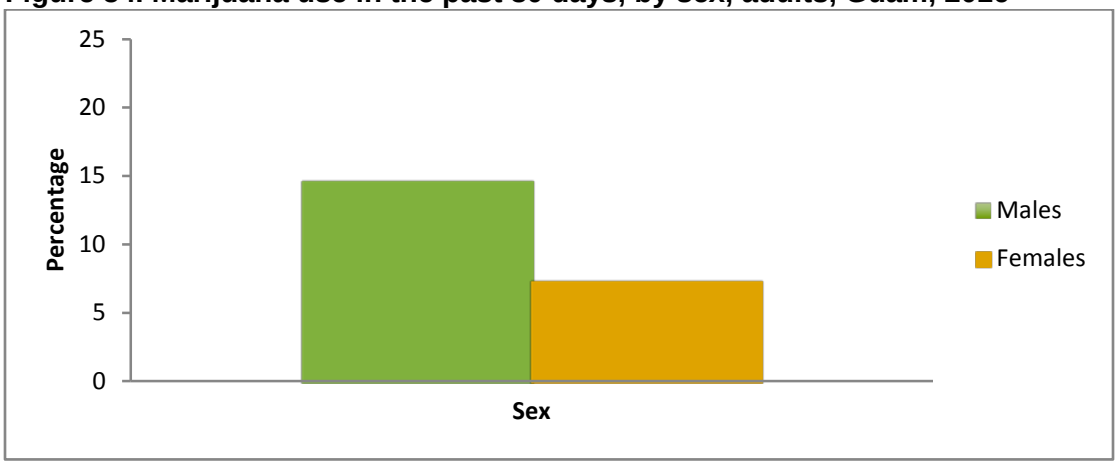
Education

Adults with some post high school education reported the highest rates of 30-day marijuana use.

Ethnicity

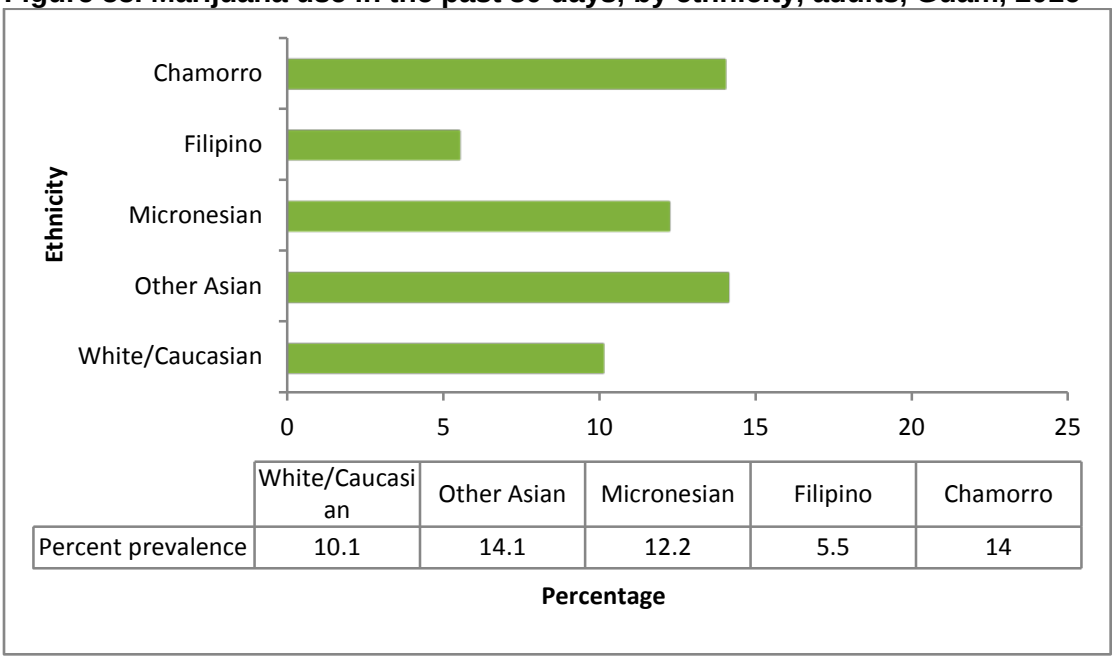
Chamorros and Asians except Filipinos had the highest rates of use in the past 30 days. Filipinos had the lowest (Figure 55).

Figure 54. Marijuana use in the past 30 days, by sex, adults, Guam, 2016



Source: DPHSS, BRFSS 2016

Figure 55. Marijuana use in the past 30 days, by ethnicity, adults, Guam, 2016



	White/Caucasian	Other Asian	Micronesian	Filipino	Chamorro
Percent prevalence	10.1	14.1	12.2	5.5	14

Source: DPHSS, BRFSS 2016

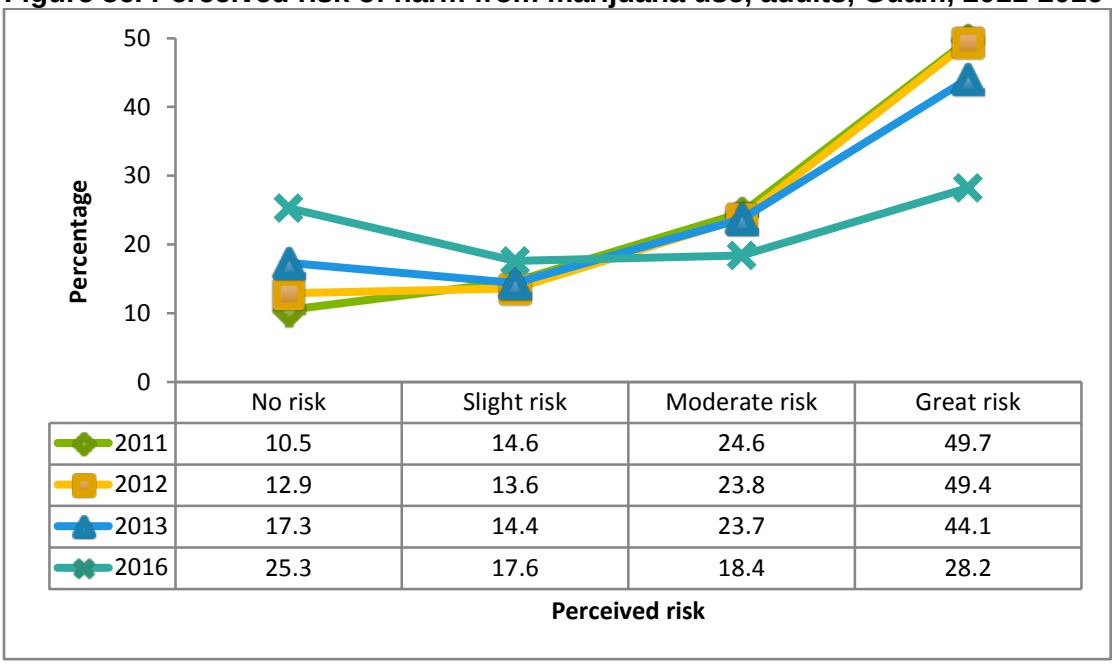
Age at Initiation

Almost 22% of current users reported first using marijuana between the ages of 13 to 17 years. Another 4% stated they first used marijuana at the age of 12 years or younger. Altogether, one-fourth (26%) of current users started using marijuana before the age of 18 years.

Perceived Risk of Harm

The perceived risk of harm from marijuana has decreased significantly over the past years. In 2016, 25% of adults thought that there was no risk associated with marijuana use, compared to 10% in 2011 (Figure 56). In contrast, 28% believed there was great risk, compared to almost 50% in 2011.

Figure 56. Perceived risk of harm from marijuana use, adults, Guam, 2011-2016



	No risk	Slight risk	Moderate risk	Great risk
2011	10.5	14.6	24.6	49.7
2012	12.9	13.6	23.8	49.4
2013	17.3	14.4	23.7	44.1
2016	25.3	17.6	18.4	28.2

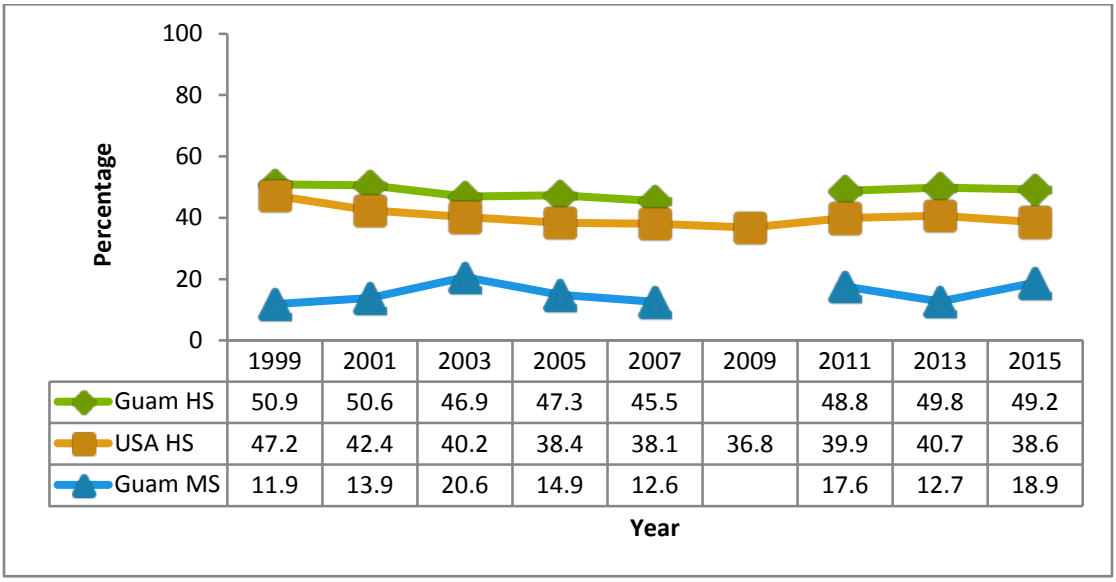
Source: DPHSS, BRFSS 2011-2013; BRFSS 2016

Consumption: Youth

TREND AND PREVALENCE

In 2015, half of all high school students had tried marijuana, and nearly one-third had used marijuana within 30 days of the survey. Among middle school students, 19% had tried marijuana at least once. Current and lifetime marijuana use among high school students in Guam remained higher than in the US (Figures 57 and 58).

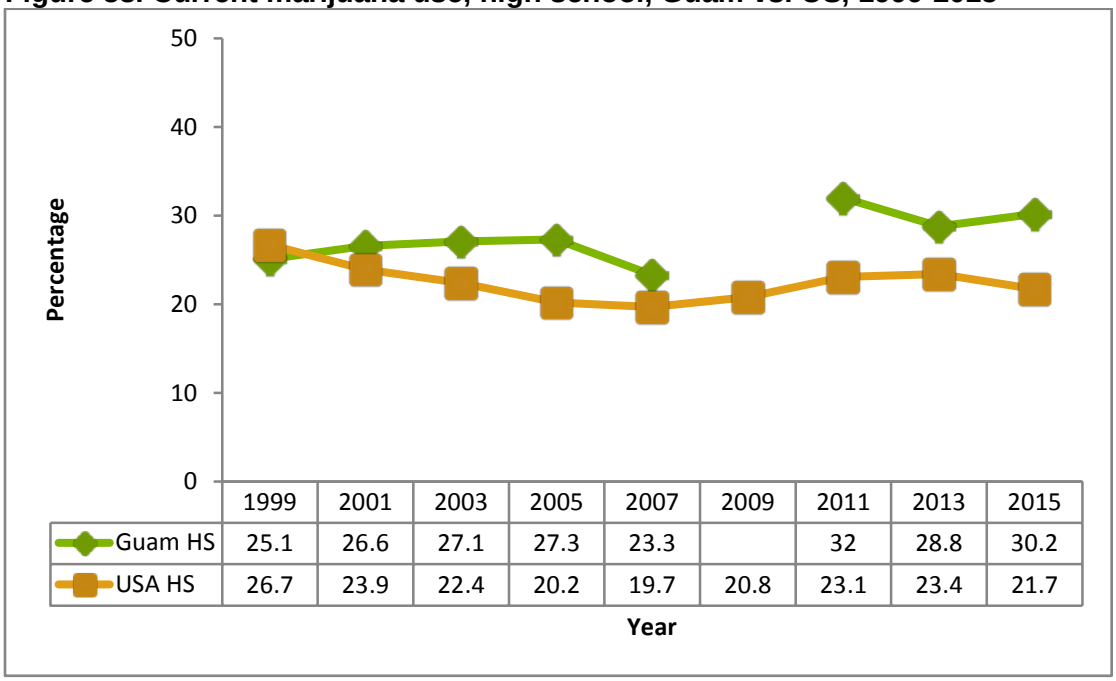
Figure 57. Lifetime marijuana use, high school, Guam vs. US, and middle school, Guam, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	50.9	50.6	46.9	47.3	45.5		48.8	49.8	49.2
USA HS	47.2	42.4	40.2	38.4	38.1	36.8	39.9	40.7	38.6
Guam MS	11.9	13.9	20.6	14.9	12.6		17.6	12.7	18.9

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Figure 58. Current marijuana use, high school, Guam vs. US, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	25.1	26.6	27.1	27.3	23.3		32	28.8	30.2
USA HS	26.7	23.9	22.4	20.2	19.7	20.8	23.1	23.4	21.7

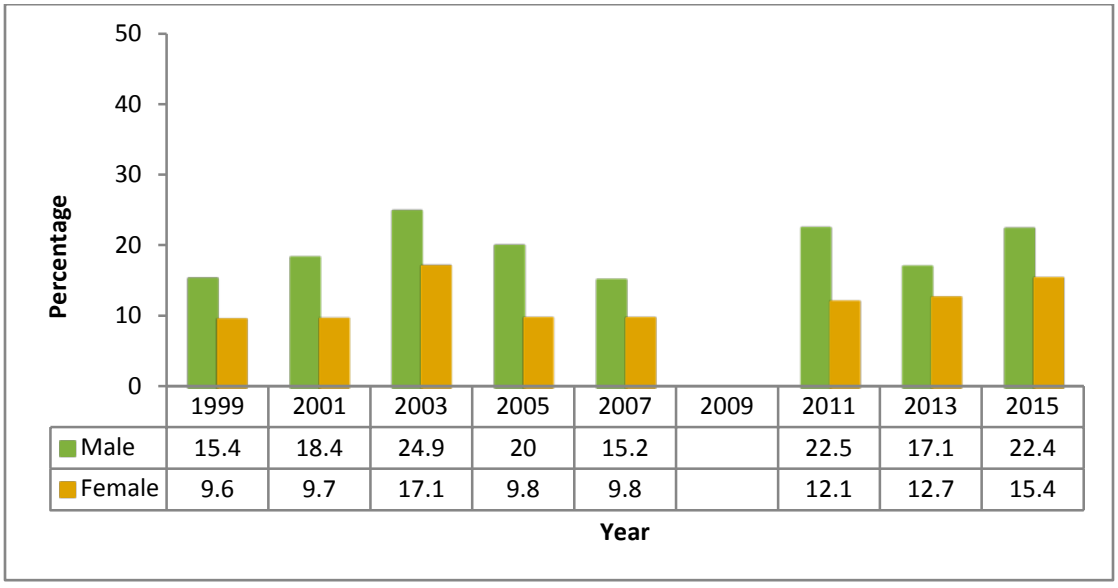
Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

CORRELATES OF MARIJUANA USE

Sex

Male students were more likely to report marijuana use (Figures 59 and 60). However, lifetime use among middle school females and current use among high school females are significant.

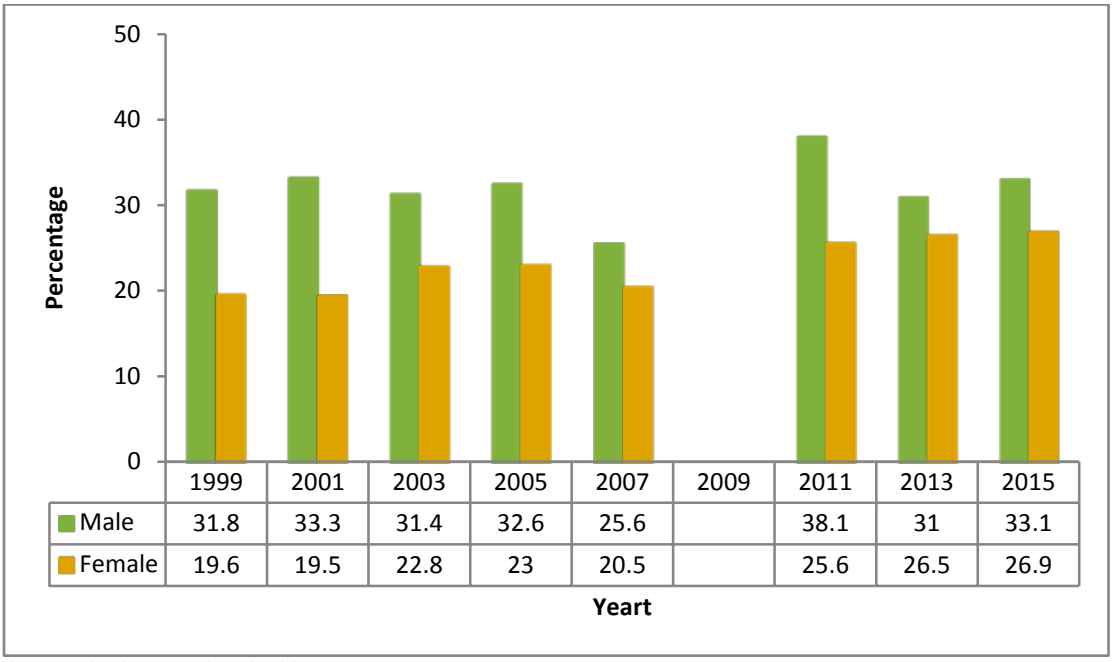
Figure 59. Lifetime marijuana use, middle school, by sex, Guam, 1999 to 2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Male	15.4	18.4	24.9	20	15.2		22.5	17.1	22.4
Female	9.6	9.7	17.1	9.8	9.8		12.1	12.7	15.4

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Figure 60. Current marijuana use, high school, by sex, Guam, 1999 to 2015



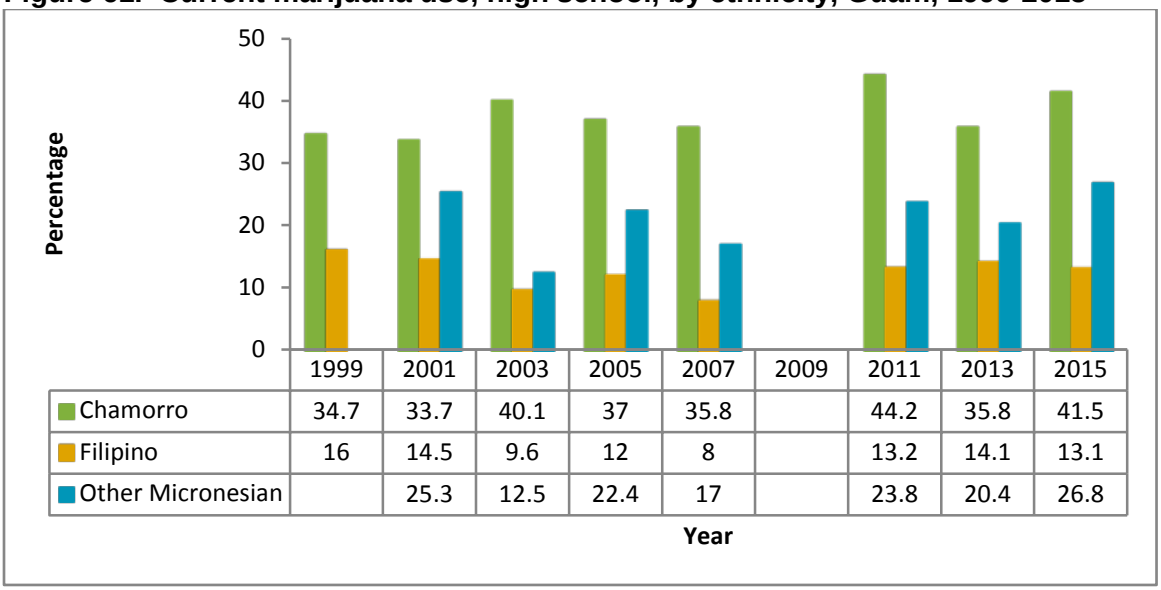
	1999	2001	2003	2005	2007	2009	2011	2013	2015
Male	31.8	33.3	31.4	32.6	25.6		38.1	31	33.1
Female	19.6	19.5	22.8	23	20.5		25.6	26.5	26.9

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Ethnicity

Marijuana use is highest among Chamorro youth and lowest for Filipino youth. Chamorro youth are more than thrice as likely to use marijuana than Filipinos, and 40% more likely to use marijuana than other Micronesian youth (Figure 61). Current use declined for Chamorro and other Micronesian youth from 2011 to 2013, prevalence rose in 2015 for these groups.

Figure 61. Current marijuana use, high school, by ethnicity, Guam, 1999-2015



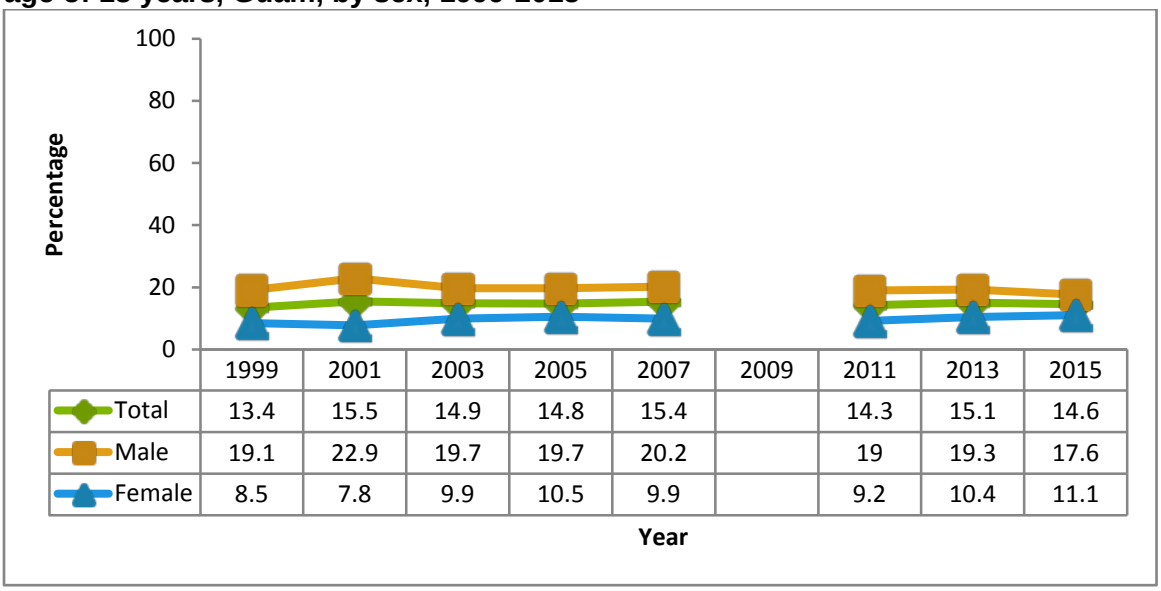
	1999	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	34.7	33.7	40.1	37	35.8		44.2	35.8	41.5
Filipino	16	14.5	9.6	12	8		13.2	14.1	13.1
Other Micronesian		25.3	12.5	22.4	17		23.8	20.4	26.8

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Age at Initiation

Overall, the proportion of high school youth who started using marijuana before the age of 13 years, remained stable at around 15%. Males are more likely than females to report age at 1st use before 13 years (Figure 62).

Figure 62. Percent of high school youth reporting 1st use of marijuana before the age of 13 years, Guam, by sex, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Total	13.4	15.5	14.9	14.8	15.4		14.3	15.1	14.6
Male	19.1	22.9	19.7	19.7	20.2		19	19.3	17.6
Female	8.5	7.8	9.9	10.5	9.9		9.2	10.4	11.1

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

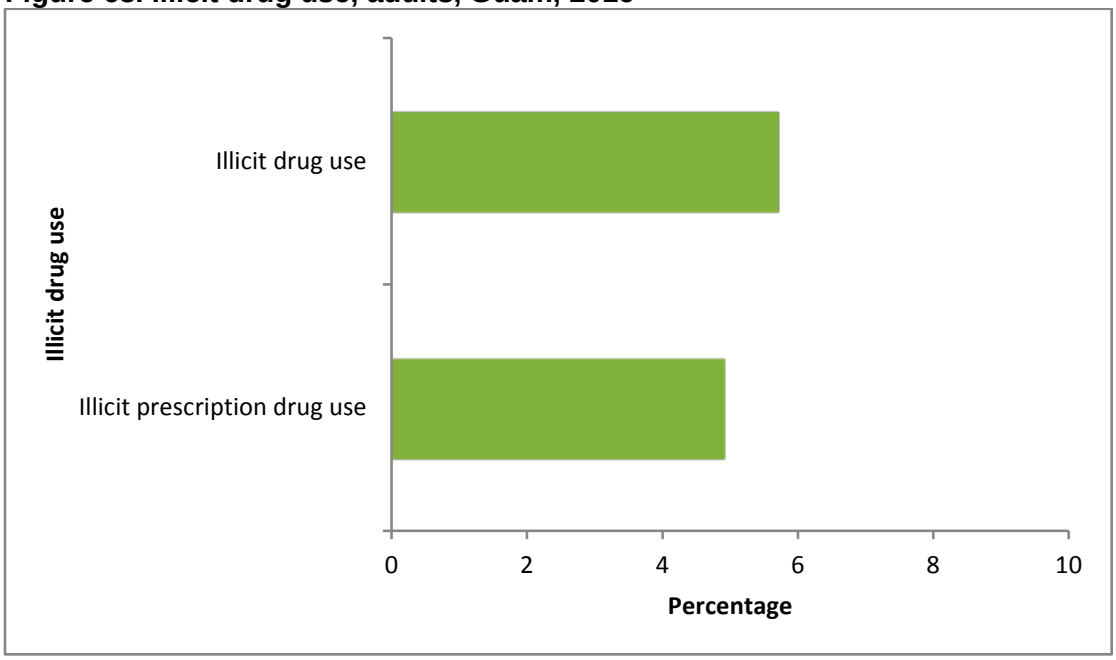
OTHER ILLICIT DRUGS

Consumption: Adults

TREND AND PREVALENCE

Guam started asking about marijuana and other illicit drug use in its BRFSS since 2011. In 2016, 5.7% of adults reported illicit drug use other than marijuana. (Figure 63). In 2016, a question on prescription drug abuse was added to the Guam BRFSS as a State-added question. About 5% of adults reported taking prescription drugs that were not prescribed for them.

Figure 63. Illicit drug use, adults, Guam, 2016



Source: DPHSS, BRFSS 2016

CORRELATES OF ILLICIT DRUG USE

Because of the small numbers of adults reporting illicit drug use, it is difficult to state with accuracy if true differences exist across demographic categories.

Age at initiation

In 2016, about 11% of adults who have used illicit drugs started before the age of 21 years.

Working for employers who conduct random employee drug testing

In 2016, 51% of adults were more likely to work for employers who conduct random drug or alcohol testing on its employees, while 12% were less likely to do so.

CORRELATES OF ILLICIT PRESCSRIPTION DRUG USE

Perception of risk

65% of adults believed there is great risk in using prescription drugs improperly, while 8% believed there was no risk. Higher educational attainment and income were associated with greater perceived risk. 20% of Micronesians perceived there to be no risk, compared to 9% of Filipinos, 7% of Chamorros and 2% of Caucasians.

Consumption: Youth

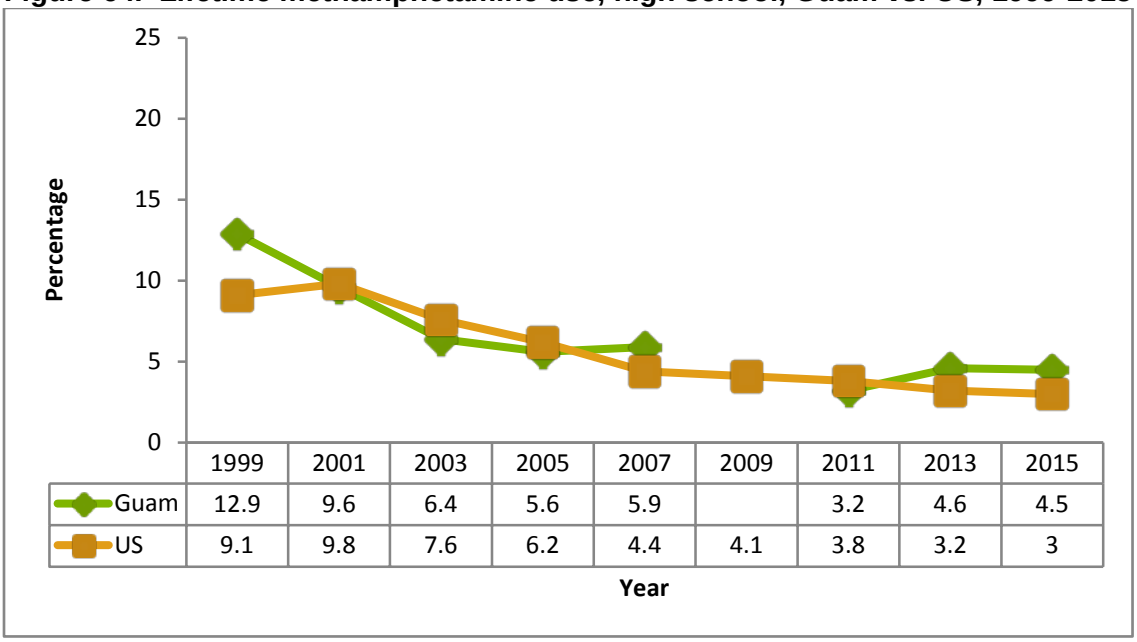
Methamphetamine

TREND AND PREVALENCE

Lifetime prevalence among Guam youth paralleled the decrease in lifetime use among US youth from 2001 to 2011; however, lifetime use increased for Guam in 2013, with no

change in 2015, while the US rate continued to decrease (Figure 64). Four percent of Guam high school students reported ever using methamphetamines.

Figure 64. Lifetime methamphetamine use, high school, Guam vs. US, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	12.9	9.6	6.4	5.6	5.9		3.2	4.6	4.5
US	9.1	9.8	7.6	6.2	4.4	4.1	3.8	3.2	3

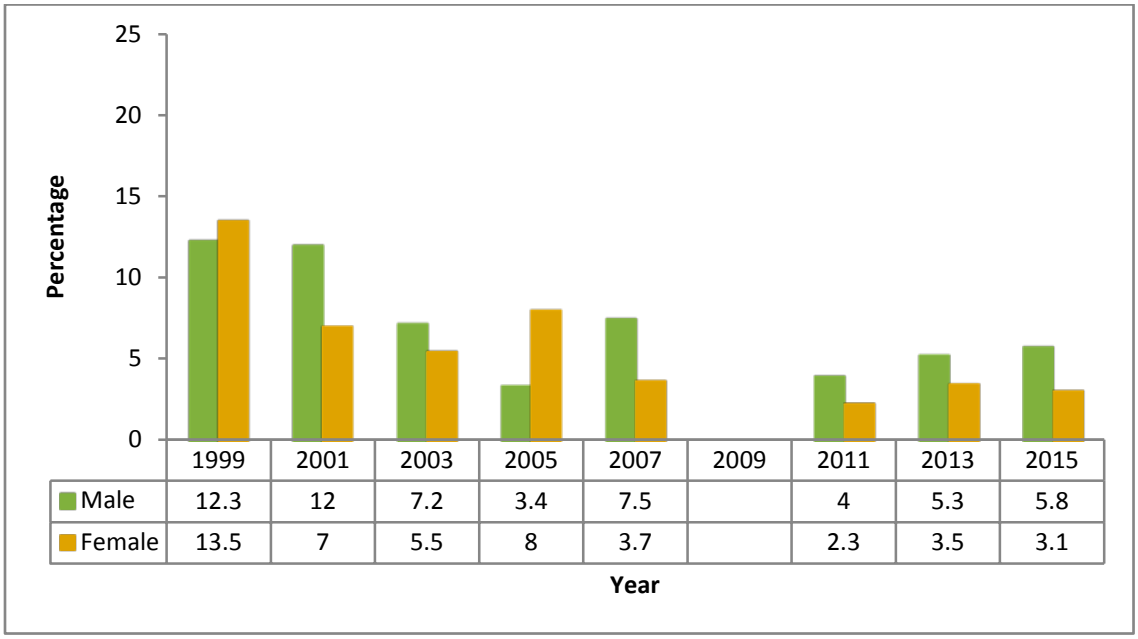
Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

CORRELATES OF METHAMPHETAMINE USE

Sex

Male students are more likely to report ever using methamphetamines than females (Figure 65).

Figure 65. Lifetime methamphetamine use, high school, by sex, Guam vs. US, 1999-2015



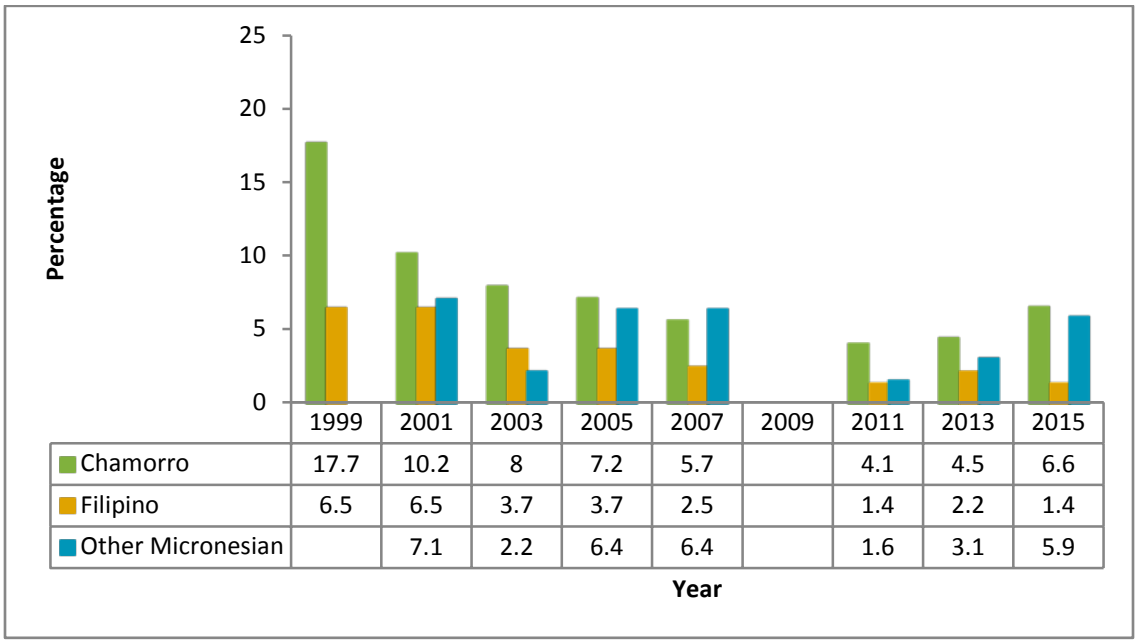
	1999	2001	2003	2005	2007	2009	2011	2013	2015
Male	12.3	12	7.2	3.4	7.5		4	5.3	5.8
Female	13.5	7	5.5	8	3.7		2.3	3.5	3.1

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Ethnicity

Chamorro youth have the highest rate of lifetime methamphetamine use, while Filipino youth have the lowest. Methamphetamine use appears to have increased for Chamorro and other Micronesian youth in 2015 (Figure 66).

Figure 66. Lifetime methamphetamine use, high school, by ethnicity, Guam, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	17.7	10.2	8	7.2	5.7		4.1	4.5	6.6
Filipino	6.5	6.5	3.7	3.7	2.5		1.4	2.2	1.4
Other Micronesian		7.1	2.2	6.4	6.4		1.6	3.1	5.9

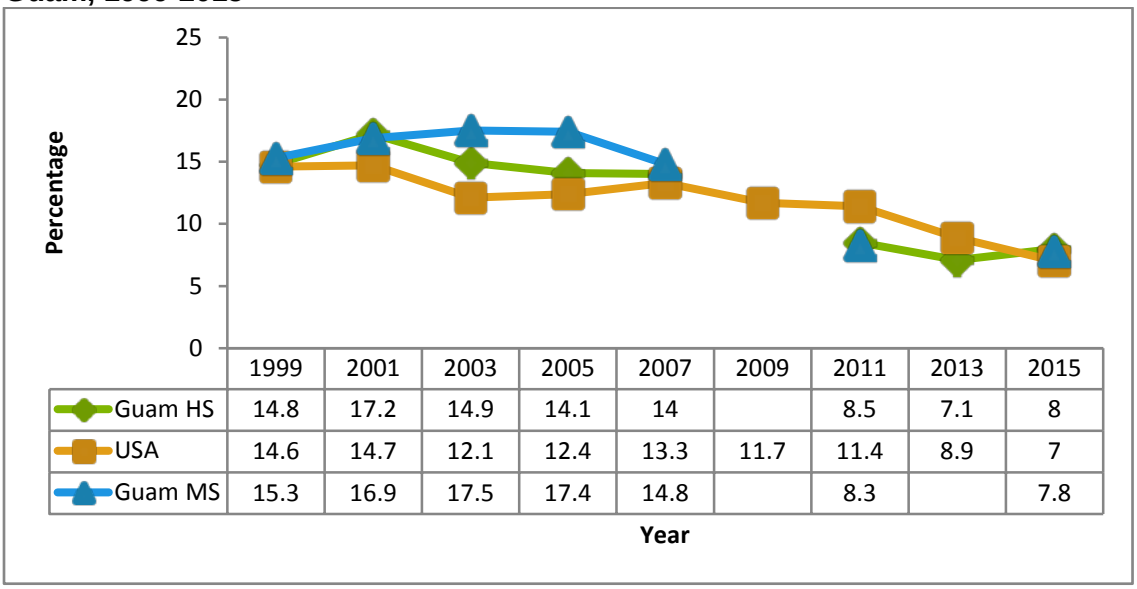
Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Inhalants

TREND AND PREVALENCE

Inhalant use appeared to be decreasing among US and Guam high school youth, and Guam middle school youth (Figure 67). In 2015, 8% of Guam high school and middle school students reported having tried inhalants.

Figure 67. Lifetime inhalant use, high school, Guam vs. US, and middle school, Guam, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam HS	14.8	17.2	14.9	14.1	14		8.5	7.1	8
USA	14.6	14.7	12.1	12.4	13.3	11.7	11.4	8.9	7
Guam MS	15.3	16.9	17.5	17.4	14.8		8.3		7.8

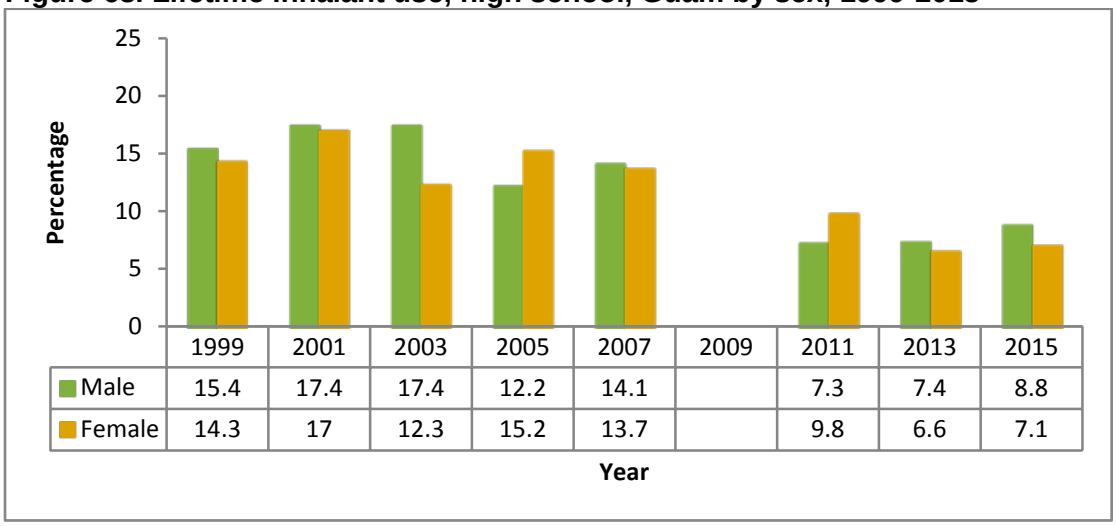
Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

CORRELATES OF INHALANT USE

Sex

There were no obvious sex differences in lifetime inhalant use among Guam youth, although the overall numbers are small and caution is needed in interpreting the data (Figure 68).

Figure 68. Lifetime inhalant use, high school, Guam by sex, 1999-2015



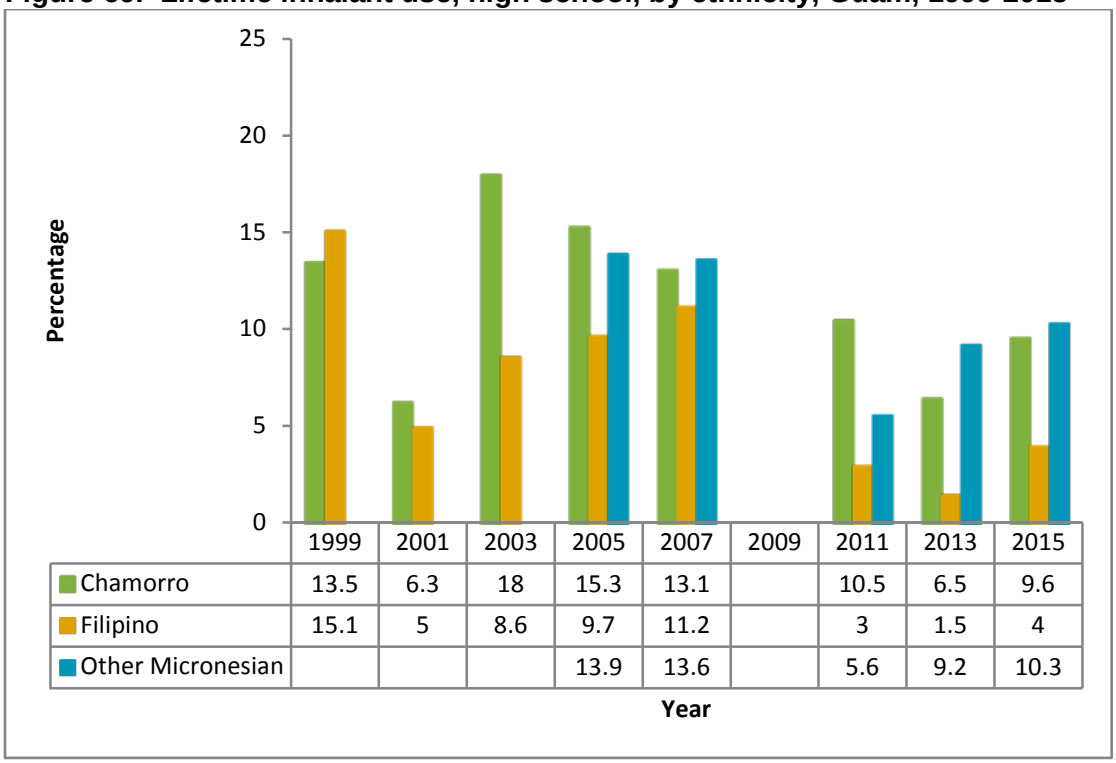
	1999	2001	2003	2005	2007	2009	2011	2013	2015
Male	15.4	17.4	17.4	12.2	14.1		7.3	7.4	8.8
Female	14.3	17	12.3	15.2	13.7		9.8	6.6	7.1

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Ethnicity

Chamorros and other Micronesians had higher reported lifetime inhalant use; among high school students, Filipinos had the lowest prevalence (Figure 69). The numbers of students under some of these categories are small, so caution is needed in interpreting the data.

Figure 69. Lifetime inhalant use, high school, by ethnicity, Guam, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	13.5	6.3	18	15.3	13.1		10.5	6.5	9.6
Filipino	15.1	5	8.6	9.7	11.2		3	1.5	4
Other Micronesian				13.9	13.6		5.6	9.2	10.3

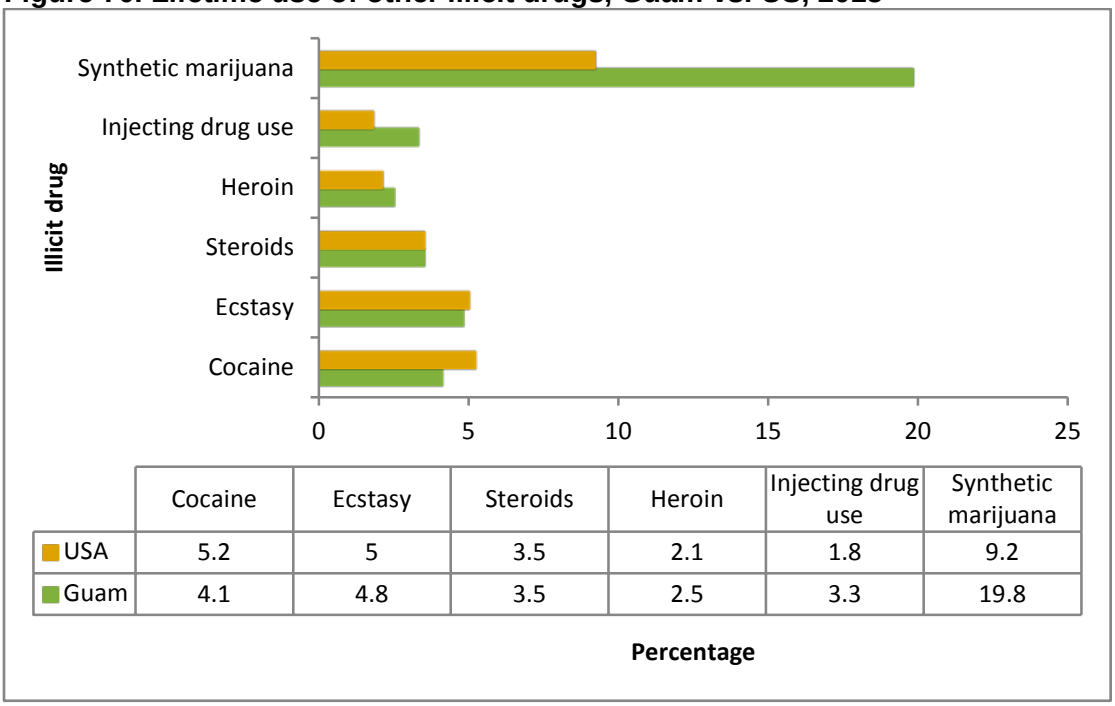
Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Other Illicit Drugs

PREVALENCE

Guam high school students reported higher rates of lifetime use of synthetic marijuana and heroin, and injecting drug use than their US counterparts (Figure 70). The overall Guam numbers are small and caution is needed in interpreting the data.

Figure 70. Lifetime use of other illicit drugs, Guam vs. US, 2015



	Cocaine	Ecstasy	Steroids	Heroin	Injecting drug use	Synthetic marijuana
USA	5.2	5	3.5	2.1	1.8	9.2
Guam	4.1	4.8	3.5	2.5	3.3	19.8

Source: GDOE, YRBS 2015

Prescription Drug Abuse

PREVALENCE

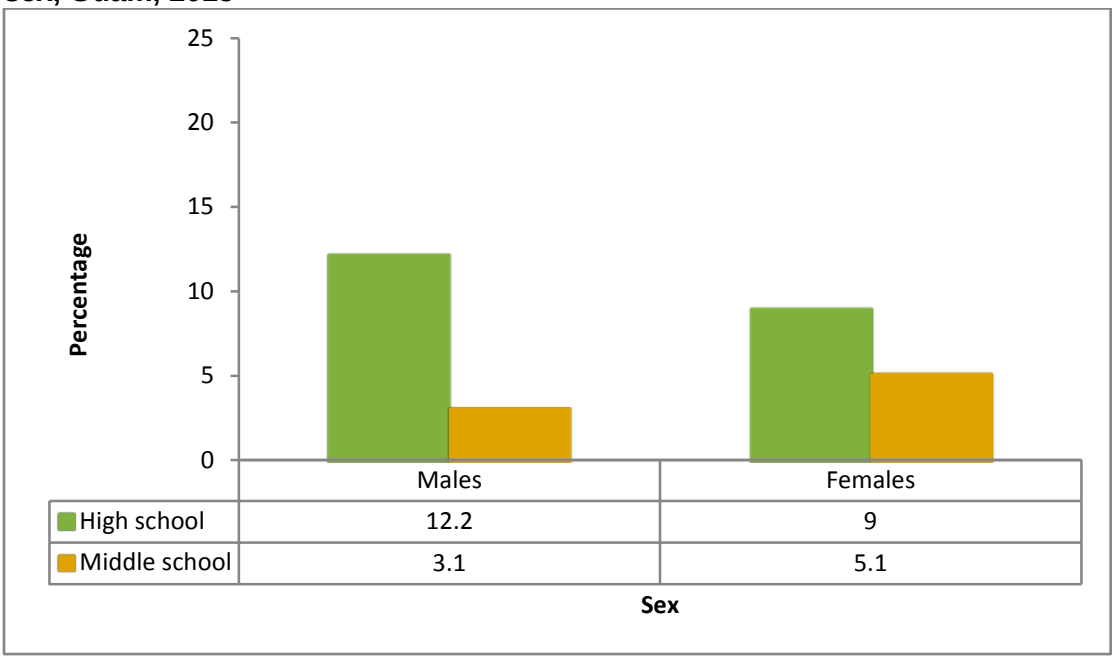
In 2015, 11% of high school students and 4% of middle school students reported taking a prescription drug, such as OxyContin, Percocet, Vicodin, codeine, Adderall, Ritalin or Xanax, without a doctor's prescription.

CORRELATES OF PRESCRIPTION DRUG ABUSE

Sex

No statistically significant sex differences were noted for prescription drug abuse among high school and middle school students (Figure 71). Because the numbers are small, caution is needed in interpreting the data.

Figure 71. Lifetime prescription drug abuse, high school vs. middle school by sex, Guam, 2015

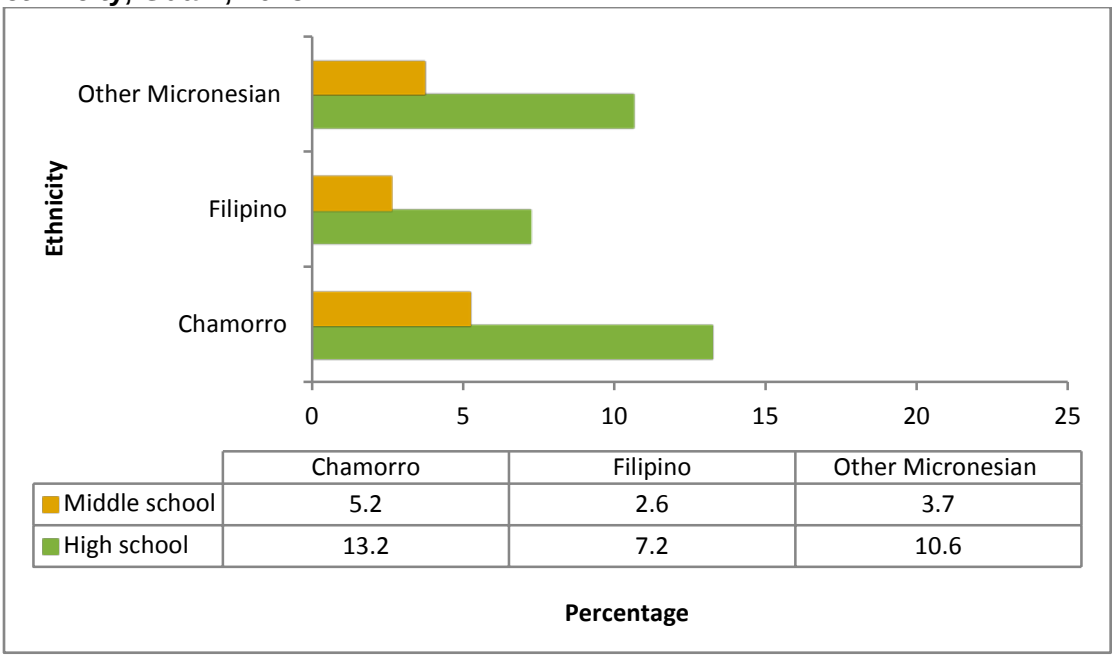


Source: GDOE, YRBS 2015

Ethnicity

For both high school and middle school students, Chamorros had higher rates of prescription drug abuse than Filipinos and other Micronesians (Figure 72).

Figure 72. Lifetime prescription drug abuse, high school vs. middle school, by ethnicity, Guam, 2015

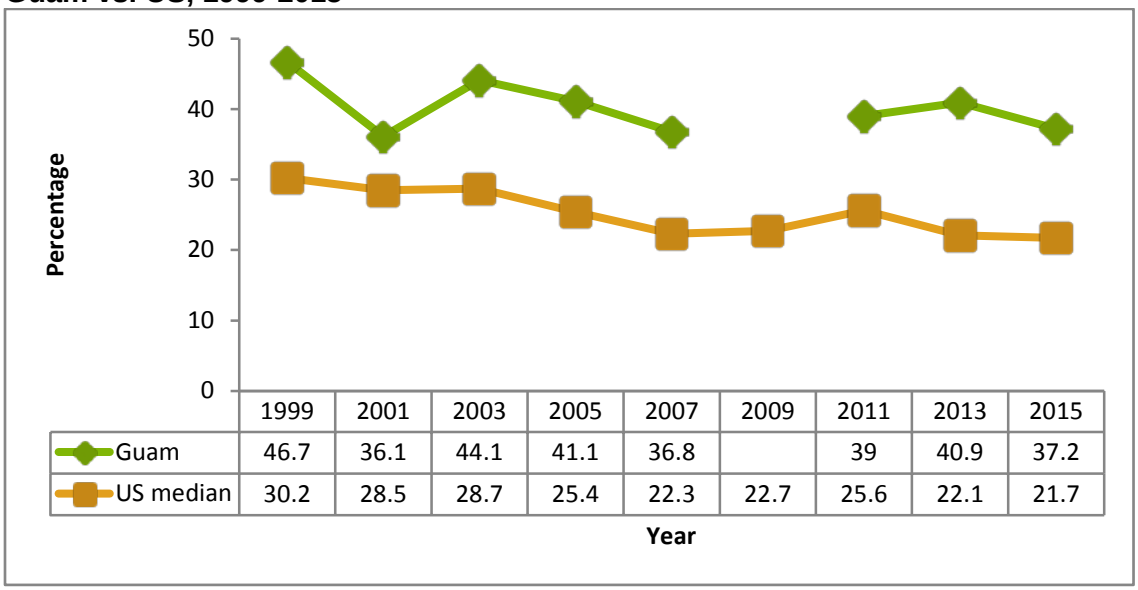


Source: GDOE, YRBS 2015

Drug Use on School Property

In 2015, nearly 40% of high school youth reported they had been offered, sold or given an illegal drug by someone on school property. The likelihood of this happening is significantly higher in Guam than in the US (Figure 73), and highlights school campuses as a critical drug enforcement setting.

Figure 73. Offered, sold or given an illegal drug on school property, high school, Guam vs. US, 1999-2015

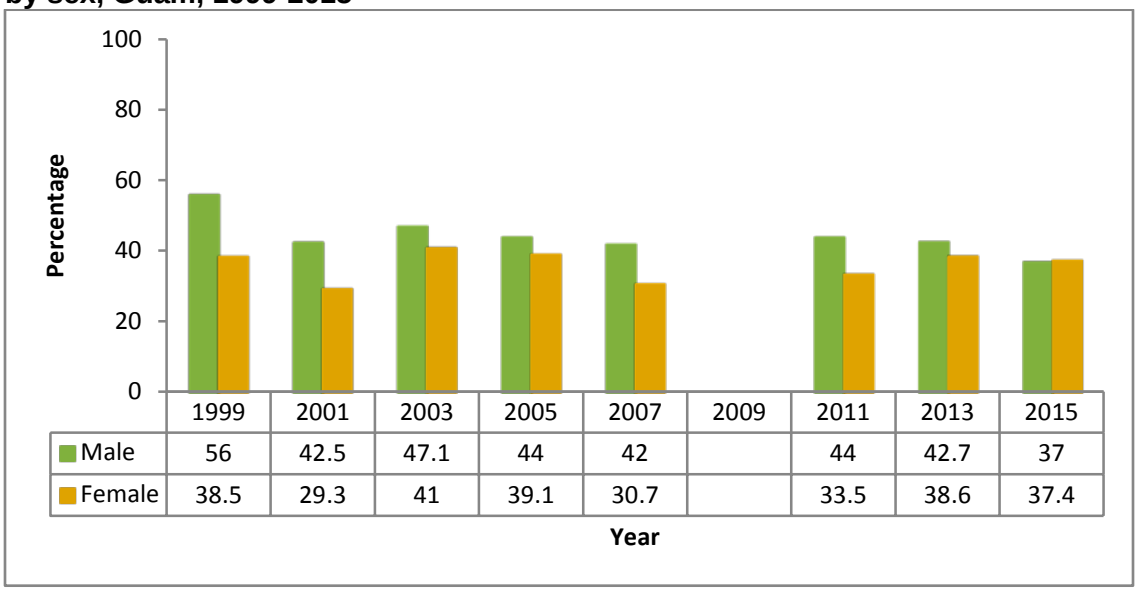


	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	46.7	36.1	44.1	41.1	36.8		39	40.9	37.2
US median	30.2	28.5	28.7	25.4	22.3	22.7	25.6	22.1	21.7

Source: GDOE, YRBS 1999-2015
Note: blank cells = data not available

Males are as likely to have an illegal drug offered or sold to them on school property as females (Figure 74).

Figure 74. Offered, sold or given an illegal drug on school property, high school, by sex, Guam, 1999-2015



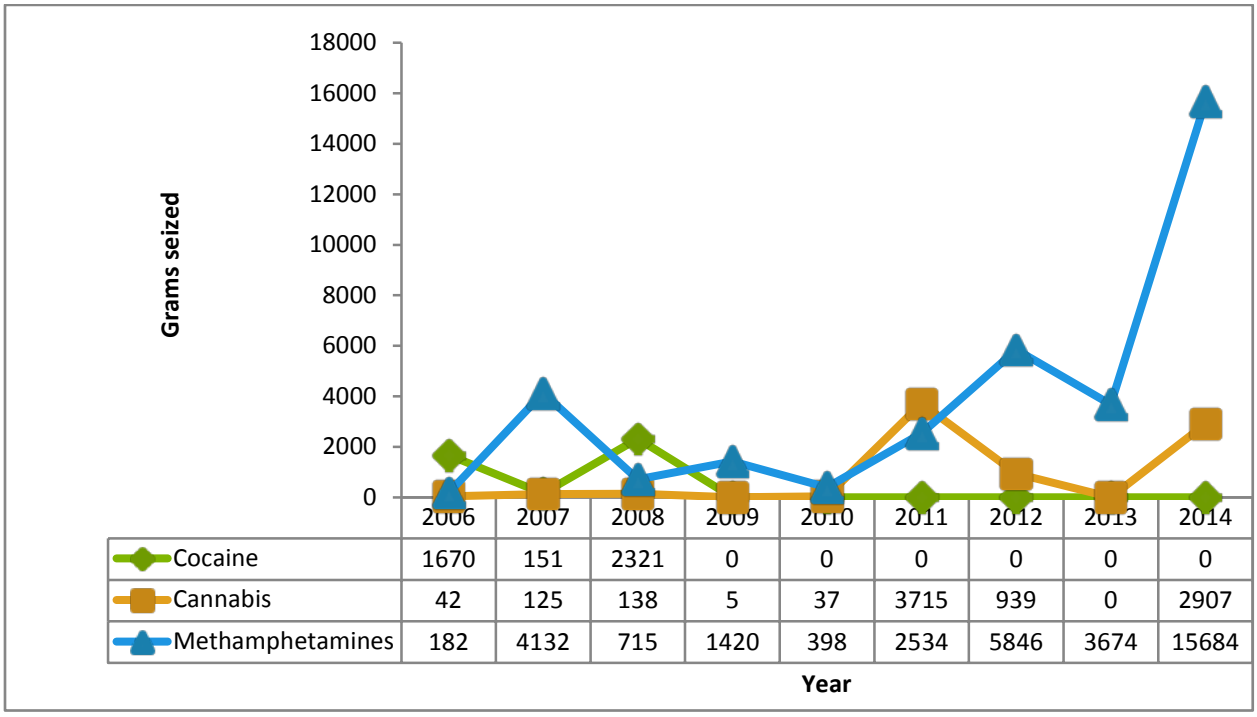
	1999	2001	2003	2005	2007	2009	2011	2013	2015
Male	56	42.5	47.1	44	42		44	42.7	37
Female	38.5	29.3	41	39.1	30.7		33.5	38.6	37.4

Source: GDOE, YRBS 1999-2015 Note: blank cells = data not available

Corollary data on drug consumption

Corollary data on drug consumption is available for 2006 to 2014 from the Drug Enforcement Agency, and 2015 drug seizure data from the Bureau of Statistics and Plans. Seizures of cocaine have decreased over time; drug seizures involving cannabis (marijuana) and methamphetamines have increased (Figures 75 and 76).

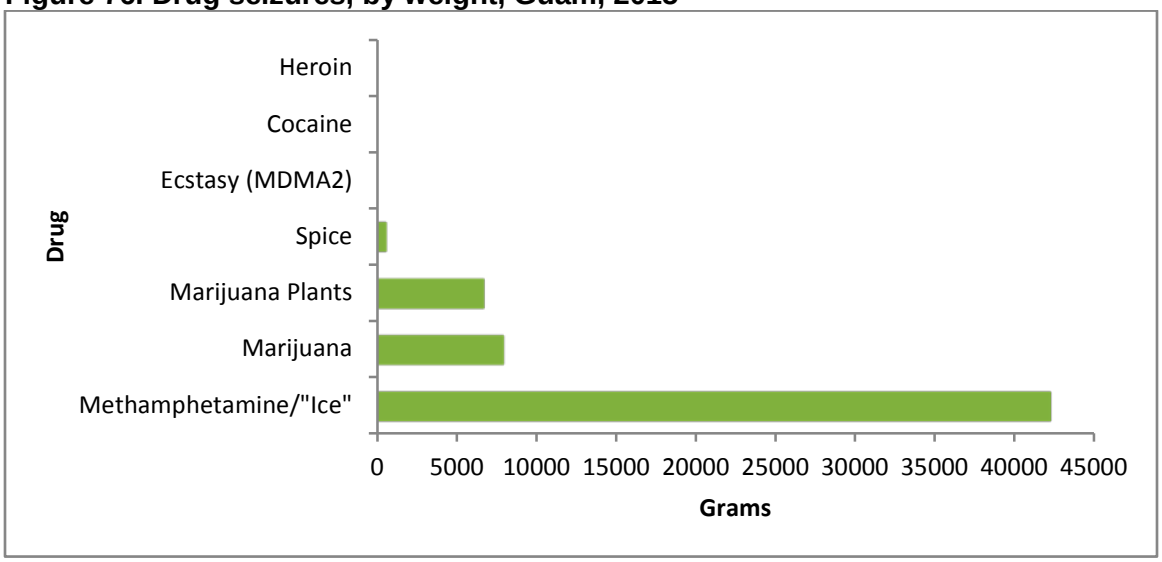
Figure 75. Drug seizures by type of drug, Guam, 2006-2014



	2006	2007	2008	2009	2010	2011	2012	2013	2014
Cocaine	1670	151	2321	0	0	0	0	0	0
Cannabis	42	125	138	5	37	3715	939	0	2907
Methamphetamines	182	4132	715	1420	398	2534	5846	3674	15684

Source: US Department of Justice Drug Enforcement Agency data, as provided to the SEOW by the Guam National Guard

Figure 76. Drug seizures, by weight, Guam, 2015



Source: Bureau of Statistics and Plans, A report to our citizens in FY 2016, July 2017

Consequences

Data on violent and property crime were discussed under the section on consequences of alcohol use. Arrests for drug-related offenses increased in 2015 by 29% from 2014 (Table 20). The rate for drug-related arrests increased from 1.0 per 1,000 people in 2010 to 3.0 per 1,000 people in 2015.

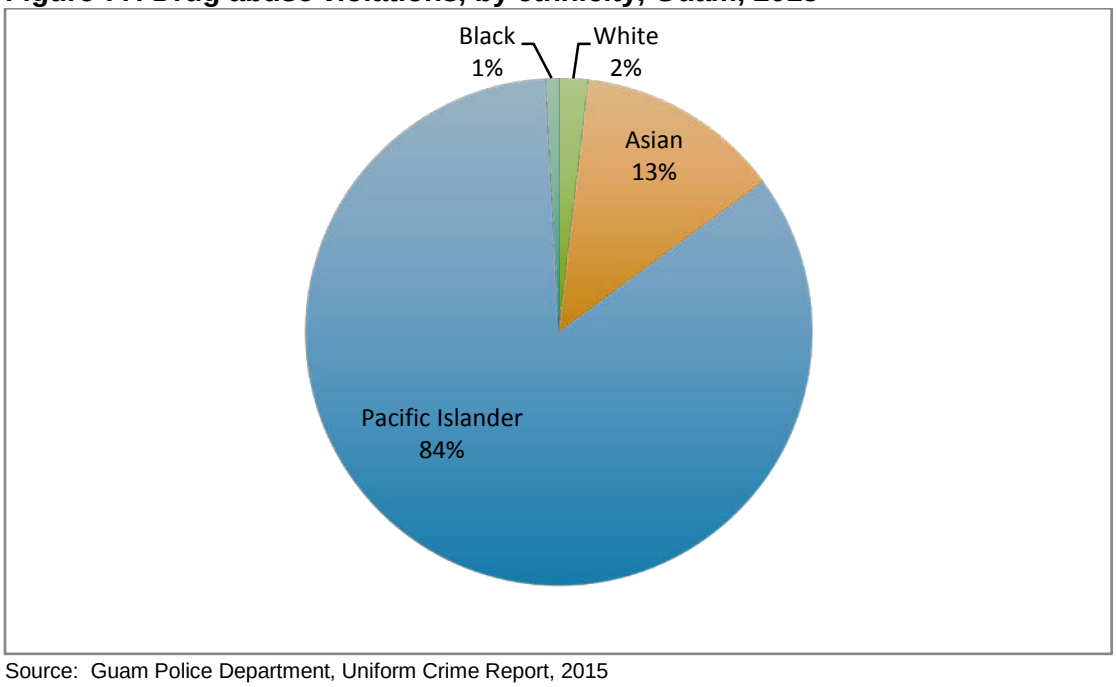
Table 20. Number of drug-related arrests per year: Guam, 2010 to 2015

	2010	2011	2012	2013	2014	2015
Number of cases	130	221	293	271	369	477
Percent change from previous year	-17.2	70	32.6	-7.5	36.2	29.3
Rate per 1,000 population	1.0	1.4	1.8	1.7	2.3	3.0

Source: Guam Police Department, Uniform Crime Report, 2015

Of persons arrested for drug abuse violations in 2015, 38% were under the age of 18 years, and 79% were males. Majority (88%) were arrested for possession of an illegal substance. Pacific Islanders comprised the majority of those arrested (Figure 77). No data on drug type was provided in the 2015 UCR.

Figure 77. Drug abuse violations, by ethnicity, Guam, 2015



Source: Guam Police Department, Uniform Crime Report, 2015

The Judiciary of Guam reported in its 2016 Citizen-centric Report that DUIs and public drunkenness comprised the 2nd and 4th top misdemeanors charged, while possession of a Schedule II controlled substance was second of top felonies charged for that year (Source: Judiciary of Guam, Fiscal year 2016 A Citizen-centric report, 2017).

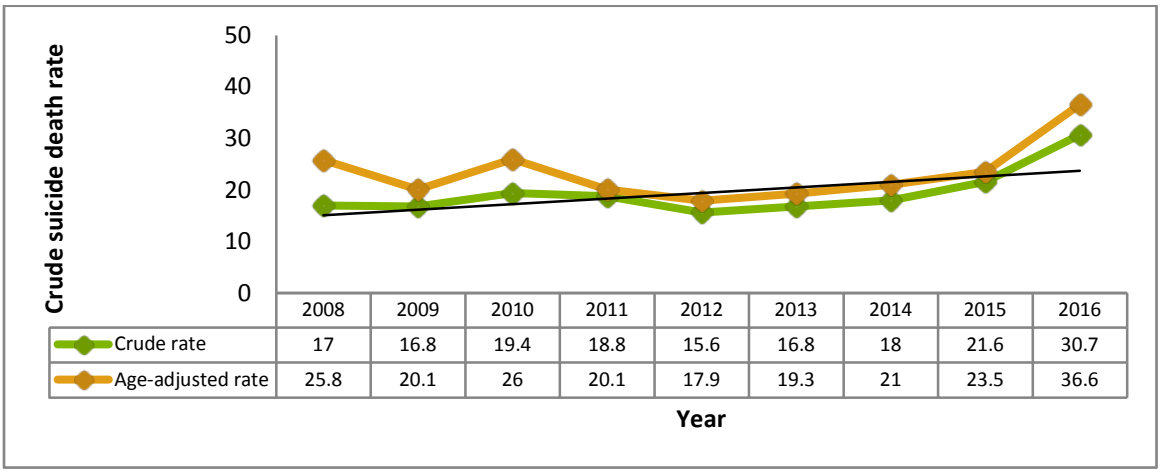
SUICIDE

MORTALITY

TREND and PREVALENCE

In 2016, there were 50 suicide deaths in Guam, resulting in a crude suicide rate of 30.7 per 100,000. Age-adjustment to the US standard population raised the suicide rate to 36.6 per 100,000 (Figure 78). This represents an increase from previous years.

Figure 78. Annual trend in suicide death rates, Guam, crude and age-adjusted, 2000-2016



	2008	2009	2010	2011	2012	2013	2014	2015	2016
Crude rate	17	16.8	19.4	18.8	15.6	16.8	18	21.6	30.7
Age-adjusted rate	25.8	20.1	26	20.1	17.9	19.3	21	23.5	36.6

Source: Calculated based on data taken from the Office of the Chief Medical Examiner, DPHSS Office of Vital Statistics and Bureau of Statistics and Plans, 2016

Guam's suicide mortality remains significantly higher than the US (Table 21). The crude suicide death rate decreased significantly for the first time in six years from 18.8 per 100,000 to 15.6 per 100,000 in 2012, but it has been rising progressively since then. The 2016 rate represents the steepest increase yet.

Table 21. Age adjusted suicide death rate, Guam vs. US, 2016

	Guam 2016	US 2016
Deaths (number)	50	44,965
Crude suicide death rate per 100,000	30.7	13.42
Age-adjusted suicide death rate per 100,000*	36.6	13.42

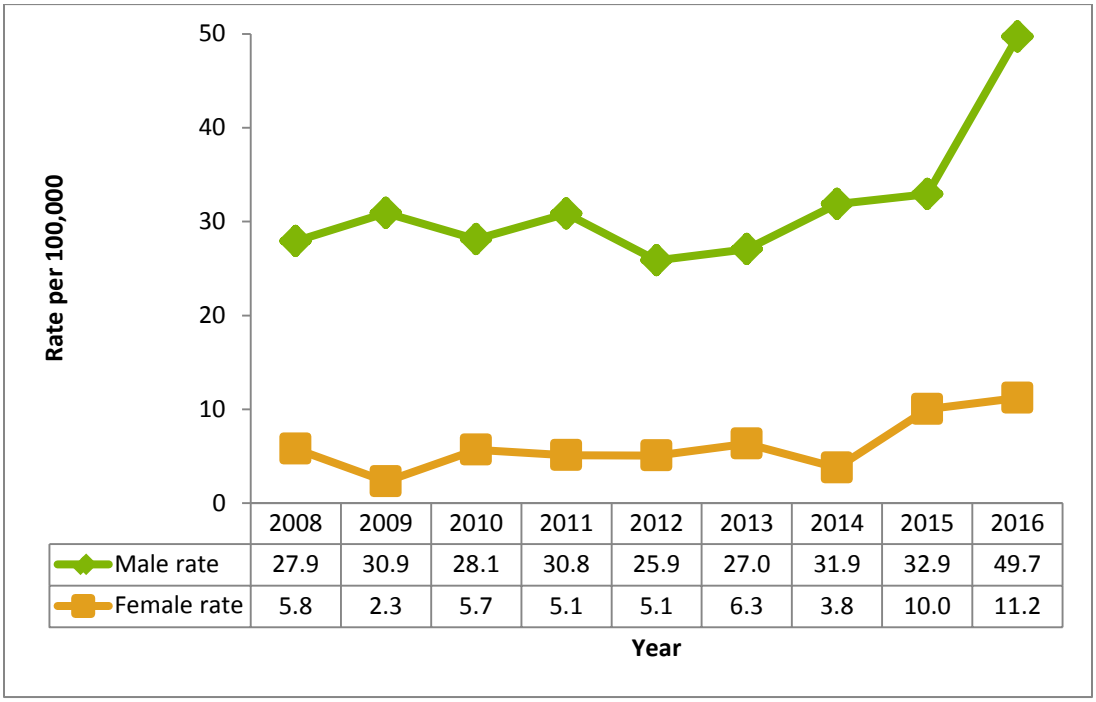
Source: Guam rates calculated based on data taken from the Office of the Chief Medical Examiner, DPHSS Office of Vital Statistics and Bureau of Statistics and Plans; US statistics from US Centers for Disease Control and Prevention (CDC), **National Suicide Statistics at a Glance**, as reported in http://www.cdc.gov/violenceprevention/suicide/statistics/trends02.html

CORRELATES OF SUICIDE MORTALITY

Sex

Suicide deaths in Guam occur predominantly among males, who outnumber suicide deaths among females. In 2016, the ratio of the male suicide rate to the female rate was 5:1 (Figure 79), higher than the US ratio of 3.5:1. The Guam male suicide rate increased markedly in 2016.

Figure 79. Suicide death rate by sex, Guam, 2008-2016



	2008	2009	2010	2011	2012	2013	2014	2015	2016
Male rate	27.9	30.9	28.1	30.8	25.9	27.0	31.9	32.9	49.7
Female rate	5.8	2.3	5.7	5.1	5.1	6.3	3.8	10.0	11.2

Sources: Calculated from data provided by the Office of the Chief Medical Examiner and Bureau of Statistics and Plans, 2016

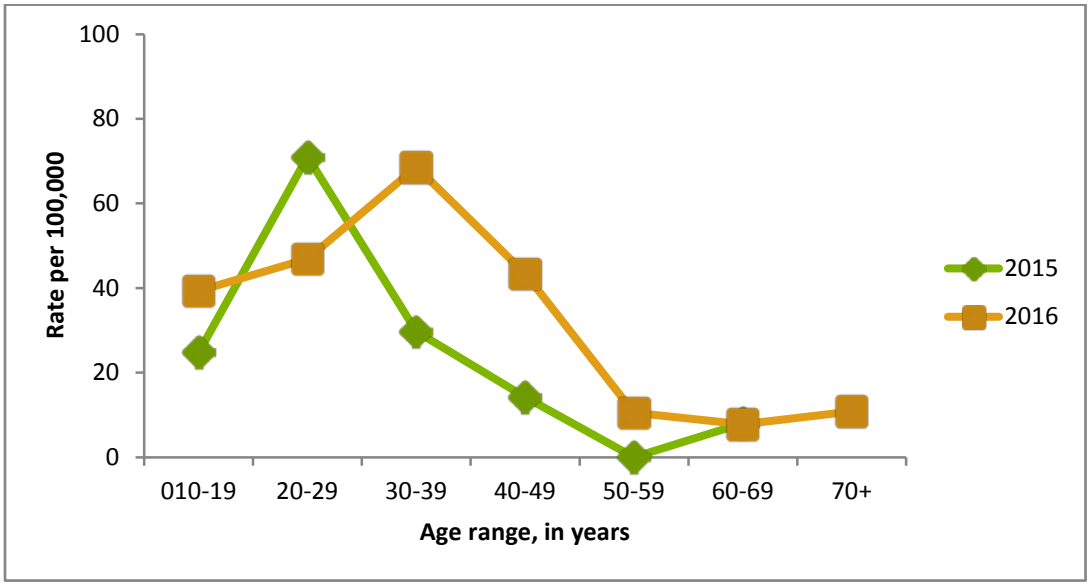
Age

The epidemiologic pattern is changing in the US, with suicide highest among men aged 75 and over, and women aged 45-64 years. Middle-aged men (45-64 years) and females aged 10-14 years are showing the fastest rise in suicide rates (Curtin SC, Warner M and Hedegaard H, 2016).

In Guam, when suicide deaths are disaggregated by age, the great majority are seen to occur in young adults and youth but in 2016, the peak rate shifted from those aged 20-29 to those aged 30-39 (Figure 80). The age range for suicide deaths in 2016 ranged from 11 to 74 years.

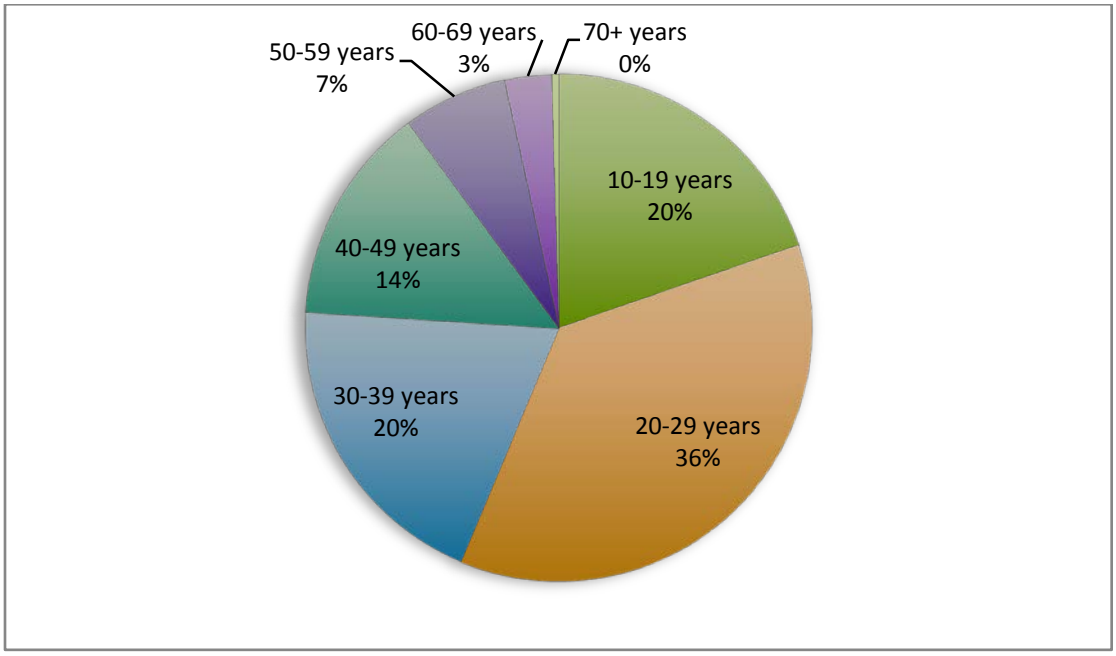
Collectively, about 56% of all suicide deaths in Guam from 2000-2016 occurred in those younger than 30 years. Thus, deaths by suicide in Guam occur predominantly among young people.

Figure 80. Suicide death rates by age, Guam, 2015 and 2016



Sources: Calculated from data provided by the Office of the Chief Medical Examiner and Bureau of Statistics and Plans, 2016

Figure 81. Cumulative suicide deaths by age, Guam, 2000-2016

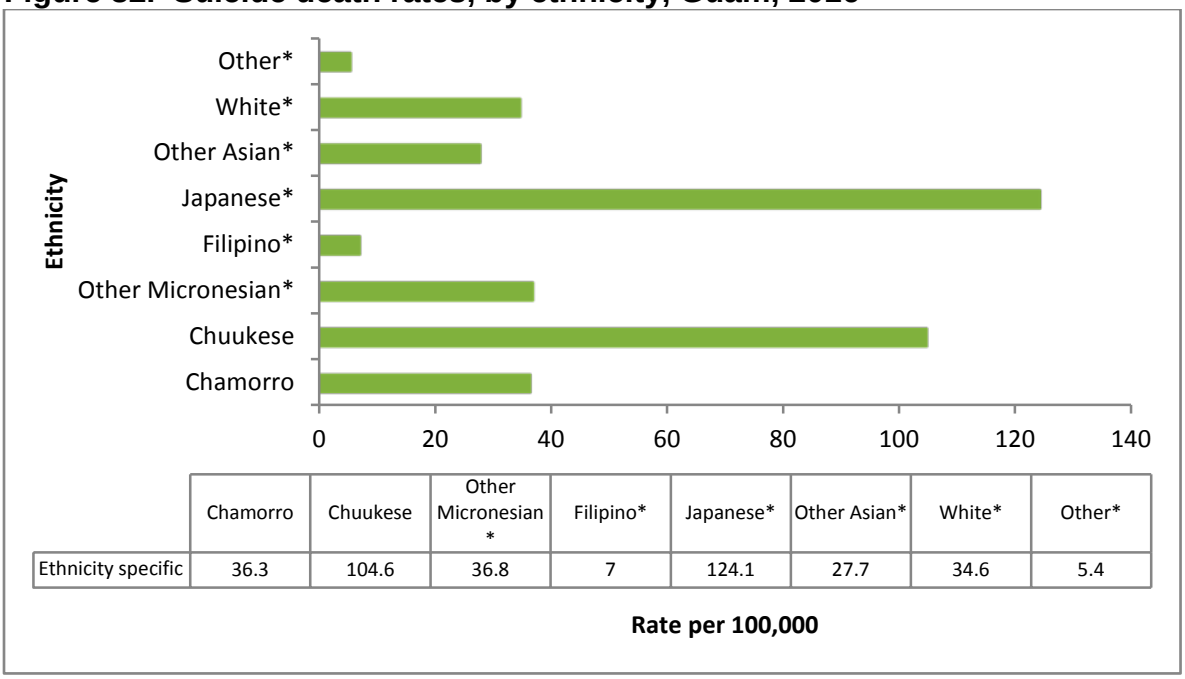


Sources: Calculated from data provided by the Office of the Chief Medical Examiner, 2016

Ethnicity

In 2016, the greatest number of suicide deaths occur among Chamorros, followed by Chuukese. However, when these are corrected for the relative contribution of each ethnic group to the total population (Figure 82), Chuukese and Japanese have the highest suicide death rates per 100,000, followed by Chamorros and other Micronesians. In contrast, in the US mainland, Pacific Islanders have the lowest suicide rates.

Figure 82. Suicide death rates, by ethnicity, Guam, 2016



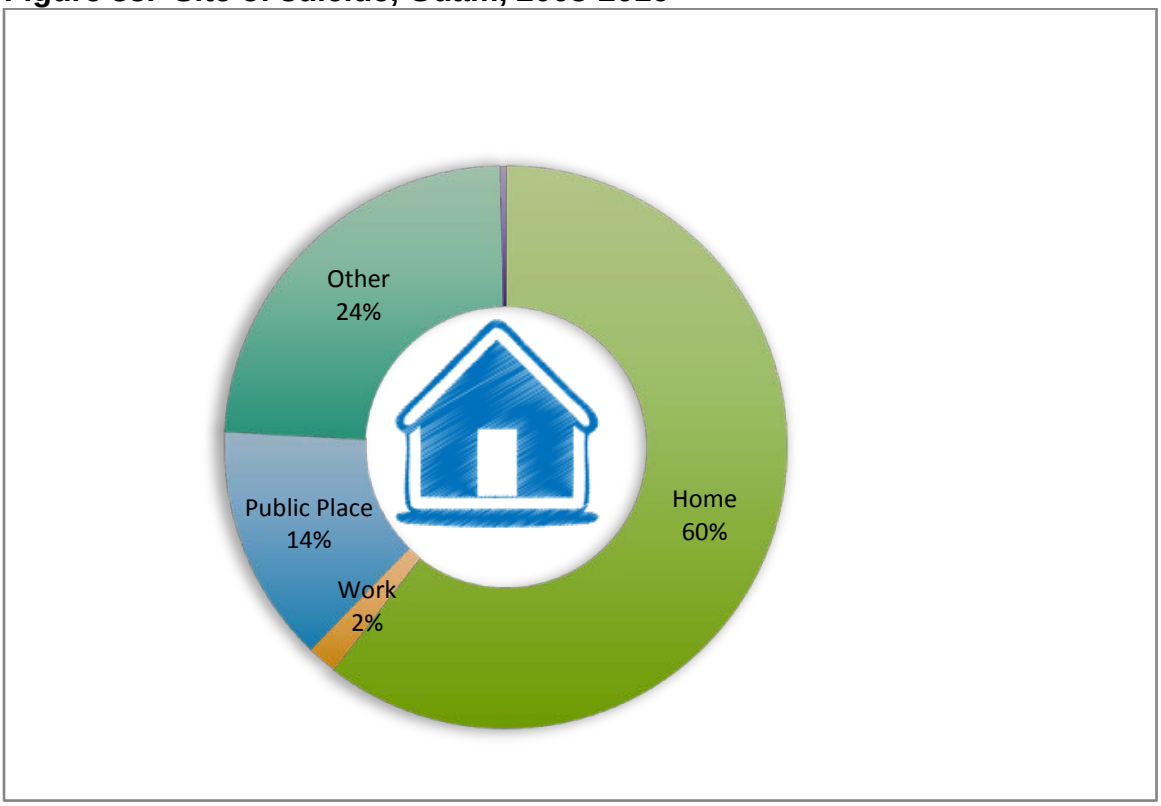
	Chamorro	Chuukese	Other Micronesian*	Filipino*	Japanese*	Other Asian*	White*	Other*
Ethnicity specific	36.3	104.6	36.8	7	124.1	27.7	34.6	5.4

Source: Calculated from data provided by the Office of the Chief Medical Examiner, 2016
Note: * = actual numbers for these are small; caution needed in interpretation

Site of suicide

Majority (60%) of suicides occurred in the home. Only 14% occurred in a public place (Figure 83). This implies that suicide prevention outreach needs to involve families and communities.

Figure 83. Site of suicide, Guam, 2008-2016

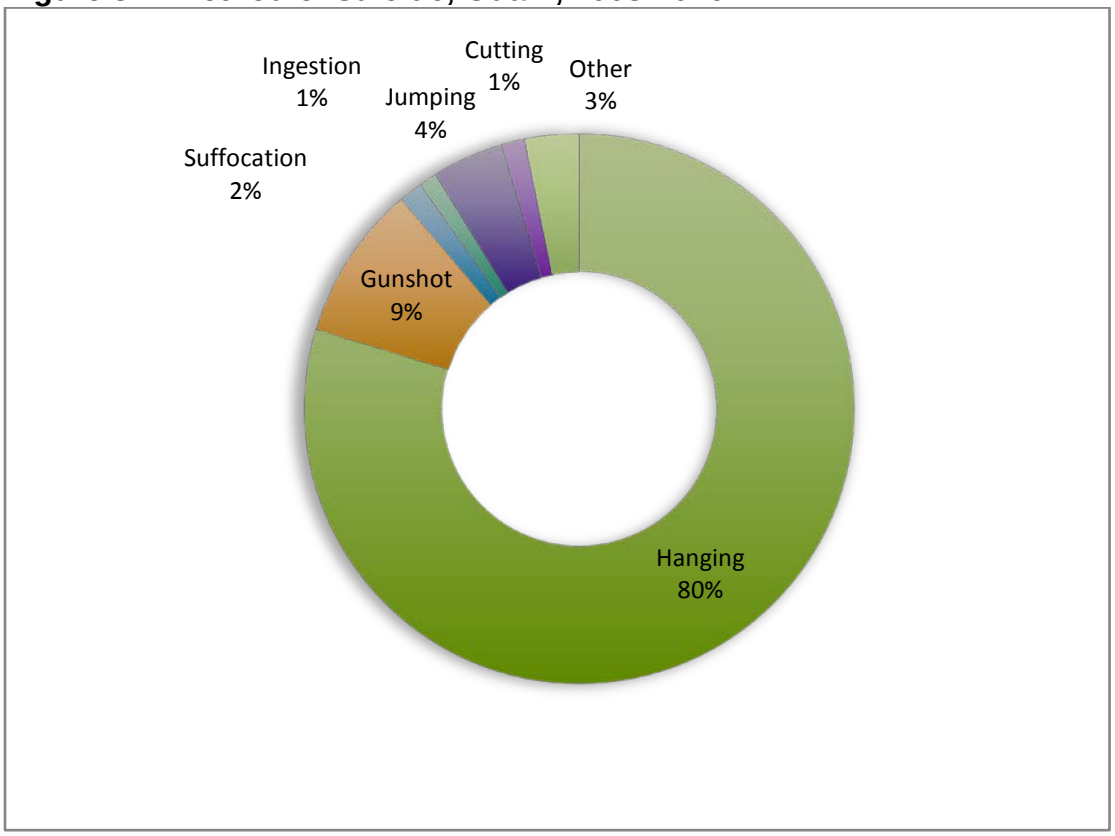


Source: Office of the Chief Medical Examiner, suicide data 2008-2016

Method of suicide

About 80% of suicides were by hanging, and 9% were through the use of guns (Figure 84). This contrasts markedly from the pattern in the US mainland, where suicide by firearms was the predominant method.

Figure 84. Method of suicide, Guam, 2008-2016

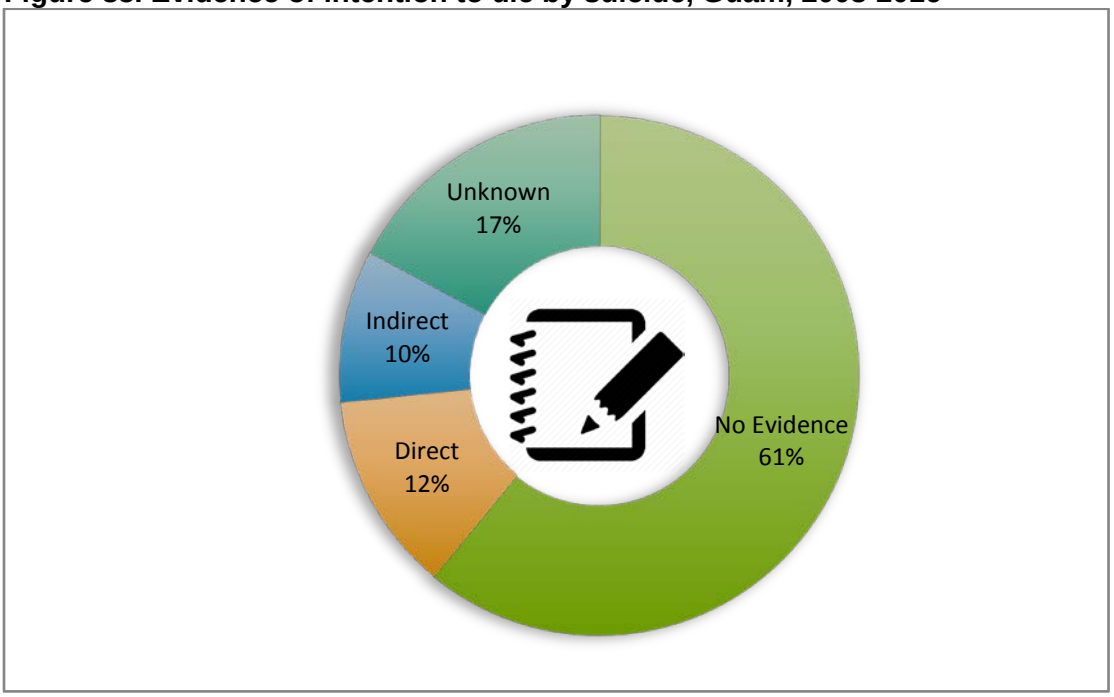


Source: Office of the Chief Medical Examiner, suicide data 2008-2016

Evidence of intention to die

Nearly 1 in 4 (12%) of those who died of suicide from 2008-2016 left direct evidence (suicide note) of intention to die by suicide (Figure 85). About one in ten (10%) left indirect evidence of intent. Altogether, about one in four (22%) suicides from 2008 to 2016 left evidence of their intent. This highlights the need for community members to be better trained to pick up on suicide intentions to increase the capacity to intervene before a suicide death occurs.

Figure 85. Evidence of intention to die by suicide, Guam, 2008-2016



Source: Office of the Chief Medical Examiner, suicide data 2008-2016

Other correlates of suicide mortality

In Guam for the year 2016:

- 4% involved the use of alcohol
- 4% involved the use of drugs
- 16% had a history of previous mental illness
- 10% had made a previous attempt

(Note: These data were obtained by interviewing family and friends of the deceased, without toxicologic confirmation. Thus these may under-estimate the true prevalence of these correlates.)

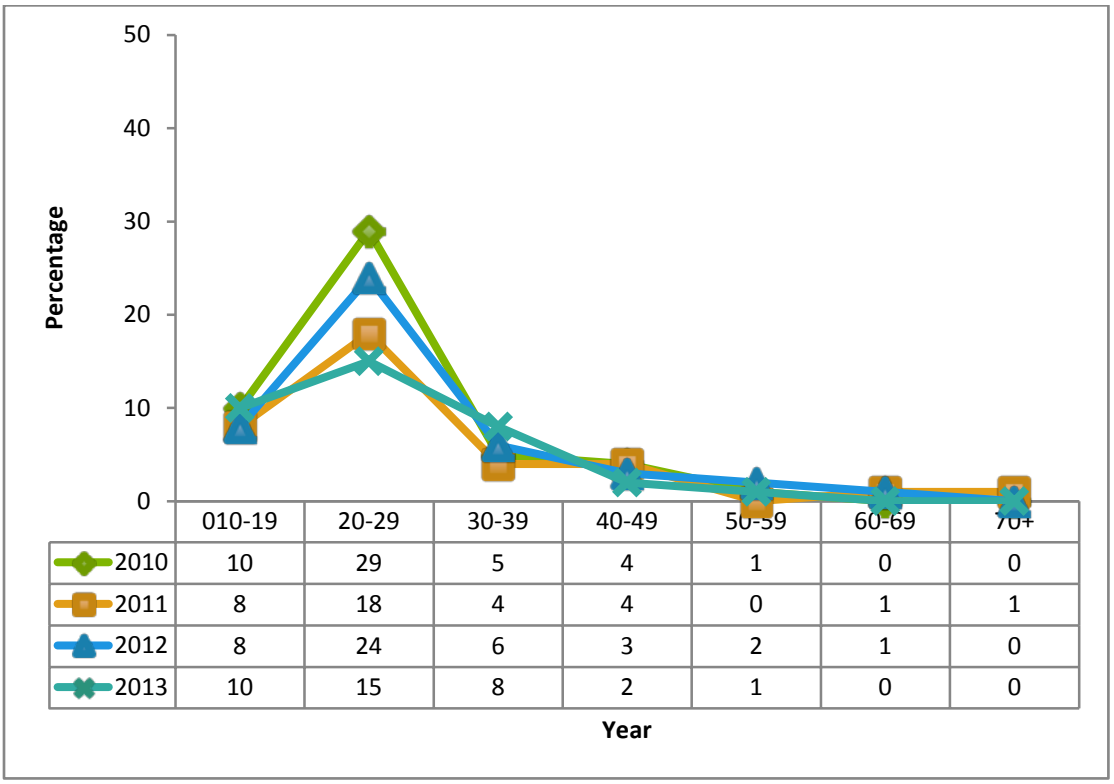
SUICIDE IDEATION and ATTEMPTS

Adults

Currently there is no readily accessible population surveillance mechanism to track suicidal attempts and suicidal ideation among adults on Guam. Data from Guam Memorial Hospital (GMH) on annual admissions for self-inflicted injuries are available from 2010 to 2013. A total of 155 admissions were seen during this 4-year period for this diagnostic category.

The largest number of admissions involves young adults aged 20-29, which mirrors the pattern of suicide mortality data. Chamorros, followed by Chuukese, had the most number of admissions (Figure 86).

Figure 86. Annual admissions to GMH for self-inflicted injuries, by age, Guam, 2010-2013



	010-19	20-29	30-39	40-49	50-59	60-69	70+
2010	10	29	5	4	1	0	0
2011	8	18	4	4	0	1	1
2012	8	24	6	3	2	1	0
2013	10	15	8	2	1	0	0

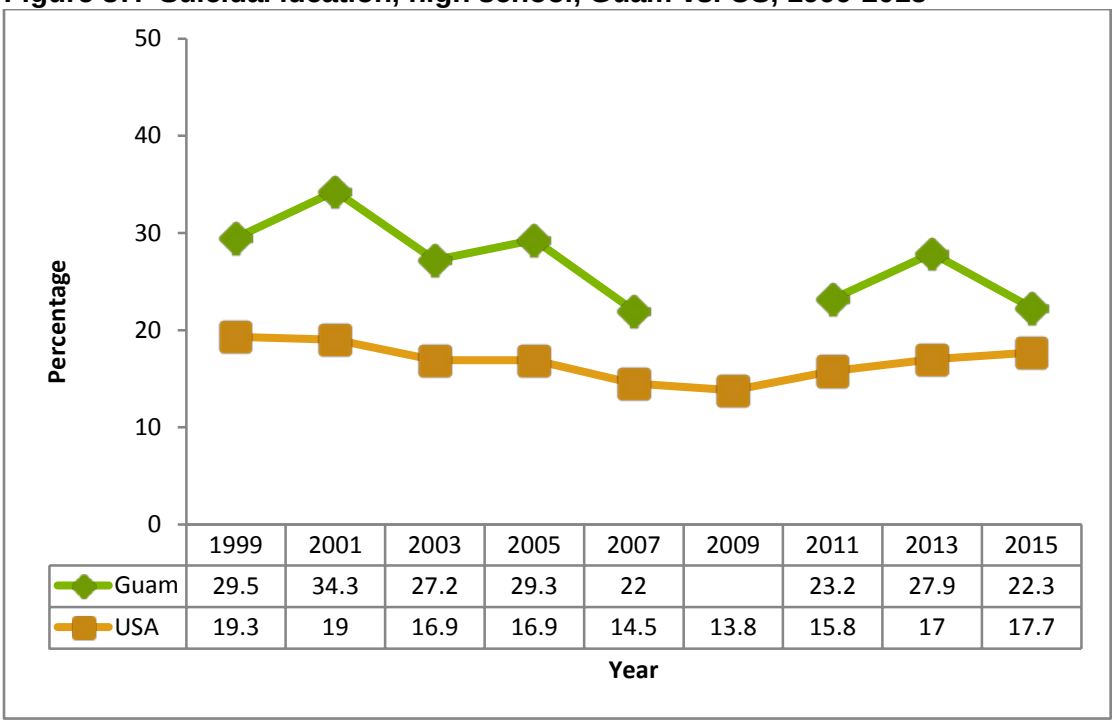
Youth

The Guam YRBS asked 4 questions on suicide:

1. During the past 12 months, did you ever seriously consider attempting suicide?
2. During the past 12 months, did you make a plan about how you would attempt suicide?
3. During the past 12 months, how many times did you actually attempt suicide?
4. If you attempted suicide during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?

Guam surpasses the US average in all four indicators, signifying an elevated likelihood of suicidal ideation and suicide attempts among youth on Guam (Figures 87-90). However, suicidal ideation decreased among Guam youth in 2015. These data indicate that suicide prevention interventions should include youth.

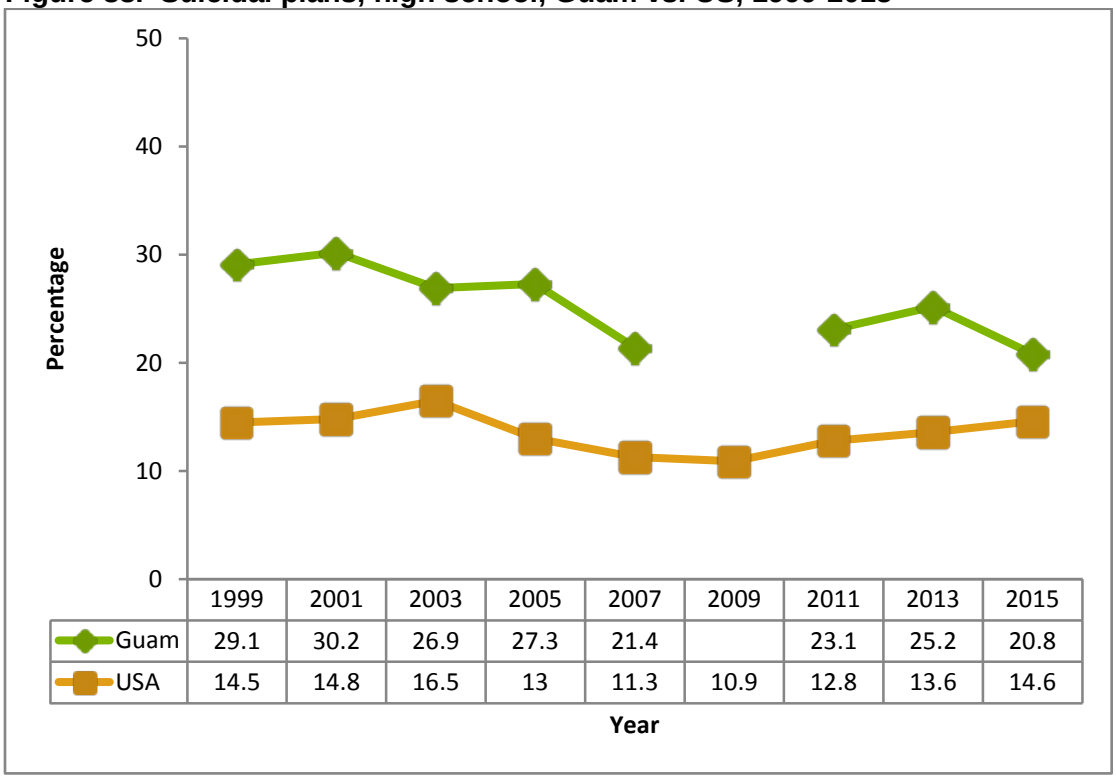
Figure 87. Suicidal ideation, high school, Guam vs. US, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	29.5	34.3	27.2	29.3	22		23.2	27.9	22.3
USA	19.3	19	16.9	16.9	14.5	13.8	15.8	17	17.7

Source: GDOE, YRBS 1999-2015; US CDC Youth Online at http://apps.nccd.cdc.gov/youthonline
Note: blank cells = data not available

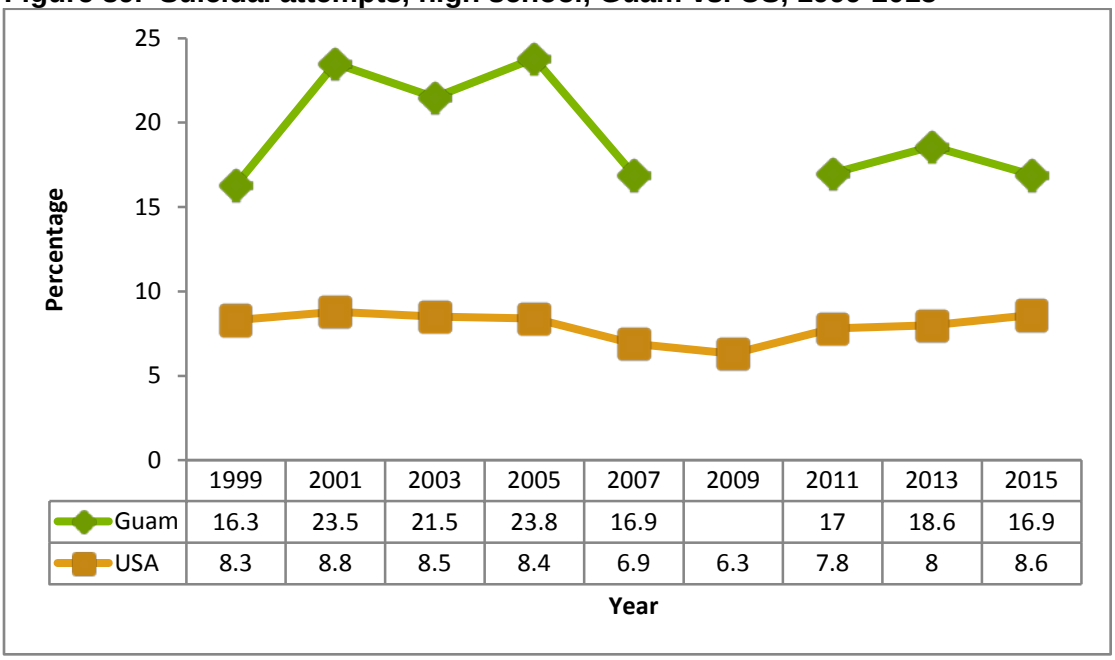
Figure 88. Suicidal plans, high school, Guam vs. US, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	29.1	30.2	26.9	27.3	21.4		23.1	25.2	20.8
USA	14.5	14.8	16.5	13	11.3	10.9	12.8	13.6	14.6

Source: GDOE, YRBS 1999-2015; US CDC Youth Online at http://apps.nccd.cdc.gov/youthonline
Note: blank cells = data not available

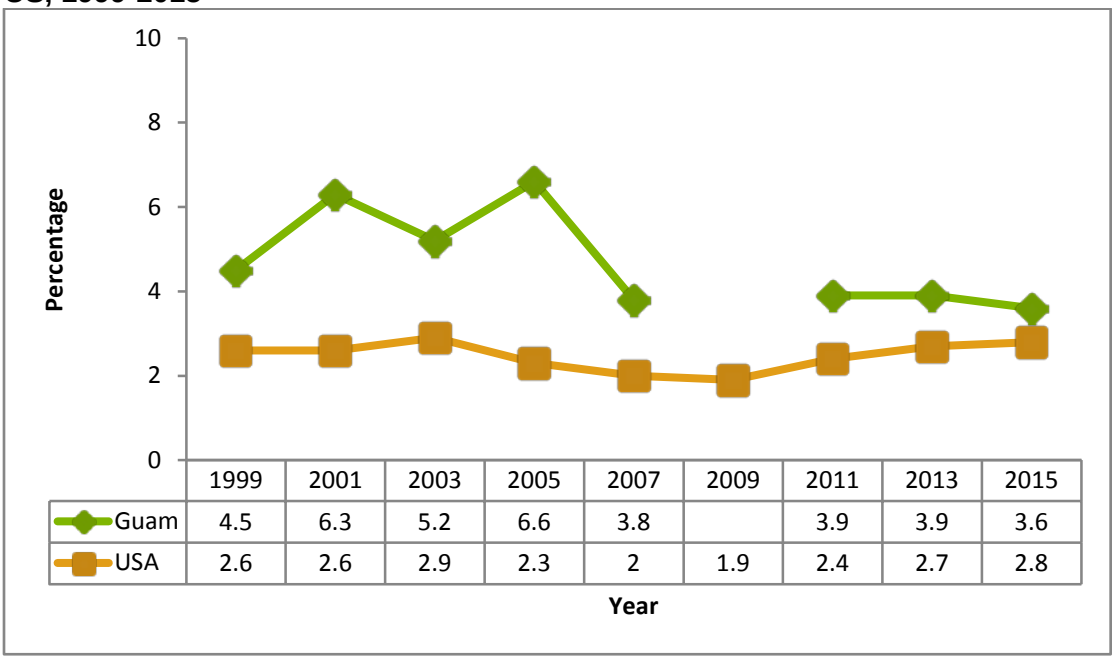
Figure 89. Suicidal attempts, high school, Guam vs. US, 1999-2015



	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	16.3	23.5	21.5	23.8	16.9		17	18.6	16.9
USA	8.3	8.8	8.5	8.4	6.9	6.3	7.8	8	8.6

Source: GDOE, YRBS 1999-2015; US CDC Youth Online at http://apps.nccd.cdc.gov/youthonline
Note: blank cells = data not available

Figure 90. Suicidal attempts requiring medical attention, high school, Guam vs. US, 1999-2015

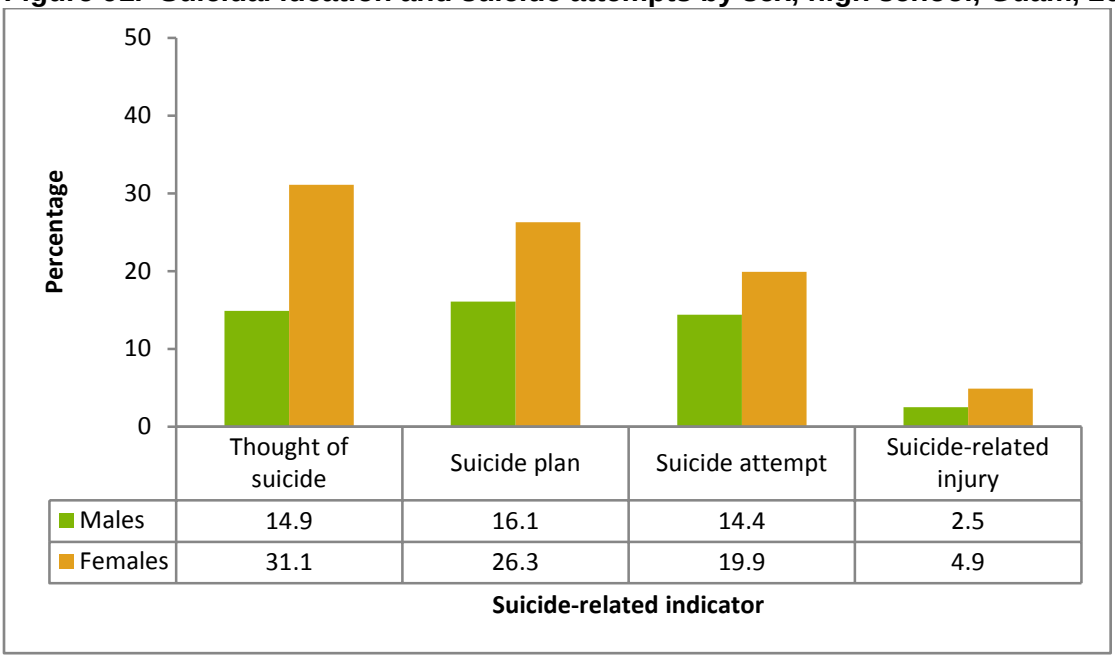


	1999	2001	2003	2005	2007	2009	2011	2013	2015
Guam	4.5	6.3	5.2	6.6	3.8		3.9	3.9	3.6
USA	2.6	2.6	2.9	2.3	2	1.9	2.4	2.7	2.8

Source: GDOE, YRBS 1999-2015; US CDC Youth Online at http://apps.nccd.cdc.gov/youthonline
Note: blank cells = data not available

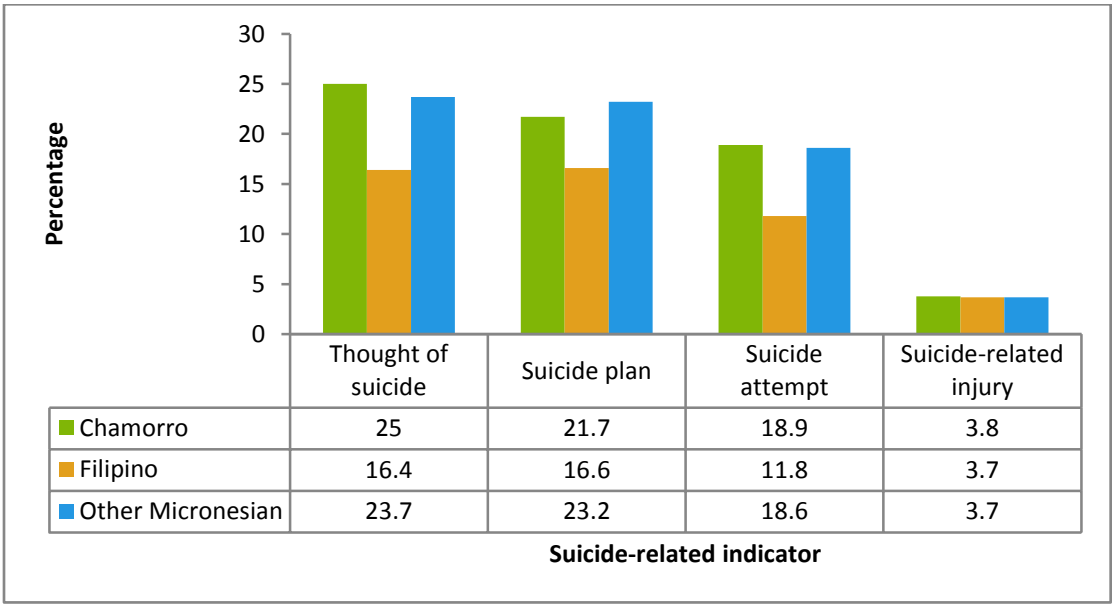
Females are more likely to think about suicide, make a plan to suicide and attempt suicide (Figure 91). Chamorros and Micronesian Islanders are most likely to think about suicide, make a plan to suicide, and actually attempt suicide, but there is no difference across these ethnic categories for serious attempts at suicide that require medical treatment (Figure 92).

Figure 91. Suicidal ideation and suicide attempts by sex, high school, Guam, 2015



Source: GDOE, YRBS 2015

Figure 92. Suicidal ideation and suicide attempts by ethnicity, high school, Guam, 2015



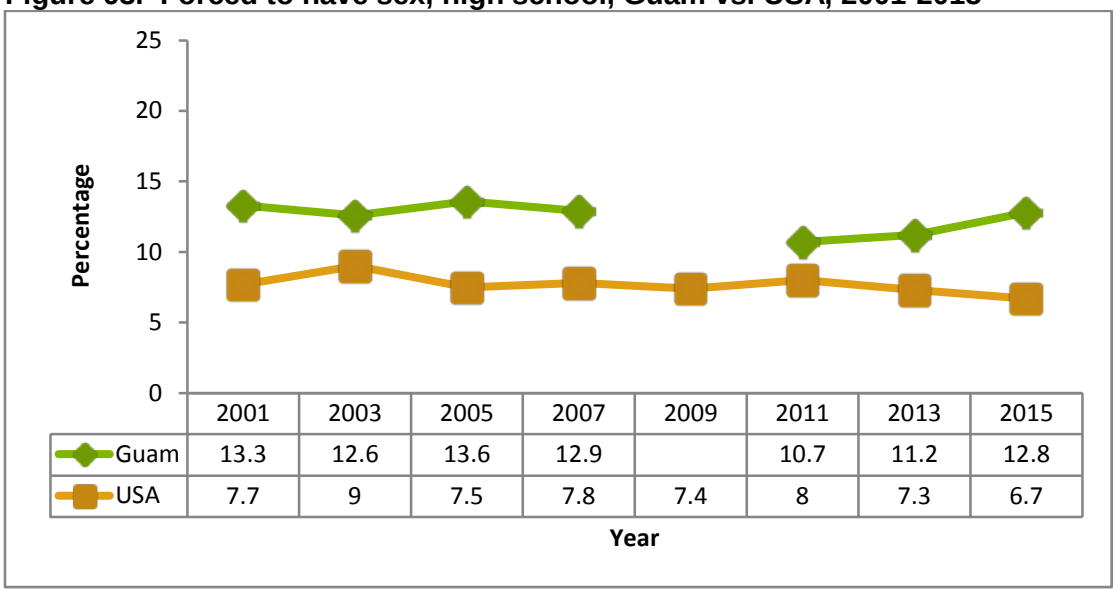
Source: GDOE, YRBS 2015

OTHER SUICIDE RISK FACTORS

The scientific literature indicates that sexual history, physical violence, a history of mental illness and the use of tobacco, alcohol and illicit drugs may increase the risk of suicidal ideation and attempts. In Guam, alcohol and mental illness have been associated with suicide deaths.

Sexual violence among Guam high school students is significantly higher than the US averages. The proportion of high school students reporting having been forced to have sex was almost twice the US median in 2013 and 2015 (Figure 93). Micronesians have the highest rates (Figure 94).

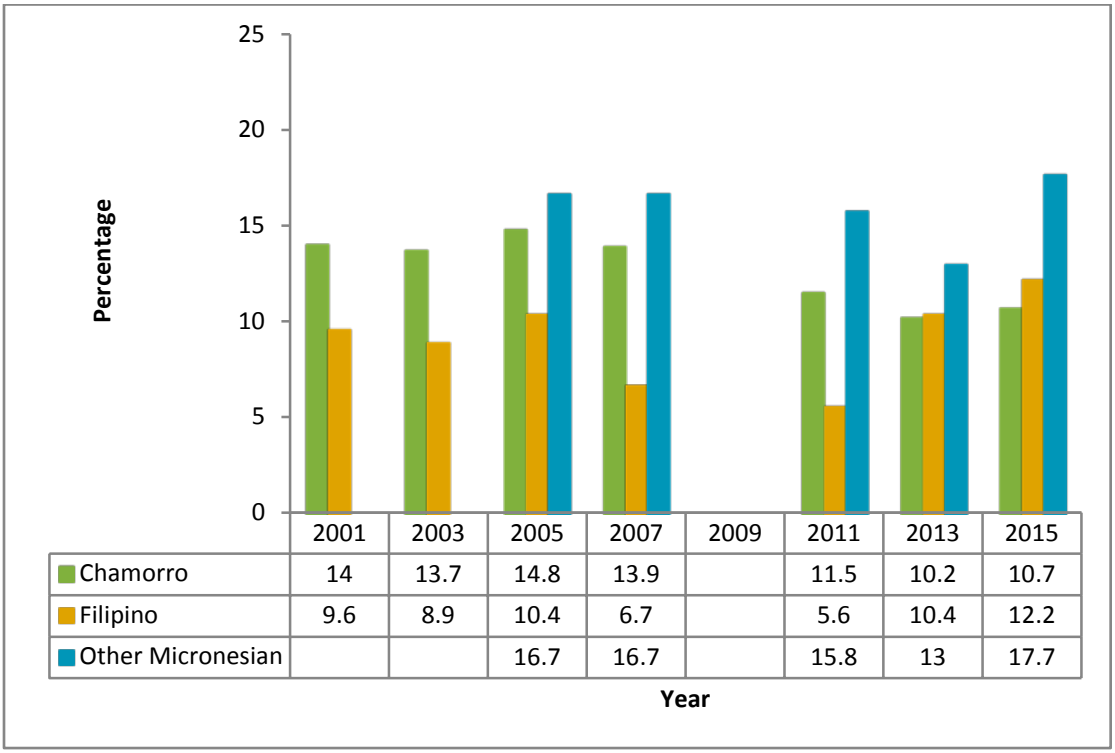
Figure 93. Forced to have sex, high school, Guam vs. USA, 2001-2015



	2001	2003	2005	2007	2009	2011	2013	2015
Guam	13.3	12.6	13.6	12.9		10.7	11.2	12.8
USA	7.7	9	7.5	7.8	7.4	8	7.3	6.7

Source: GDOE, YRBS 2001-2015; US CDC Youth Online at http://apps.nccd.cdc.gov/youthonline
Note: blank cells = data not available

Figure 94. Forced to have sex in the past year by ethnicity, Guam, 2001-2015



	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	14	13.7	14.8	13.9		11.5	10.2	10.7
Filipino	9.6	8.9	10.4	6.7		5.6	10.4	12.2
Other Micronesian			16.7	16.7		15.8	13	17.7

Source: GDOE, YRBS 2001-2015
Note: blank cells = data not available

Bullying and physical violence may also be linked to an increased likelihood for suicide. In 2015, for every 100 Guam high school students:

- 3 carried a weapon on school property at least 1 day during the 30 days before the survey;
- 6 carried a gun on at least 1 day during the 30 days before the survey;
- 6 were threatened or injured with a weapon on school property;
- 12 were in a physical fight on school property;
- 12 did not attend class because they felt unsafe in school;
- 13 were electronically bullied in the past year; and
- 17 were bullied on school property;
- 29 were in a physical fight one or more times in the past year, and 5 were injured in a physical fight;

(Source: GDOE, YRBS 2015)

Addressing sexual and physical violence and bullying should be integral to suicide prevention efforts among youth in Guam.

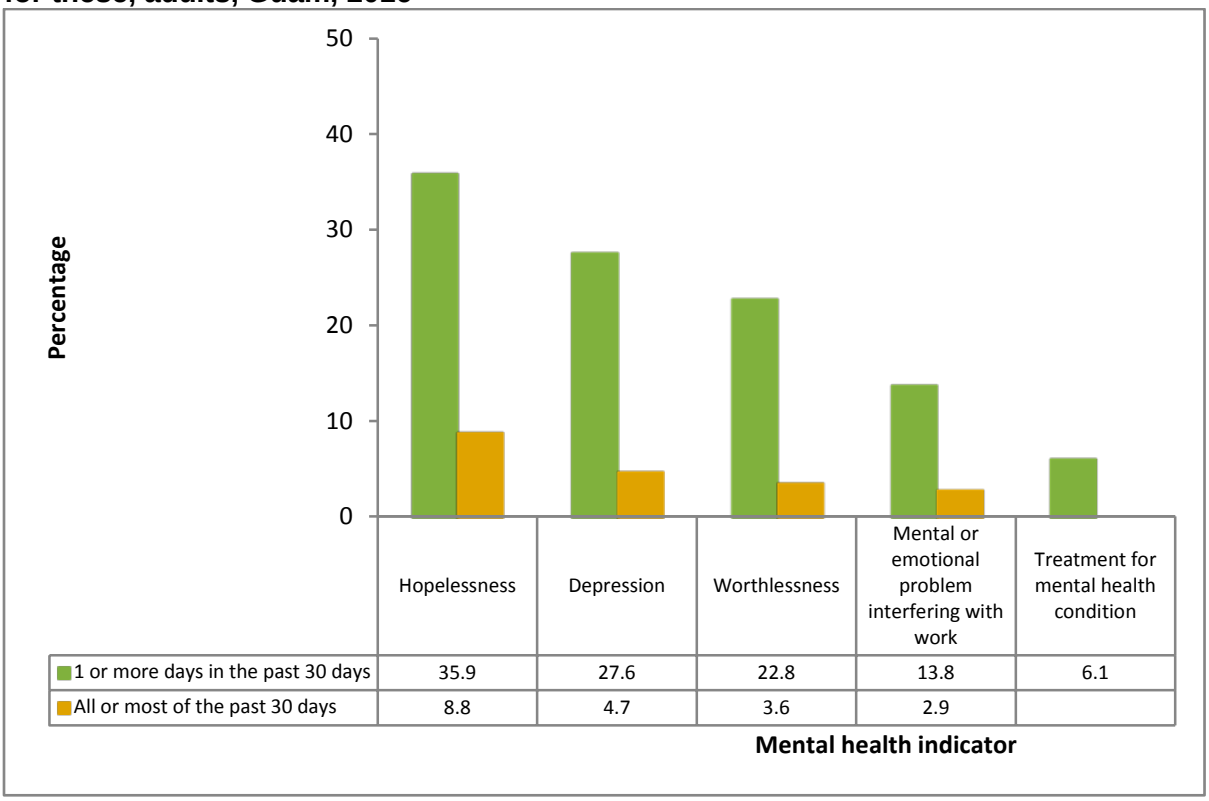
MENTAL HEALTH

Mental illness is closely linked to substance abuse and suicide. The GBHWC started commissioning mental health questions incorporated into the BRFSS in 2013, and risk and protective factors questions into the YRBS since 2011. The latest data on adults are from 2016; for youth, the latest data are from 2015. Because the mental health questions form an optional module in the survey, national data is not available for these indicators.

ADULTS

In 2016, 36% of adults in Guam reported feeling hopeless, 23% felt worthless, and 28% reported feeling so depressed that nothing could cheer them up, on one or more of the past 30 days. Of these adults, 8.8% felt hopeless, 4.7% felt depressed and 3.6% felt worthless on all or most of the past 30 days. Almost 14% stated they suffered from a mental or emotional problem that hindered them from working or performing usual activities in the past 30 days, yet only 6% were taking medication or receiving treatment for their condition (Figure 95).

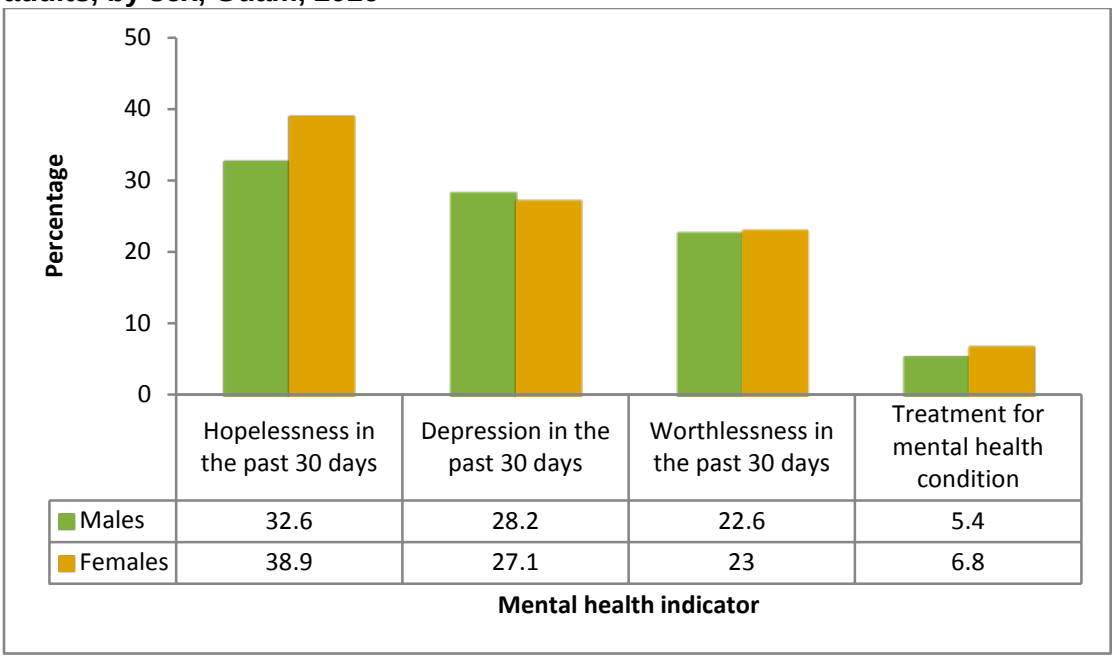
Figure 95. Prevalence of mental health symptoms and conditions and treatment for these, adults, Guam, 2016



Source: DPHSS and GBHWC, BRFSS State-added questions, 2016
Note: blank cells = data not available

These symptoms appear equally distributed across the sexes (Figure 96).

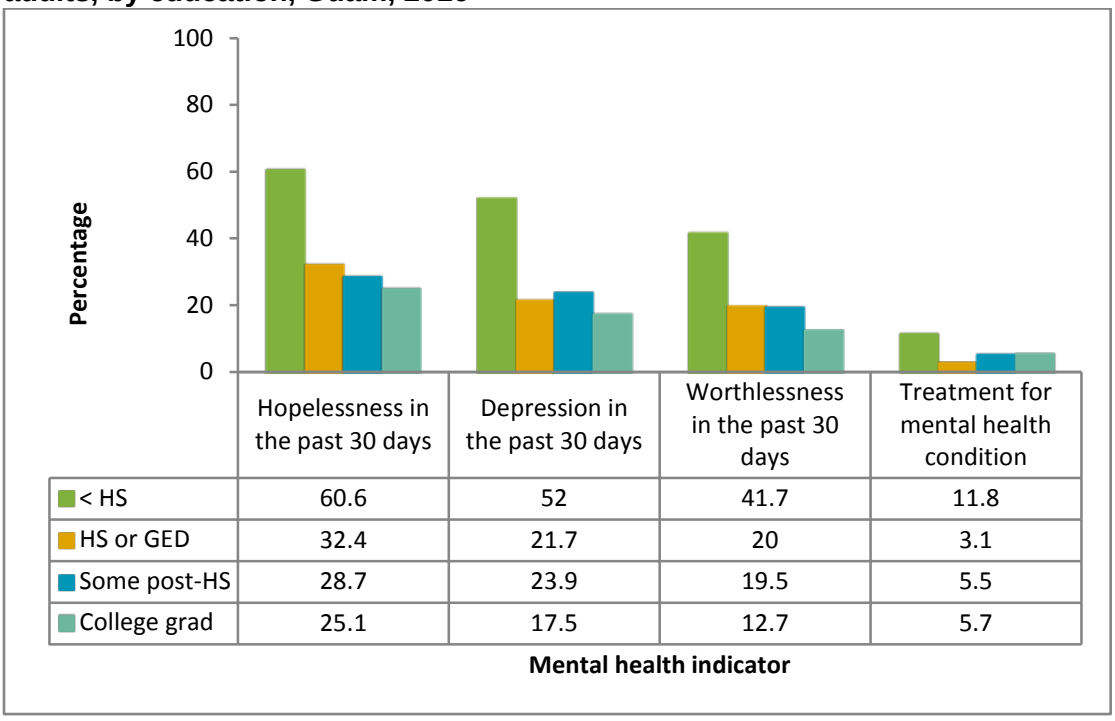
Figure 96. Prevalence of mental health symptoms and conditions and treatment, adults, by sex, Guam, 2016



Source: DPHSS and GBHWC, BRFSS State-added questions, 2016

Mental conditions or emotional problems involving hopelessness, depression and worthlessness were more prevalent among those with lower education and income (Figures 97-98). Micronesians were most likely to report hopelessness, depression and worthlessness, and to be receiving treatment for their mental conditions (Figure 99).

Figure 97. Prevalence of mental health symptoms and conditions and treatment, adults, by education, Guam, 2016

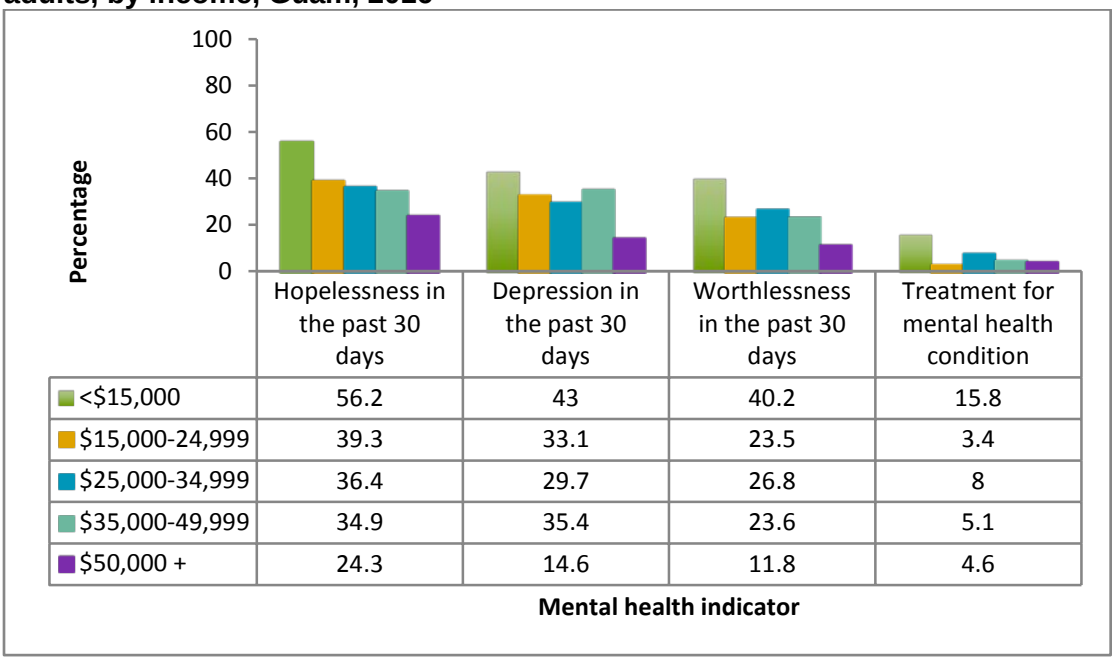


	Hopelessness in the past 30 days	Depression in the past 30 days	Worthlessness in the past 30 days	Treatment for mental health condition
< HS	60.6	52	41.7	11.8
HS or GED	32.4	21.7	20	3.1
Some post-HS	28.7	23.9	19.5	5.5
College grad	25.1	17.5	12.7	5.7

Mental health indicator

Source: DPHSS and GBHWC, BRFSS State-added questions, 2016

Figure 98. Prevalence of mental health symptoms and conditions and treatment, adults, by income, Guam, 2016

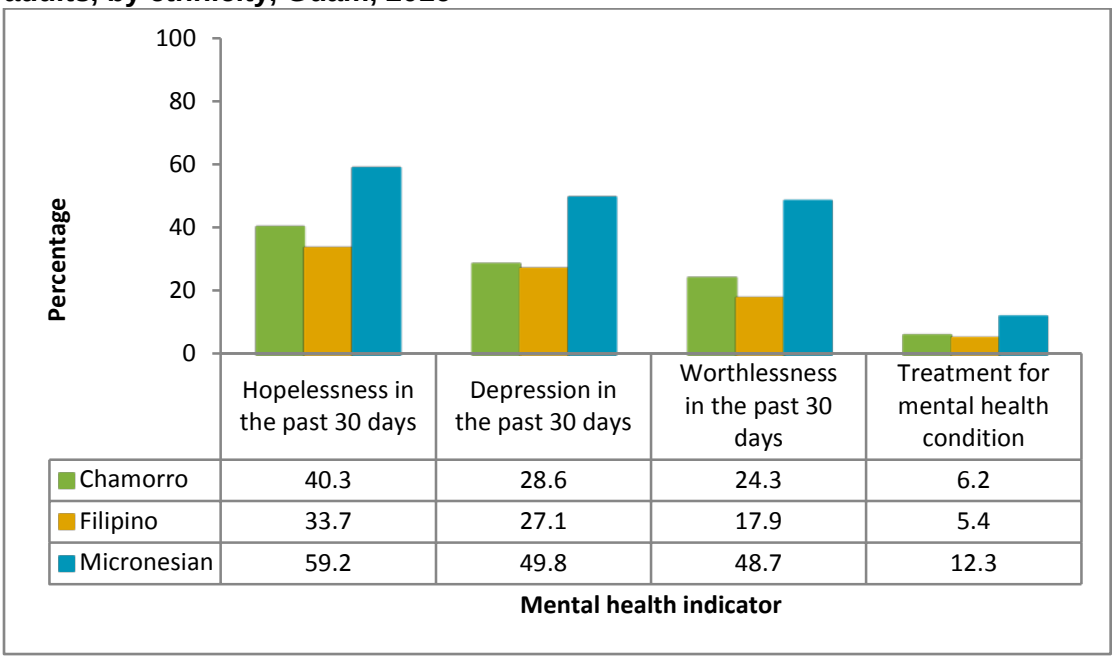


	Hopelessness in the past 30 days	Depression in the past 30 days	Worthlessness in the past 30 days	Treatment for mental health condition
<$15,000	56.2	43	40.2	15.8
$15,000-24,999	39.3	33.1	23.5	3.4
$25,000-34,999	36.4	29.7	26.8	8
$35,000-49,999	34.9	35.4	23.6	5.1
$50,000 +	24.3	14.6	11.8	4.6

Mental health indicator

Source: DPHSS and GBHWC, BRFSS State-added questions, 2016

Figure 99. Prevalence of mental health symptoms and conditions and treatment, adults, by ethnicity, Guam, 2016

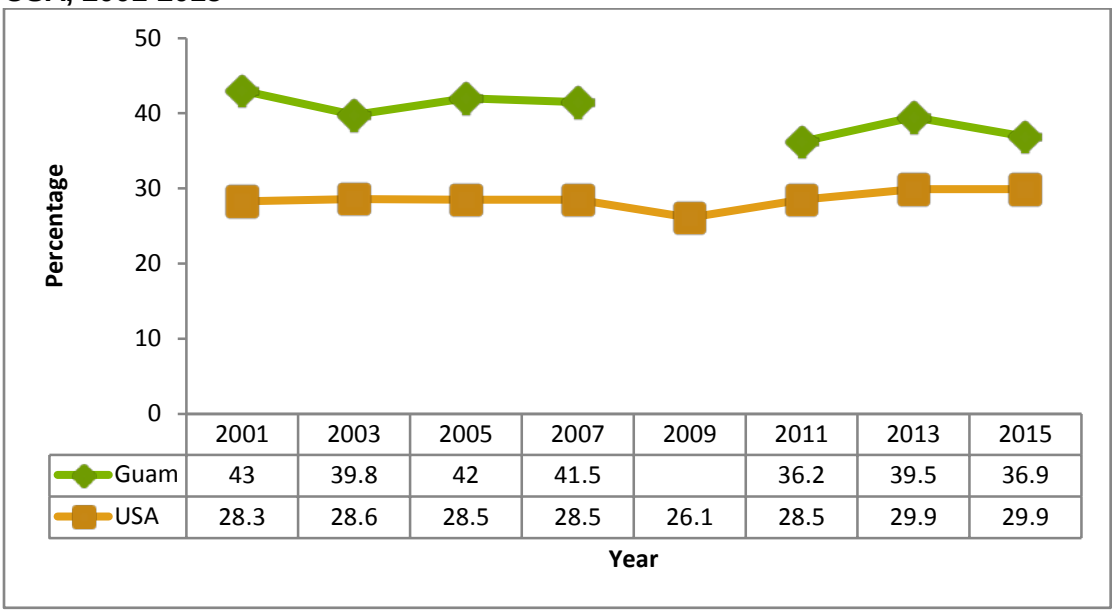


Source: DPHSS and GBHWC, BRFSS State-added questions, 2016

YOUTH

Persistent sadness is an indicator for depression. Depression prevalence may be significantly higher among youth on Guam (Figure 100). There appears to be less discrepancy of prevalence of depressive symptoms among youth of different ethnicities (Figure 101). This suggests that depression screening and early referral to mental health professionals should be conducted routinely among all high school youth, as a mental health and suicide prevention intervention.

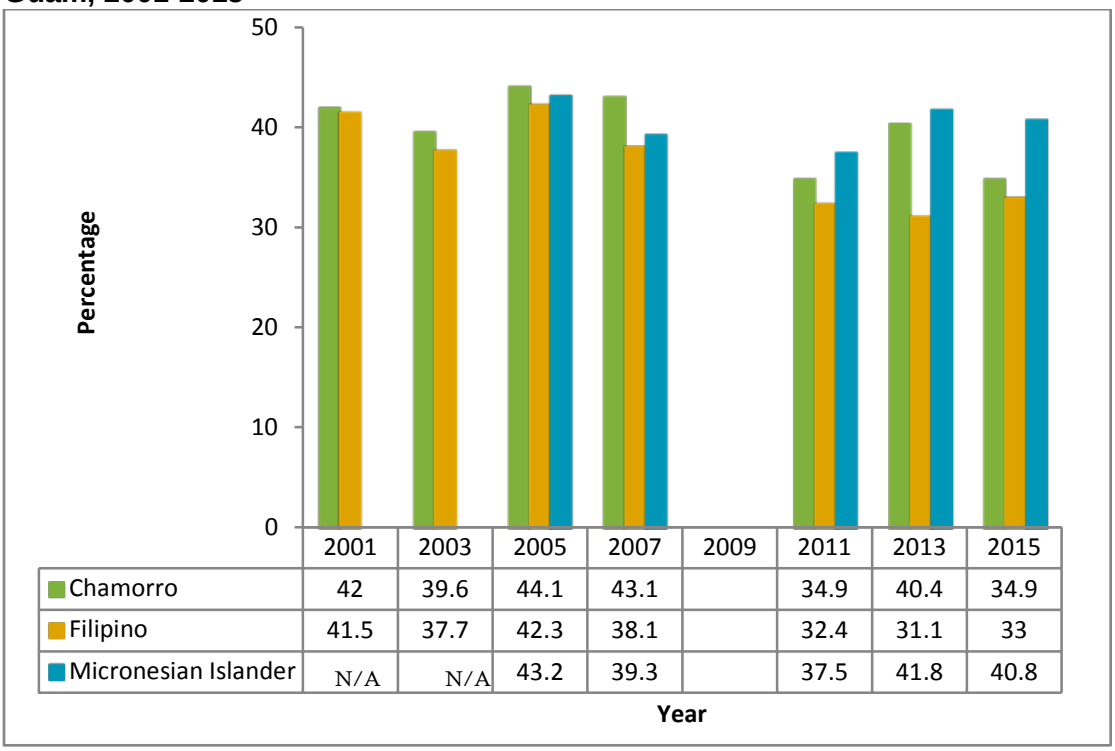
Figure 100. Feeling sad for at least 2 weeks over the past 12 months, Guam vs. USA, 2001-2015



	2001	2003	2005	2007	2009	2011	2013	2015
Guam	43	39.8	42	41.5		36.2	39.5	36.9
USA	28.3	28.6	28.5	28.5	26.1	28.5	29.9	29.9

Source: GDOE, YRBS 2001-2015; US CDC Youth Online at http://apps.nccd.cdc.gov/youthonline
Note: blank cells = data not available

Figure 101. Feeling sad for at least 2 weeks over the past 12 months by ethnicity, Guam, 2001-2015



	2001	2003	2005	2007	2009	2011	2013	2015
Chamorro	42	39.6	44.1	43.1		34.9	40.4	34.9
Filipino	41.5	37.7	42.3	38.1		32.4	31.1	33
Micronesian Islander	N/A	N/A	43.2	39.3		37.5	41.8	40.8

Source: GDOE, YRBS 2001-2015; US CDC Youth Online at http://apps.nccd.cdc.gov/youthonline
Note: blank cells = data not available

SPECIAL POPULATIONS

There were no new data reported for either the LGBTQ or the out-of-school youth special population groups for this edition of the Epi Profile.

CONCLUSIONS AND RECOMMENDATIONS

This version of the Guam Epidemiological Profile is an expanded version that seeks to combine substance abuse, suicide and mental health data in a comprehensive but user-friendly data document. These three areas of behavioral health are intrinsically linked, and the interrelationships are broad and far-reaching.

Challenges in substance abuse prevention and control remain. Tobacco use remains high, and despite recent declines, smoking prevalence for both adults and youth are significantly higher than the US median prevalence rates. On the positive side, in 2016, 75% of Guam adults aged 18 to 24 years have never smoked. However, because of many years of elevated tobacco consumption, the health burden in relation to tobacco-related noncommunicable diseases (NCD) like cancer is already being manifested in rising disease incidence and premature mortality. Smokeless tobacco use is nearly double the US rate, and needs to be carefully monitored. Future surveillance instruments will also begin to track e-cigarette and other electronic nicotine delivery device usage.

Current drinking among adults in Guam remains comparable to US rates. However, unsafe alcohol use - binge drinking and heavy drinking - is higher in Guam. Youth alcohol consumption reflects the powerful and immediate impact of sound policies---current and binge drinking among Guam youth dropped markedly following policy milestones in 2003 and 2010.

Decreases in smoking also occurred in direct temporal association with key policy initiatives. In contrast, marijuana prevalence among youth remained unchanged, and rates for current and lifetime use were notably higher in Guam than in the US. These findings support the relatively quick and considerable population impact of policy change, particularly among youth, who are considered a vulnerable population for substance abuse. It will be critical to track future marijuana consumption, with the recently enacted medical marijuana act that legalizes marijuana use for medical reasons. Guam's Epi Profile highlights the pivotal role of environmental interventions through sound policies in substance abuse prevention.

Suicide rates are rising after a brief drop in the crude death rate. Mortality data is supplemented with hospital data and surveillance data from the YRBS. Suicide prevention remains a key public health priority, and the data point towards specific strategies to reduce suicide in Guam. These strategies include:

- Targeting suicide prevention efforts towards youth and young adults, especially Micronesian Islanders, Japanese and Chamorros;
- Preventing and controlling alcohol and other drug abuse;
- Aggressively screening to recognize and treat mental illness and depression, including within schools;
- Building community capacity to recognize the signs of impending or possible suicide and training families, community members and first responders to effectively intervene to bring individuals at risk of suicide to professional attention;
- Training emergency room personnel and other hospital personnel to do brief interventions and referral to GBHWC and other mental health treatment providers for all cases of attempted suicide; and,

- Skills training in developing healthy relationships, avoiding physical and sexual violence, and countering bullying.

Mental health indicators highlight the discrepancy between those who have a debilitating mental condition or emotional problem and those who receive treatment for their condition. In particular, symptoms of depression appear pervasive among our youth, suggesting that depression screening and early referral to mental health providers should be conducted routinely among all high schools.

By examining substance abuse, suicide and mental health through disaggregated data, this Profile makes note of disparities across socio-economic and demographic sub-groups. Furthermore, this analysis begins to define the linkages between social determinants of consumption and disparities in health and social consequences of substance abuse, such as the higher smoking and binge drinking prevalence among Chamorros and other Micronesians and their notably higher rates of tobacco and alcohol-related cancer mortality, and likelihood of committing suicide.

For this edition of the Profile, no new data were available on special populations – the LGBT community and out-of-school youth in the Department of Youth Affairs. Once new data are available, they will be incorporated in future iterations of the Epi Profile.

This expanded Profile represents the culmination of multiple efforts through the years by Guam's SEOW to strengthen and expand the substance abuse and mental health surveillance system. Over the years, with SAMHSA/CSAP support through the SPF-SIG, Focus on Life and SEOW grants Guam has upgraded its substance abuse and mental health data capacity and infrastructure. For example, the previous lack of adult illicit drug use data was addressed through an ongoing Memorandum of Understanding between DPHSS (which runs the BRFSS) and GBHWC, where selected questions taken from the NSDUH survey instrument have been appended to the annual BRFSS survey instrument as a "State-added module."

Some data limitations remain. For example, youth in the private schools, and the military are not covered by the current surveillance mechanisms. The SEOW and PEACE Office conducted a survey among students within the Catholic school system, but were not given permission to release the results in public.

Guam also is constantly challenged by the difficulties of working with small numbers. Especially when data is disaggregated, the totals are often too small for accurate trending, and interpretation of for example, year-to-year changes or comparisons across similarly small groups are fraught with uncertainty. The lack of standardization in defining subgroup categories, such as age groups and ethnicity, sometimes within the same surveillance system across time, also make comparisons challenging.

Nonetheless, this Profile attests to the enhanced data capacity developed through the years, with leadership by the SEOW and support from the GBHWC PEACE Office and SAMHSA/CSAP. Evidence-based prevention is now facilitated and guided by accessible data in Guam.

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