

Kosrae Federated States of Micronesia Adult Hybrid Survey



2019



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HYBRID SURVEY ENDORSEMENT

Kosrae is one of four states that make up the Federated States of Micronesia (FSM), along with the states of Chuuk, Pohnpei, and Yap. It is the only single-island state in the FSM and the furthest southeastern point of the four states. Over the years, there have been drastic changes in lifestyle in Kosrae. It has shifted from mostly subsistence living and reliance on locally produced crops and fish to a more Western lifestyle that includes sedentary occupation and more reliance on imported foods. This lifestyle shift has resulted in higher burdens of certain risk factors, NCDs, and poor mental health. Risk factors for developing NCDs in these island jurisdictions (Kosrae being one of them) are among the highest in the world.

There has not been a population-based NCD adult survey with physical and biochemical measurement since 2009. New data has been long overdue to provide a more current view of the health status of the population. This information is vital in order to prioritize public health programs and select appropriate interventions. Therefore I am very pleased to have completed the Adult NCD Hybrid Survey in 2019.

The Adult NCD Hybrid Survey provides a more current snapshot of the health status of Kosrae. It allows us to assess the current prevalence of non-communicable diseases (NCDs) and selected risk factors for NCDs in Kosrae. It enables us to better understand the burden of these conditions and risk factors, monitor trends, and determine who is at greater risk for poor health in order to improve health through the development of targeted evidence-based interventions.

I am grateful for the hard work and diligent perseverance that went into this effort, culminating in the Survey findings and report. I would also like to express appreciation for the participation of the community in the implementation of this survey. It is with sincere gratitude that I endorse the Adult NCD Hybrid Survey report and its findings. The purpose of this survey is to improve our efforts to prevent and address NCDs in Kosrae, and work together towards a happy and healthy Kosrae.

Thank you,


Dr. Livinson Taulung
Director of Health Services



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- Kosrae Community Health Center
- Kosrae Utilities Authority
- Division of Statistics, Dept. of Administration/Kosrae State Government
- Kosrae Nurses Association
- Municipal Mayors
- 2018 Kosrae Hybrid Survey Team



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FOREWORD

Kosrae, as many of its neighbors in the Pacific Region has been plagued with Non-Communicable Diseases that are currently among the leading causes of death and disability among our people. In order to address this threat to the health of our people there is an urgent need to have accurate information on NCDs. Current and accurate information will inform key planning and decision making in the efforts to mitigate and minimize the impact of NCDs on the island of Kosrae.

The NCD Adult Hybrid Survey is a collaborative effort between regional and federal partners such as the World Health Organization, the Centers for Disease Control and Prevention, the Secretariat of the South Pacific Community, the Pacific Islands Health Officers Association, the Kosrae State Government through the Department of Health and of course the people of Kosrae.

The NCD Adult Hybrid Survey was an immense undertaking and would not have been possible without the support and collaboration of all of our partners. I take this opportunity to extend my sincere appreciation on behalf of the Department of Health to all those who brought this effort to fruition. Our genuine gratitude is extended to all of the organizations listed above, and to the people of Kosrae for allowing our teams to enter their homes and work places, and for sharing vital information with us that benefits the state as a whole.

The NCD Hybrid Survey helps us have a better understanding of both the challenges and opportunities that exist as we strive to improve overall health of our community. It is our hope that our people also have a better understanding of their health as a result of the Survey and every sector of our society can work together towards a healthier Kosrae.

Thank you,

Dr. Nelson Taulung
Director, Dept. of Health Services

Table of Contents

Summary	6
Summary Dashboard	7
Introduction	8-9
Survey Methodology	10-11
Sample Summary	12
Demographics	13-14
Healthcare	
General Health	15
Access to Care	16-18
Oral Health	19
Biometric Measures	
Body Mass Index	20
Hypertension	21-22
Diabetes	23-26
Total Cholesterol	27
Self-Reported Chronic Conditions	28
Chronic Kidney Disease	29
Health Risk Behaviors	
Cigarette Smoking	30
Other Tobacco Use & Smoking Cessation Behavior	31
Second-Hand Smoke Exposure	32
Betel Nut Chewing	33
Other Betel Nut Use & Betel Nut Cessation Behavior	34
Alcohol Use and Binge Drinking	35
Other Substance Use	36
Nutrition and Physical Activity	
Regular Diet	37
Fruit and Vegetable Consumption	38
Processed Meat Consumption	39
Sodium	40
Sugar Sweetened Beverage Consumption	41
Physical Activity	42-43

Table of Contents

Cancer Screening	
Colon Cancer Screening	44-46
Female Cancer Screening	47-49
Family Planning	50-51
Women’s Health	52
Mental Health	
Depression	53
Anxiety	54
 Notes on the Survey	 55
Discussion & Recommendations	56-57
Acknowledgements	58
References	59
Appendix: details about indicators	60-68



Summary

The aim of this report is to assess the current prevalence of non-communicable diseases (NCDs) and selected risk factors for NCDs in Kosrae, Federated States of Micronesia. We hope that this report enables Kosrae to better understand its burden of these conditions and risk factors, monitor trends, and determine who is at greatest risk for poor health in order to improve health through the development of targeted evidence-based interventions.



NCDs such as heart disease, cancer, and diabetes are global issues that result in high burdens of disability and premature death [1]. Additionally, substance use and poor mental health can also greatly contribute to disability and premature death throughout the world [2]. NCDs, substance use, and poor mental health are highly linked to a number of key risk factors, such as cigarette smoking, tobacco chewing, excessive alcohol consumption, unhealthy diet, lack of physical activity, and overweight/obesity [1]. Over the past few decades there have been drastic changes in lifestyle in Kosrae, an island state of the Federated States of Micronesia in the Western Pacific Ocean. Kosrae has shifted from mostly subsistence living and reliance on locally produced crops and fish to a more Western lifestyle that includes sedentary occupation and more reliance on imported foods. This lifestyle shift has resulted in higher burdens of certain risk factors, NCDs, and poor mental health [3].

The NCDs of concern in the US-Affiliated Pacific Islands (USAPIs) include diabetes, heart disease, stroke, cancer, and chronic obstructive pulmonary disease [1,2]. The social determinants of health demonstrate that there is a complex system of factors that are linked to NCDs which include demographic, social, technological, cultural, environmental, biological, economic, and political [4]. However, the four leading risk factors attributable to NCDs globally include unhealthy diets (insufficient consumption of fruit and vegetables, excessive consumption of salt, high fat, and high sugar foods), insufficient physical activity, excessive consumption of alcohol, obesity, and tobacco use [2]. In the Pacific Islands, betel nut (which is carcinogenic to humans) chewing with or without tobacco is also identified as a significant health problem [5].

In Kosrae, there has not been a population-based NCD adult survey with physical and biochemical measurement since 2009. Therefore, a new survey was greatly needed to evaluate progress. This information is vital in order to prioritize public health programs and select appropriate interventions.

Kosrae undertook a novel population-based household survey that combined NCD and associated risk factor indicators between 2018-2019. A total of 604 individuals aged 18 years or older participated in the survey. Respondents answered questions about their alcohol and tobacco use, other substance use, dietary habits, physical activity, health access, oral health, health conditions, mental health, and cancer screening. Additionally, height and weight, fasting blood glucose, total cholesterol, and blood pressure were measured.

Kosrae vs. USA

Here are Kosrae's 2018 Hybrid Survey prevalence data compared to U.S. prevalence data using the most comparable sources available. Cigarette smoking prevalence in Kosrae is similar to the US prevalence. Current alcohol use prevalence is lower in Kosrae compared to the US, although binge drinking prevalence in Kosrae is higher. Hypertension, and high cholesterol prevalence is lower in Kosrae compared to the US. However, all other indicators examined had worse prevalence compared to the US.

	Kosrae %	US %	Comparison
Current tobacco use (past 30 days) Cigarette smoking	18.7	17.1	○
Current alcohol use (past 30 days) Alcohol use (any)	22.4	55.1	↓
Binge drinking (5+ drinks per day)	21.0	17.4	↑
Nutrition <5 servings of fruits and vegetables (per day)	96.3	76.6 ¹	↑
Health and healthcare Fair or poor health (self-reported)	58.2	17.6	↑
No medical checkup in the past year	58.2	29.6	↑
Oral health No dental visit within past year	61.7	33.6 ²	↑
Extracted permanent teeth due to decay/disease	79.8	43.1 ²	↑
Chronic conditions Overweight/obesity	81.8	71.6 ³	↑
Diabetes (self-reported + undiagnosed)**	29.4	12.2 ⁴	↑
Hypertension (self-reported + undiagnosed)**	27.0	33.2 ³	↓
Measured high total cholesterol (≥240mg/dL)	6.0	11.8 ³	↓
Cancer screening No Pap smear in the past 3 years (women 21-65 yo)***	61.5	20.2 ²	↑
No mammogram in the past 2 years (women 50-74 yo)	92.0	22.4 ²	↑

Source for US comparison: BRFSS 2017 unless noted with ¹BRFSS 2009, ²BRFSS 2016, ³NHANES 2015-2016 (adults 20+), ⁴NHANES 2011-2014 (adults 20+), **Diabetes prevalence is estimated based on either a self-report of diabetes for which the patient is taking medication and/or a single fasting blood sugar of ≥126mg/dL during the survey; Hypertension prevalence is estimated based on either a self-report of hypertension for which the patient is taking medication and/or a measured average blood pressure (of 3 readings) of ≥140/90, ***Pap smear prevalence in Kosrae includes VIA test.
NOTE: Statistically significant differences could not be determined due to the fact that BRFSS comparison data are based on median values of the 50 US States + DC. Therefore, differences of 2% were considered to be comparatively different.

Introduction

Non-communicable diseases (NCDs) are the leading causes of morbidity and mortality for adults in the United States Affiliated Pacific Islands (USAPIs) (American Samoa, Guam, Commonwealth of the Northern Mariana Islands [CNMI], Federated States of Micronesia [FSM], Republic of Palau, and Republic of Marshall Islands [RMI]) [5].



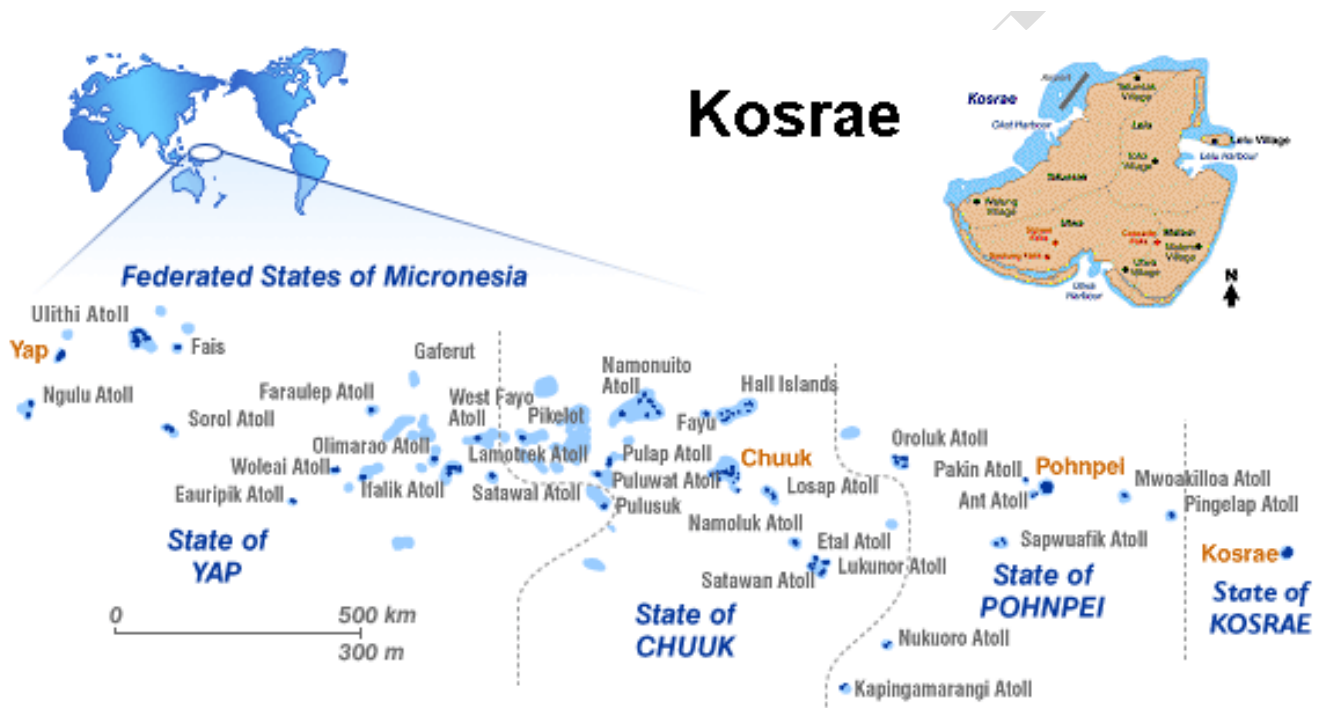
On May 25, 2010 the Pacific Island Health Officers Association (PIHOA) declared a Regional State of Health Emergency due to the epidemic of non-communicable diseases in the USAPI due to the fact that NCDs account for around 70-75% of all deaths in the region [1]. The NCDs of concern in the USAPIs include diabetes, heart disease, stroke, cancer, and chronic obstructive pulmonary disease [1,2]. Risk factors for developing NCDs within these island jurisdictions are among the highest in the world. This includes tobacco use, poor diet, sedentary lifestyles, and binge drinking [1]. In most of the USAPIs, betel nut (which is carcinogenic to human) chewing with or without tobacco is also identified as a significant health problem [6].

As previously mentioned, the last NCD adult population-based survey was conducted in 2009. This was a STEPS survey supported primarily by the World Health Organization (WHO). Over time, other support partners have requested NCD and other health indicator data from Kosrae that have not been collected and therefore cannot be provided.

Although support partners such as Centers for Disease Control and Prevention (CDC), Substance Abuse and Mental Health Services Administration (SAMHSA), and WHO have standardized surveillance systems, they are not always the best fit for Kosrae or the other USAPIs. This is due to the fact that Kosrae is a low-resource setting that lacks technological infrastructure and epidemiological capacity to maintain multiple NCD surveillance systems. Therefore, the USAPIs have shifted to a “hybrid approach” in which key indicators from multiple support partner surveillance systems are integrated into one survey, and multiple partners contribute financially and through technical support to conduct the “hybrid” survey.

For this survey, the Kosrae Department of Health Services and the Kosrae Community Health Center provided local support. Funding was provided the U.S. Department of Interior. Technical support was provided primarily by PIHOA. Other technical support was provided by CDC, SPC, and WHO.

Kosrae is one of four states that make up the Federated States of Micronesia (FSM), along with the states of Chuuk, Pohnpei, and Yap. Kosrae is the only single-island state in the FSM and the furthest southeastern point of the four states. With an area of 42.3 square miles, it is the second largest island in the FSM (after Pohnpei). Kosrae is divided into four municipalities: Lelu, Malem, Utwe, and Tafunsak. The community of Walung, part of the Tafunsak municipality, is isolated from much of the island and not easily accessible. The capitol Tofol is the political and commercial center of Kosrae [3].



The total population of Kosrae is 6,616 (2010 census). About half (50.7%) of the population of Kosrae is less than 20 years of age [7]. According to the 2010 census, there were 3,352 males (50.7%) and 3,264 (49.3%) females. A majority of the population resides in rural areas of the island, which inhabit 4,456 residents (67.4%). Urban areas inhabit 2,160 residents (32.6%). The population in Kosrae is decreasing with an average annual growth rate of -1.50% [7].

Survey Methodology

The Kosrae Hybrid Survey aimed to assess NCD risk factors such as fruits and vegetables consumption, processed meats consumption, sugar sweetened beverages consumption, physical activity levels, tobacco use, alcohol use, healthcare utilization, oral health, as well as NCD conditions by self-diagnosis and cancer screening rates. Finally, the Kosrae Hybrid Survey collected physical measurement of height, weight blood pressure, and biochemical measurement of fasting blood glucose and total cholesterol.

The Kosrae Hybrid survey includes questions from validated instruments such as the CDC Behavioral Risk Factor Surveillance System (BRFSS), WHO STEPwise approach to Surveillance (STEPS), CDC National Health and Nutrition Examination Survey (NHANES), SAMHSA National Outcomes Measures (NOMs), as well as locally developed questions as needed.

OBJECTIVES

1. Inform the community on NCD and risk factor prevalence in Kosrae.
2. Use these data to determine whether or not current efforts are succeeding in decreasing risk factors and the prevalence of common NCDs.
3. Support further research on NCD risk and protective factors in Kosrae.
4. To direct policy and program strategies to reduce NCDs.

TARGET GROUP

Participants eligible for the Kosrae Hybrid survey included all Kosrae residents aged 18 years and over who were able to provide consent.

Sampling procedures



Multi-stage sampling was be used to recruit participants in this survey. This procedure is described in detail below

Stage 1: Geographical Stratification and Household Sampling

All municipalities were sampled based on adult population size within these municipalities based on most recent estimates from the Census (2010). Individual households were then randomly selected from Kosrae Utilities Authority household electric meter listings with the exception of Walung that does not have electricity. Households in Walung were randomly selected from the 2016 FSM Integrated Agriculture Census household maps.

Stage 2: Selection of the individual from the household for the Hybrid survey

Kish methodology was used for random selection of one adult per selected household.

Step 1: Ask for the age and sex of all adults living the household (Start with youngest person in the household, Exclude those visiting and do not live in the household; also exclude those who would be unable to provide consent)

Step 2: Put a rank for each individual aged 18 years and over following the rules below:

First put a rank for males from the oldest to the youngest

Second put a rank for females from the oldest to the youngest

Step 3: Use Kish grid to identify selected participant based on rank.

Data collection



Data were collected by trained surveyors contracted by the Kosrae Nursing Association. All surveyors underwent an extensive one-week training. Interviews were conducted in either Kosraean or English in the home on the day of the home visit, then an appointment was made for an early morning visit to collect fasting blood measurements. Data were collected from October 2018 through May 2019. Data collection spanned several months due to a shut down and restart occurring over the holiday season in Kosrae when many residents travel off-island.

Data entry



All data were collected electronically on a tablet using the ODK Collect app. Tablets were uploaded on a weekly basis to the PIHOA Ona account.

Data cleaning



Descriptive statistics were produced for all variables. Outliers were also checked, validated, and rectified.

A data dictionary was created to explain the indicators and data codes.

Data analysis

Descriptive data analysis was conducted. Chi-squared analysis was used to analyzed differences by:

- **age group** (18-24 years old, 25-34 yo, 35-44 yo, 45-55 yo, 55-64 yo, 65+ yo)
- **gender** (male, female)
- **municipality** (Lelu, Malem, Tafunsak, Utwe)
- **education** (less than high school education, completed high school education, more than high school education)

[Due to the age of the most recent Census data, large sample size, and ability to analyze locally, these data were not weighted.]

Sample Summary

The sample collected was similar to population estimates based on the 2010 Census. Although the sample appears to be a bit older, the comparison population statistics are almost a decade old. Therefore, these data were not weighted.

	<u>Survey sample</u>	<u>2010 Census data (18 and older)</u>
	n=604	n=3,713
Gender		
Male	307 (50.8%)	1,872 (50.4)
Female	297 (49.2%)	1,841 (49.6)
Age group		
18-24 years	69 (11.4%)	790 (21.3)
25-34 years	120 (19.9%)	800 (21.5)
35-44 years	132 (21.9%)	672 (18.1)
45-54 years	117 (19.4%)	717 (19.3)
55-64 years	106 (17.5%)	458 (12.3)
65+ years	60 (9.9%)	276 (7.4)
Municipality		
Lelu		
Malem	204 (33.8%)	1230 (33.1%)
Tafunsak	117 (19.4%)	721 (19.4%)
Utwé	205 (33.9%)	1205 (32.5%)
	78 (12.9%)	557 (15.0%)

Demographics

Gender	<u>n</u>	<u>%</u>
Male	307	50.8
Female	297	49.2
<i>Education</i>		
Less than high school	194	32.1
High school	243	40.2
Associate's degree	124	20.5
Bachelor's degree	31	5.1
Graduate or professional degree	12	2.0
<i>Ethnic Background</i>		
Kosraean	574	95.0
Other	30	5.0
<i>Marital Status</i>		
Single, never married	149	24.7
Married	377	62.4
Widowed	55	9.1
Divorced/separated	23	3.8
<i>Employment Status</i>		
Government employee	178	29.5
Non-government employee	135	22.4
Self-employed	98	16.2
Non-paid (volunteer, subsistence, etc.)	24	4.0
Student	21	3.5
Homemaker	77	12.7
Retired	20	3.3
Unemployed (able to work)	32	5.3
Unemployed (unable to work)	19	3.1

Demographics

Military Status

	<u>n</u>	<u>%</u>
Active Duty	0	0.0
Reservist	2	0.3
Veteran	23	3.8
Retired	0	0.0
Never Served	577	95.8

Religion

Congregational Christian Church	518	85.8
Catholic	16	2.6
Seventh Day Adventist	11	1.8
LDS/Mormon	20	3.3
Pentecostal/AOG	11	1.8
Baptist	17	2.8
Other	9	1.5
None	2	0.3

Household Income

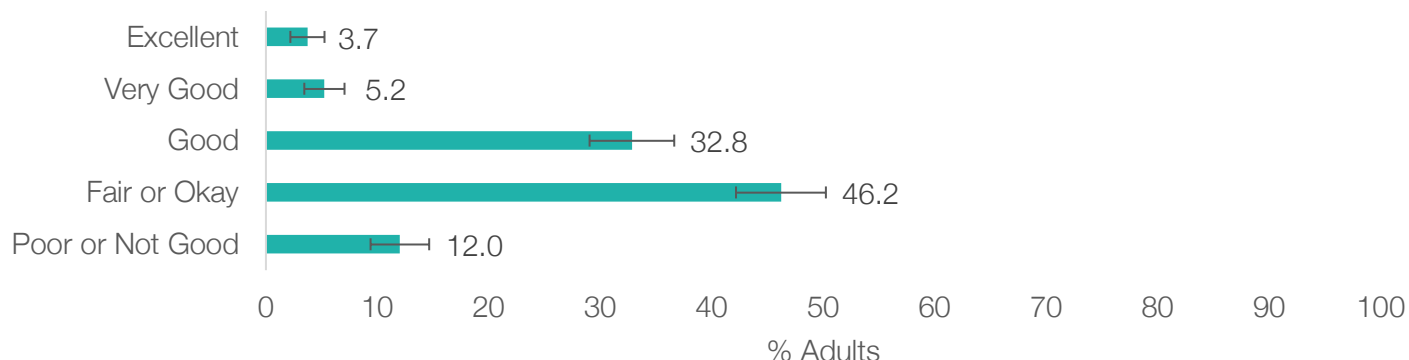
< \$5,000	227	46.0
\$5,000 to < \$10,000	152	30.8
\$10,000 to < \$15,000	61	12.4
\$15,000 to < \$20,000	29	5.9
\$20,000 or more	24	4.9

NOTE: some Ns may not total 604 due to responses of “don’t know” or “refused”

General Health

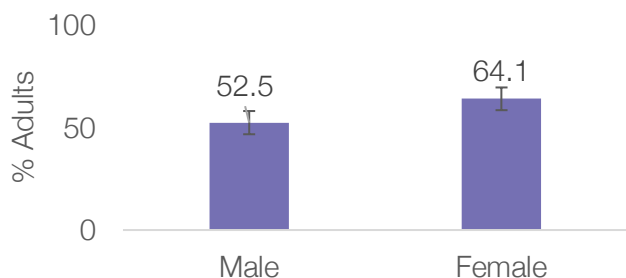
More than half (58.2%) of adults in Kosrae self-reported their general health to be fair or poor.

Self-reported health status among adults in Kosrae, 2019

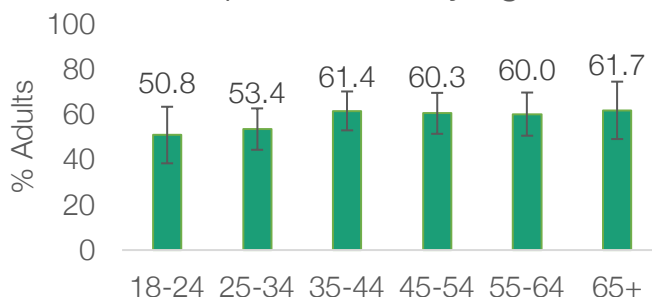


Women had a higher prevalence (64.1%) of self-reported fair or poor health compared to men (52.5%). There were no statistically significant differences between age, education levels, or municipality.

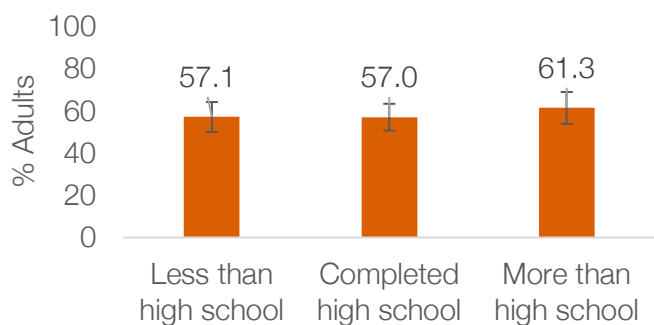
Fair or poor health, by Gender



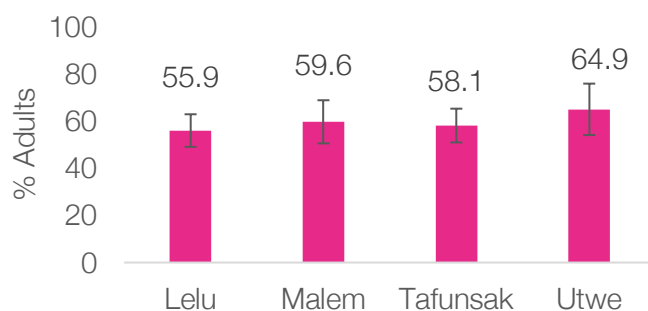
Fair or poor health, by Age



Fair or poor health, by Education



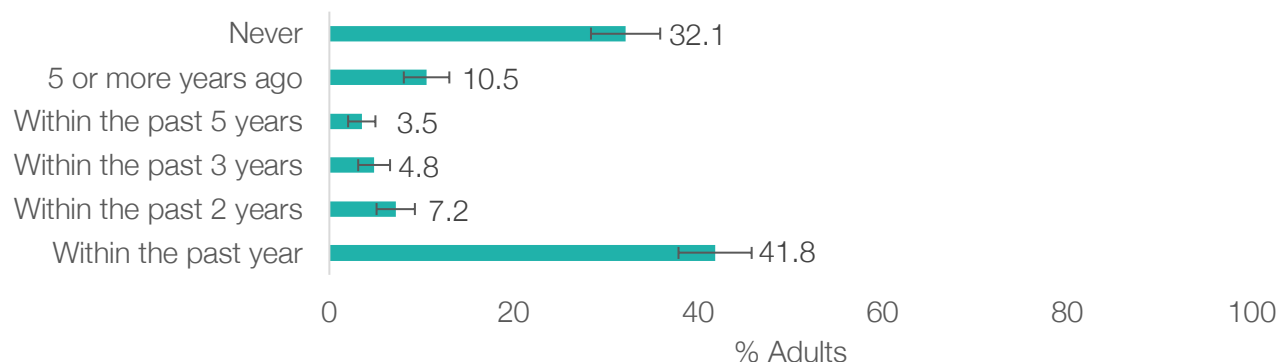
Fair or poor health, by Municipality



Access to Care: Annual Checkup

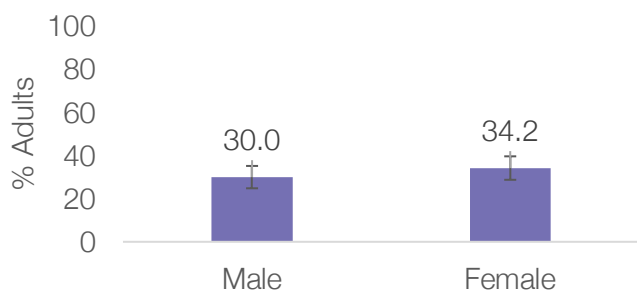
Overall, over half (58.2%) of adults in Kosrae did not receive an annual checkup in the past year, and one third (32.1%) of adults have never had an annual checkup.

Last Annual Exam among adults in Kosrae, 2019

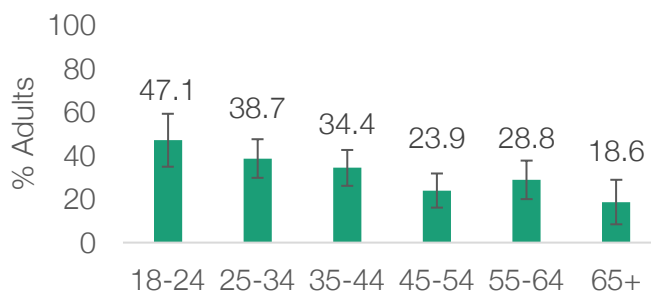


Younger adults had a higher prevalence of never having an annual exam. There were no statistically significant differences between gender, education levels, or municipality.

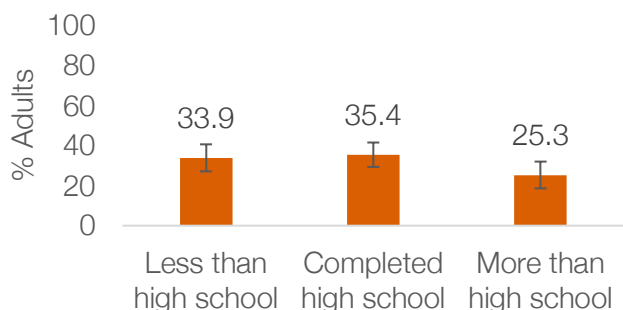
No Annual Exam, by Gender



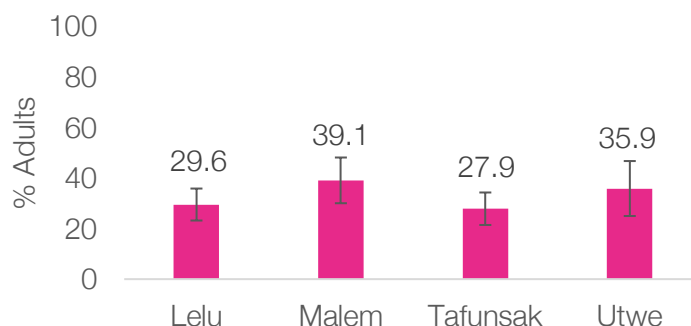
No Annual Exam, by Age



No Annual Exam, by Education



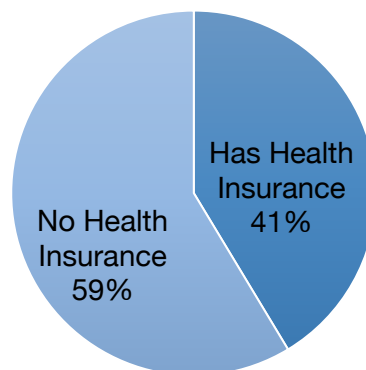
No Annual Exam, by Municipality



Access to Care: Health Insurance

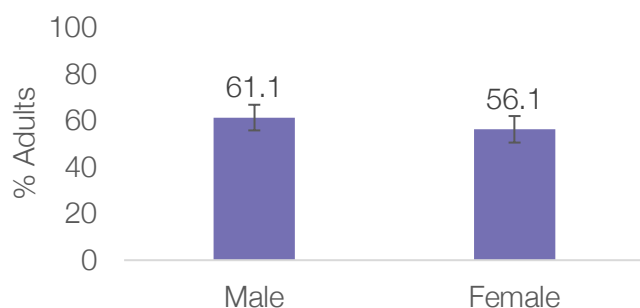
Over half (58.6%) of the adult population in Kosrae does not have any kind of health insurance.

Health Insurance Status among adults in Kosrae, 2019

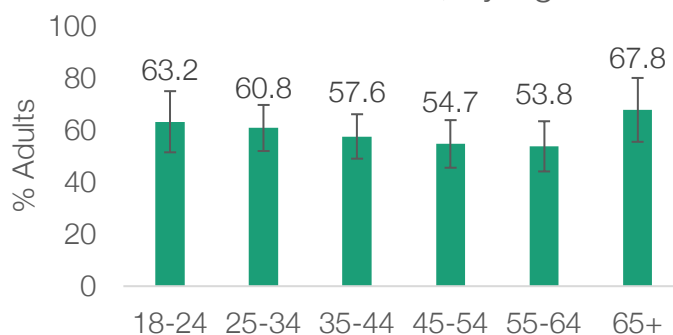


Adults with less than high school education had the highest prevalence (74.6%) of no health insurance. Lelu had the lowest prevalence (50.5%) of residents without health insurance. There were no statistically significant differences between gender and age group.

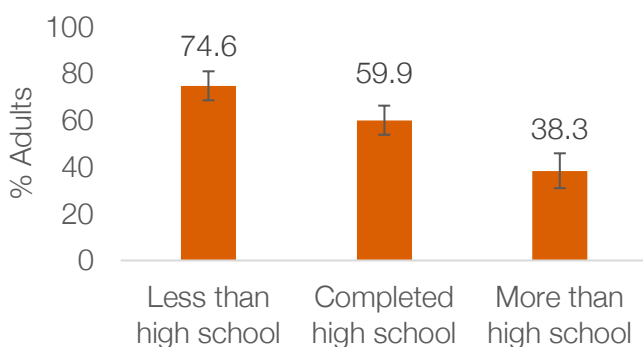
No Health Insurance, by Gender



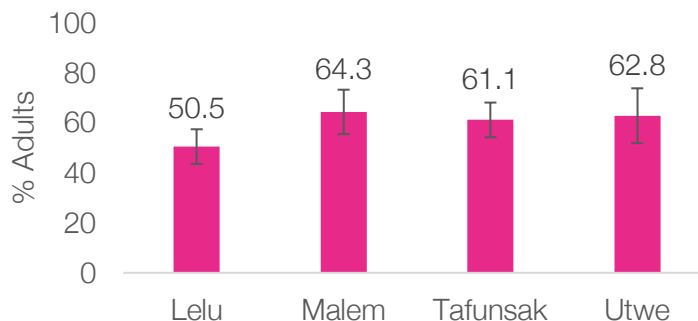
No Health Insurance, by Age



No Health Insurance, by Education



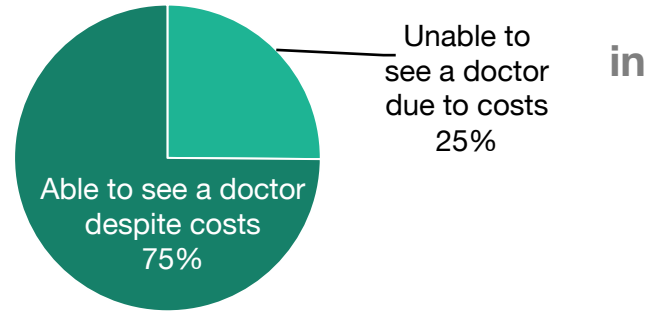
No Health Insurance, by Municipality



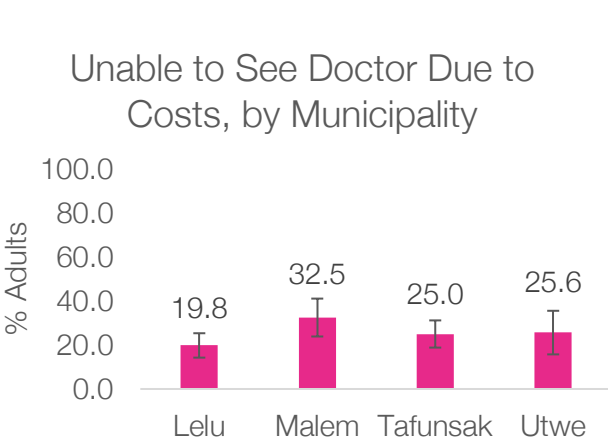
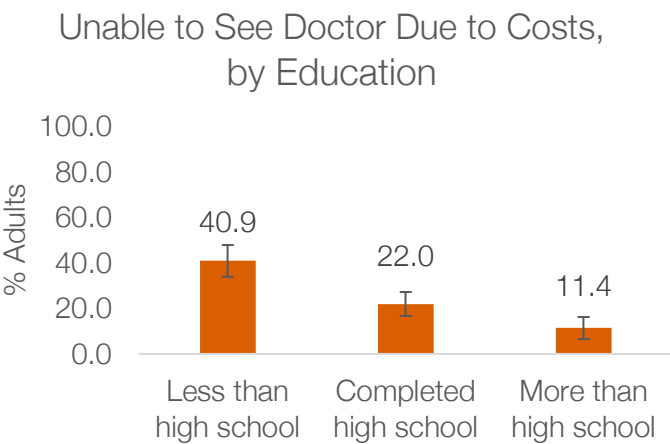
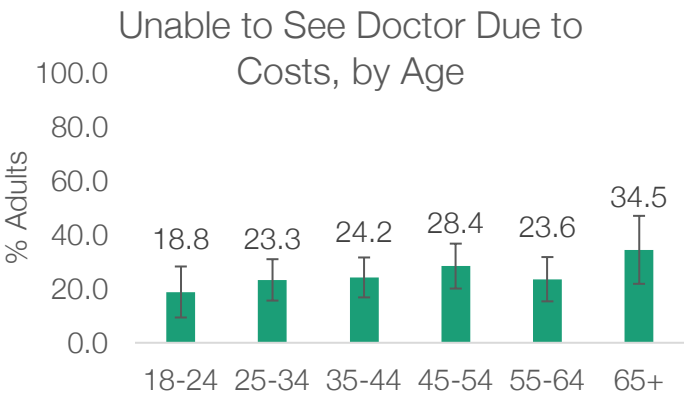
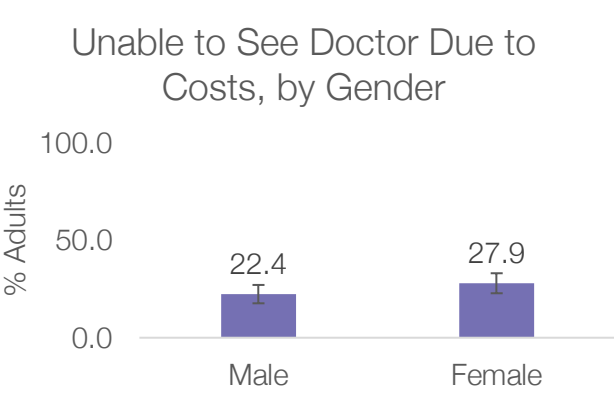
Access to Care: Health Care Barriers

In the past year, one quarter (25.1%) of adults Kosrae could not see a doctor because of health care costs.

Health Care Costs as a Barrier in Kosrae, 2019



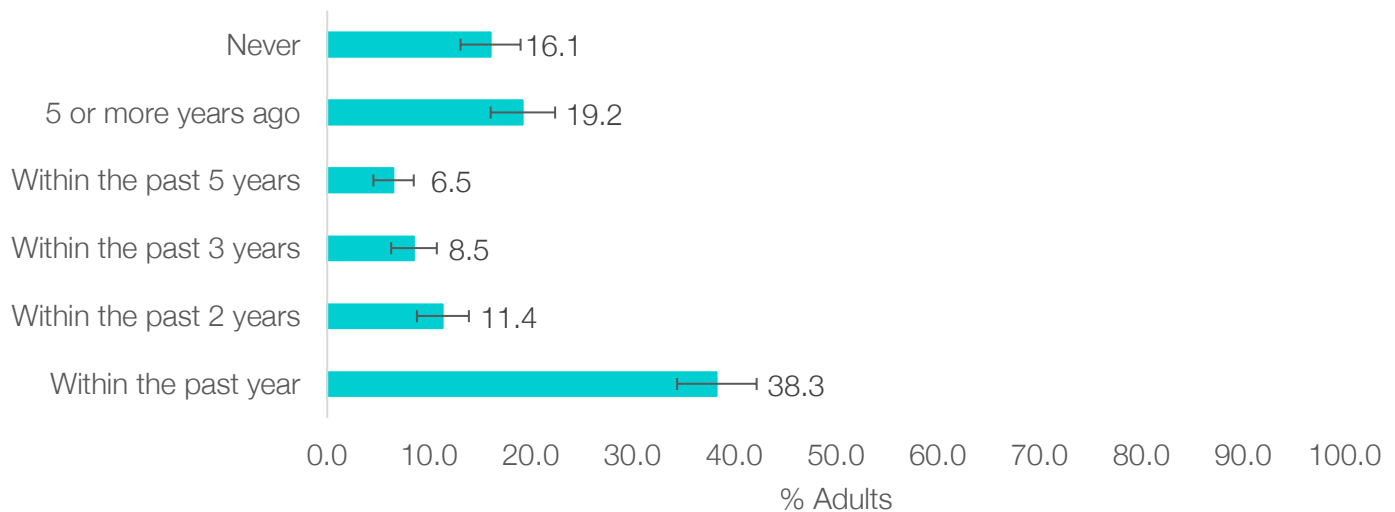
Adults with less than high school education had the highest prevalence (40.9%) of not seeing a doctor due to health care costs. There were no statistically significant differences between gender, age, or municipality.



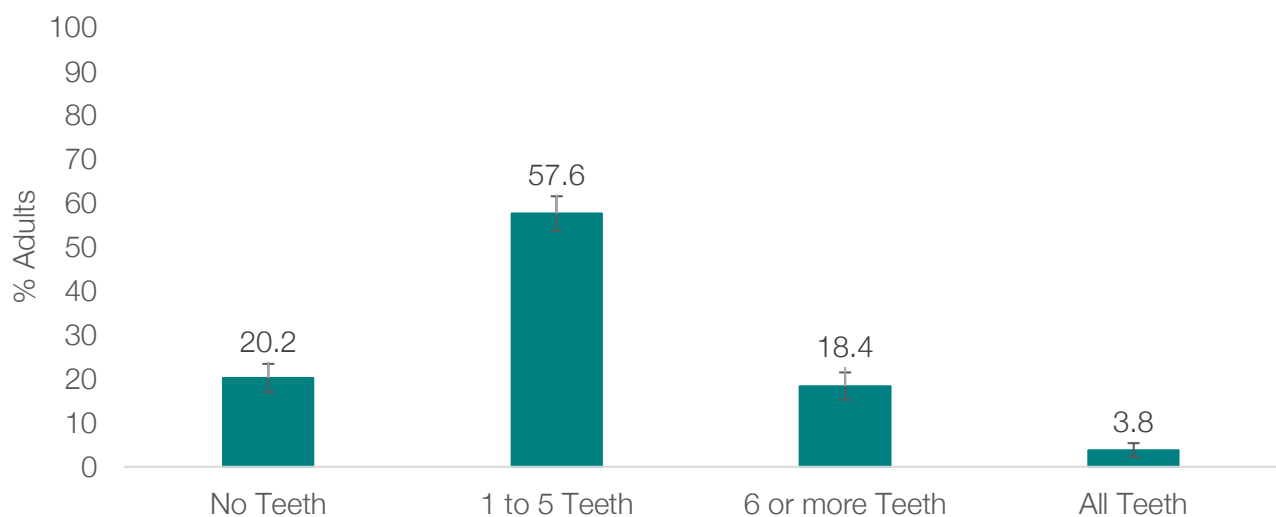
Oral Health

About two out of every five adults (38.3%) in Kosrae had a dental visit in the past year. About one out of every six adults (16.1%) have never seen a dentist. Four out of every five adults (79.8%) in Kosrae have had at least one tooth removed due to tooth decay or gum disease.

Last Dental Exam among Adults in Kosrae, 2019



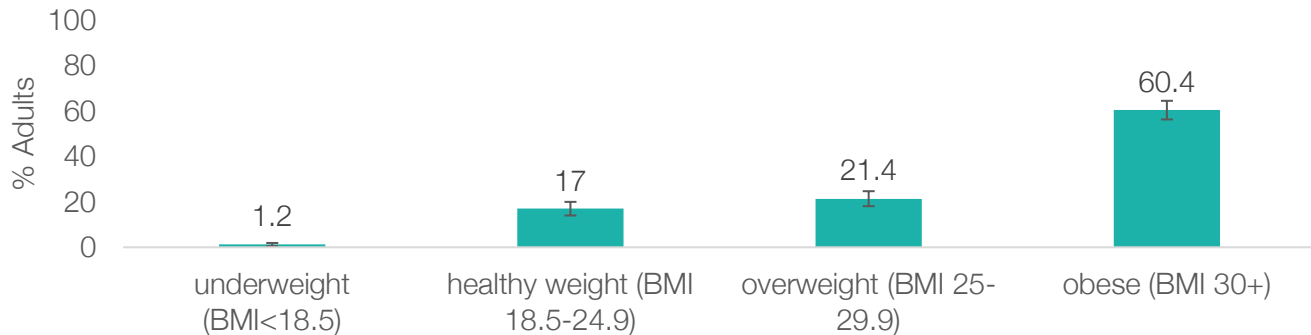
Number of Permanent Teeth Removed due to Tooth Decay or Gum Disease among adults in Kosrae, 2019



Overweight / Obesity

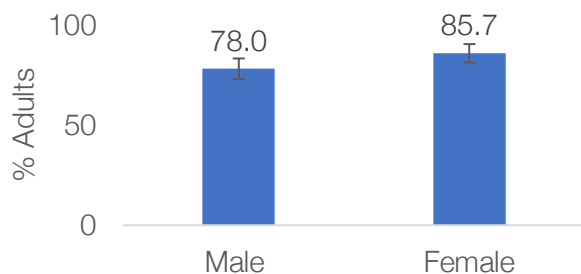
Body Mass Index (BMI) is calculated based on height and weight measurements. Based on these measurements, more than four out of five (81.8%) of adults in Kosrae were overweight or obese.

BMI Categories among adults in Kosrae, 2019

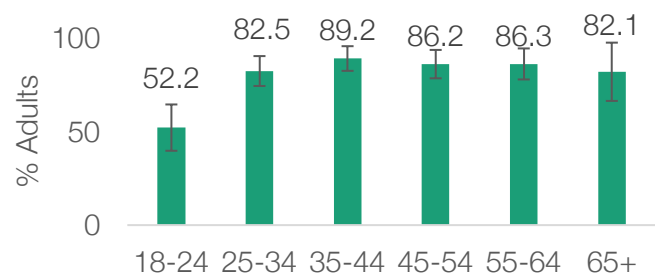


Younger adults (18-24 years old) had the lowest prevalence of overweight/obesity and females had a significantly higher prevalence of overweight/obesity compared to males.

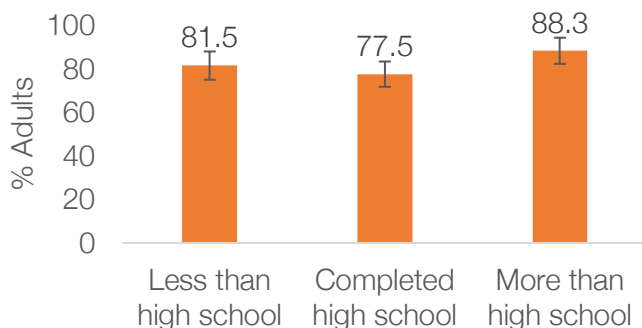
Overweight/Obese, by Gender



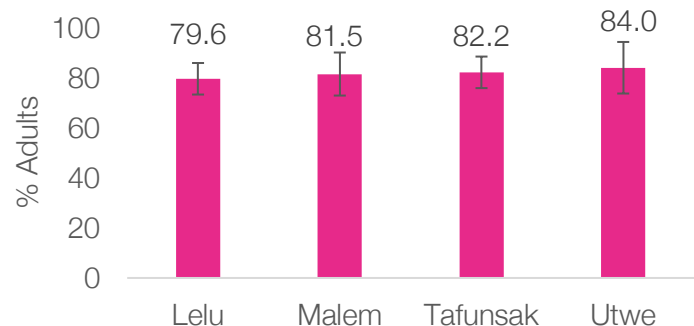
Overweight/Obese, by Age



Overweight/Obese, by Education



Overweight/Obese, by Municipality

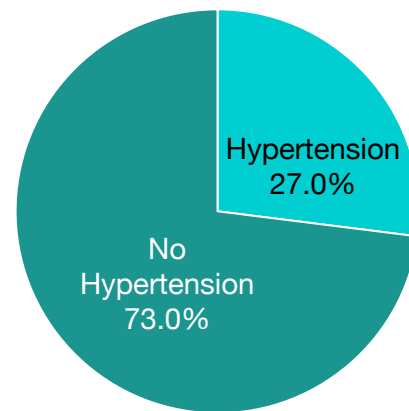


Hypertension

Almost one-third of adults (27.0%) in Kosrae had high blood pressure ($\geq 140/90$) during screening or self-reported having hypertension* for which they took medication.

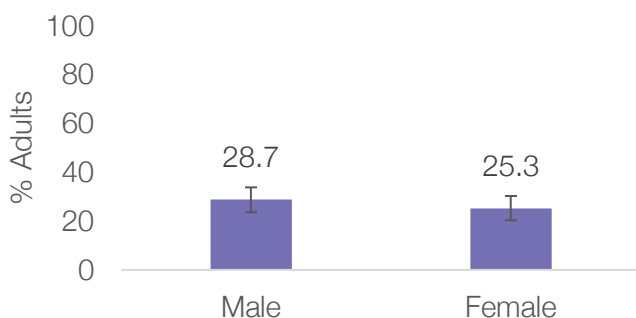
* Hypertension prevalence is estimated based on either a self-report of hypertension for which the individual is taking medication and/or a measured average blood pressure (of 3 readings) of $\geq 140/90$

Adult Hypertension in Kosrae, 2019

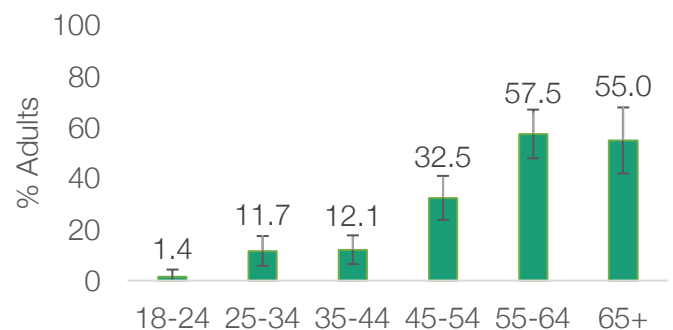


Hypertension prevalence increased greatly with age, with over half of adults 55 years and older having hypertension. Those with less than high school education and more than high school education had higher prevalence of hypertension. There were no significant differences observed by gender or municipality.

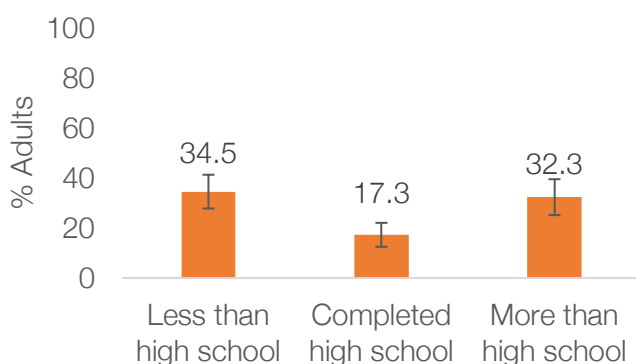
Hypertension, by Gender



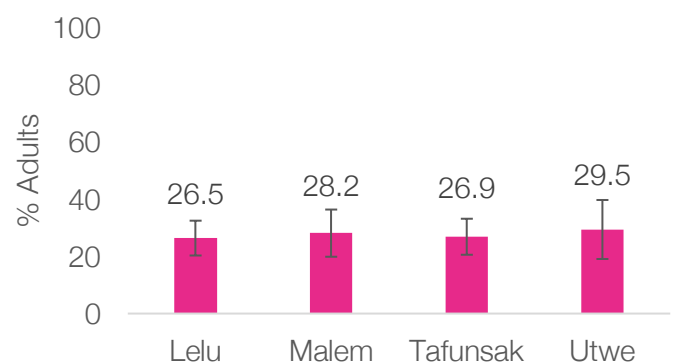
Hypertension, by Age



Hypertension, by Education



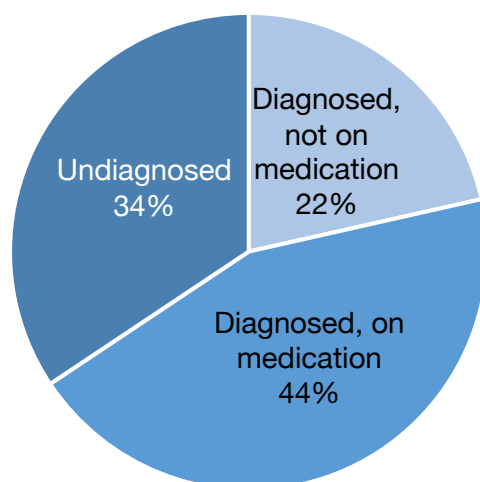
Hypertension, by Municipality



Hypertension Diagnosis & Control

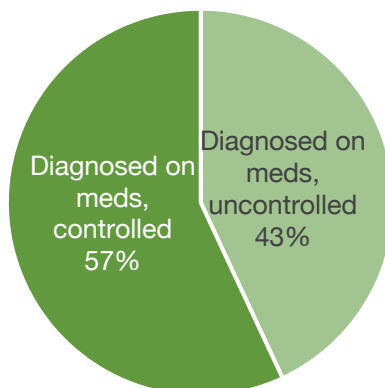
Among the adults in Kosrae classified as having hypertension, 34.4% of adults did not report that they had been diagnosed with hypertension. 44.2% of individuals classified as having hypertension reported that they were diagnosed and taking medication for their hypertension, and 21.5% reported that they had been diagnosed, but were not currently on medication for their hypertension.

Diagnosis Status among adults with Hypertension in Kosrae, 2019



Among those adults who reported that they were diagnosed and taking medication for their hypertension, 43.1% had an uncontrolled blood pressure measurement (average blood pressure [of 3 measurements] during survey was $\geq 140/90$). This indicates that these individuals with hypertension are not controlled.

Control Status among Diagnosed with Hypertension and on Medication in Kosrae, 2019

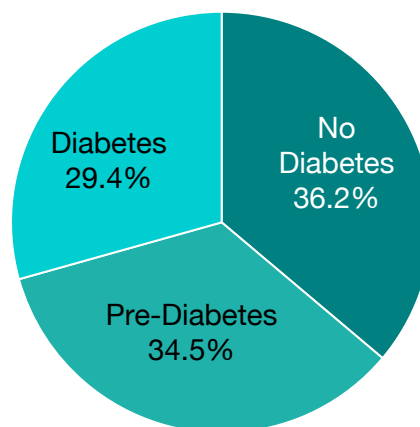


Diabetes

29.4% of adults in Kosrae were estimated to have diabetes. 34.5% of adults were estimated to have pre-diabetes.

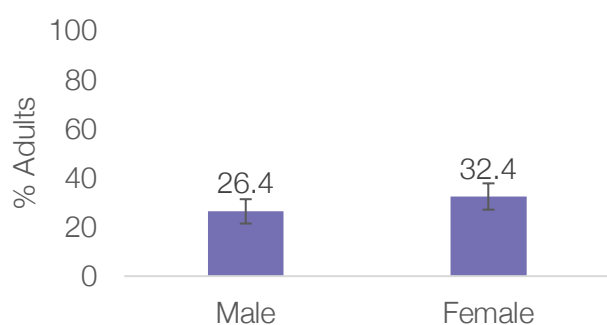
*Diabetes prevalence is estimated based on either a self-report of diabetes for which the patient is taking medication and/or a single fasting blood sugar of 126mg/dL or higher during the survey. Pre-diabetes is estimated based on either a self-report of pre-diabetes and/or a single fasting blood sugar of 100-125 mg/dL during the survey.

Adult Diabetes in Kosrae, 2019

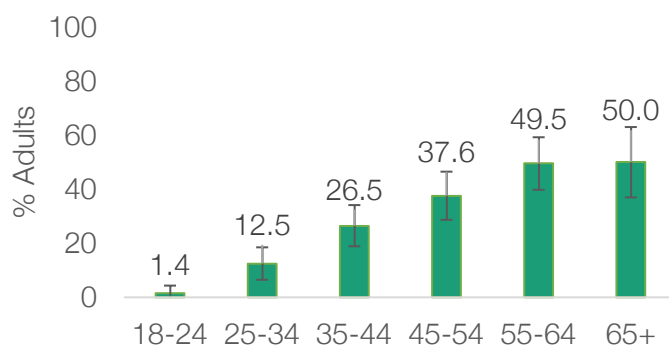


Diabetes prevalence increased with age, with about half of all adults 55 years and older having diabetes. There were no statistically significant differences between gender, education, and municipalities.

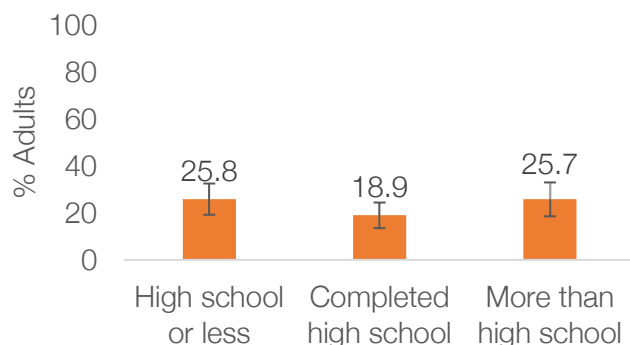
Diabetes, by Gender



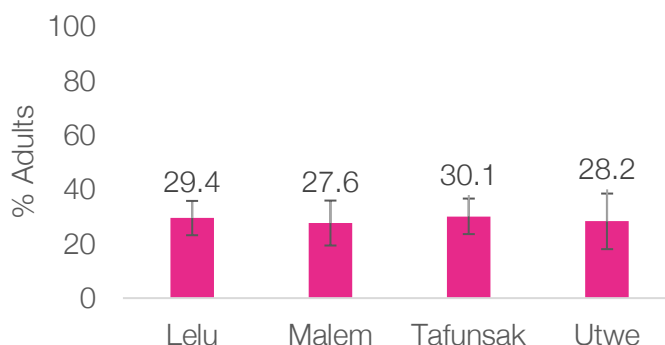
Diabetes, by Age



Diabetes, by Education



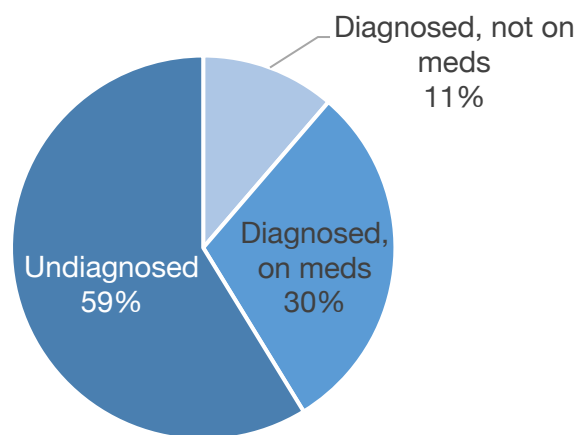
Diabetes, by Municipality



Diabetes Diagnosis & Control

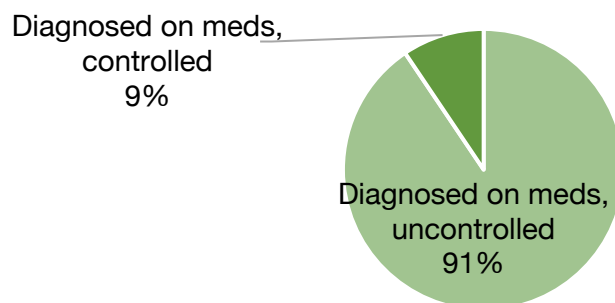
Among those individuals classified as having diabetes, 59.0% were not diagnosed. 29.9% reported having diabetes and currently being on medication for their diabetes, and 11.3% reported that they had been diagnosed with diabetes but were not currently taking medication for their diabetes.

Diagnosis Status among adults with Diabetes
in Kosrae, 2019



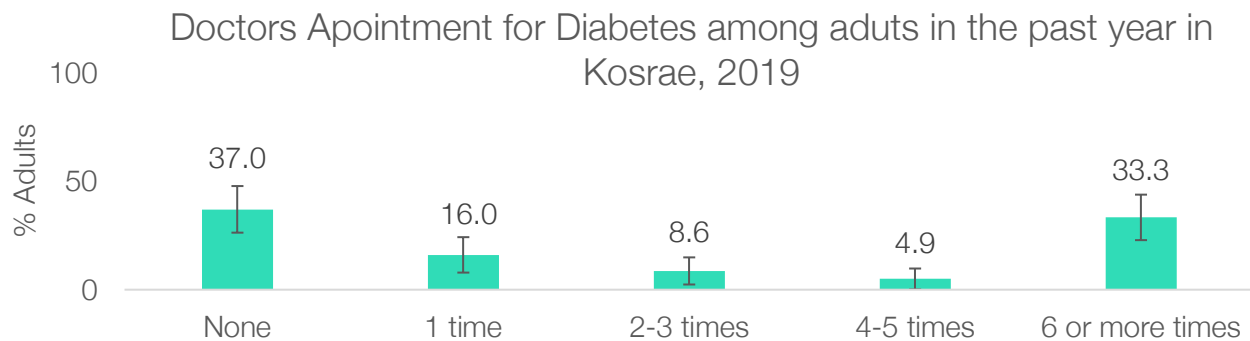
Among those adults in Kosrae who reported being diagnosed with diabetes, almost all (90.6%) had a high measured fasting blood sugar (126mg/dL or higher during survey). This indicates that these diabetics are not controlled.

Control Status among Diagnosed with Diabetes and on
Medication in Kosrae, 2019

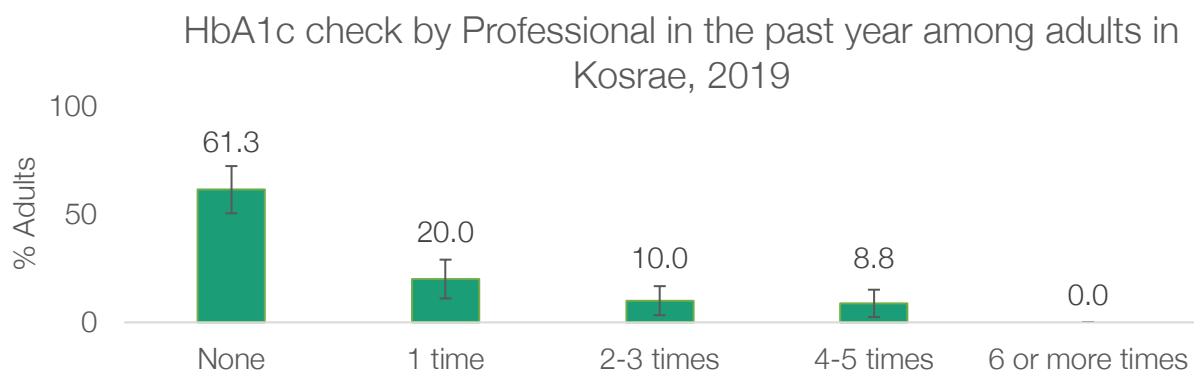
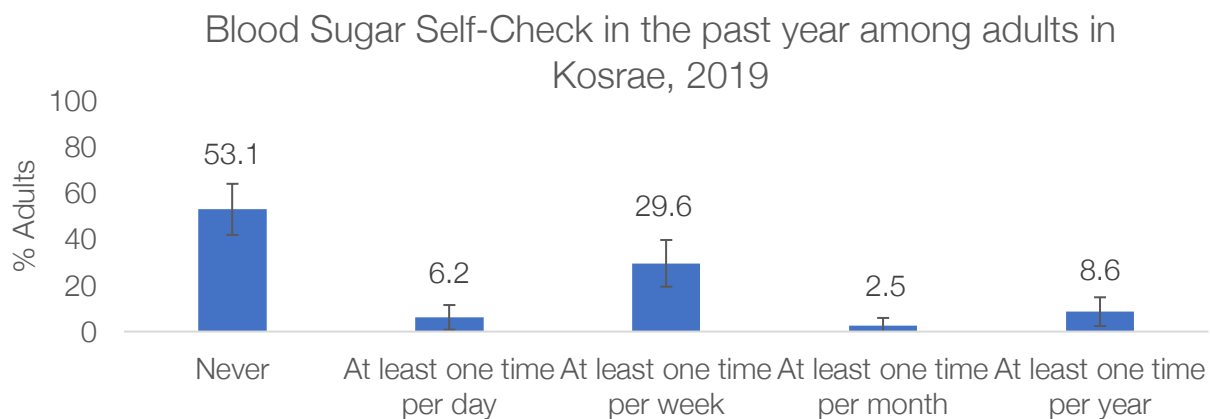


Diabetes Management

Among adults with who self-reported having diabetes in Kosrae, about one in three adults (37.0%) have not seen a health professional for their diabetes in the past year.

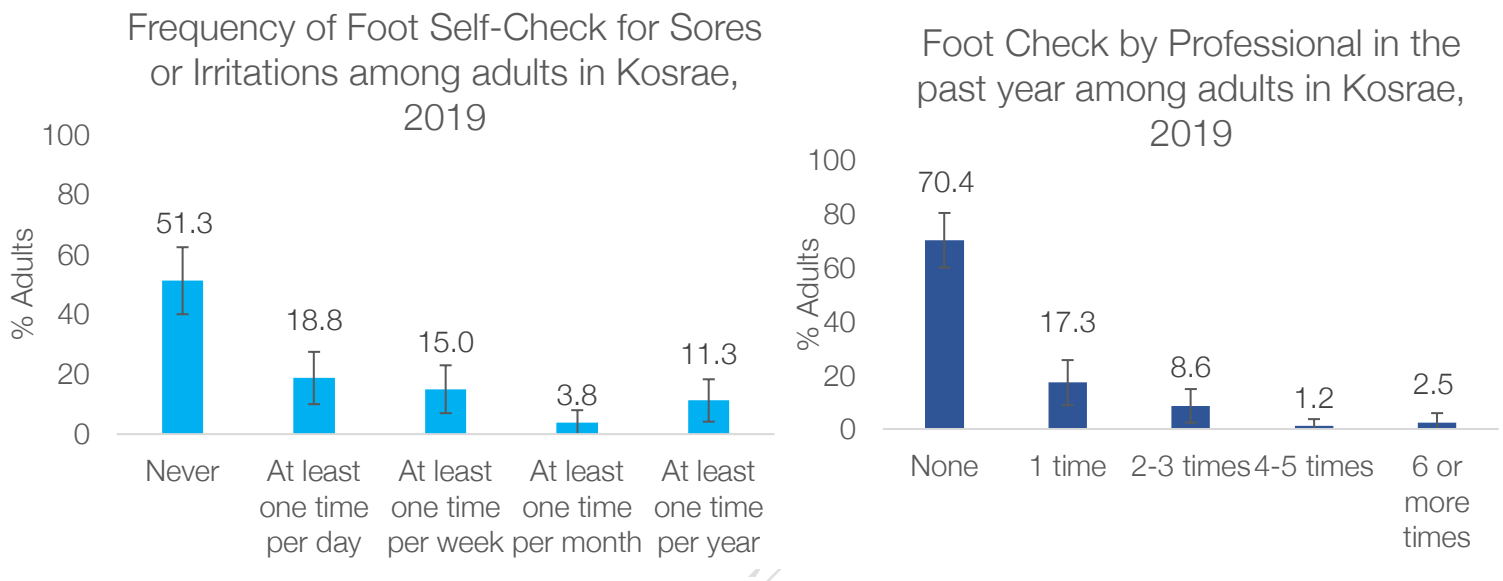


About half (53.1%) adults with self-reported diabetes in Kosrae did not check their blood sugar levels in the past year. 61.3% of adults in Kosrae with self-reported diabetes have not had their HbA1c check by a health professional in the past year.

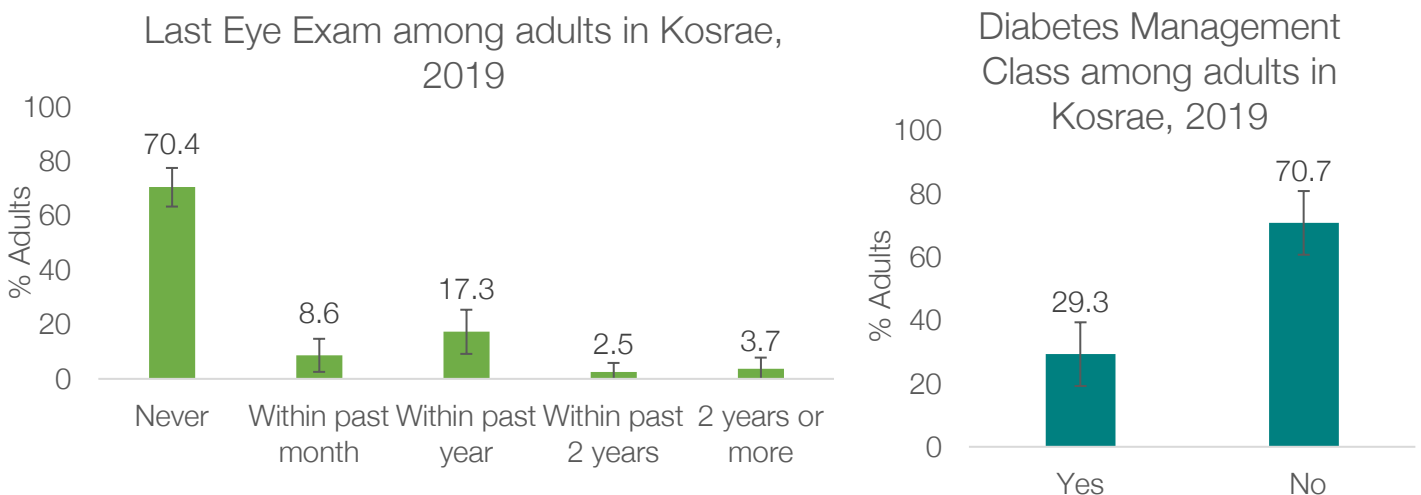


Diabetes Management

Among adults who self-reported as having diabetes in Kosrae, about half (51.3%) have never checked their feet for sores or irritations; 70.4% have not had a health professional check their feet for any sores or irritations in the past year.



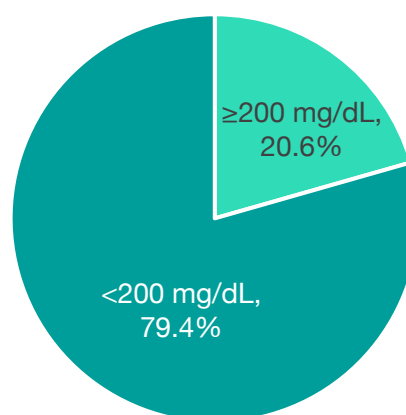
Among adults who self-reported as having diabetes in Kosrae, 70.4% had never had an eye exam in which their pupils were dilated; 70.4% have not ever taken a course or class on how to manage diabetes themselves.



Total Cholesterol

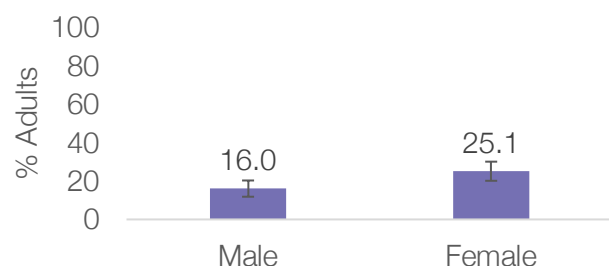
20.6% of adults in Kosrae had “elevated” total cholesterol (≥ 200 mg/dL) during screening. However, 6% had “high” total cholesterol (≥ 240 mg/dL).

Adult Total Cholesterol in Kosrae, 2019

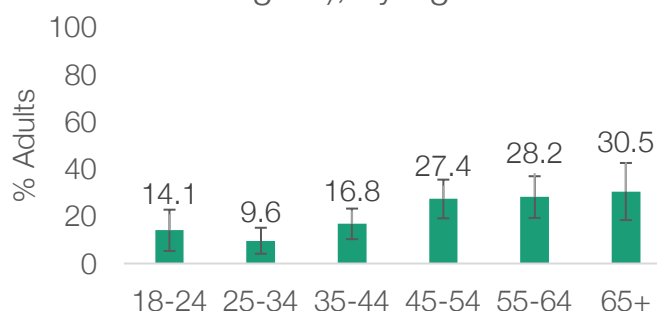


Elevated total cholesterol prevalence was highest among women and adults aged 45 and older. There were no significant differences between education level or municipality.

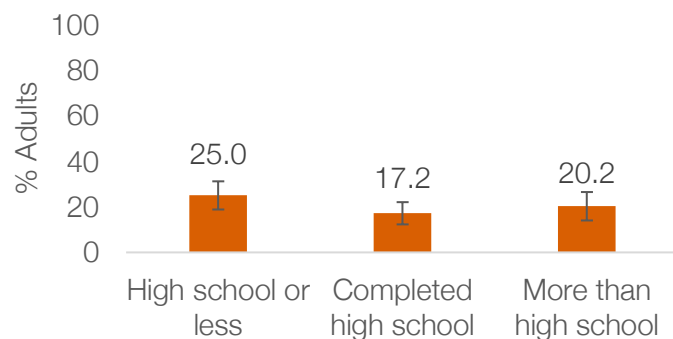
Elevated Cholesterol (≥ 200 mg/dL), by Gender



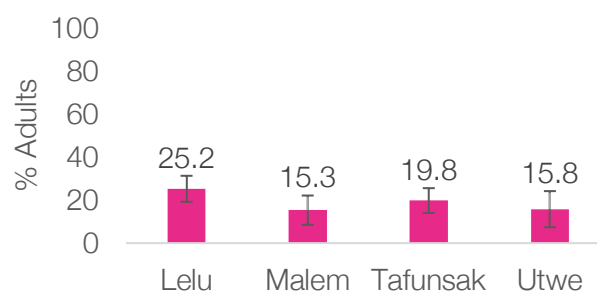
Elevated Cholesterol (≥ 200 mg/dL), by Age



Elevated Cholesterol (≥ 200 mg/dL), by Education



Elevated Cholesterol (≥ 200 mg/dL), by Municipality



Self-Reported Chronic Disease

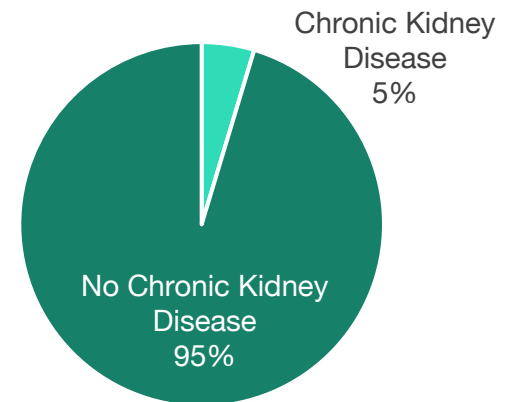
Self-reported chronic disease prevalence is organized below by most prevalent to least.

	%	95% Confidence Interval	
Arthritis	10.4	7.9	12.9
Gout	9.6	7.2	12.0
Asthma	7.1	5.1	9.3
Coronary Heart Disease	6.9	4.9	9.0
Other Heart Condition	3.6	2.1	5.2
Tuberculosis (TB)	3.3	1.9	4.8
COPD	2.9	1.5	4.2
Stroke	2.5	1.2	3.8
Ulcer	2.4	1.3	3.6
Angina	2.2	1.0	3.4
Heart Attack	1.2	0.3	2.0
Cancer	1.2	0.3	2.1
Emphysema	1.0	0.2	1.8

Chronic Kidney Disease

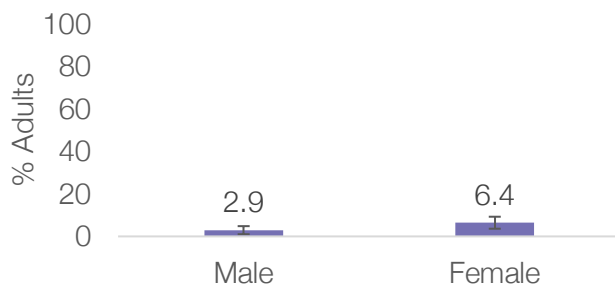
5% of adults in Kosrae not on dialysis have chronic kidney disease. Chronic kidney disease is defined as having been told by a doctor or other health professional that one has weak or failing kidneys, not including kidney stones, bladder infection, or incontinence.

Adult Chronic Kidney Disease in Kosrae, 2019

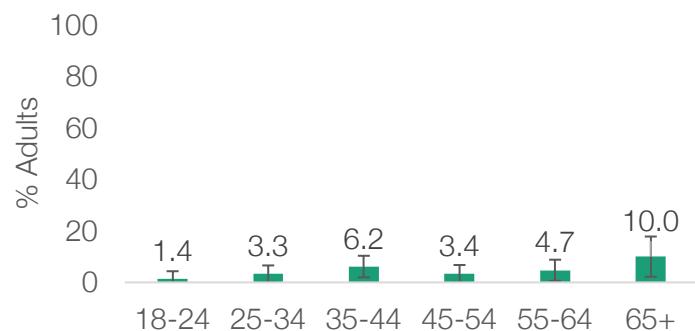


Chronic kidney disease prevalence was higher among women than men. There were no significant differences between age, education level, or municipality.

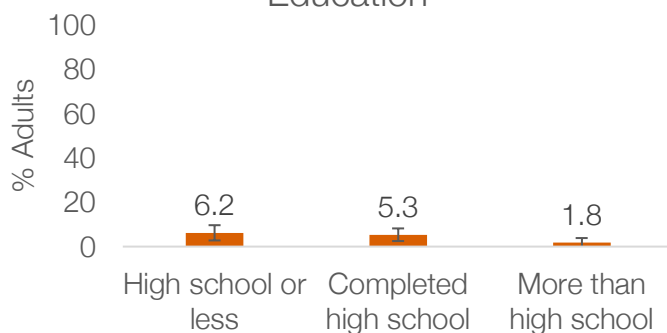
Chronic Kidney Disease, by Gender



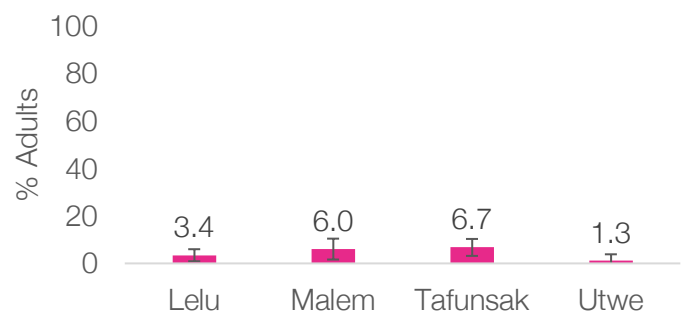
Chronic Kidney Disease, by Age



Chronic Kidney Disease, by Education

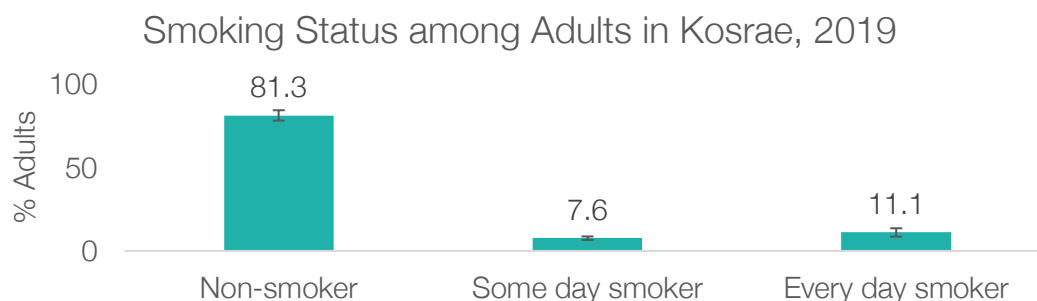


Chronic Kidney Disease, by Municipality

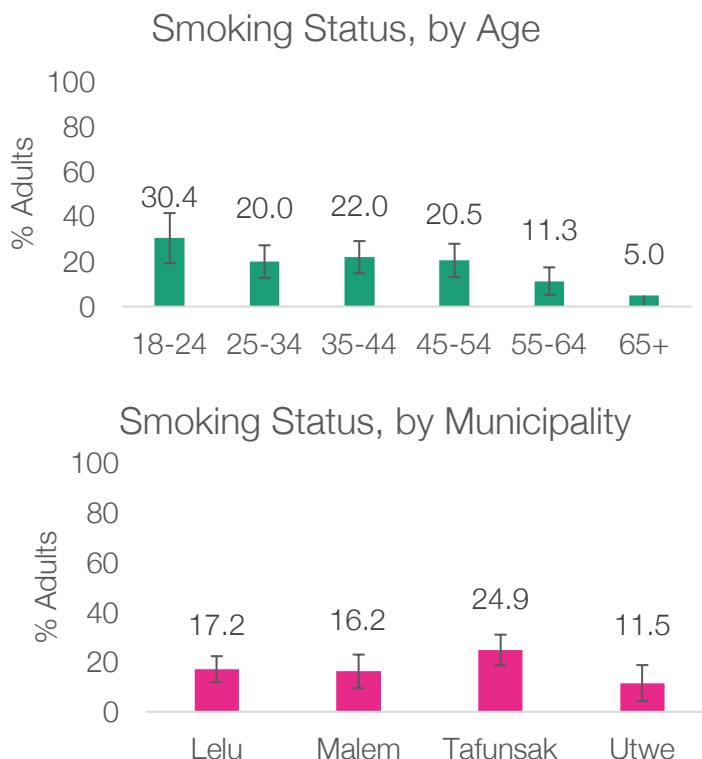
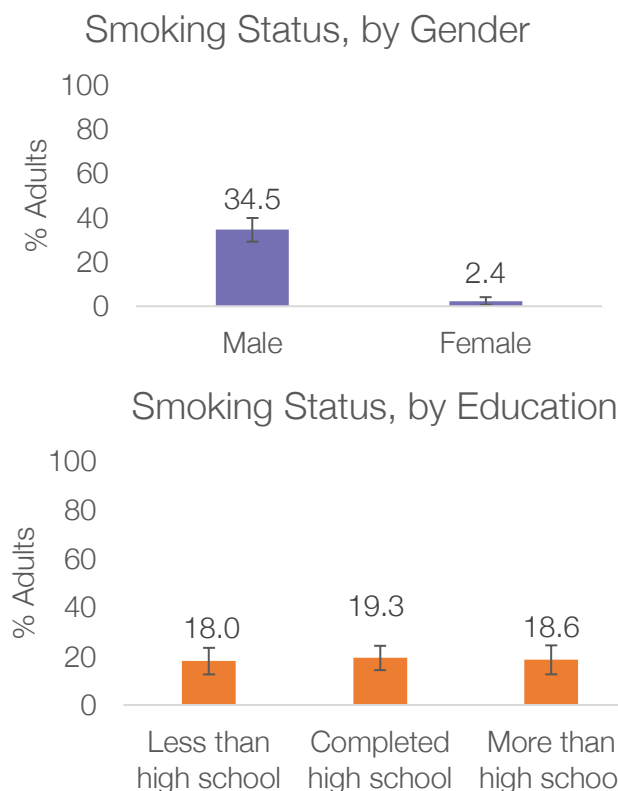


Cigarette Smoking

About one out of five (18.7%) adults in Kosrae reported cigarette smoking in the last 30 days. 59.3% of these adults smoke every day. The average age adults started smoking among current smokers in Kosrae was 16 years old.



Smoking prevalence was significantly higher among men (34.5%) compared to women (2.4%). Young adults aged 18 to 24 years had the highest prevalence of cigarette smoking (30.4%). There was significantly higher prevalence of smoking in Tafunsak (24.9%). There were no significant differences between education level.

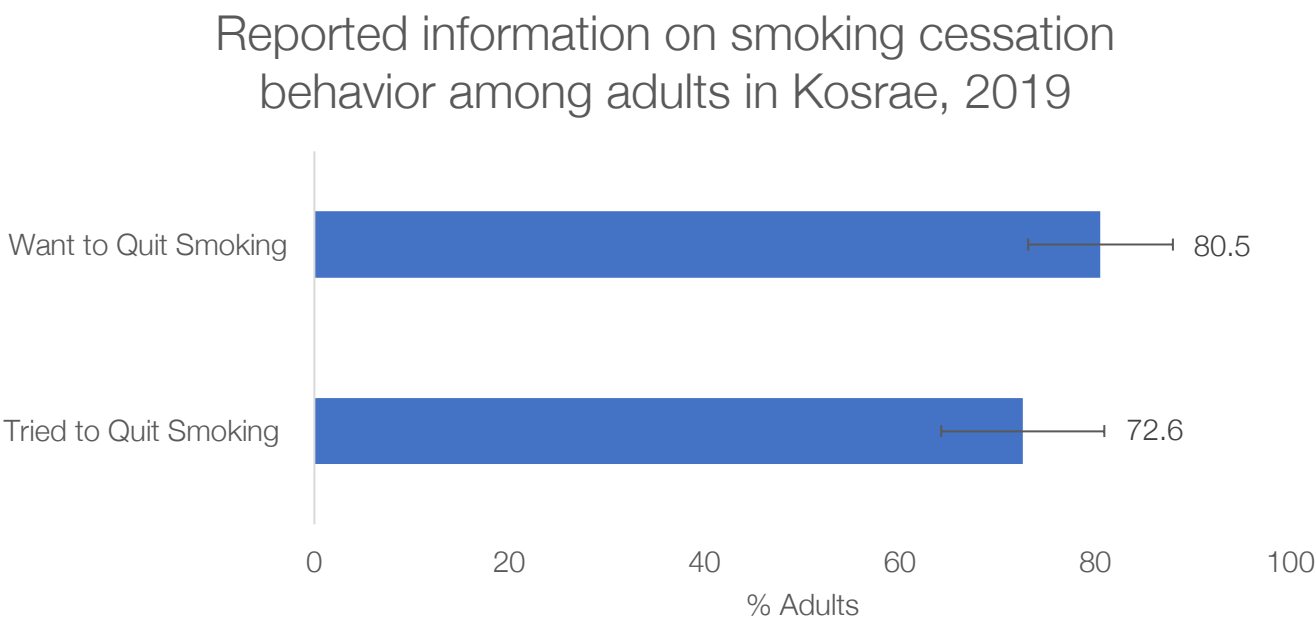


Other Tobacco Use & Smoking Cessation Behavior

About 2% of adults in Kosrae reported using e-cigarettes, personal vaporizer (PV), or electronic nicotine in the past 30 days.

<u>Other Tobacco Behavior</u>	<u>n</u>	<u>%</u>
E-cig, PV, or electronic nicotine in past 30 days	12	2.0

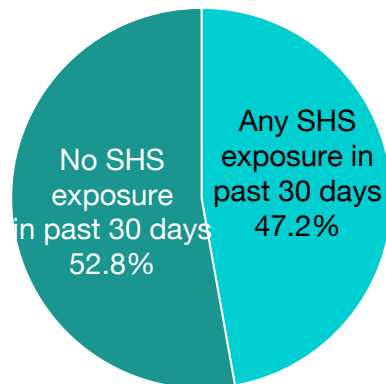
Among smokers, four out of five adults (80.5%) in Kosrae reported that they wanted to quit. About three-quarters (72.6%) of smokers reported that they tried quitting.



Second-Hand Smoke Exposure

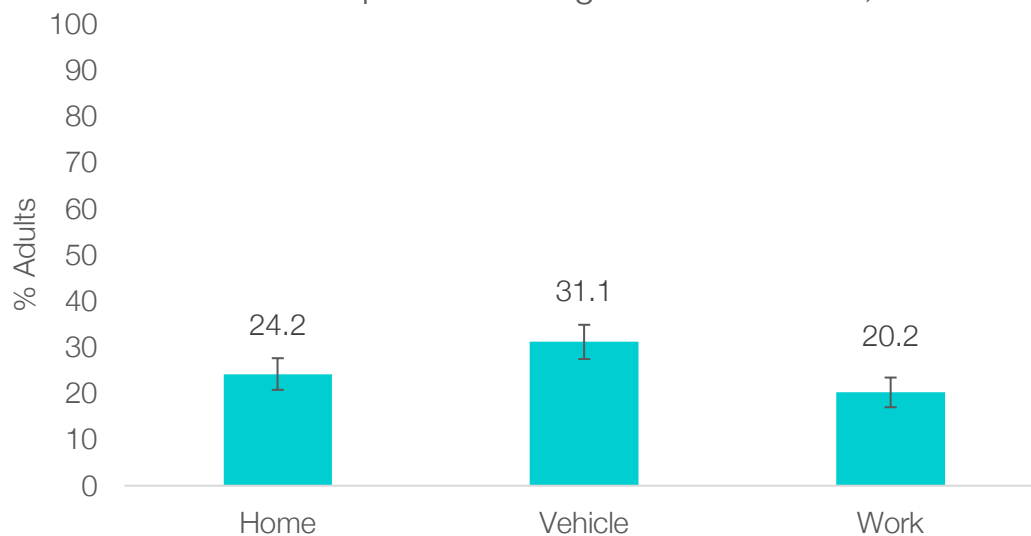
Almost half (47.2%) of all adults in Kosrae reported any sort of exposure to second-hand smoke (SHS) at home, in a vehicle, or at work in the past 7 days.

Adult Second-Hand Smoke Exposure in Kosrae, 2019



The most common place of second-hand smoke exposure was in a vehicle (31.1%). 24.2% of adults reported second-hand smoke exposure in the home and 20.2% of adults reported second-hand smoke exposure at work.

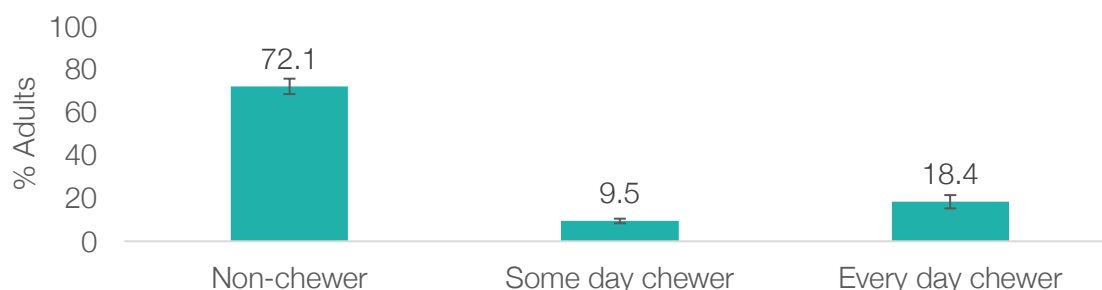
SHS Exposure among adults in Kosrae, 2019



Betel Nut Chewing

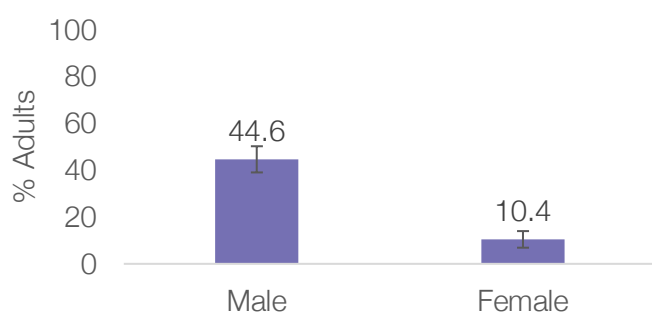
About one third (27.9%) of adults in Kosrae reported chewing betel nut in the last 30 days. Of these betel nut chewers, 66.1% chew every day. The average age adults started chewing among current chewers in Kosrae was 18 years old.

Betel Nut Chewing Status among Adults in Kosrae, 2019

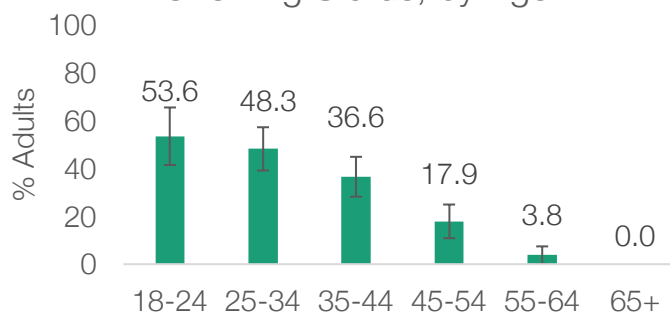


Chewing prevalence was significantly higher among men (44.6%) compared to women. Adults who complete high school had a significantly higher prevalence of betel nut chewing (33.7%) compared to those with less than or more than a high school education. Chewing prevalence was much higher among younger adults. There were no significant differences between municipality.

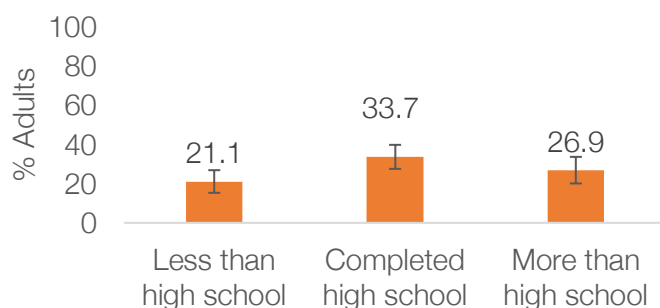
Chewing Status, by Gender



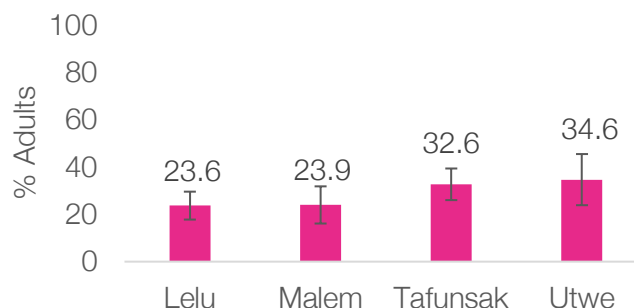
Chewing Status, by Age



Chewing Status, by Education



Chewing Status, by Municipality



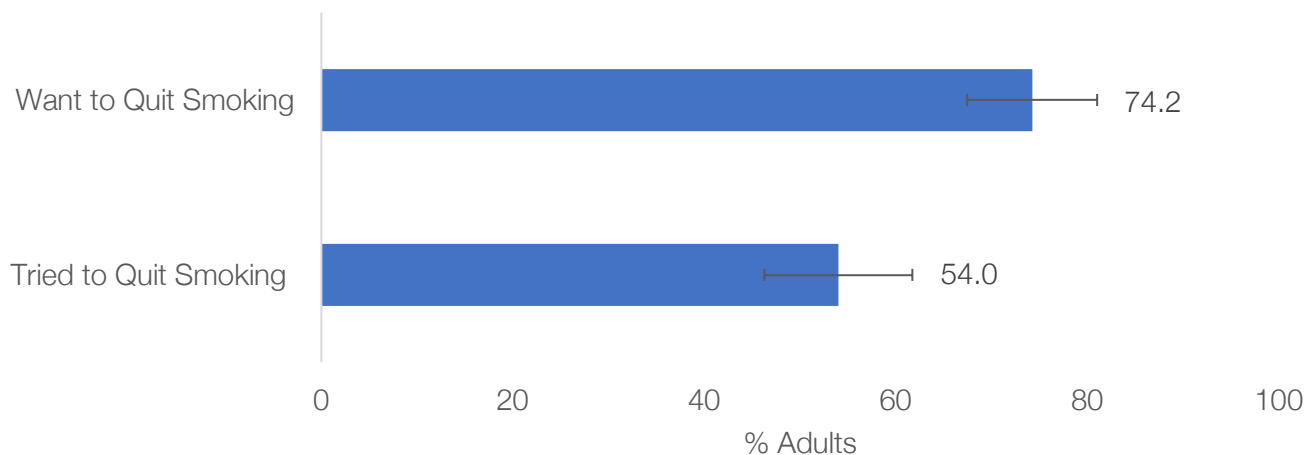
Other Betel Nut Use & Betel Nut Cessation Behavior

Almost all current betel nut chewers add tobacco to their betel nut chew (97.0%). The majority of current betel nut chewers add cigarette sticks to their betel nut (94.6%).

<u>Type of tobacco used with betel nut</u>	<u>n</u>	<u>%</u>
Cigarette Stick	159	94.6
Imported Loose Tobacco	2	1.2
Locally Grown Tobacco	2	1.2
No Tobacco	5	3.0

Among chewers, three out of four adults (74.2%) in Kosrae reported that they wanted to quit. A little more than half (54.0%) of chewers reported that they tried quitting.

Adults that Want to/Tried to Quit on Betel Nut Chewing in Kosrae, 2019



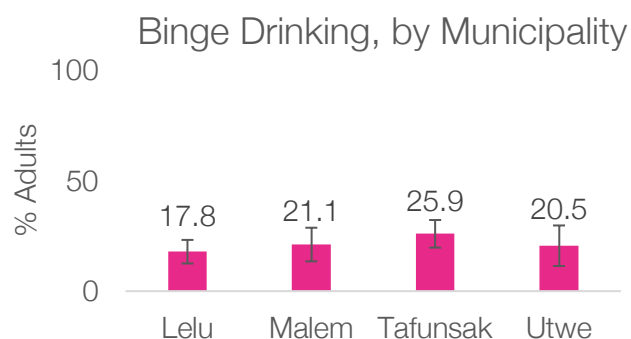
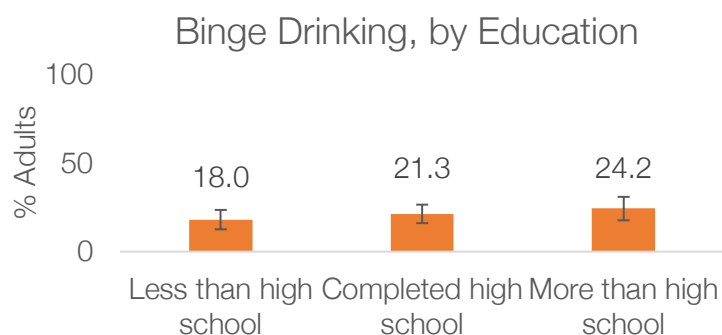
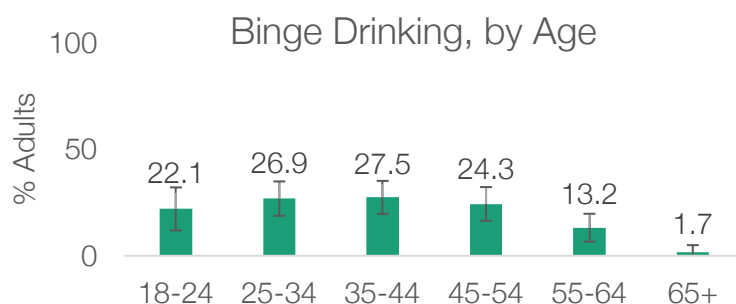
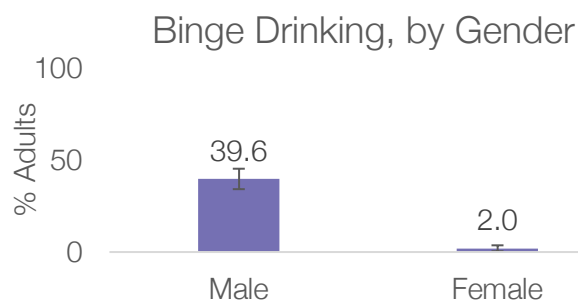
Alcohol Use and Binge Drinking

22.4% of adults in Kosrae reported alcohol use in the past 30 days. Few adults (0.5%) reported drinking alcohol every day in the past 30 days. 21.0% of adults reported binge drinking in the past 30 days. The average age that adults started drinking among those who drank in the past 30 days in Kosrae was about 17 years old. In addition, among adults who drank in the past 30 days, 37% of them also reported drinking and driving in the past 30 days.

*(binge drinking is defined as drinking 4 or more standard drinks on one occasion for women and 5 or more standard drinks on one occasion for men)



Binge drinking was most prevalent among men (39.6%) and adults 25-44 years old. There was no statistically significant difference in binge drinking by education or municipality.



Other Substance Use

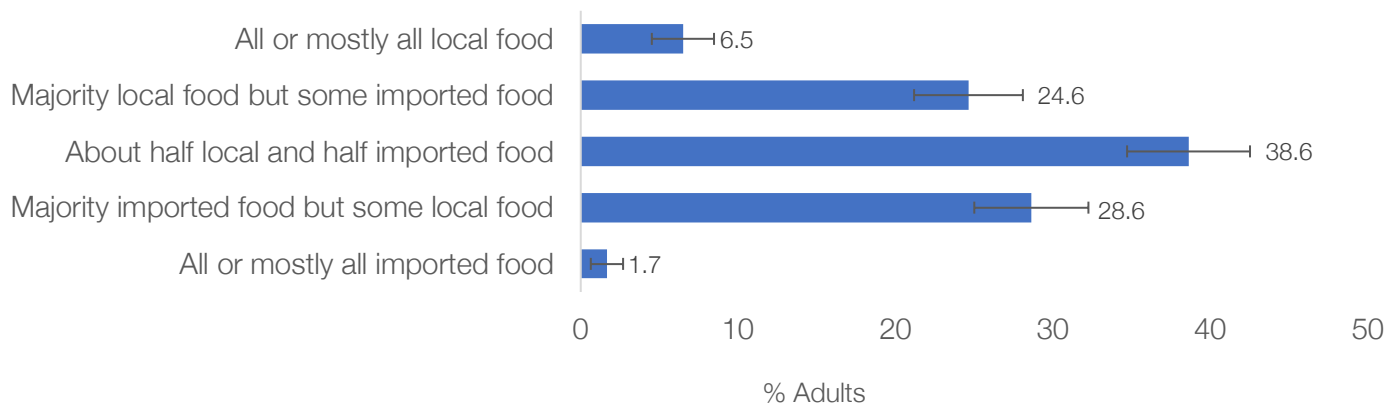
7.3% of adults in Kosrae reported using marijuana, 1.0% consumed sakau, less than 1% reported using inhalants, and no adults reported using prescription drugs without doctor's orders

<u>Other Substance Use</u>	<u>n</u>	<u>%</u>
Sakau	6	1.0
Marijuana	44	7.3
Inhalants or sniffed/huffed substances such as glue, gasoline, paint thinner, markers, or butane	2	0.3
Prescription drugs such as tramadol, demerol, oxycodon, codeine (Tylenol 3, or morphine without a doctor's orders	0	0.0

Regular Diet

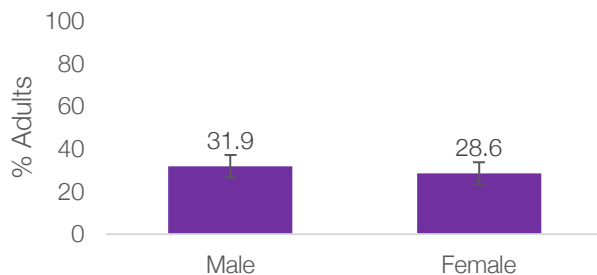
Almost one-third of adults in Kosrae (30.3%) reported eating a majority imported food or all or mostly all imported food. 38.6% of adults reported eating about half local food and half imported food. 31.1% of adults in Kosrae eat majority or all or mostly all local food.

Regular Diet among adults in Kosrae, 2019

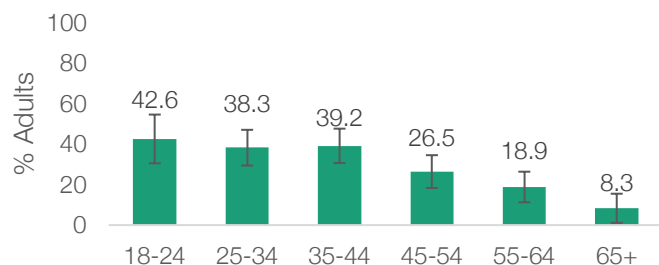


A diet consisting of a majority of imported food was more prevalent among younger adults and more educated adults.

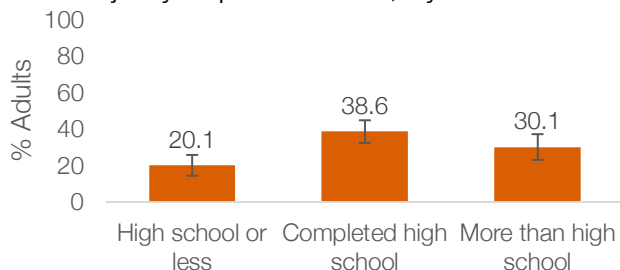
Majority Imported Food, by Gender



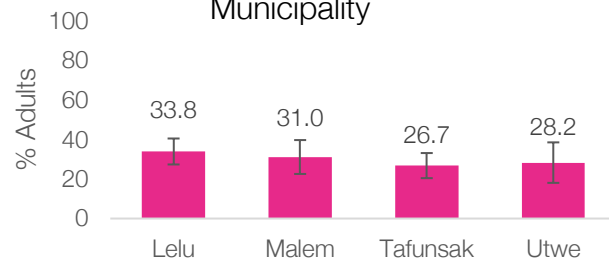
Majority Imported Food, by Age



Majority Imported Food, by Education

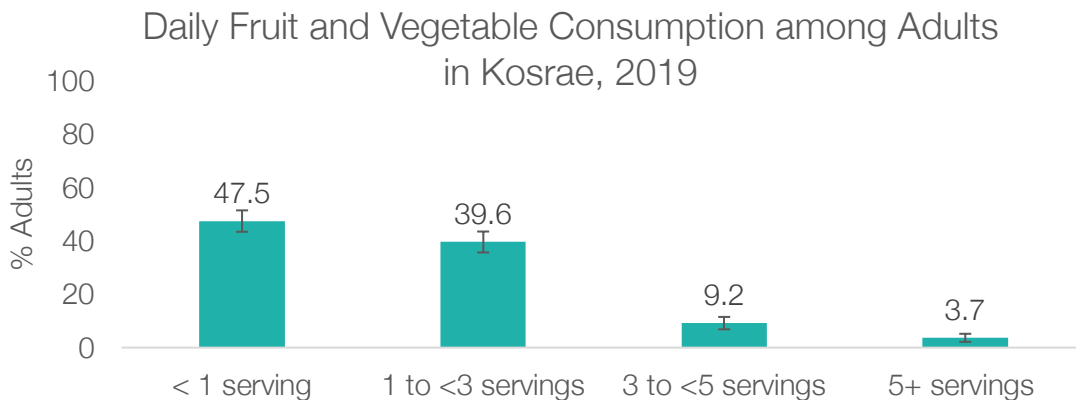


Majority Imported Food, by Municipality

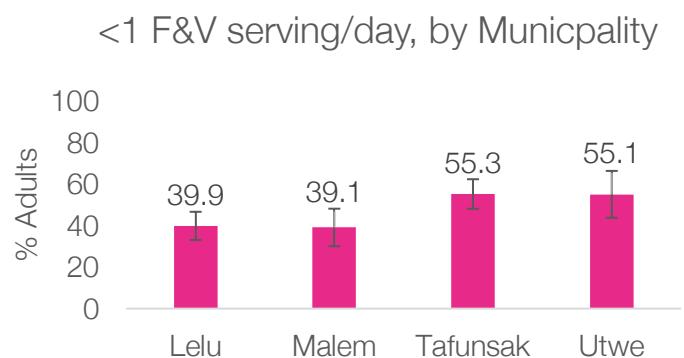
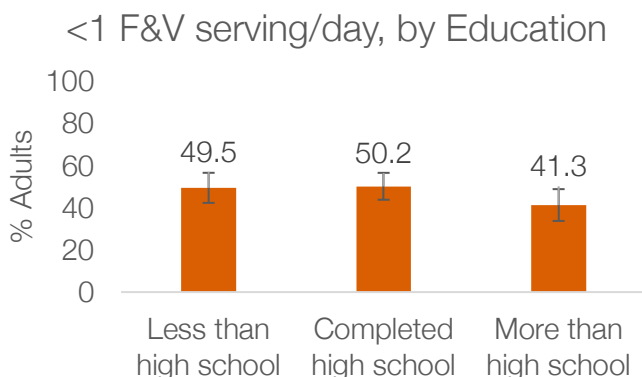
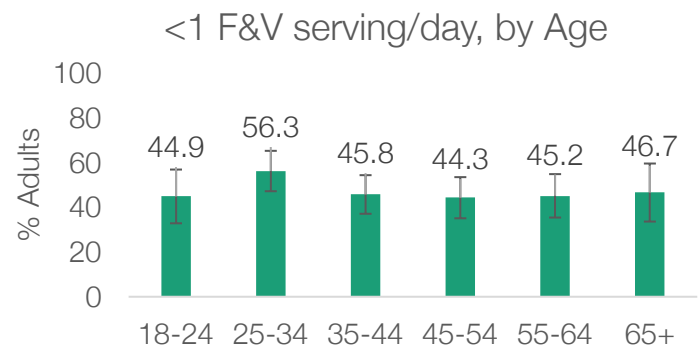
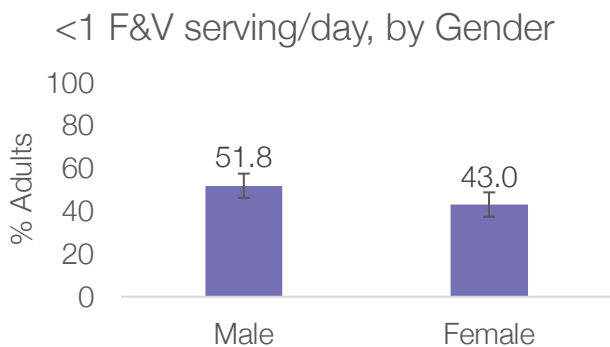


Fruit and Vegetable Consumption

Almost all adults (96.3%) consumed less than the recommended daily servings of fruits and vegetables (at least 5 per day), and 47.5% consume no or very little (<1 serving) fruits and vegetables daily.

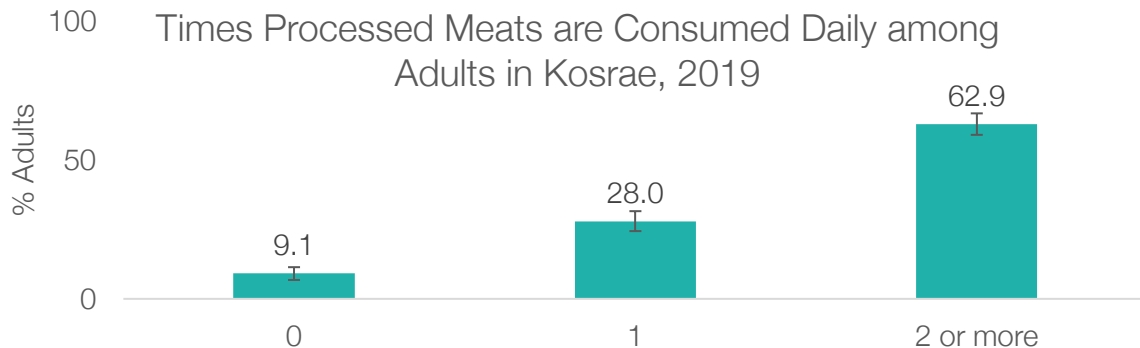


Very fruit and vegetable consumption (<1 serving per day) was more prevalent among adults living in Tafunsak and Utwe. There was no statistically significant difference in fruit and vegetable consumption by age, education, or municipality. **low**

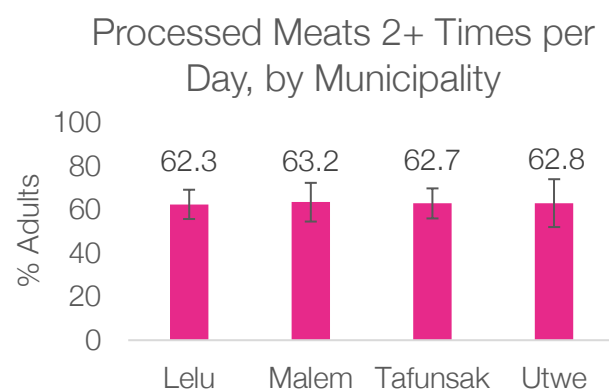
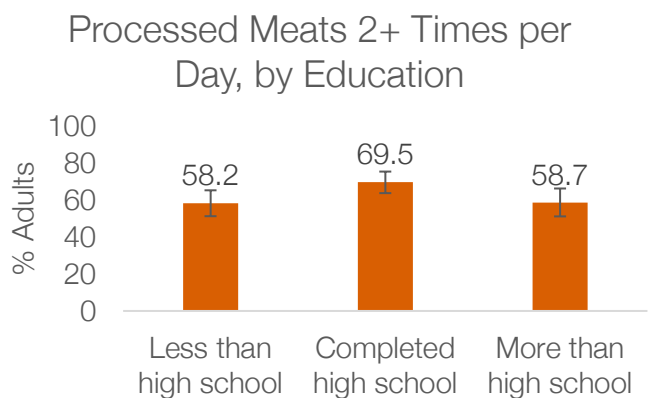
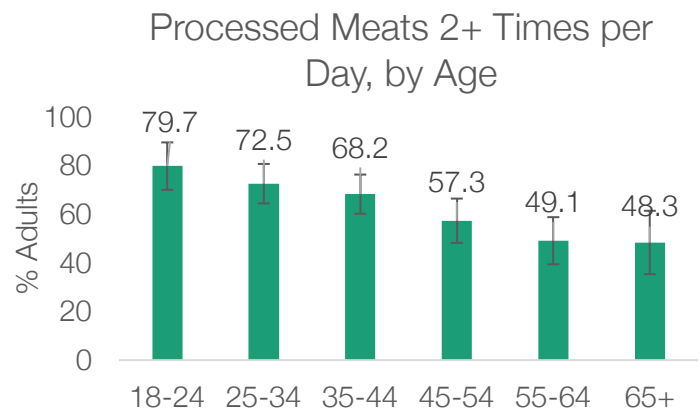
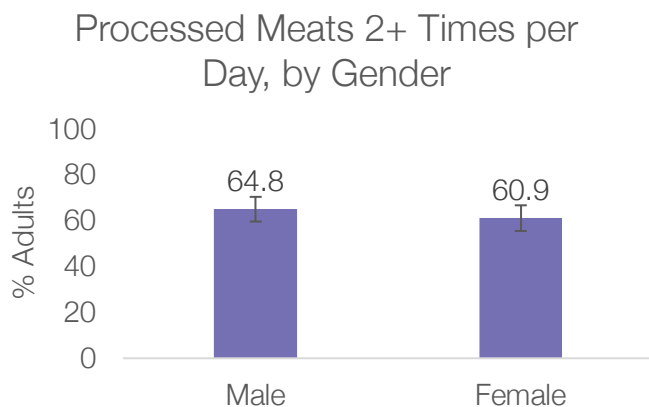


Processed Meat Consumption

Most adults in Kosrae (90.9%) consumed processed meats (defined as packaged or canned modified meat products such as spam, hotdogs, vienna sausages, etc.) at least once per day. Almost two-thirds (62.9%) consume processed meats two or more times per day.



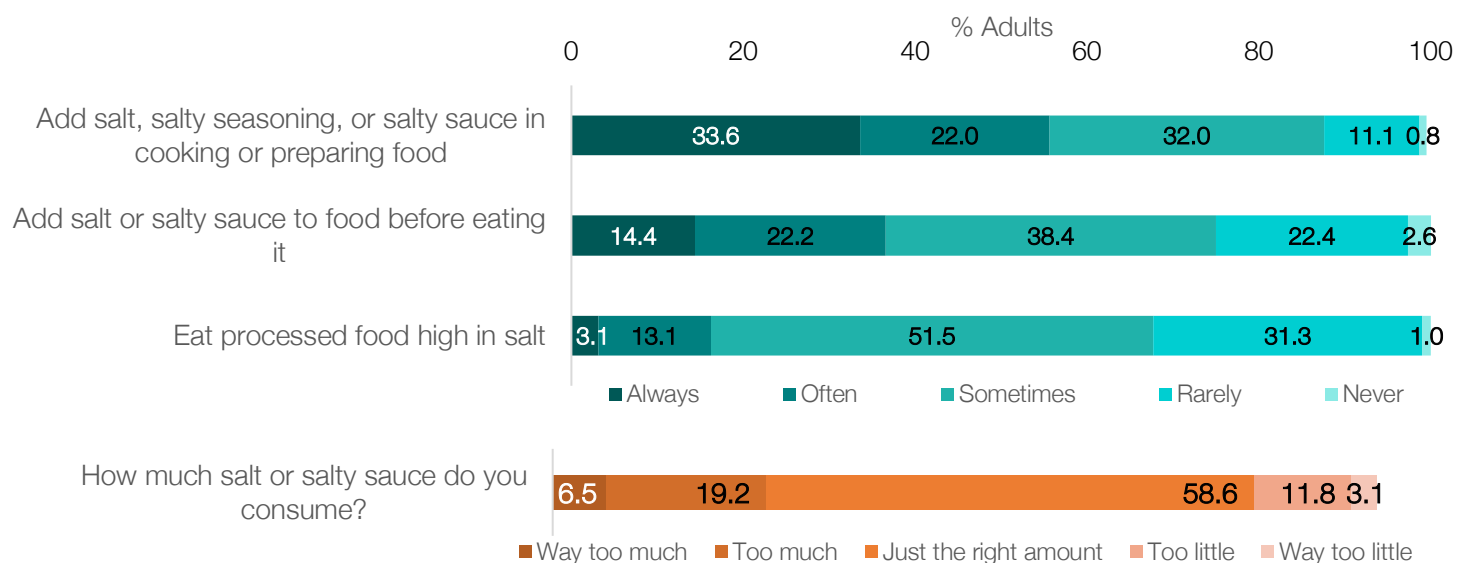
Heavy consumption of processed meats (2+ times per day) was more prevalent among younger adults.



Sodium

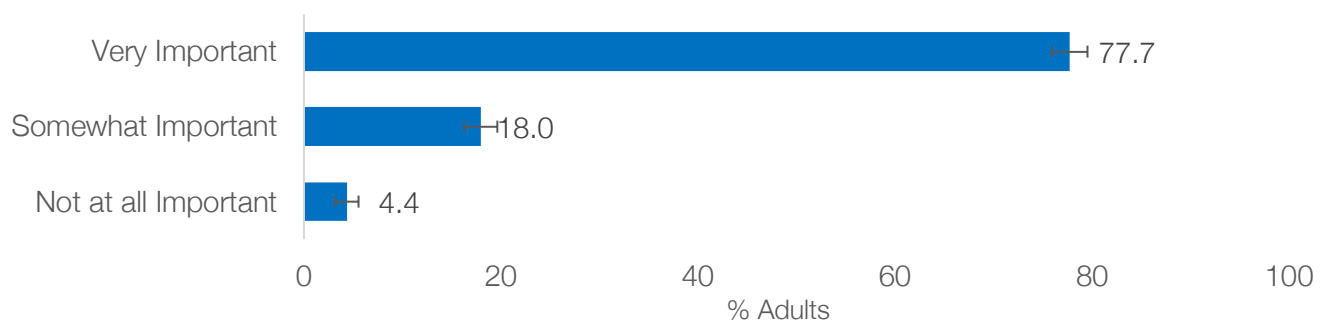
74.3% of adults in Kosrae say they are currently watching their salt intake. Over half (55.6%) of adults report always or often adding salt, salty seasoning, or salty sauce in cooking or preparing food, and over two-thirds (36.6%) add salt or salty sauce to food before eating it. 16.2% of adults in Kosrae always or often eat processed food high in salt. About one-quarter of adults in Kosrae (25.7%) believe they consume way too much or too much salt or salty sauce.

Self-Reported Salt Intake among Adults in Kosrae, 2019



Three out of four adults (77.7%) in Kosrae feel that lowering their dietary salt intake is very important.

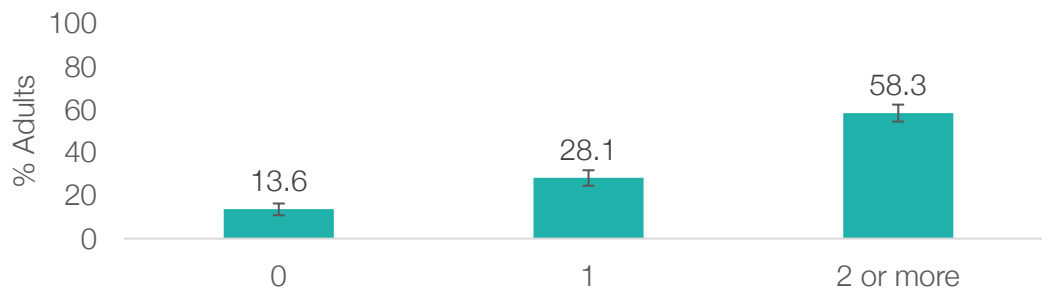
Self-reported Importance of Lowering Dietary Salt among Adults in Kosrae, 2019



Sugar-Sweetened Beverages

Most adults (86.4%) in Kosrae consumed at least one sugar-sweetened beverage (SSB) each day. More than half (58.3%) consumed 2 or more serving of SSBs daily.

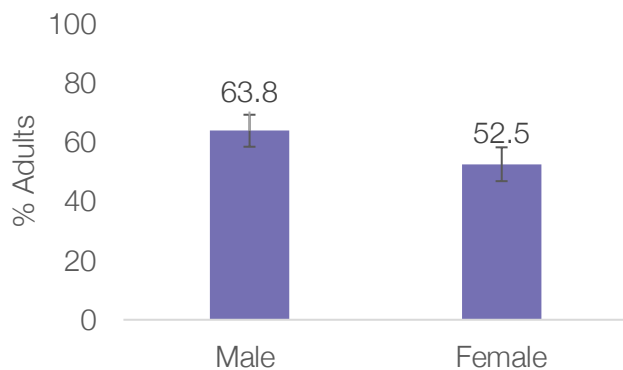
SSBs Consumed Daily among Adults in Kosrae, 2019



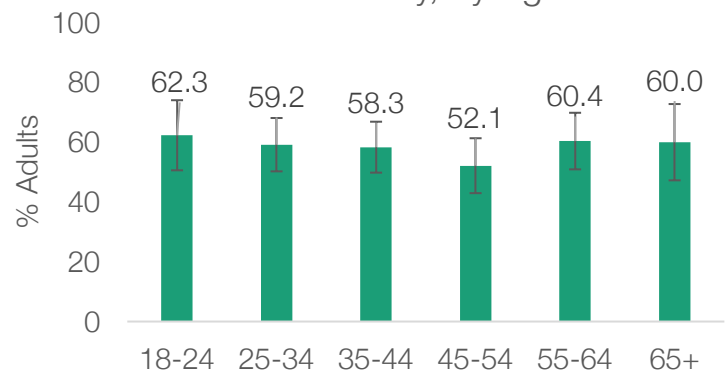
Heavy

consumption of SSBs (2+ SSB servings daily) was most prevalent among males (63.8%) and those living in the Tafunsak (68.9%).

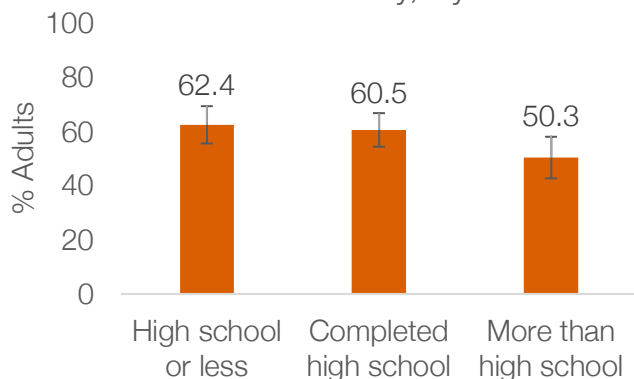
2+ SSBs Daily, by Gender



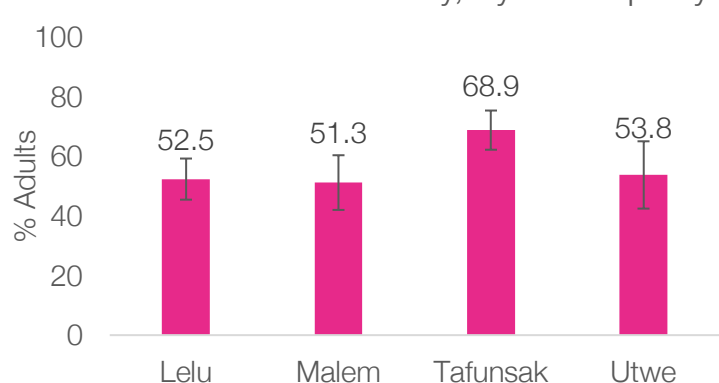
2+ SSBs Daily, by Age



2+ SSBs Daily, by Education



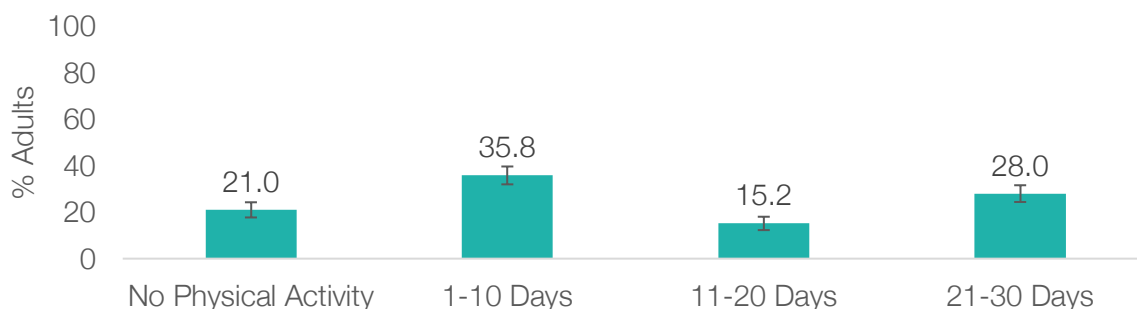
2+ SSBs Daily, by Municipality



Physical Activity

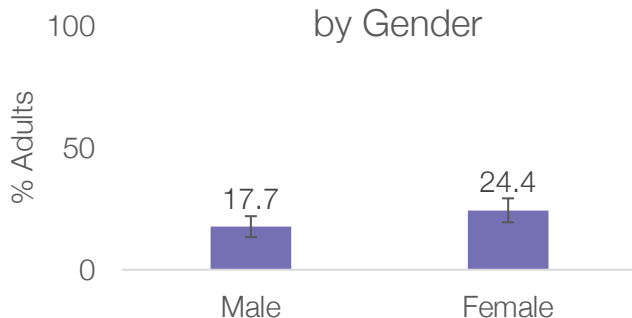
In Kosrae, about 21.0% of adults did not engage in any physical activity specifically for exercise in the past month. About half (51.0%) engaged in physical activity on some days (1-20 days), while 28.0% participated in physical activity for exercise majority of days (21-30 days) in the past month.

Days of Physical Activity for Exercise in Past Month among Adults in Kosrae, 2019

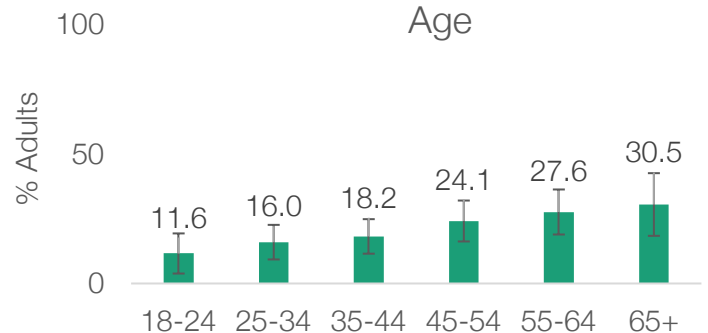


No physical activity is also more prevalent among women, older adults, and those with less than high school education.

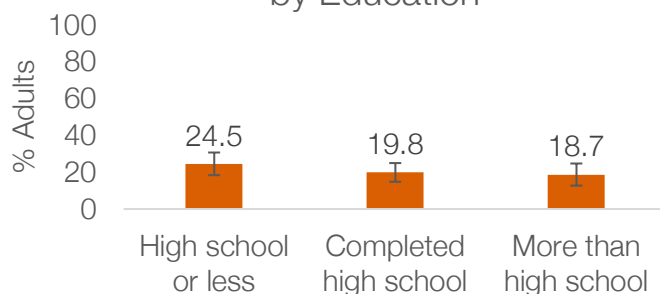
No Physical Activity for exercise, by Gender



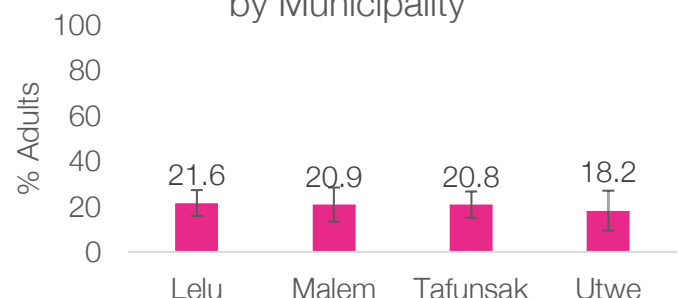
No Physical Activity for exercise, by Age



No Physical Activity for exercise, by Education

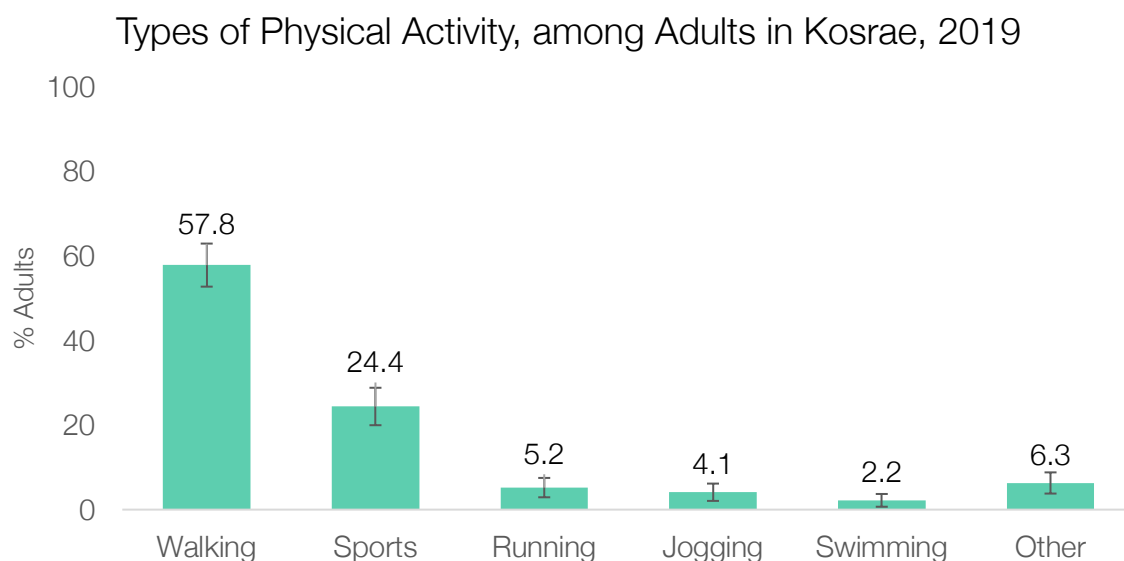


No Physical Activity for exercise, by Municipality

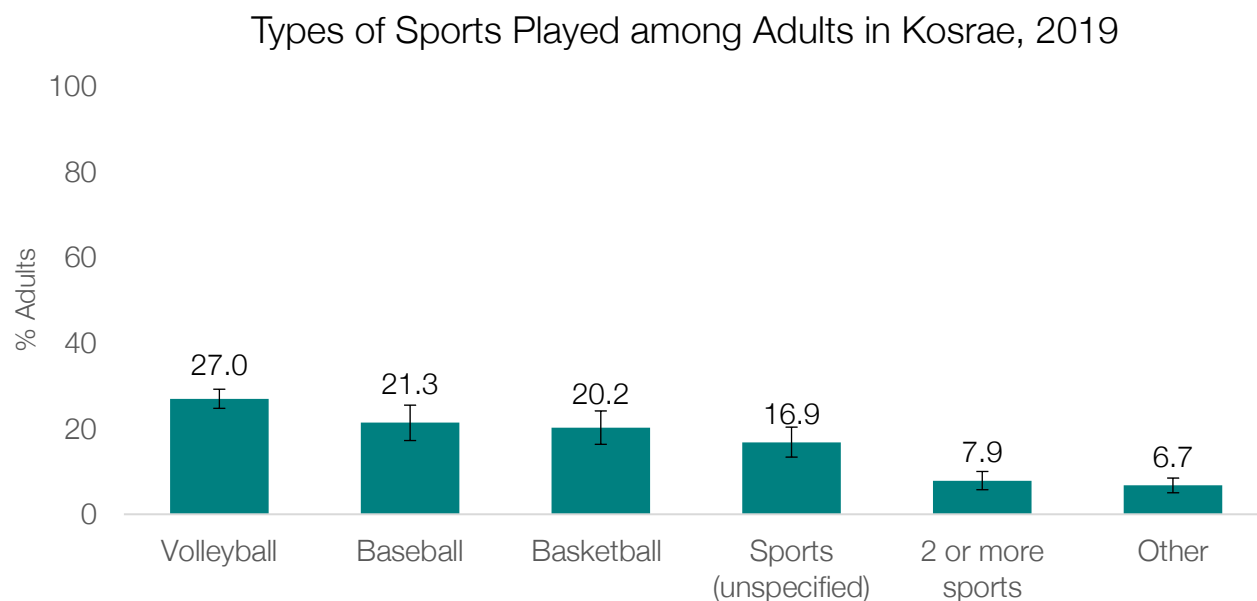


Type of Physical Activity

Among adults who were physically active, specifically for exercise in the past 30 days in Kosrae, walking was the most prevalent form of physical activity done for exercise (57.8%). In addition, 24.4% of adults in Kosrae play sports to stay physically active. A small percent goes running, jogging, or swimming.

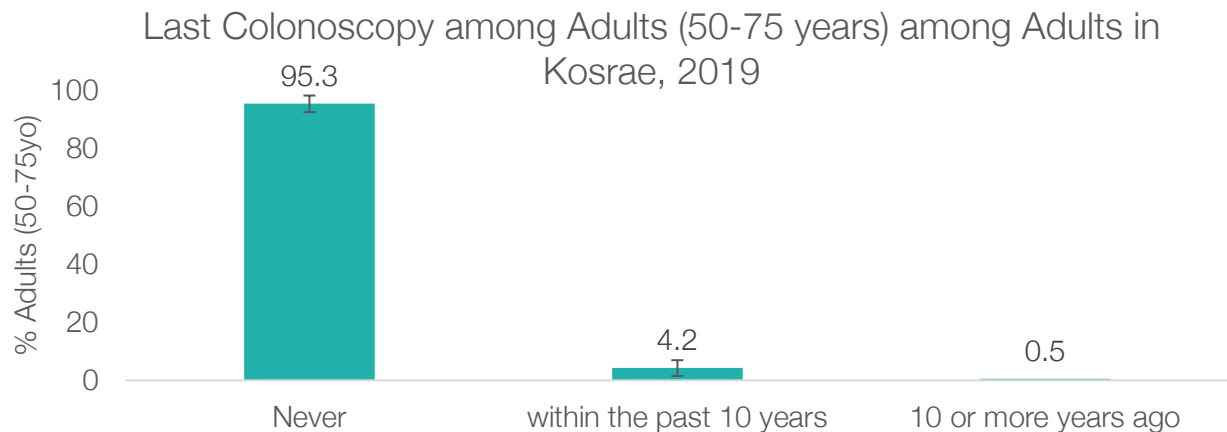


Among adults in Kosrae who play sports, the most common sports reported were volleyball (27.0%), baseball (21.3%), and basketball (20.2%).

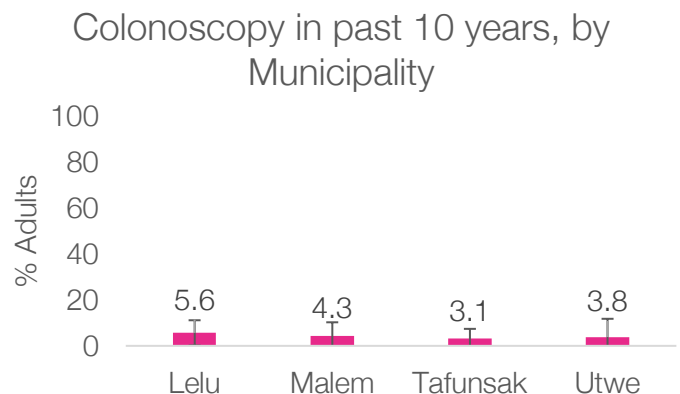
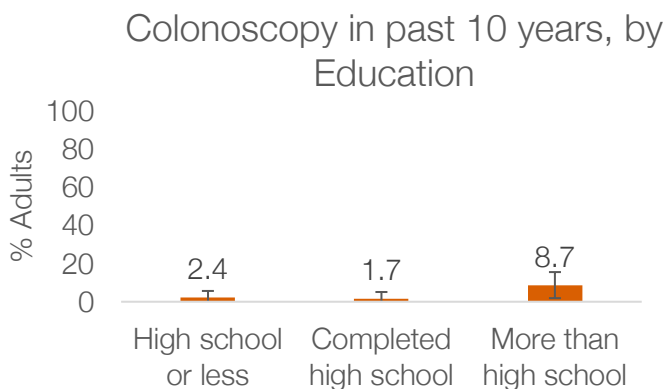
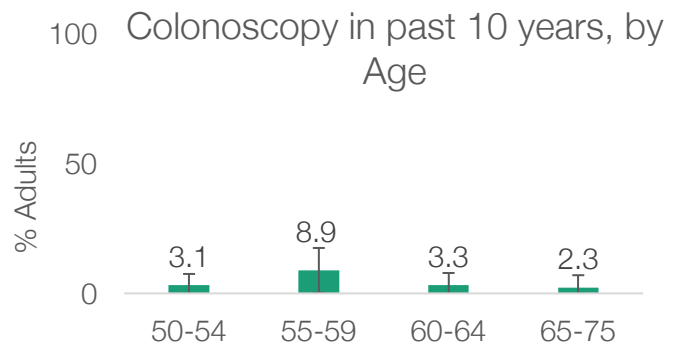
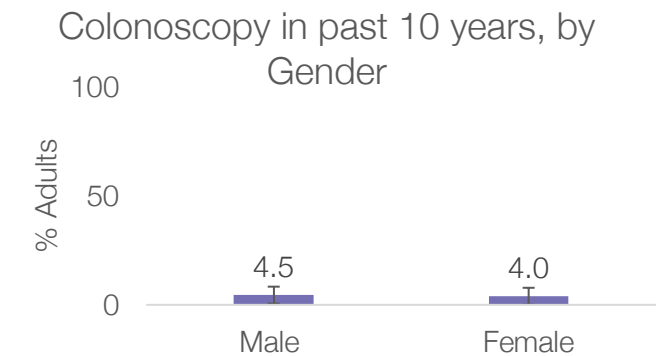


Colon Cancer Screening: Colonoscopy

Most adults 50-75 years old in Kosrae (95.3%) have never received a colonoscopy. About 4% of adults 50-75 years meet the American Cancer Society recommendation for receiving a colonoscopy every 10 years.

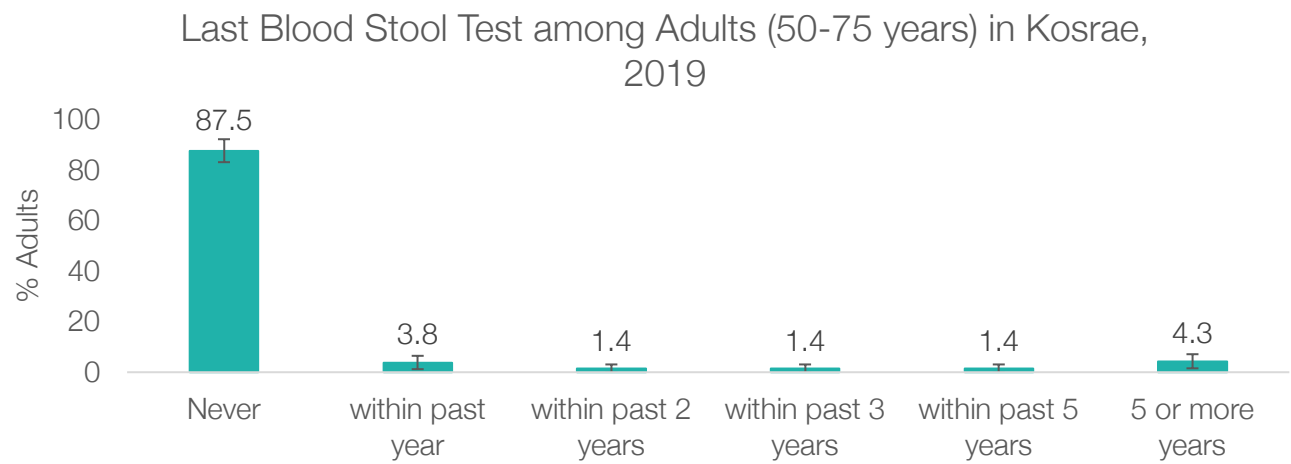


There were no statistically significant differences in colonoscopy prevalence between gender, age, education, or municipality.

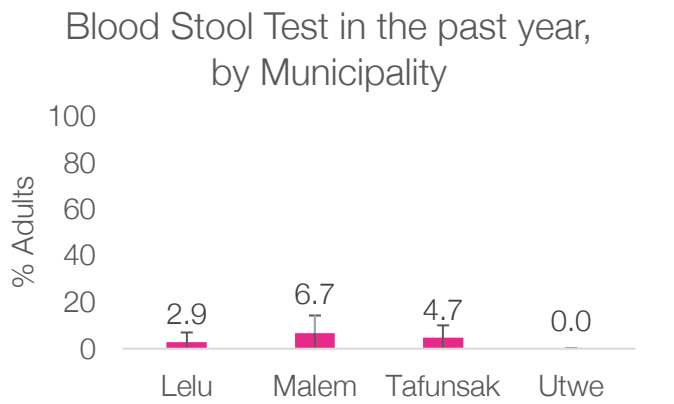
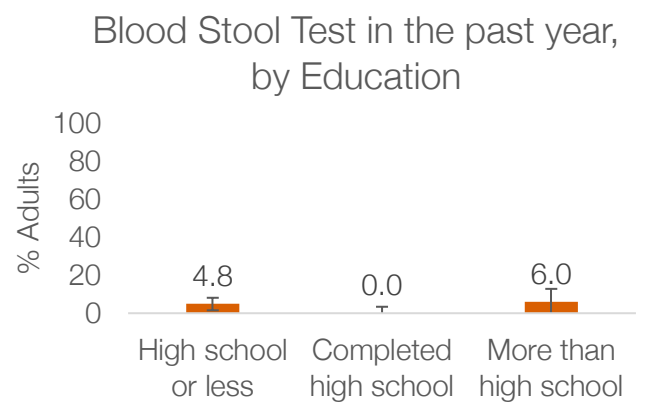
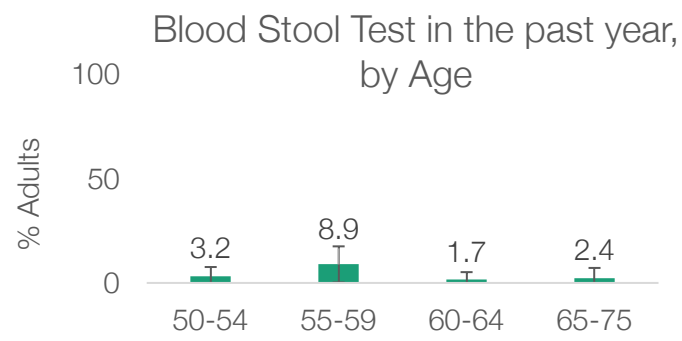
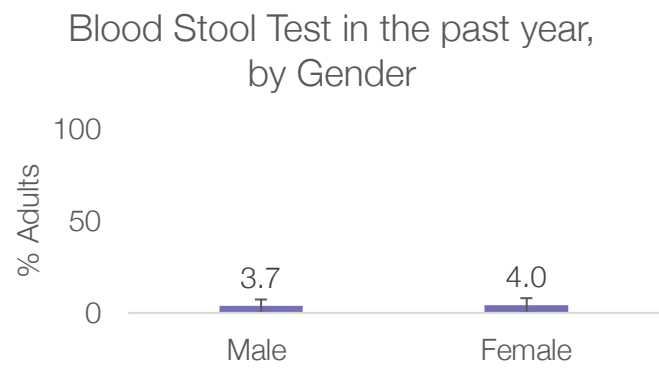


Colon Cancer Screening: Blood Stool Test

Most adults in Kosrae (87.5%) have never received a Blood Stool Test. 3.8% of adults 50-75 years old met the American Cancer Society recommendation of receiving a Blood Stool Test once per year.



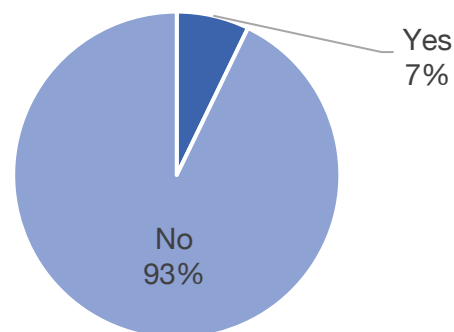
There were no statistically significant differences in blood stool test prevalence between gender, age, education, or municipality.



Any Colon Cancer Screening

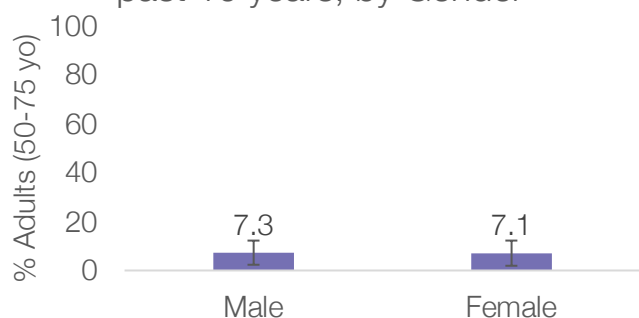
Among adults 50-75 years old, 7.2% have had a colon cancer screening. Any colon cancer screening is defined as someone who has had a blood stool test in the past year and/or a colonoscopy in the past 10 years.

Any Colon Cancer Screening in past 10 years among adults (50-75 yo) in Kosrae, 2019

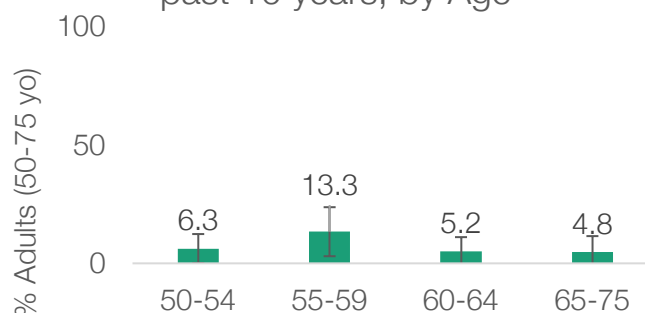


Adults with more than a high school education had a higher prevalence of receiving a colon cancer screening. There was no significant difference between gender, age, or municipality.

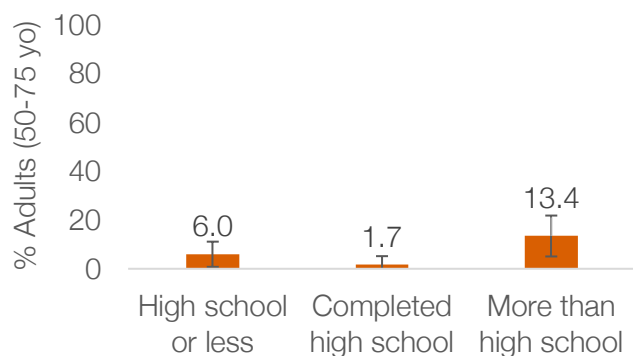
Any Colon Cancer Screening in past 10 years, by Gender



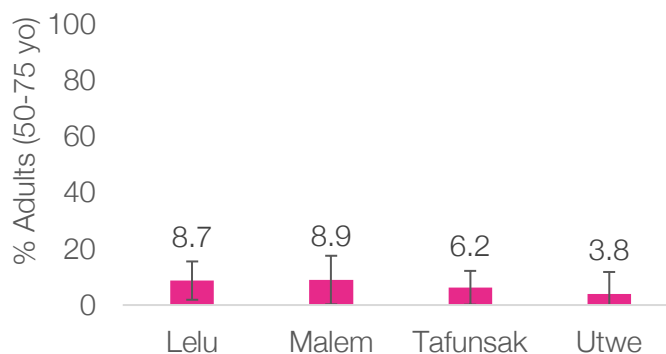
Any Colon Cancer Screening in past 10 years, by Age



Any Colon Cancer Screening in past 10 years, by Education



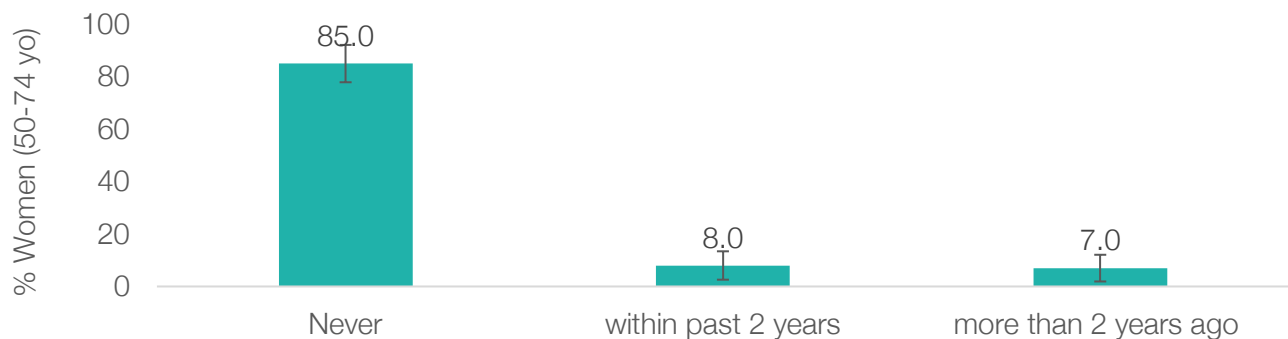
Any Colon Cancer Screening in past 10 years, by Municipality



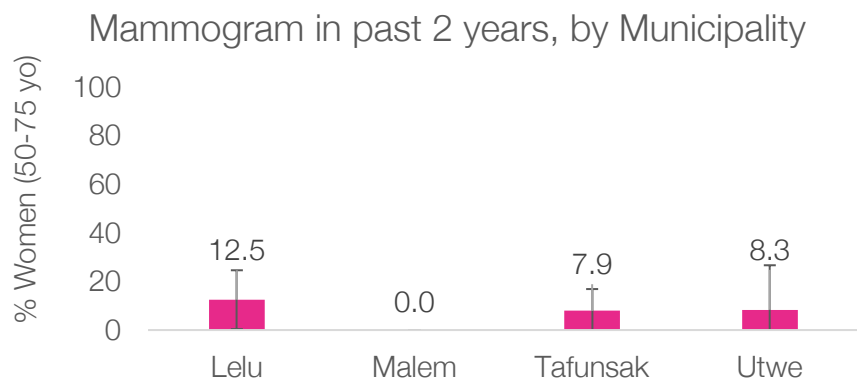
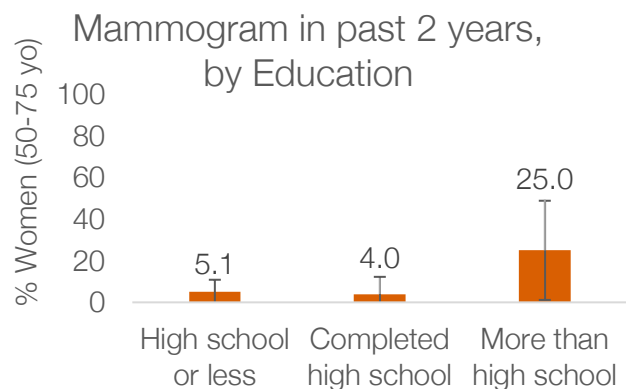
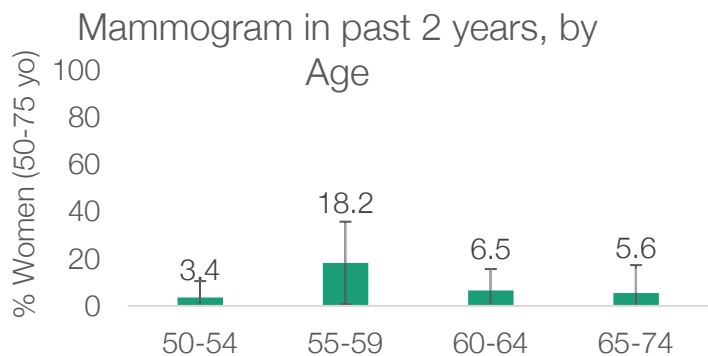
Female Cancer Screening: Mammogram

8.0% of women aged 50-74 years in Kosrae have received a mammogram in the past two years per US Preventative Task Force (USPTF) recommendation.

Last Mammogram among Women (50-74 years) in Kosrae, 2019

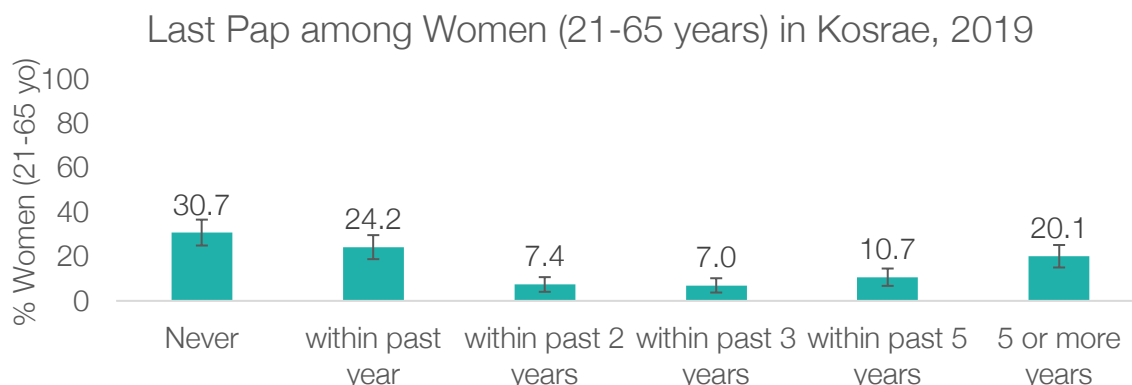


There were no statistically significant differences in mammogram prevalence between age, education, or municipality among women ages 50-74 years old in Kosrae.

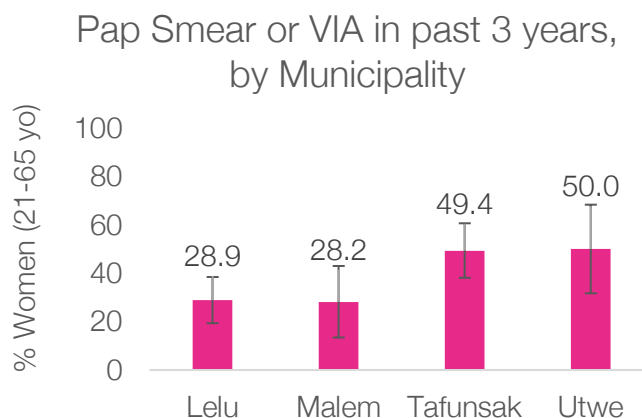
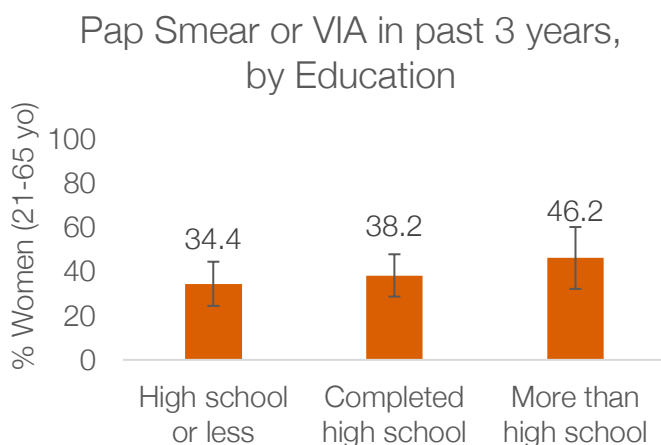
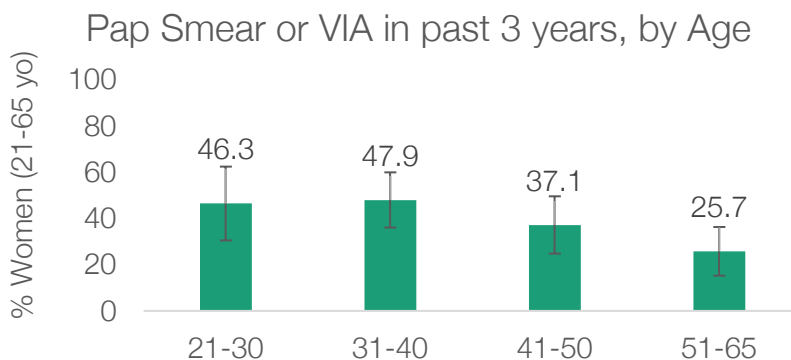


Female Cancer Screening: Pap Smear or VIA

About 38.5% of women aged 21-65 years in Kosrae had a Pap Smear or VIA test in the past 3 years (per USPTF recommendation); About one third (30.7%) had never had a Pap Smear or VIA test.

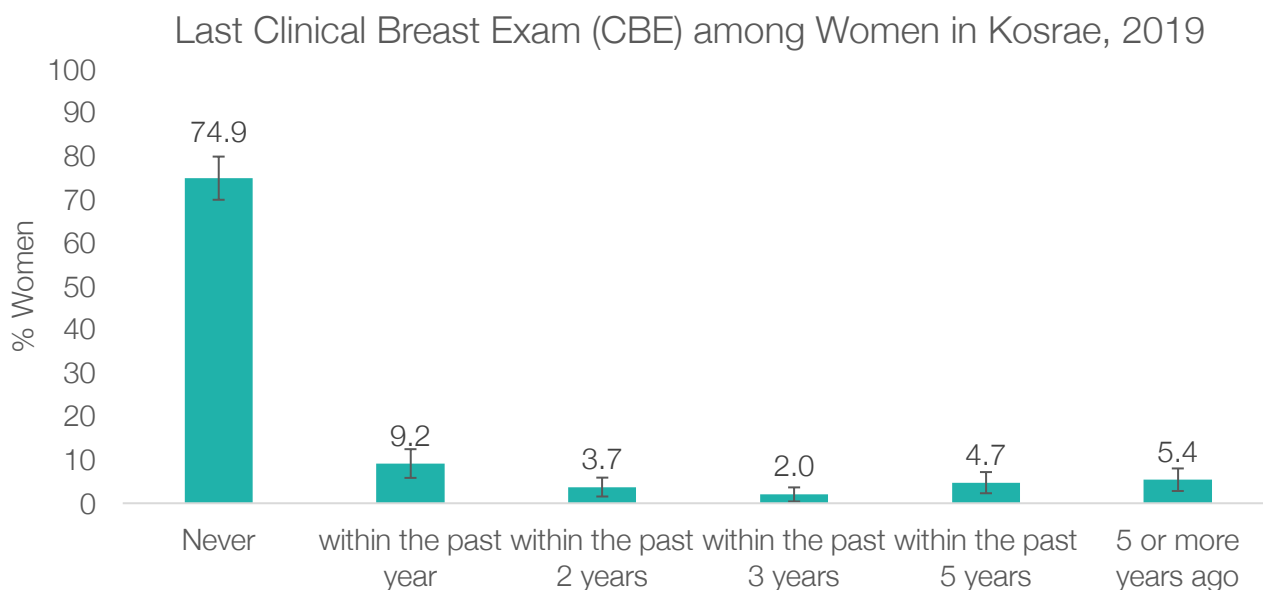


The recommendation for receiving a Pap Smear was met more often by more educated women and younger women (<40).



Female Cancer Screening: Clinical Breast Exam

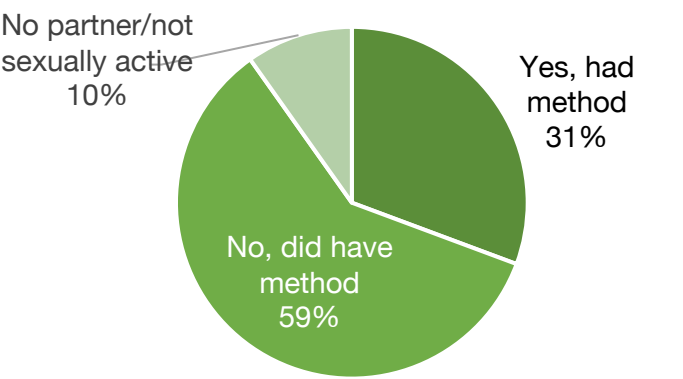
74.9% of women in Kosrae have never received a Clinical Breast Exam (CBE). There are currently no USPTF guidelines for CBE.



Family Planning

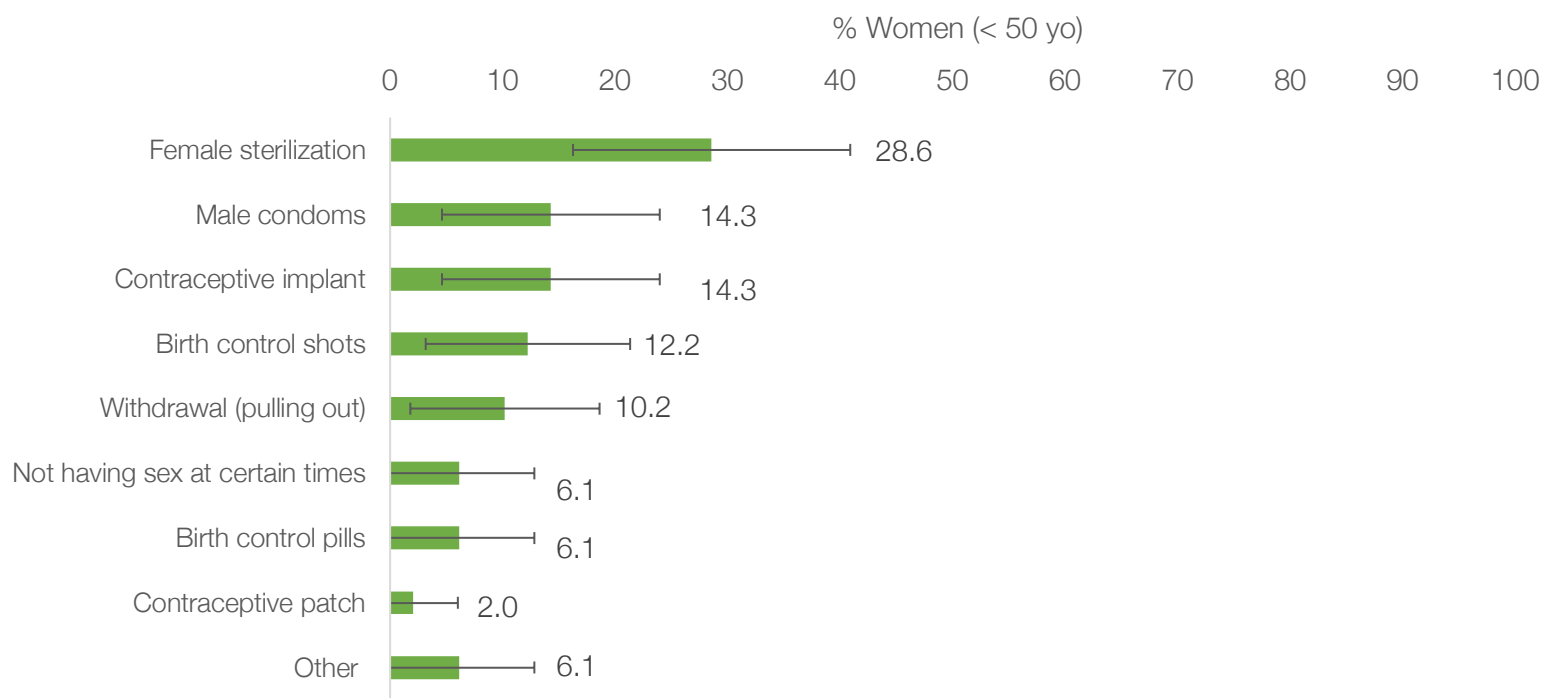
95.5% of women younger than 50 years old in Kosrae reported not being pregnant at the time of the survey. Of these non-pregnant women, about one third (30.7%) reported having used a birth control method to prevent pregnancy and more than half (59.5%) reported not having used any birth control method. The remaining women were not sexually active (9.8%).

Any birth control method used to keep from getting pregnant among non-pregnant women in Kosrae, 2019



Among non-pregnant women who had used a birth control method, the most prevalent method was female sterilization (i.e. tubal ligation, Essure, or Adiana).

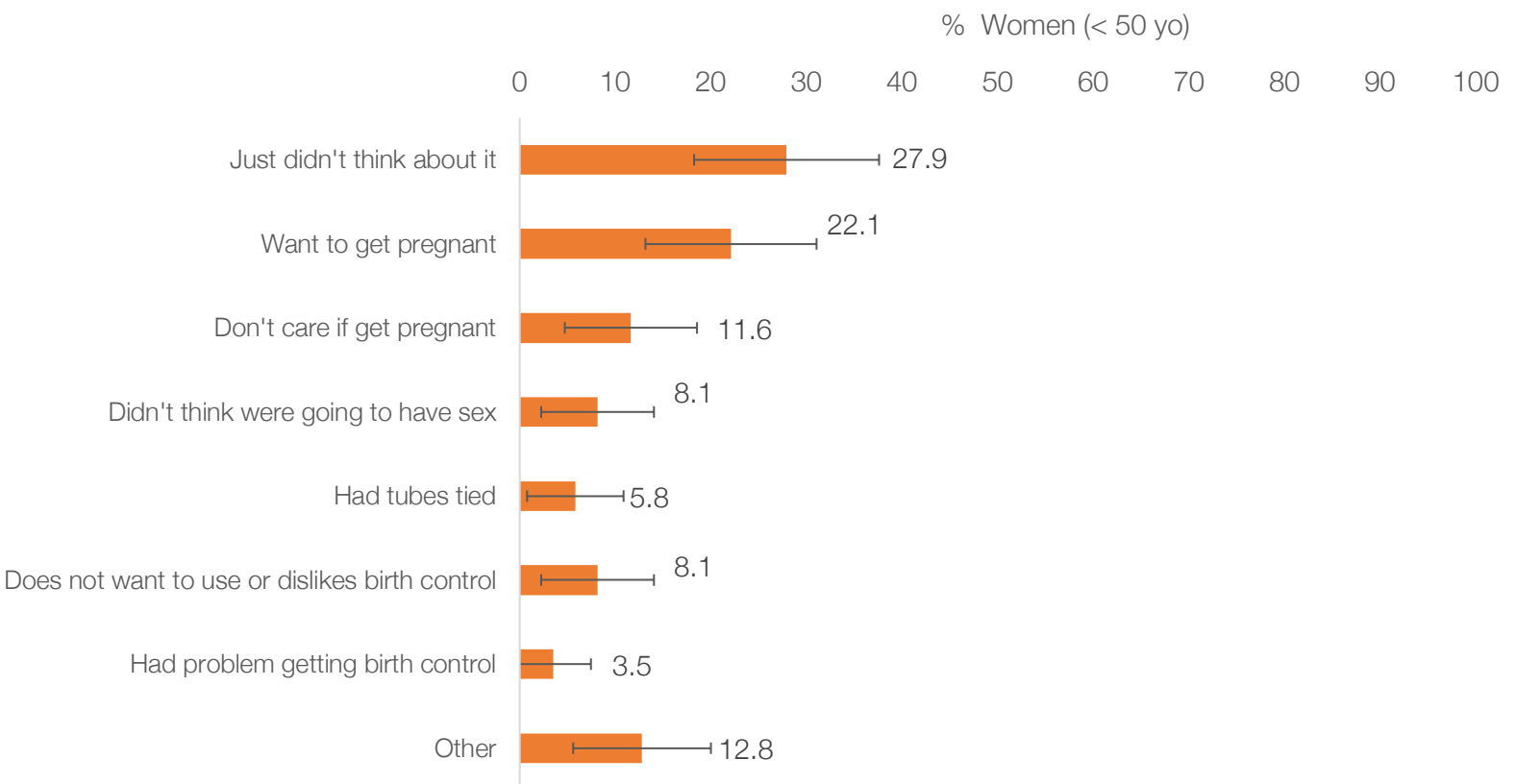
Birth Control Method used among Non-Pregnant Women in Kosrae, 2019



Family Planning

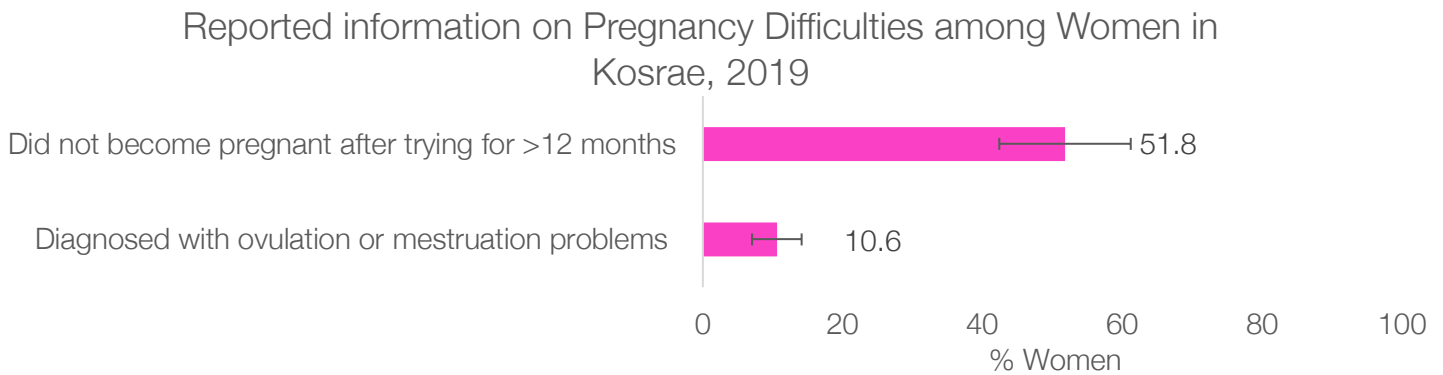
Among non-pregnant women who had not used a birth control method, the most common reason for not using a method was that they did not think about it or they wanted to get pregnant.

Reasons for not using Birth Control Method among Non-Pregnant Women in Kosrae, 2019

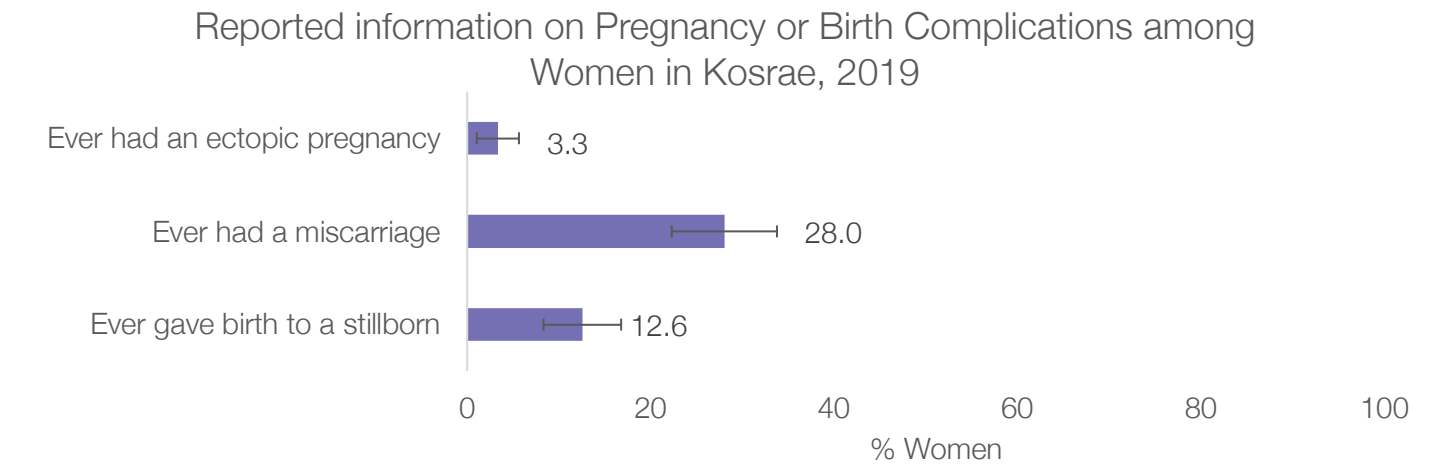


Women’s Health

About half of women (51.8%) in Kosrae reported not becoming pregnant after more than 12 months of trying. 10% said they were diagnosed with problems in ovulation or menstruation.



Among women who have had at least one pregnancy, 28.0% of women reported having at least one miscarriage. About one in ten women (12.6%) reported having given birth to a stillborn. 3.3% had an ectopic pregnancy.



Few women in Kosrae self-reported being diagnosed with a sexually transmitted disease (STI) or pelvic inflammatory disease.

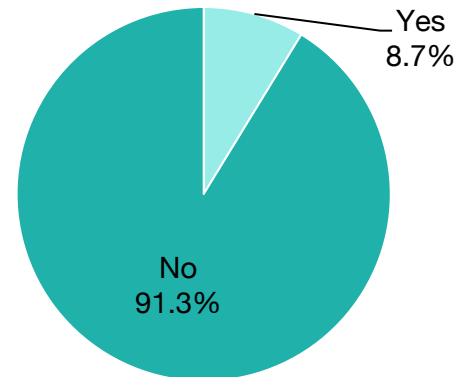
<u>Sexually Transmitted Infection (STI)</u>	<u>n</u>	<u>%</u>
Chlamydia	7	2.4
Gonorrhea	4	1.4
Pelvic Inflammatory Disease (PID)	5	1.7

Mental Health: Depression

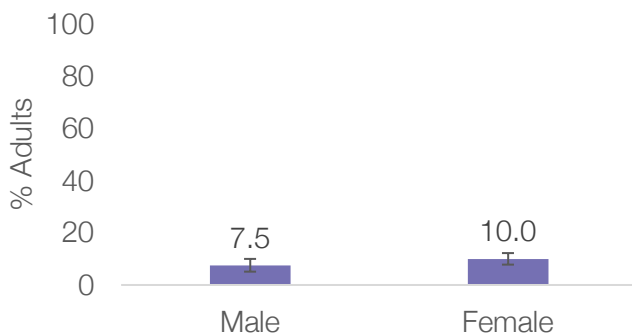
Participants were asked questions regarding their mental health status. 8.7% of adults reported signs of depression. Signs of depression was defined as having little interest or pleasure in doing things or feeling down, depressed or hopeless nearly every day and/or more than half the days in the past two weeks.

Depression was most prevalent among those aged 65+ years old (20.3%). There were no significant differences in prevalence of experiencing signs of depression between gender, education level, or municipality.

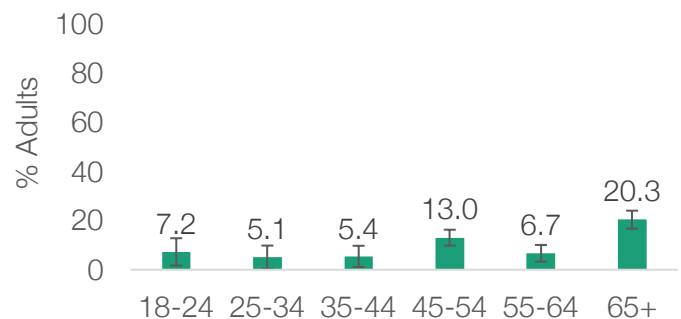
Signs of Depression among adults in Kosrae, 2019



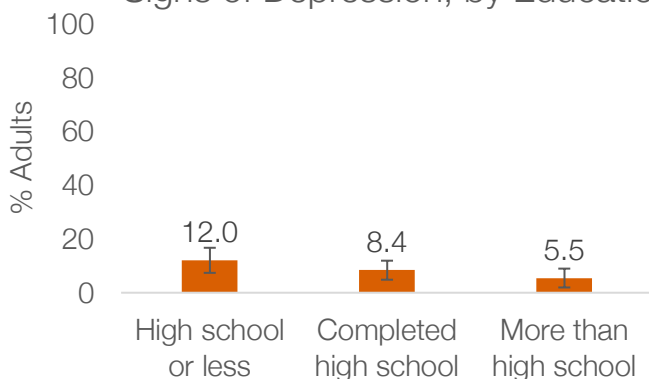
Signs of Depression, by Gender



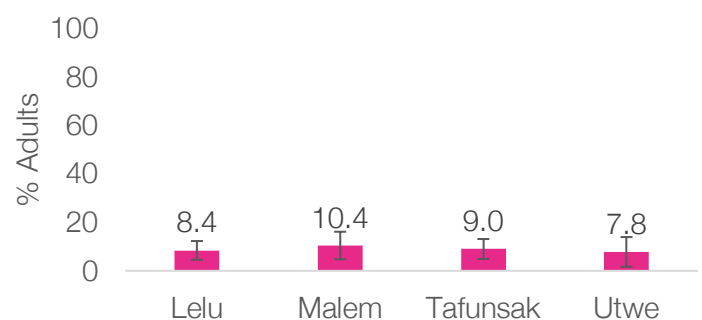
Signs of Depression, by Age



Signs of Depression, by Education



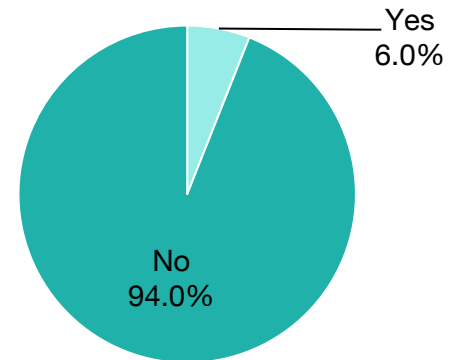
Signs of Depression, by Municipality



Mental Health: Anxiety

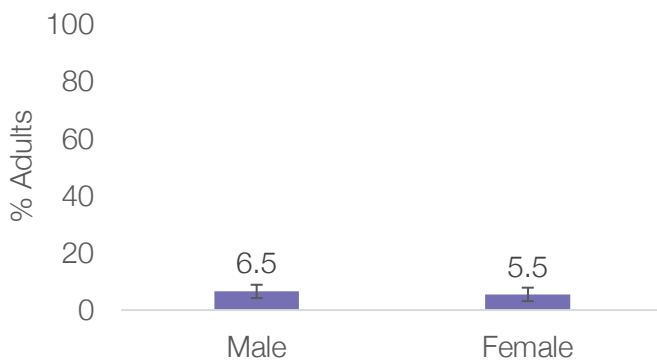
6.0% of adults reported experiencing signs of anxiety. Anxiety was defined as feeling nervous, anxious or on edge, or not being able to stop or control worrying nearly every day and/or more than half the days in the past two weeks.

Signs of Anxiety among adults in Kosrae, 2019

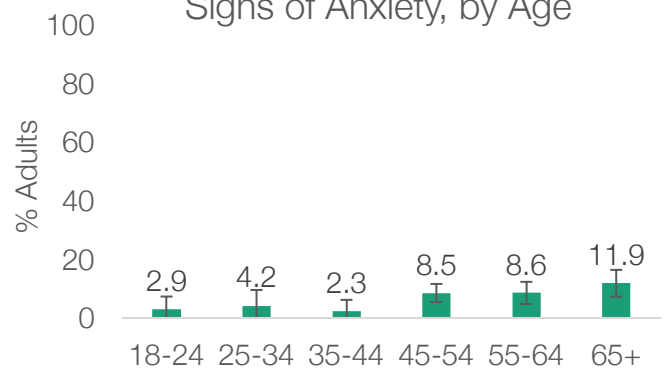


Anxiety was most prevalent among the those 65 years and older (11.9%). There were no significant differences in prevalence of experiencing signs of anxiety between gender, education level, or municipality.

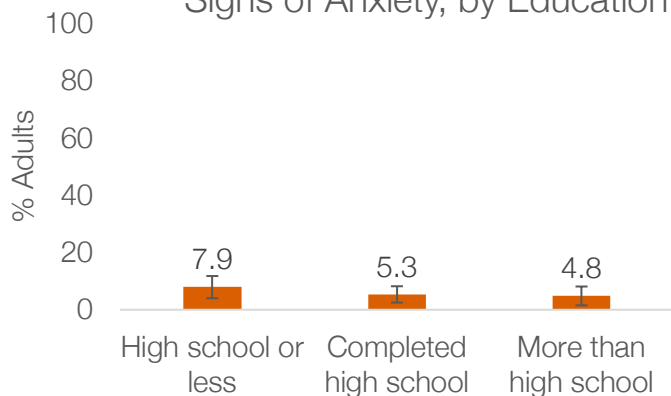
Signs of Anxiety, by Gender



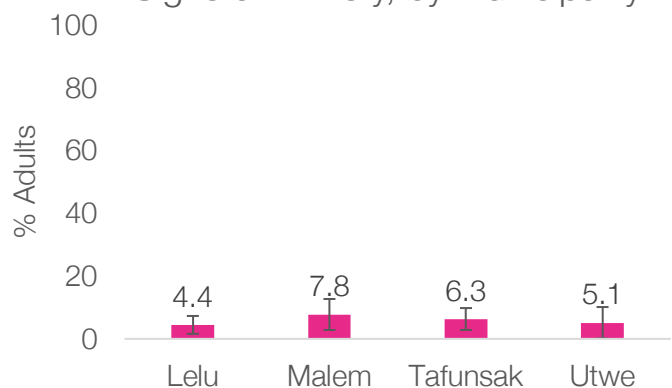
Signs of Anxiety, by Age



Signs of Anxiety, by Education



Signs of Anxiety, by Municipality



Important notes about survey

Limitations:

- A good portion of the data collected are self-reported, thus bias may exist, specifically regarding the more sensitive about substance use and mental health. Therefore, certain indicators may be under-reported.
- The sample was a bit older and more female than the last Census population estimates. However, the data were not weighted due to the fact that the most recent Census data were outdated.

Strengths:

- Physical and biochemical measurements were conducted for NCD prevalence estimation rather than just self-report.
- Quality and thorough training provided for all surveyors and partners (including standardization of anthropometric measures - height and weight).
- Use of tablets ensured data collection was clean, efficient, and timely.
- There were successful partnerships and collaboration between internal and external stakeholders.
- There was substantial support from local leadership.
- The survey team was mostly made up of health workers who were able to assist with accurate health translations, understand the health questions, and were dedicated to collecting high quality health data to assist with their programs.
- Kosrae is a small island, so it was easy to identify households and track participants

Challenges:

- Using meter numbers for household sampling presented some challenges due to the fact that some households share meters or have multiple meters. Also, some meters labeled as household meters actually belonged to cookhouses, garages, stores, etc.
- Customary practices in Kosrae presented some challenges. For example, some parents would not allow their adult child to participate in the survey even though their child was 18 or older.

Discussion and Recommendations

This adult Hybrid Survey provides much needed information about the status of NCDs and risk factors in Kosrae, which complements data from youth school surveys (that provide a picture of how well we are protecting youth from development of habits that will make them sick in the future) and death rates (that give a picture of the final impact of NCDs).

Comparing the results of the present survey with data from the US helps to paint a picture of health disparities that exist between Kosrae and the US. Based on these comparisons, it is evident that although smoking prevalence in Kosrae is similar to the US, chewing betel nut with tobacco is a significant concern, especially among youth and young adults. The overall prevalence of alcohol consumption in Kosrae is lower than the US, though the binge drinking prevalence is higher. It is clear that there is lower utilization of preventive health (to include annual exams and oral health) in Kosrae compared to the US, which may be contributing to the higher prevalence of self-reported fair or poor health among adults in Kosrae. Although prevalence of overweight/obesity, hypertension, and elevated cholesterol are lower in Kosrae compared to the US, the diabetes prevalence in Kosrae is 2.5 times higher than the US. Finally, female cancer screening prevalence is much lower in Kosrae compared to the US, especially with breast cancer screening.

A large amount of effort has been given to control of NCDs in Kosrae, especially in the areas of health promotion, health education, and the delivery of health services. It is now clear, however, that more needs to be done to address tobacco use, preventative healthcare, oral health, diabetes, and cancer screening.

The Monitoring Alliance for NCD Action (MANA) Dashboard for Federated States of Micronesia shows the status of adoption of the critical, evidence-based policies and programs that are known to be effective in controlling NCDs. For both tobacco and NCDs, the Dashboard shows that there is much “unfinished business” in adopting policies that protect the community, especially youth, from the risk factors that cause NCDs.

From the MANA Dashboard, the list of policies that need adoption or strengthening for tobacco include increases in tobacco excise tax, requirements for putting strong health warnings on tobacco packages, and stronger restrictions on tobacco advertisement, promotions, and sponsorship. To combat diabetes measures that need to be done include excise taxes on unhealthy foods (especially sugar-sweetened beverages and processed meats), banning of trans fats in foods, restrictions on marketing of unhealthy foods to children, strong healthy food policies in schools, issuing of dietary guidelines, and stronger enforcement of NCD policies.

In addition to much more aggressive policies to control NCD risk factors, the results of this survey indicate that there is large “protection gap” in the delivery of health services designed to screen for and control the damage

done by NCDs. The findings of this survey indicate that 3% of people with diabetes and 25% of those with hypertension have their disease under good control, and that only a small fraction of target age groups have been screened for early detection of common cancers (7% for colon cancer, 8% for breast cancer, and 38% for cervical cancer). Much more aggressive efforts are needed to assure that most adults receive the screening services they need for cancer prevention, and to provide the follow-up and care that those with diabetes and hypertension need to protect them from complications and death.

Recommendations:

1. Update other components of the Kosrae NCD Monitoring & Surveillance plan, to provide a more complete picture of the status of the NCD crisis in Kosrae. These components include: 1) analysis of NCD death rates from vital statistics data (due every year according to the Kosrae NCD Monitoring & Surveillance Plan); and 2) high school youth risk factor survey (due every 2 years).
2. Assure that a this Hybrid Adult Survey will be conducted every 5 years, in accordance with the NCD Monitoring & Surveillance Plan (next due in 2024).
3. Use the MANA Dashboard as the basis for developing a policy agenda and tracking progress to more effectively address NCDs risk factors, especially overweight/obesity and tobacco use in Kosrae.
4. Develop a strategy across health service agencies (Kosrae State Hospital and Kosrae Community Health Center) to monitor care delivery, provide expanded outreach, tracking, and accessible services for care of patients with NCDs.
5. Provide appropriate services and support for substance use and mental health.

Priority areas for health improvement in Kosrae include:

1. Reducing diabetes by improving diet/nutrition education and healthy food access and increasing physical activity using evidence-based programs.
2. Strengthening NCD clinical screening and management programs among adults in Kosrae.
3. Providing appropriate cessation services for substance use, specifically tobacco and alcohol.
4. Consider policy approaches to reduce certain risk factors, especially those in the Monitoring Alliance for NCD Action (MANA) framework.
5. Support chronic disease self-management programs to help individuals with NCDs control their disease.

Acknowledgements

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Mr. Joston Edmond, Division of Statistics, Dept. of Administration, Kosrae State Government

Municipal Mayors

Community Leaders

2018 Kosrae Hybrid Survey Team

Kosrae Nurses Association

U.S. Department of Interior

Pacific Island Health Officers' Association (PIHOA)

Marshall Islands Epidemiology and Prevention Initiatives, Inc. (MIEPI)



References

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APPENDIX: Details on indicators

Variable	Source question	Classifications used in this report
Gender	Gender	The following responses were used: <ul style="list-style-type: none"> • Male • Female
Education	What is highest level of formal education you have completed?	The following responses were used: <ul style="list-style-type: none"> • Less than high school • High school • Associate's degree completed • Bachelor's degree completed • Graduate or professional degree completed
Ethnic background	What is your ethnic background?	The following responses were used: <ul style="list-style-type: none"> • Kosraean • Other
Marital Status	Which best describes your current marital status?	The following responses were used: <ul style="list-style-type: none"> • Single, never married • Married • Widowed • Divorced/separated
Employment Status	Which best describes your current employment?	The following responses were used: <ul style="list-style-type: none"> • Government employee • Non-government employee • Self-employed • Non-paid (volunteer, subsistence, etc.) • Student • Homemaker • Retired • Unemployed (able to work) • Unemployed (unable to work)
Military Status	What is your military status?	The following responses were used: <ul style="list-style-type: none"> • Active duty • Reservist • Veteran • Retired • Never served
Religion	What is your religion?	The following responses were used: <ul style="list-style-type: none"> • Congregational Christian Church • Catholic • Methodist • Seventh Day Adventist • LDS/Mormon • Pentecostal/AOG • Muslim

		<ul style="list-style-type: none"> • Jehovah's Witness • Victory • Baptist • Other • None
Household Income	Approximately how much was your household income this past year?	<p>The following responses were used:</p> <ul style="list-style-type: none"> • <\$5,000 • \$5,000-<10,000 • \$10,000-<15,000 • \$15,000-<20,000 • \$20,000 or more
General Health	Would you say that your general health is...	<p>The following responses were used:</p> <ul style="list-style-type: none"> • Excellent • Very good • Good • Fair or okay • Poor or not good
Last doctor visit	About how long has it been since you last visited a medical provider for an annual checkup? An annual checkup is a general physical exam, not an exam for a specific injury, illness, or condition.	<p>The following responses were used:</p> <ul style="list-style-type: none"> • Within past year • Within past 2 years • Within past 3 years • Within last 5 years • 5 or more years ago • Never
Health Insurance	Do you have any kind of health care coverage (health insurance)?	Yes or no
Health care costs as a barrier	Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?	Yes or no
Last dental visit	How long has it been since you last visited a dentist or a dental clinic for any reason? Include visits to dental specialists, such as orthodontists.	<p>The following responses were used:</p> <ul style="list-style-type: none"> • Within past year • Within past 2 years • Within past 3 years • Within last 5 years • 5 or more years ago • Never
Teeth missing	How many of your permanent teeth have been removed because of tooth decay or gum disease? Include teeth lost to infection, but do not include teeth lost for other reasons, such as injury or orthodontics.	<ul style="list-style-type: none"> • 1 to 5 • 6 or more but not all • All • None
Body Mass Index category	Measured height and weight were used.	<p>BMI is calculated by taking your weight (in kilograms) over your height squared (in centimeters). We used CDC categories:</p> <ul style="list-style-type: none"> • Underweight <18.5 • Normal 18.5-24.9 • Overweight 25-29.9 • Obese 30+

Hypertension	Measured blood pressure and self-reported high blood pressure and medication status was used to categorize hypertension.	Individuals were categorized as having hypertension if their measured BP was $\geq 140/90$ and/or if they self-reported being diagnosed with hypertension and were taking medication for their hypertension
High blood sugar or diabetes	Measured fasting blood glucose and self-reported diagnosis of diabetes and medication status was used to categorize high blood sugar/diabetes.	Individuals were categorized as having diabetes if their fasting blood glucose was $\geq 126\text{mg/dL}$ and/or if they self-reported being diagnosed with diabetes and were on medication for their diabetes.
Diabetes Health Appointment	About how many times in the past 12 months have you seen a doctor, nurse, or other health professional for your diabetes?	<ul style="list-style-type: none"> • 1 time • 2-3 times • 4-5 times • 6 or more times • None
HbA1c	A test for "A one C" (HbA1c) measures the average level of blood sugar over the past three months. About how many times in the past 12 months has a doctor, nurse, or other health professional checked you for "A one C"?	<ul style="list-style-type: none"> • 1 time • 2-3 times • 4-5 times • 6 or more times • None
Diabetes foot self-check	About how often do you check your feet for any sores or irritations? Include times when checked by a family member or friend, but do NOT include times when checked by a health professional.	<ul style="list-style-type: none"> • At least one time per day • At least one time per week • At least one time per month • At least one time per year • Never
Diabetes foot checked by health professional	About how many times in the past 12 months has a health professional checked your feet for any sores or irritations?	<ul style="list-style-type: none"> • 1 time • 2-3 times • 4-5 times • 6 or more times • None
Diabetes Eye Exam	When was the last time you had an eye exam in which the pupils were dilated? This would have made you temporarily sensitive to bright light.	<p>The following responses were used:</p> <ul style="list-style-type: none"> • Within the past month (any time less than one month ago) • Within the past year (1 month but less than 12 months ago) • Within the past 2 years (1 year but less than 2 years ago) • 2 or more years ago • Never
Diabetes Management Class	Have you ever taken a course or class in how to manage your diabetes yourself?	Yes or no

High Total Cholesterol	Measured total cholesterol was used.	If total cholesterol was $\geq 190\text{mg/dL}$ the individual was classified as having elevated total cholesterol. If total cholesterol was $\geq 240\text{mg/dL}$ the individual was classified as having high total cholesterol.
Low HDL Cholesterol	Measured HDL cholesterol was used.	If HDL cholesterol was $< 40\text{mg/dL}$ the individual was classified as having low HDL.
Arthritis	Have you ever been told by a doctor that you have _____?	Yes or no
Gout		
Asthma		
Coronary heart disease		
Other heart disease		
Tuberculosis (TB)		
COPD		
Stroke		
Ulcer		
Angina		
Heart Attack		
Cancer		
Emphysema		
Chronic Kidney Disease	Have you ever been told by a doctor or other health professional that you had weak or failing kidneys? Do not include kidney stones, bladder infections, or incontinence.	Yes or no
Cigarette Use	During the past 30 days, on how many days did you smoke cigarettes?	0 days= no use 1-29 days= some use 30 days= Everyday use
Want to quit cigarette use	Do you want to quit smoking cigarettes?	Yes or no
Try to quit cigarette use	During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking cigarettes?	Yes or no
Betel nut use	During the past 30 days, on how many days did you chew betel nut?	0 days = no use 1-30 days = some use
Want to quit betel nut use	Do you want to quit chewing betel nut?	Yes or no
Try to quit betel nut use	During the past 12 months, have you stopped chewing for one day or longer because you were trying to quit chewing betel nut?	Yes or no
E-cigarette use	During the past 30 days, on how many days did you use E-Cigarettes or a personal vaporizer (PV), or electronic nicotine?	0 days= no use 1-30 days= some use

Home 2 nd hand smoke	During the past 30 days, on how many days did someone other than you smoke tobacco inside your home while you were at home?	0 days= no exposure 1-30 days= some exposure
Work 2 nd hand smoke	During the past 30 days, on how many days did you breathe tobacco smoke at your workplace from someone else other than you who was smoking tobacco?	0 days= no exposure 1-30 days= some exposure
Vehicle 2 nd hand smoke	During the past 30 days, on how many days did you ride in a vehicle where someone other than you was smoking tobacco?	0 days= no exposure 1-30 days= some exposure
Any 2 nd hand smoke exposure	Answered yes to any of the 2 nd hand smoke questions	Yes or no
Alcohol consumption	During the past 30 days, on how many days did you have at least one standard drink of any alcohol?	0 days= no use 1-29 days= some use 30 days= Everyday use
Binge alcohol frequency	During the past 30 days, how many days did you have: <ul style="list-style-type: none"> • for men: <ul style="list-style-type: none"> ○ Five or more standard alcoholic drinks? • for women: <ul style="list-style-type: none"> ○ Four or more standard alcoholic drinks? 	0 days= no binge 1-29 days= some binge 30 days= Everyday binge
Drink and Drive	During the past 30 days, on how many days have you driven a vehicle after you've consumed alcohol?	0 days = did not drink and drive 1-30 days = did drink and drive some days
Passenger drink and drive	During the past 30 days, on how many days have you been a passenger in a vehicle with a driver other than yourself who has consumed alcohol?	0 days = was not a passenger in a car with a driver who consumed alcohol 1-30 days = was a passenger in a car with a driver who consumed alcohol
Non-ceremonial sakau	During the past 30 days, on how many days did you have at least one standard drink of non-ceremonial sakau?	0 days = no non-ceremonial sakau 1-30 days = some non-ceremonial sakau
Regular Diet	How much of your regular diet is made up of local/traditional foods (such as local fish, taro, breadfruit, banana, tangerine, etc)?	The following responses were used: <ul style="list-style-type: none"> • All or mostly all local food • Majority local food but some imported food • About half local and half imported food • Majority imported food but some local food • All or mostly all imported food
Fruit and vegetable consumption	Sum of usual daily fruit consumption and daily vegetable consumption.	<1 serving 1-<3 servings 3-<5 servings 5 or more servings
Processed meat consumption	In a regular day, how many times do you eat processed meats? This does not include canned fish.	0 servings 1 serving 2 or more servings

Salt use when cooking or preparing food	How often is salt, salty seasoning or a salty sauce added in cooking or preparing foods in your household?	The following responses were used: <ul style="list-style-type: none"> • Always • Often • Sometimes • Rarely • Never
Adding salt to prepared food	How often do you add salt or a salty sauce such as soy sauce to your food right before you eat it or as you are eating it?	The following responses were used: <ul style="list-style-type: none"> • Always • Often • Sometimes • Rarely • Never
Processed food high in salt	How often do you eat processed food high in salt?	The following responses were used: <ul style="list-style-type: none"> • Always • Often • Sometimes • Rarely • Never
Perception of salt consumption	How much salt or salty sauce do you think you consume?	The following responses were used: <ul style="list-style-type: none"> • Way too much • Too much • Just the right amount • Too little • Way too little
Watching salt intake	Most of the sodium or salt we eat comes from processed foods and foods prepared in restaurants. Salt also can be added in cooking or at the table. Are you currently watching or reducing your sodium or salt intake?	Yes or no
Lowering salt intake	How important to you is lowering the salt in your diet?	The following responses were used: <ul style="list-style-type: none"> • Very important • Somewhat important • Not at all important
Sugar-sweetened beverage consumption	In a regular day, how many sugary drinks do you drink? This does not include diet drinks made with artificial sweeteners.	0 servings 1 serving 2 or more servings
Physical Activity	During the past 30 days, other than your regular job, on how many days did you participate in any physical activities or exercises such as running, Zumba, sports, walking, or going to the gym, specifically for exercise?	0 days = no physical activity 1-29 days = some physical activity 30 days = everyday physical activity
Colonoscopy screening	How long has it been since your last colonoscopy?	The following responses were used for those adults 50+: <ul style="list-style-type: none"> • Within past year • Within past 2 years • Within past 3 years • Within last 5 years

		<ul style="list-style-type: none"> • Within past 10 years • 10 or more years ago • Never
Blood stool test	A blood stool test is a test that determines whether the stool contains blood. How long has it been since your last blood stool test?	<p>The following responses were used for those adults 50+:</p> <ul style="list-style-type: none"> • Within past year • Within past 2 years • With past 3 years • Within last 5 years • 5 or more years ago • Never
Mammogram screening	How long has it been since you had your last mammogram?	<p>The following responses were used for those women 50-74:</p> <ul style="list-style-type: none"> • Within past year • Within past 2 years • Within past 3 years • Within past 5 years • 5 or more years ago • Never
Clinical breast exam	A clinical breast exam is when a doctor, nurse, or other health professional feels the breasts for lumps. How long has it been since your last clinical breast exam?	<p>The following responses were used for those women:</p> <ul style="list-style-type: none"> • Within past year • Within past 2 years • Within past 3 years • Within last 5 years • 5 or more years ago • Never
Pap smear or VIA	How long has it been since you had your last Pap test?	<p>The following responses were used for those women 21-65:</p> <ul style="list-style-type: none"> • Within past year • Within past 2 years • Within past 3 years • Within last 5 years • 5 or more years ago • Never
Marijuana drug use	During the past 30 days, report on how many days you used any of the following substance: _____.	No use= 0 days Use= 1 or more days
Inhalant drug use		
Prescription drug use		
Birth control use	Did you or your partner do anything the last time you had sex to keep you from getting pregnant?	Yes or no
Type of birth control	What did you or your partner do the last time you had sex to keep you from getting pregnant? (if multiple methods, select first method on the list)	<p>The following responses were used for those women:</p> <ul style="list-style-type: none"> • Female sterilization (ex. Tubal ligation, Essure, Adiana) • Male sterilization (vasectomy) • Contraceptive implant (ex. Implanon) • Levonorgestrel (LNG) or

		<ul style="list-style-type: none"> hormonal IUD (ex. Mirena) • Copper-bearing IUD (ex. ParaGard) • IUD, type unknown • Shots (ex. Depo-Provera) • Birth control pills, any kind • Contraceptive patch (ex. Ortho Evra) • Contraceptive ring (ex. NuvaRing) • Male condoms • Diaphragm, cervical cap, sponge • Female condoms • Not having sex at certain times (rhythm or natural family planning) • Withdrawal (or pulling out) • Foam, jelly, film, or cream • Emergency contraception (morning after pill) • Other method
Reasons not using birth control	<p>Some reasons for not doing anything to keep you from getting pregnant the last time you had sex might include wanting a pregnancy, not being able to pay for birth control, or not thinking that you can get pregnant. What was your main reason for not doing anything the last time you had sex to keep you from getting pregnant?</p>	<p>The following responses were used for those women:</p> <ul style="list-style-type: none"> • You didn't think you were going to have sex • You just didn't think about it • Don't care if you get pregnant • You want a pregnancy • You or your partner don't want to use birth control • You or your partner don't like birth control/side effects • You couldn't pay for birth control • You had a problem getting birth control when you needed • Religious reasons • Lapse in use of a method • Don't think you or your partner can get pregnant (infertile or too old) • You had tubes tied (sterilization) • You had a hysterectomy • Your partner had a vasectomy (sterilization) • You are currently breast-feeding

		<ul style="list-style-type: none"> You just had a baby/postpartum You are pregnant now Same sex partner Other reasons
Unable to become pregnant	At any time did you try for more than 12 months and not become pregnant?	Yes or no
Ovulation or menstruation problems	Has a nurse, doctor or other medical care provider ever told you that you had problems with ovulation or menstruation, that is, your female cycle?	Yes or no
Ectopic pregnancy	Were you ever told that you had an ectopic pregnancy (tubal pregnancy that resulted in a miscarriage)?	Yes or no
Miscarriage	How many resulted in a miscarriage?	No miscarriage = 0 Ever had a miscarriage = 1 or more
Stillborn	How many pregnancies resulted in a stillborn infant/baby?	No stillborn = 0 Ever had a stillborn = 1 or more
Chlamydia	Have you ever been told by a nurse, doctor or other medical provider that you had a sexually transmitted infection (STI) called chlamydia?	Yes or no
Gonorrhea	Have you ever been told by a nurse, doctor or other medical provider that you had a sexually transmitted infection called gonorrhea?	Yes or no
Pelvic inflammatory disease (PID)	Have you ever been treated with antibiotics for an infection in your fallopian tubes, womb, or ovaries, also called a pelvic infection, pelvic inflammatory disease, or P.I.D.?	Yes or no
Depression	Over the last 2 weeks, how often have you been bothered by any of the following problems? <ul style="list-style-type: none"> Little interest or pleasure in doing things Feeling down, depressed or hopeless 	The following responses were used: <ul style="list-style-type: none"> Never Several days More than half the days Nearly everyday
Anxiety	Over the last 2 weeks, how often have you been bothered by any of the following problems? <ul style="list-style-type: none"> Feeling nervous, anxious or on edge Not being able to stop or control worrying 	The following responses were used: <ul style="list-style-type: none"> Never Several days More than half the days Nearly everyday