

Chuuk

Federated States of Micronesia

Adult Hybrid Survey



2023/2024

Endorsement

December 10, 2025

Ran anim and Greetings,

I am pleased to formally endorse the *Chuuk Adult NCD Hybrid Survey 2023/2024*, conducted by the Chuuk State Department of Health Services and the Chuuk Community Health Center.

The findings of this survey represent a significant contribution to our understanding of the burden and risk factors associated with non-communicable diseases (NCDs) in Chuuk. The timely, reliable, and comprehensive data gathered through this effort will guide evidence-based policies, strengthen public health programs, and support our continued work to reduce premature mortality from NCDs.

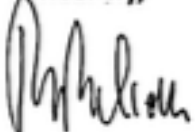
On behalf of the Chuuk State Department of Health Services, I extend our sincere appreciation to all partners and stakeholders whose commitment made this survey possible. Your collective efforts ensured that this report serves not only as a dataset, but as a practical tool for strengthening our response to NCDs and improving the health and well-being of our communities.

We are grateful for the contributions of the Pacific Island Health Officer Association, World Health Organization, US Center for Disease Control (TB Division), FSM National Department of Health & Social Affairs, Chuuk Community Health Center, as well as the leadership and support of community authorities across Chuuk. We also acknowledge the dedication of the NCD Program Coordinator, Ms Moria Shomour, and her survey teams whose work was essential to this achievement.

As we move forward, we remain committed to using this information to address NCD risk factors at every level. Guided by the principle that health is a shared responsibility, we look forward to continued collaboration toward building a healthier and more resilient Chuuk.

Thank you for your continued support.

Sincerely,



Dr. Bosco Buliche

Director

Department of Health Services

Table of Contents

Summary	4
Summary Dashboard: Chuuk vs. US	5
Summary Dashboard: Chuuk 2016 vs. 2023	6
Introduction	7-8
Survey Methodology	9-10
Sample Summary	11
Demographics	12-14
General Health	15
Access to Care: Annual Check-up	16
Access to Care: Health Insurance	17
Access to Care: Basic Needs	18
Oral Health	19-20
Community Wellbeing	21
COVID-19	22
Overweight/Obesity	23
Hypertension	24-25
Diabetes/Pre-Diabetes	26-28
Total Cholesterol	29
LDL Cholesterol	30
HDL Cholesterol	31
Triglycerides	32
Cigarette Smoking	33
Vaping	34
Smokeless Tobacco Use	35
Betel Nut Chewing	36-37
Any Tobacco Use	38
Secondhand Smoke	39
Alcohol Use and Binge Drinking	40-41
Marijuana Use	42
Other Substance Use	43
Perceptions of Substance Use Risk	44
Disapproval of Substance Use	45
Mental Health: Depression	46
Mental Health: Anxiety	47
Mental Health: Suicide	48
Fruit and Vegetable Consumption	49
Processed Meat Consumption	50

Sugar Sweetened Beverage Consumption	51
Salt Intake	52
Physical Activity	53-54
Sedentary Behavior	55
Colon Cancer Screening: Colonoscopy	56
Colon Cancer Screening: Blood Stool Test	57
Colon Cancer Screening: Any Colon Cancer Screening	58
Female Cancer Screening: Mammogram	59
Female Cancer Screening: Clinical Breast Exam	60
Female Cancer Screening: Pap Smear	61
Important Notes	62
Discussion and Recommendations	63-64
Acknowledgements	65
References	66

Summary

The aim of this report is to assess the current prevalence of non-communicable diseases (NCDs), substance use, mental health, and other selected risk factors in Chuuk. We hope this report enables Chuuk to better understand its burden of disease, 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.



Non-Communicable Diseases (NCDs) such as heart disease, cancer, and diabetes are global issues that result in high burdens of disability and premature death. Additionally, substance use and poor mental health can also greatly contribute to disability and premature death throughout the world. NCDs and poor mental health are highly linked to several key risk factors, such as cigarette smoking, tobacco chewing, excessive alcohol consumption, unhealthy diet, lack of physical activity, and overweight/obesity. Over the past few decades there have been drastic changes in lifestyle in the Chuuk, the most populated state of the Federated States of Micronesia. Chuuk has shifted from mostly subsistence living and reliance on locally produced crops and fish to a more Western lifestyle of sedentary occupation and more reliance on imported foods, as well as the introduction of many illicit substances. This lifestyle shift has resulted in higher burdens of certain risk factors, NCDs, substance use, and poor mental health.

Chuuk undertook its first Hybrid Survey from May – September 2023 (Northern Namoneas, Southern Namoneas, Faichuk) and from May – June 2024 (Mortlocks) alongside the Chuuk TB+Leprosy Free Chuuk Project. A total of 1,744 individuals aged 18 years or older participated in the survey. Respondents answered questions about their alcohol and tobacco use, other substance use, mental health, dietary habits, physical activity, health access, oral health, health conditions, and cancer screening. Additionally, height and weight, Hemoglobin A1c, and blood pressure were measured.

Chuuk vs. USA

Here are Chuuk's 2023/2024 Hybrid Survey prevalence data compared to U.S. prevalence data using the most comparable sources available. Almost all selected indicators had a higher prevalence in Chuuk compared to the US. E-cigarette use prevalence is lower in Chuuk compared to the US. Alcohol use and binge drinking in the past 30 days prevalence is lower in Chuuk compared to the US. The overweight/obesity and diabetes prevalence is similar in both locations, and the prevalence of hypertension in Chuuk is lower than the US. Due to lack of raw data from US sources, statistical analysis could not be performed.

	Chuuk %	US %	Comparison
Current tobacco use (past 30 days)			
Cigarette smoking	21.0	14.0	↑
E-cigarette use	2.5	7.7	↓
Current alcohol use (past 30 days)			
Alcohol use (any)	12.4	53.6	↓
Binge drinking (5+ drinks per day)	9.9	17.0	↓
Nutrition			
Consuming fruit <1 time per day	76.1	40.8 ¹	↑
Consuming vegetables <1 time per day	68.0	19.7 ¹	↑
Health and healthcare			
Fair or poor health (self-reported)	30.7	17.0	↑
No medical checkup in the past year	79.9	23.2	↑
Oral health			
No dental visit within past year	86.3	34.2	↑
Extracted permanent teeth due to decay/disease	71.1	40.3	↑
Chronic conditions			
Overweight/obesity	72.0	73.1 ²	○
Diabetes (self-reported + undiagnosed)**	14.7	14.3 ³	○
Hypertension (self-reported + undiagnosed)**	22.3	31.7 ⁴	↓
Cancer screening			
No Pap smear in the past 3 years (women 21-65 yo)	95.1	22.3 ⁵	↑
No mammogram in the past 2 years (women 50-74 yo)	95.8	21.7 ⁵	↑

Source for US comparison: BRFSS 2022 unless noted with ¹BRFSS 2021, ²NHANES 2017-2018 (adults 20+), ³CDC National Diabetes Report 2022 (includes diagnosed and undiagnosed diabetes) ⁴NHANES 2017-2018 (adults 18+; includes diagnosed and undiagnosed hypertension), ⁵BRFSS 2020; **Diabetes prevalence is estimated based on either a self-report of diabetes for which the patient is taking medication and/or an A1c of ≥6.5% 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 2 readings) of ≥140/90.

Surveillance in Chuuk: 2006 vs. 2023

The table below compares the 2006 Chuuk STEPS results to the 2023 Chuuk Hybrid Survey. The Chuuk Hybrid Survey data were limited to those 24 - 64 years old so that they can be compared to the STEPS data which offers estimates for those among 24 - 64 years old. Chi-square analysis ($p < 0.05$ considered statistically significant) was used for comparisons with red indicating a worsening trend, green indicating an improving trend, and yellow indicating no significant change.

AMONG THOSE 24 - 64 YEARS OLD	2006 (%)	2023 (%)	p-value	Comparison
Current tobacco use Smoked tobacco products in the past 12 months	32.4	22.7	< 0.01	↓
Current alcohol use Alcohol use in the past 30 days	17.7	16.9	0.583	○
Nutrition <5 servings of fruits and vegetables per day	90.4	89.1	0.255	○
Chronic conditions Overweight/obesity ¹ Hypertension ²	76.5 15.2	79.0 22.7	0.108 < 0.01	○ ↑

¹Overweight/obesity determined as a BMI ³25 based on measured height and weight

²Hypertension was determined by a self-report of medicated hypertension and/or an average blood pressure reading (out of 3 readings) of ³140/90

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]).



In 2010, the Pacific Island Health Officers Association (PIHOA) declared a regional health emergency due to the epidemic of NCDs in the USAPIs [1]. The NCDs of concern in the USAPIs include diabetes, heart disease, stroke, cancer, and chronic obstructive pulmonary disease [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 factors [3]. However, the five 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 [4].

Chuuk undertook a novel population-based household survey that combined NCD and associated risk factor indicators from several NCD surveillance frameworks in 2023. A total of 1,744 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, Hemoglobin A1c, and blood pressure were measured.



Chuuk is located in the northern Pacific Ocean east of Guam. Chuuk is a large archipelago of mountainous islands with a land area of 46 square miles. Most of the population lives within Chuuk Lagoon that contains the State Capitol, Weno. Chuuk also has several sparsely populated outer islands located outside of the lagoon.

The Federated States of Micronesia (FSM) is an island country in Micronesia that is affiliated with the US under a Compact of Free Association, which became effective on November 3, 1986. Within the FSM there are four states: Chuuk, Kosrae, Pohnpei, and Yap that are geographically separated and have their own unique languages and cultures. There are around 607 islands that make up the nation of FSM totaling 271 square miles. Chuuk is made up of about 290 islands totaling 46 square miles.

The population of FSM is 102,843 (2010 Census). Chuuk is the most populated state of FSM with 48,654 people. Among these, 36,152 reside within the lagoon and 12,502 reside in the outer islands (including the Mortlocks). Within the lagoon, there are 14,620 people residing in Northern Namoneas, 10,233 residing in Southern Namoneas, and 11,305 in Faichuk. Overall, the population is quite young with 21,417 people (44%) under 18 years old.

Survey Methodology

The Chuuk Hybrid Survey aimed to assess the prevalence of selected NCDs, risk factors, and substance use/mental health indicators according to CDC, PIHOA, SAMHSA, and WHO surveillance frameworks.

Objectives

1. Inform the local community of Chuuk and support partners on NCD, risk factor, and substance use/mental health prevalence
2. Use these data to prioritize and tailor prevention programs developed and supported by the Chuuk Department of Health Services
3. Support further research on risk and protective factors of NCDs and substance use/mental health in Chuuk
4. Use these data to monitor progress and trends to reduce morbidity and mortality in Chuuk



Target group

Participants eligible for the Chuuk Hybrid Survey included all Chuukese residents aged 18 and older who were able to comprehend either English or Chuukese language and provide consent.

Data collection

Data collection began on May 10, 2023, and ended on September 30, 2023 in the Northern Namoneas, Southern Namoneas, and Faichuk. Data collection in the Mortlocks took place from May 28, 2024, to June 10, 2024. A total of 1,744 respondents completed the survey and measurements. All interviews and measurements were performed by trained surveyors hired by the Chuuk Department of Health Services.



Sample size determination



The Chuuk TB+Leprosy Free Campaign estimated that they would screen about 10,000 adults. Therefore, it was decided that 3 out of every 10 adults who came in for screening would also receive the Hybrid Survey. This would provide a sample size of about 3,000 adults.

Sampling procedures



Adults from the community were assigned ID numbers using ID cards daily upon entering the TB+Leprosy screening. All ID numbers ending in 3, 6, and 9 were printed on pink cards rather than the standard blue cards. These adults were offered the Hybrid Survey after completing their TB+Leprosy screening if their screening was negative.

Data collection



Surveys were translated and available in Chuukese and English. Data were collected by trained surveyors using face-to-face questionnaires and anthropometric and other physical and biochemical measurements. Quality control of completed questionnaires was ensured at different stages during the questionnaire-processing phase.

Data entry



All data were collected electronically using a tablet. Tablets were uploaded on a daily basis at the Department of Health Services.

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

Data cleaning



Descriptive statistics were produced for all variables. Values that did not match the data codes defined in the data dictionary were verified against the original questionnaire and rectified. Outliers were also checked, validated, and rectified.

Data analysis



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

- **age group** (18-24 years old, 25-34 yo, 35-44 yo, 45-65 yo, 65+ yo)
- **gender** (male, female)
- **education** (less than high school completed, high school completed, more than high school completed)
- **location** (Faichuk, Mortlocks, Northern Namoneas, Southern Namoneas)

Due to the representativeness of these data, large sample size, and ability to analyze locally, these data were not weighted.

Sample Summary

When compared to data from the most recent Chuuk Census (2010), the sample collected was more female, younger, and had a higher proportion of adults from the Northern Namoneas. However, there were likely significant changes to the population since 2010. Therefore, these data were not weighted due to lack of recent population estimates.

	<u>Survey sample</u>	<u>2010 Census data</u> <u>(18 and older)</u>
	n=1,744	n=26,072
<u>Gender</u>		
Male	716 (41.1%)	13,263 (50.9%)
Female	1,028 (58.9%)	12,809 (49.1%)
<u>Age group</u>		
18-24 years	291 (16.7%)	10,611 (9.4%)
25-34 years	383 (22.0%)	6,845 (19.9%)
35-44 years	389 (22.3%)	5,201 (20.6%)
45-54 years	311 (17.8%)	4,251 (20.8%)
55-64 years	238 (13.6%)	2,605 (17.0%)
65+ years	132 (7.6%)	1,442 (12.3%)
<u>Location</u>		
Faichuk	218 (12.5%)	5,521 (21.2%)
Northern Namoneas	958 (54.9%)	8,072 (31.0%)
Southern Namoneas	422 (24.2%)	5,307 (20.4%)
Mortlocks (Census= all Chuuk Outer Islands)	146 (8.4%)	7,172 (27.5%)

Demographics

	N	%
Region		
Faichuk	218	12.5%
Mortlocks	146	8.4%
Northern Namoneas	958	54.9%
Southern Namoneas	422	24.2%
Sex		
Male	716	41.1%
Female	1,028	58.9%
Age		
18-24	291	16.7%
25-34	383	22.0%
35-44	389	22.3%
45-54	311	17.8%
55-64	238	13.6%
65+	132	7.6%
Marital Status*		
Single, never married	463	26.6%
Married	1,143	65.6%
Widowed	86	4.9%
Divorced/Separated	51	2.9%
Education*		
No formal schooling	175	10.0%
Less than 8th grade	409	23.5%
Some high school but did not graduate high school	452	25.9%
High school completed	554	31.8%
Associate's degree completed	110	6.3%
Bachelor's degree completed	31	1.8%
Graduate or professional degree completed	11	0.6%

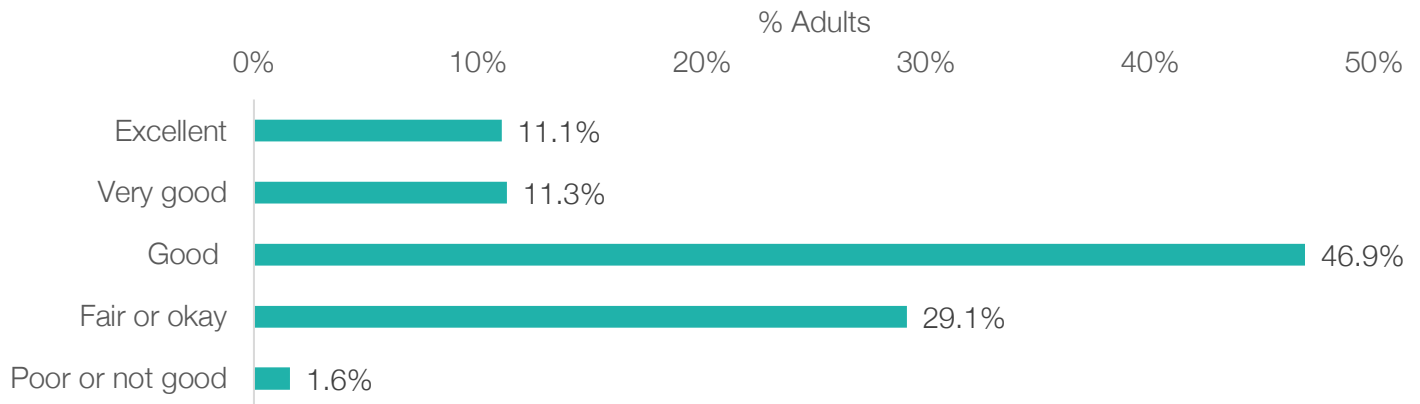
	N	%
Ethnicity		
Chuukese	1,728	99.1%
Non-Chuukese	16	0.9%
Military Status*		
Active Duty	2	0.1%
Reservist	0	0.0%
Veteran	3	0.2%
Retired	3	0.2%
Never served	1,725	99.5%
Religion*		
Congregational Christian Church	1	0.1%
Catholic	908	52.1%
Protestant	771	44.2%
Seventh Day Adventist	6	0.3%
LDS/Mormon	17	1.0%
Pentecostal/AOG	9	0.5%
Muslim	1	0.1%
Jehovah's Witness	4	0.2%
Victory	5	0.3%
Baptist	9	0.5%
Other	10	0.6%
None	2	0.1%
Employment*		
Government employee	252	14.5%
Non-government employee	195	11.2%
Self-employed	9	0.5%
Non-paid (volunteer, subsistence, etc)	4	0.2%
Student	61	3.5%
Homemaker	430	24.7%
Retired	83	4.8%
Unemployed (able to work)	570	32.8%
Unemployed (unable to work)	136	7.8%

	N	%
Drinking water*		
Piped water into dwelling	18	1.0%
Piped water into yard/plot	146	8.4%
Public tap / stand pipe	29	1.7%
Tubewell / borehole	47	2.7%
Protected dug well	6	0.3%
Unprotected dug well	3	0.2%
Protected spring	141	8.1%
Unprotected spring	9	0.5%
Rainwater collection	230	13.2%
Bottled water	602	34.5%
Cart with small tank / drum	462	26.5%
Tanker truck	15	0.9%
Surface water	35	2.0%
Toilet facility*		
Flush / pour toilet to piped sewer system	359	20.7%
Flush / pour toilet to septic tank	1,128	65.0%
Flush / pour toilet to pit latrine	44	2.5%
Flush / pour toilet to elsewhere	6	0.3%
Ventilated improved pit latrine	10	0.6%
Pit latrine with slab	59	3.4%
Pit latrine without slab / open pit	11	0.6%
Bucket	9	0.5%
Hanging toilet / hanging latrine	28	1.6%
No facilities or bush or field	77	4.4%
Other	5	0.3%

**1 missing data on marital status, 11 missing data on military status, 1 missing data on religion, 2 missing data on education, 4 missing data on employment, 1 missing data on drinking water, 8 missing data on toilet facility*

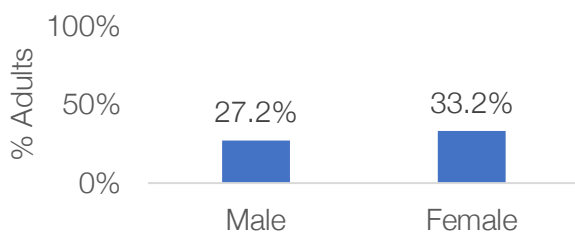
General Health

Self-reported health status among adults in Chuuk, 2023

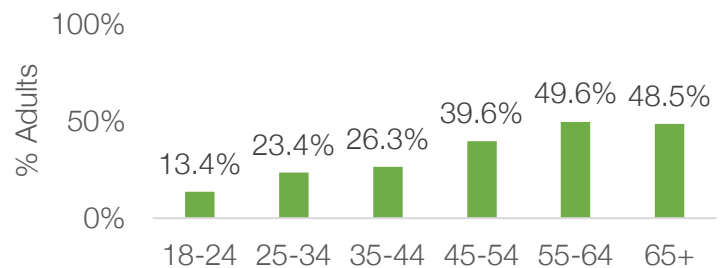


About one in three adults (30.7%; 95% CI: 28.6%-33.0%) in Chuuk self-reported their health as fair or poor. Fair or poor health was significantly higher among women, those 45 years and older, and those living outside the Mortlocks.

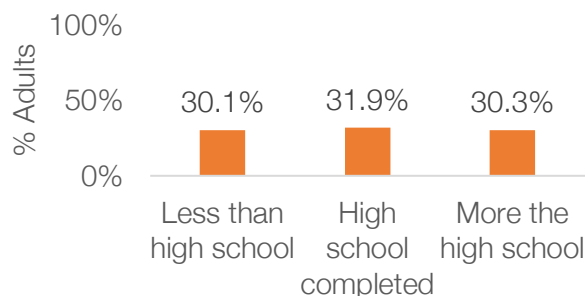
Fair/Poor Health, by Gender



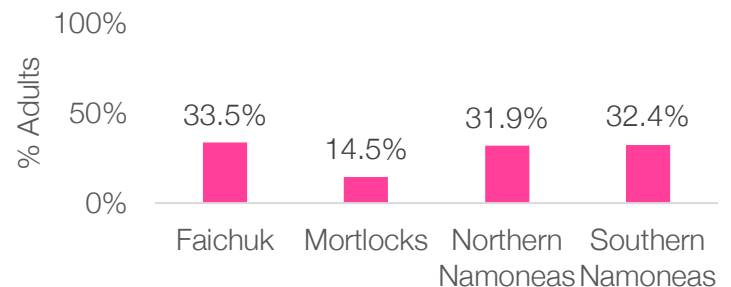
Fair/Poor Health, by Age



Fair/Poor Health, by Education

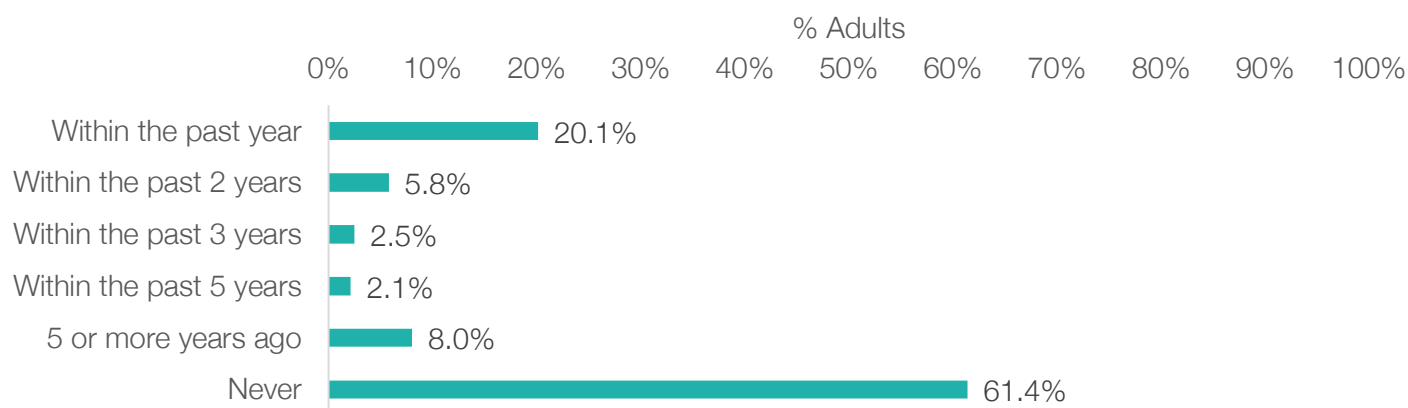


Fair/Poor Health, by Location



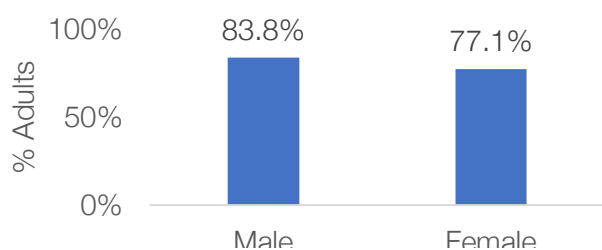
Access to Care: Annual Checkup

Last annual exam among adults in Chuuk, 2023

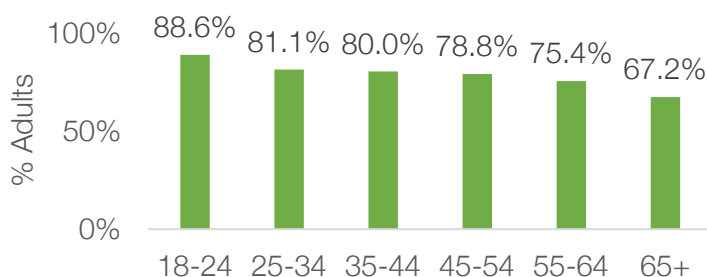


About 1 out of 5 adults (20.1%; 95%CI: 18.3%-22.1%) in Chuuk had an annual exam in the past year. Over half of adults (61.4%) have never had an annual exam. Men, younger adults, those with a high school education or less, and those residing in the Southern Namoneas or Mortlocks were significantly more likely to not have had an annual exam in the past year.

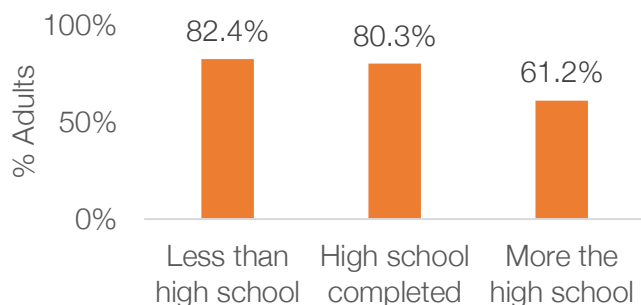
NO annual exam, by Gender



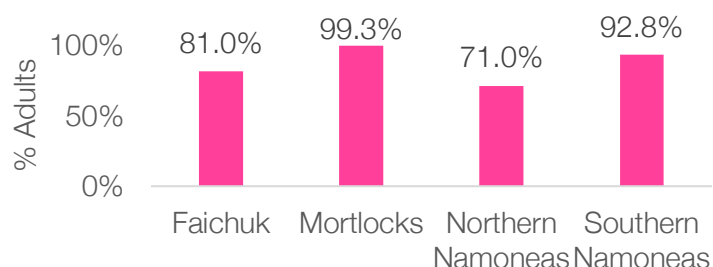
NO annual Exam past year, by Age



NO annual exam, by Education



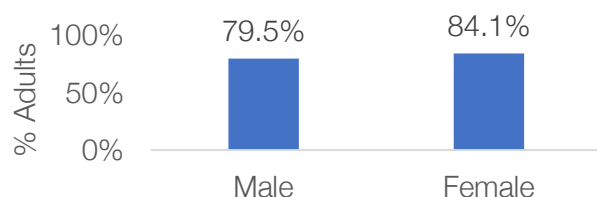
NO annual Exam past year, by Location



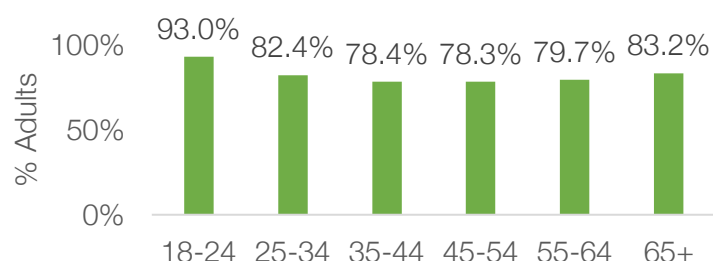
Access to Care: Health Insurance

Fewer than one out of five (17.8%; 95% CI: 16.0%-19.7%) adults in Chuuk reported having health insurance. Being uninsured was significantly higher among women, adults 18-24 years old, those with a high school education or less, and those residing in Faichuk, Southern Namoneas, or the Mortlocks.

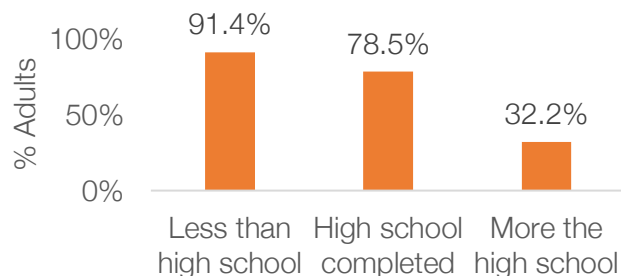
NO health insurance, by Gender



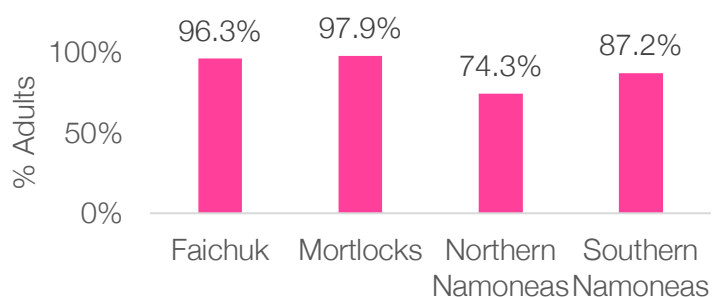
NO health insurance, by Age



NO health insurance, by Education



NO health insurance, by Location

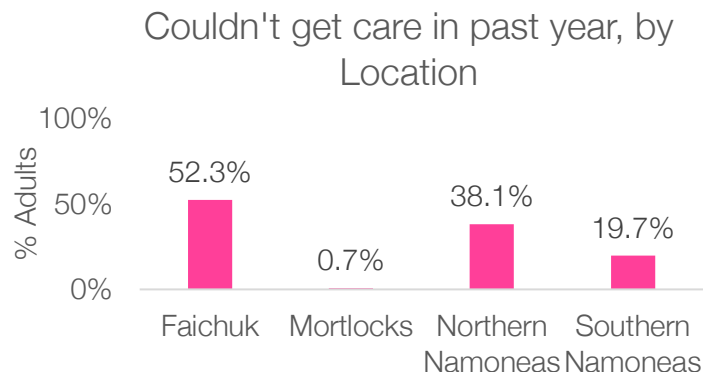
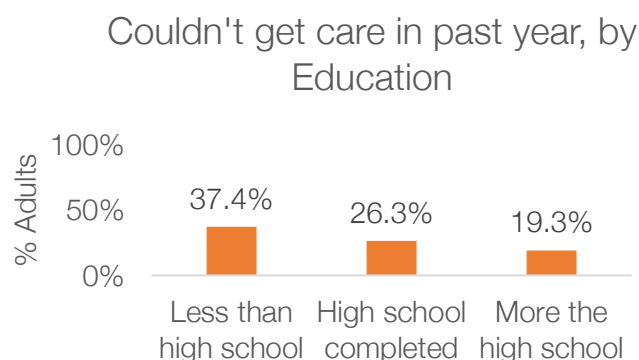
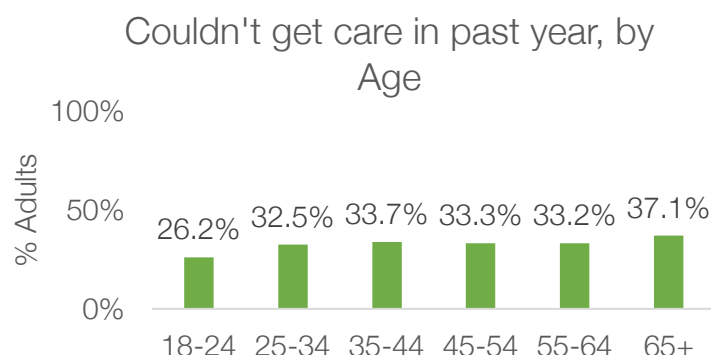
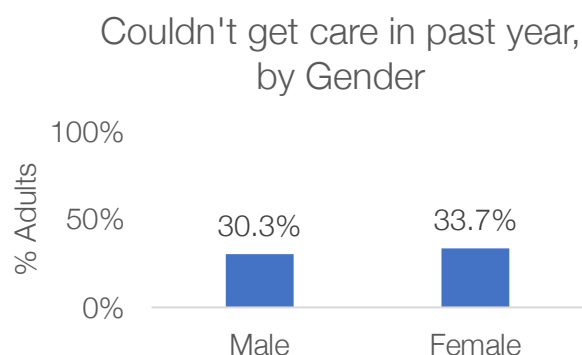


Access to Care: Barriers

In the past 12 months, 32.3% (95%CI: 30.1%-34.6%) of adults were unable to get healthcare when they needed it due to cost, lack of services available on-island, lack of transportation, and/or lack of childcare.

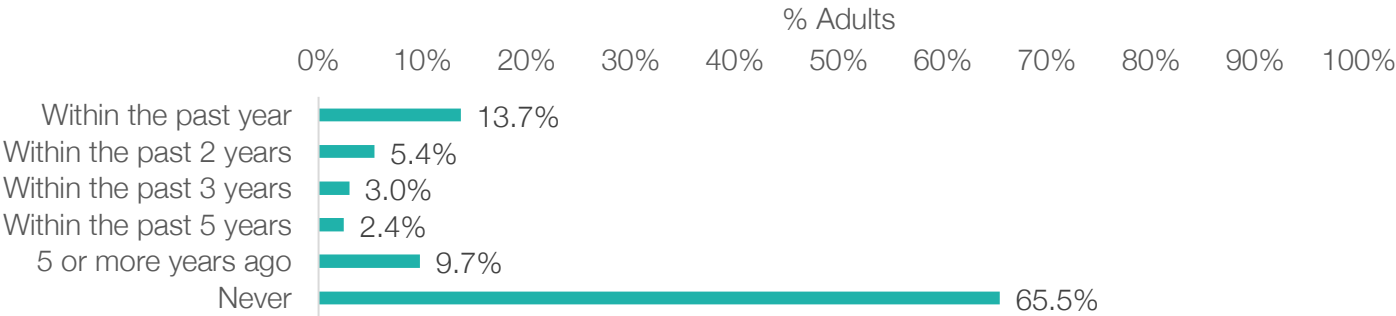
Was there a time in the past 12 months when you needed healthcare but could not get it because:	
of cost	25.6%
the services were not available on-island (ex. no doctor, no supplies / equipment, broken equipment, etc.)?	18.5%
you did not have transportation	26.0%
you did not have childcare	20.4%

Challenges with getting healthcare were significantly higher among those adults with less than a high school education and those residing in Faichuk.



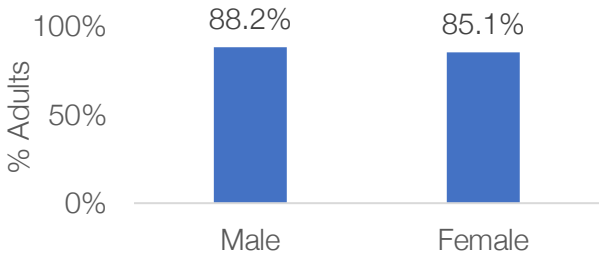
Oral Health

Last dental visit among adults in Chuuk, 2023

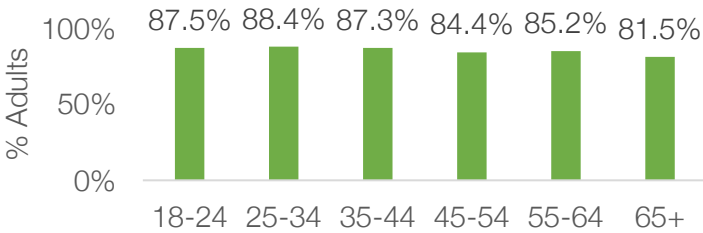


Fewer than one out of five (13.7%; 95% CI: 12.1%-15.4%) adults in Chuuk reported having a dental visit in the past year. Additionally, 65.5% of adults reported that they had never had a dental visit. NOT having a dental exam in the past year was significantly higher among those with a high school education or less and those who reside in Faichuk, Southern Namoneas, or the Mortlocks.

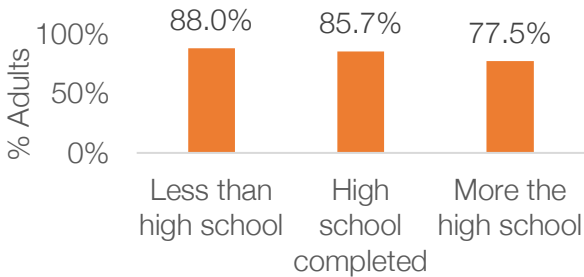
NO dental visit in past year, by Gender



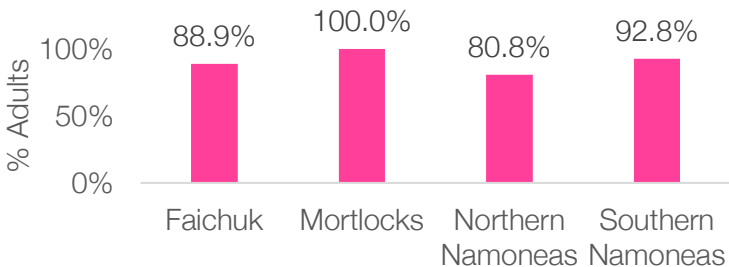
NO dental visit in past year, by Age



NO dental visit in past year, by Education

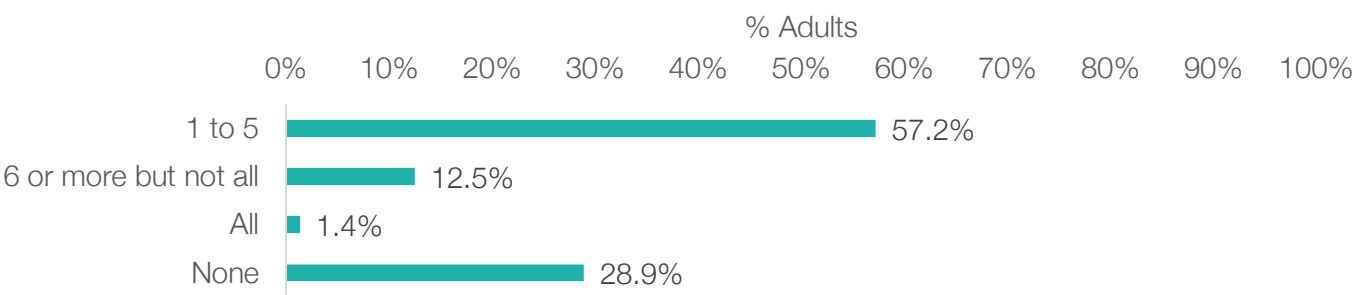


NO dental visit in past year, by Location



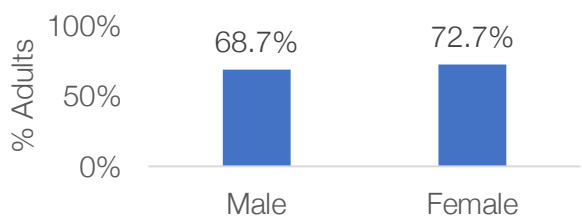
Oral Health

Number of self-reported missing teeth among adults in Chuuk, 2023

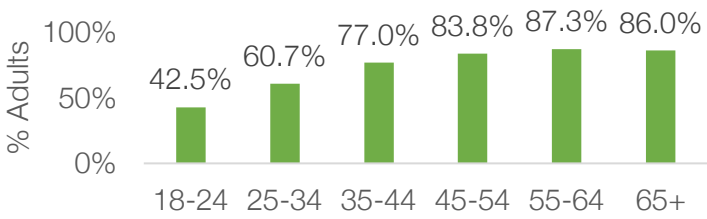


Almost three-quarters (71.1%; 95% CI: 68.9%-73.2%) of adults in Chuuk self-reported that they have at least one missing tooth due to tooth decay or gum disease. Having at least one missing tooth is significantly higher among those 35 years and older and those residing outside the Mortlocks.

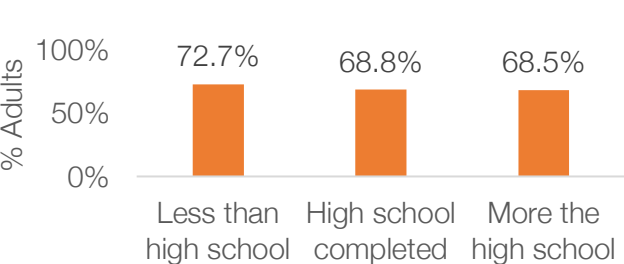
Any missing teeth, by Gender



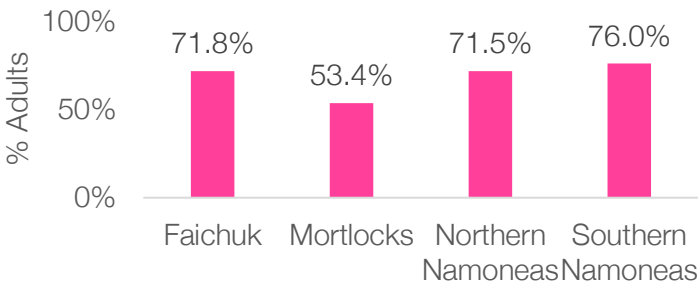
Any missing teeth, by Age



Any missing teeth, by Education



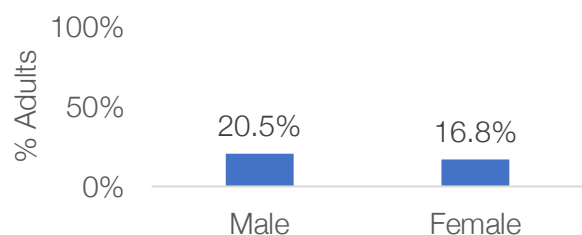
Any missing teeth, by Location



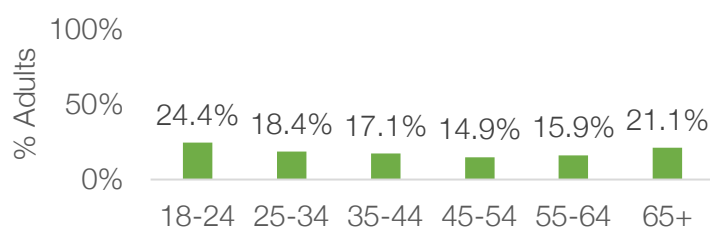
Flu Shot

About four out of five (81.6%; 95%CI: 79.7%-83.4%) adults in Chuuk reported having a flu shot in the past 12 months. Not having a flu shot was significantly higher among those residing in the Northern Namoneas.

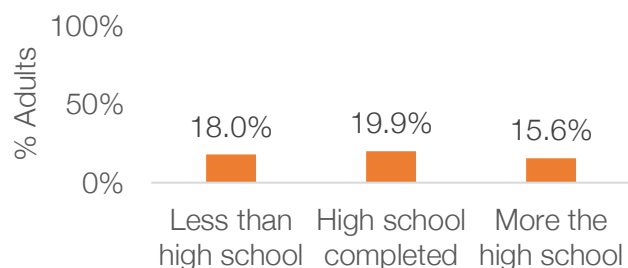
NO flu shot, by Gender



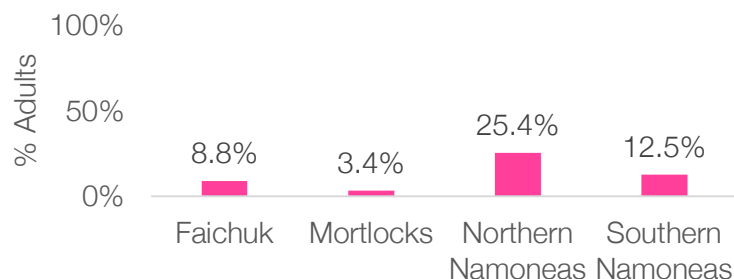
NO flu shot, by Age



NO flu shot, by Education

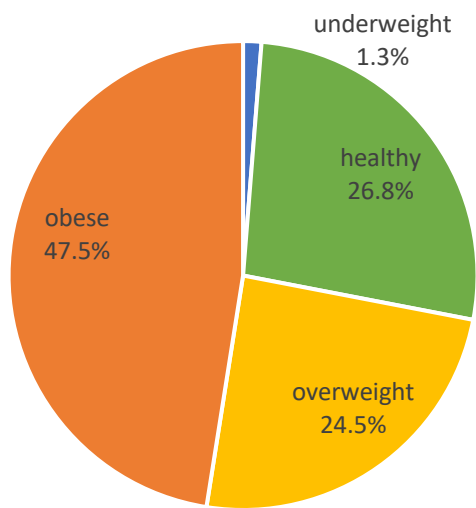


NO flu shot, by Location



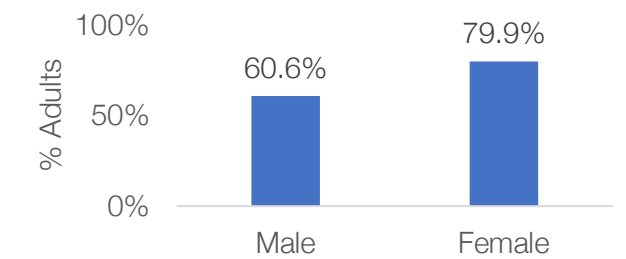
Overweight / Obesity

BMI categories among adults in Chuuk, 2023

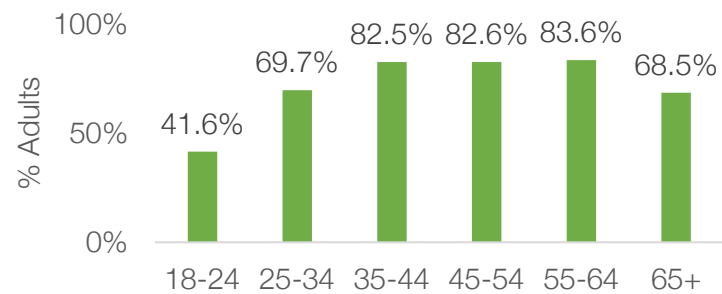


Body Mass Index (BMI) is calculated based on height and weight measurements. About three out of four (72.0%; 95% CI: 69.8%-74.1%) adults in Chuuk were overweight or obese. Overweight/obesity prevalence was significantly higher among women, those 35-64 years old, those with higher levels of education, and those residing in the Mortlocks, Northern Namoneas, and Southern Namoneas.

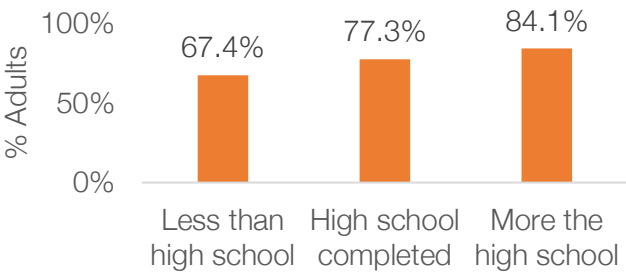
Overweight/obesity, by Gender



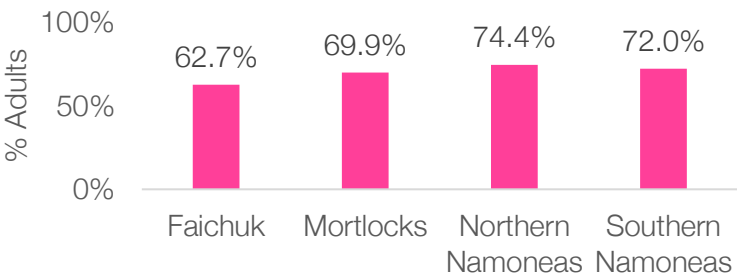
Overweight/obesity, by Age



Overweight/obesity, by Education



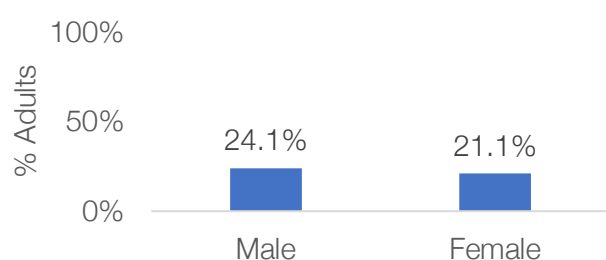
Overweight/obesity, by Location



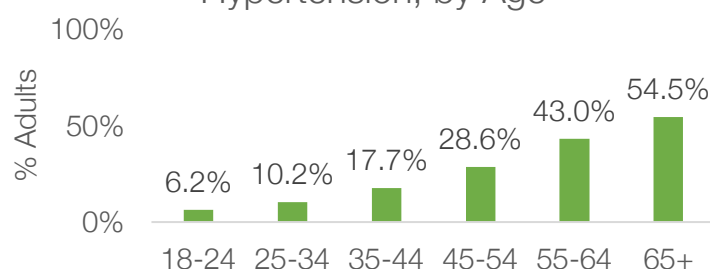
Hypertension

Almost one-quarter of adults (22.3%; 95% CI: 20.3%-24.4%) in Chuuk had high blood pressure ($\geq 140/90$) during screening or self-reported having hypertension for which they took medication. Hypertension prevalence significantly increased with age.

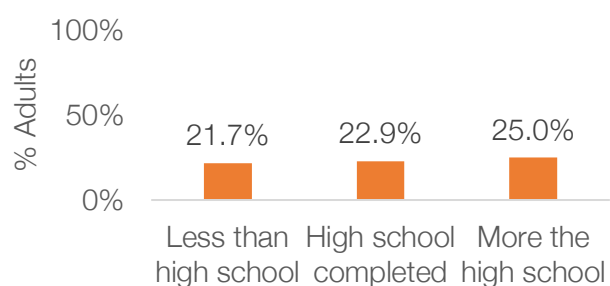
Hypertension, by Gender



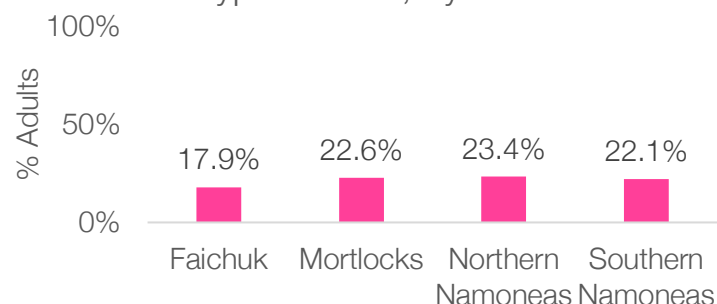
Hypertension, by Age



Hypertension, by Education

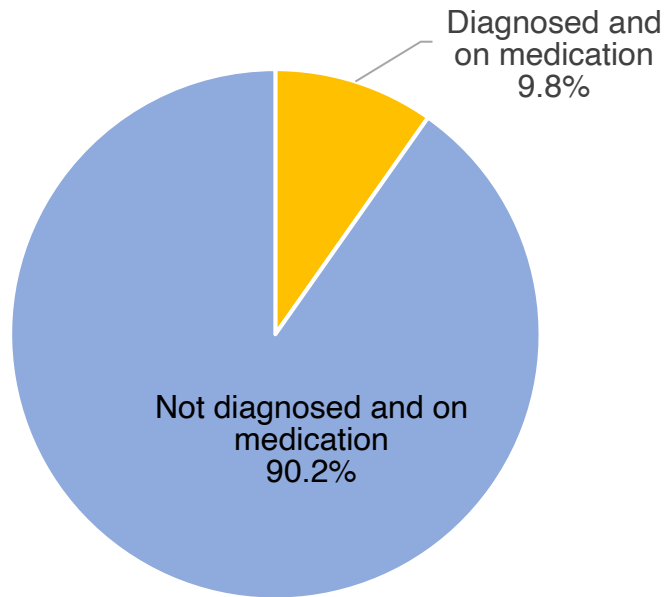


Hypertension, by Location



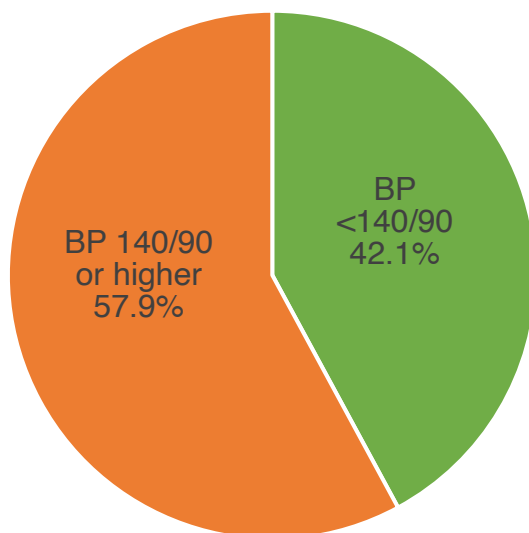
Hypertension Diagnosis & Control

Diagnosis and medication status among hypertensives



Among the adults in Chuuk classified as having hypertension, 9.8% of hypertensives reported that they were diagnosed and were taking medication for their hypertension. Most (90.2%) of adults with hypertension in Chuuk did not report that they were diagnosed and were taking medication.

Blood pressure levels among those hypertensives who are diagnosed and on medication

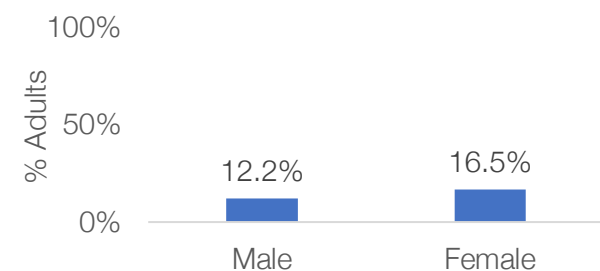


Among those adults who reported that they were diagnosed and taking medication for their hypertension, 57.9% had an uncontrolled blood pressure measurement (average blood pressure [of 3 measurements] during survey was $\geq 140/90$). This indicates that these individuals with hypertension who are on medication are not controlled.

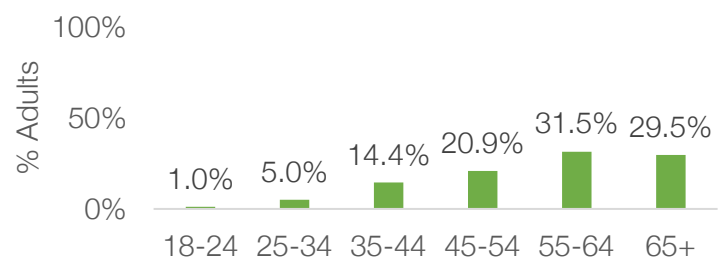
Diabetes

14.7% (95% CI: 13.1%-16.5%) of adults in Chuuk were estimated to have diabetes (diabetes prevalence is estimated based on either a self-report of having diabetes for which the patient is taking medication and/or an A1c measurement of 6.5% or higher). Diabetes prevalence was significantly higher among women and increases significantly with age, peaking at 31.5% among 55-64 year olds.

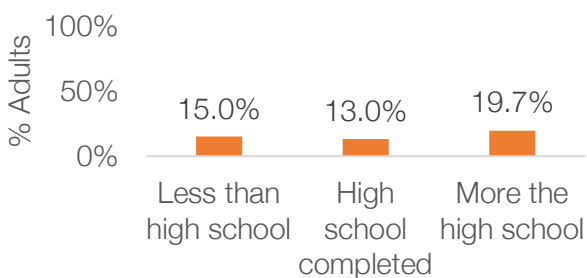
Diabetes, by Gender



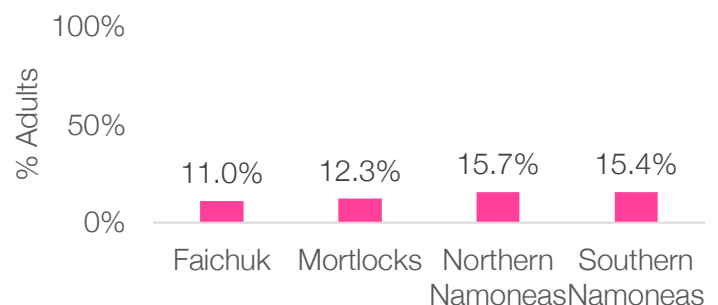
Diabetes, by Age



Diabetes, by Education

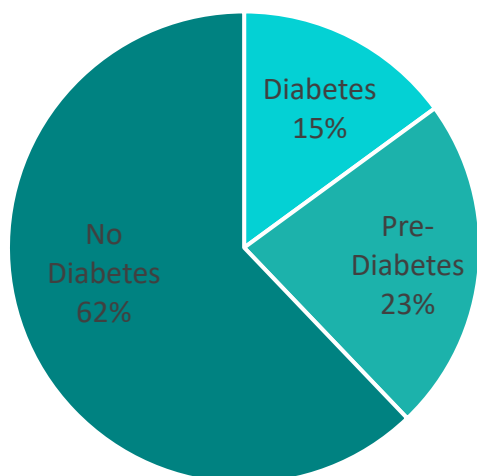


Diabetes, by Location



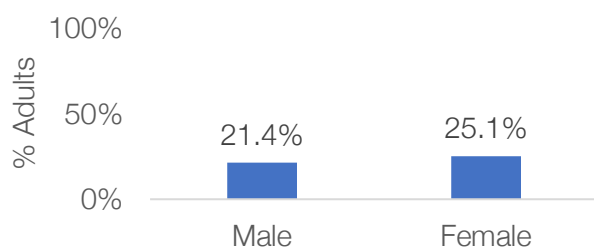
Pre-diabetes

Adult Diabetes in Chuuk, 2023

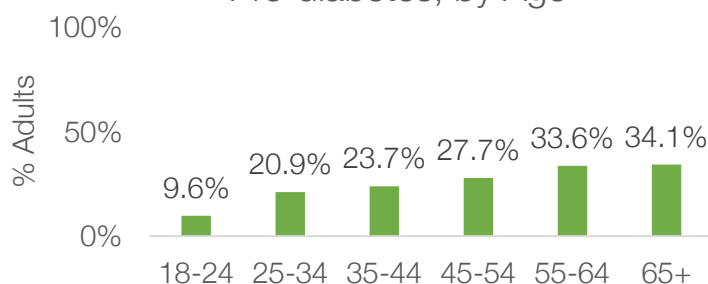


23.6% (95% CI: 21.6%-25.6%) of adults in Chuuk were estimated to have pre-diabetes (pre-diabetes prevalence is estimated based on either a self-report of pre-diabetes and/or an A1c measurement of 5.7%-6.4%). Pre-diabetes prevalence increases significantly with age.

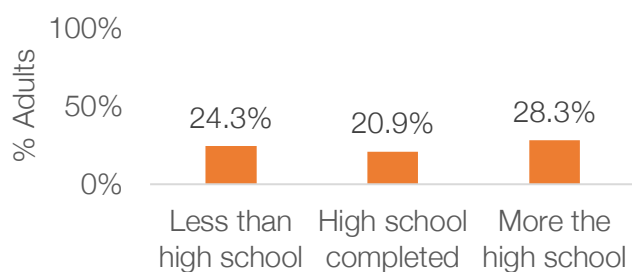
Pre-diabetes, by Gender



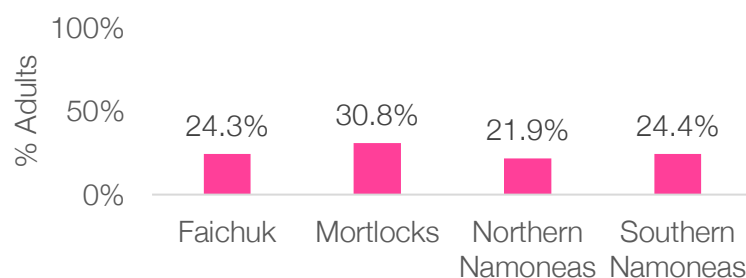
Pre-diabetes, by Age



Pre-diabetes, by Education

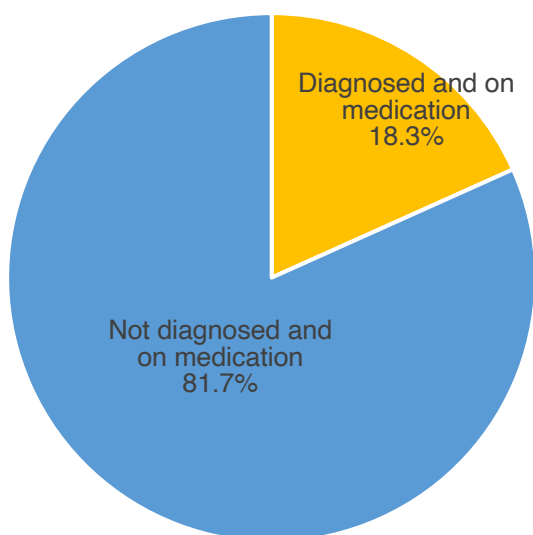


Pre-diabetes, by Location



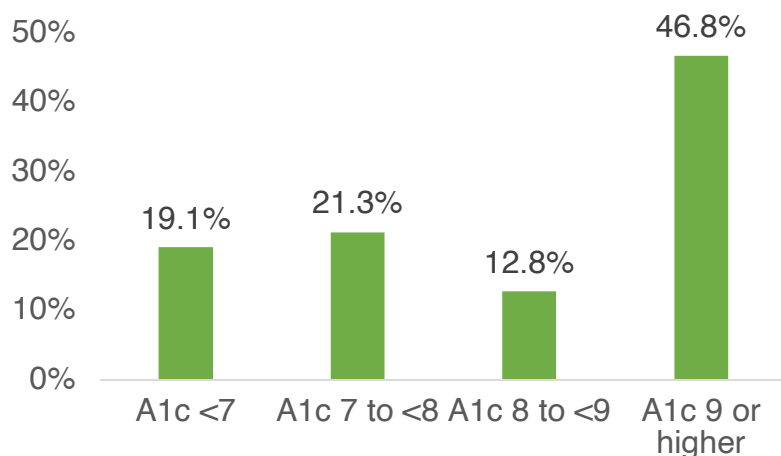
Diabetes Diagnosis & Control

Diagnosis and medication status among diabetics



Among the adults in Chuuk classified as having diabetes, 18.3% of adults reported that they were diagnosed and taking medication for their diabetes. The majority (81.7%) of adults with diabetes in Chuuk were not diagnosed and receiving treatment.

A1c levels among those diabetics who are diagnosed and on medication



Among the adults in Chuuk classified as having diabetes who have been diagnosed and are on medication, fewer than one out of five (19.1%) are reaching the American Diabetes Association (ADA) A1c goal for diabetics of having an A1c <7%.

Diabetes Management

Among adults in Chuuk who self-reported that they have diabetes, about half (49.0%) reported that they are currently on medication prescribed by a doctor or insulin. About three out of five (59.1%) of adults with self-reported diabetes reported seeing a doctor in the past year for their diabetes and about one-third (34.4%) reported having their A1c checked by a health professional in the past 12 months. About one in five (21.9%) adults in Chuuk who self-reported having diabetes indicated that they have ever taken a class on how to manage their own diabetes.

Among those who self-reported being diagnosed with diabetes:	
Reported current use of insulin	32.3%
Reported current use of medicine prescribed by a doctor	42.7%
Reported current use of insulin and/or medicine prescribed by a doctor	49.0%
Reported current use of herbal or traditional medicine for diabetes	12.5%
Reported seeing a doctor in the past 12 months for their diabetes	59.1%
Reported having A1c checked by a health professional in the past 12 months	34.4%
Reported having a foot check by a health professional in the past 12 months	17.0%
Reported having an eye exam in the past 12 months	18.5%
Reported ever having taken a class on how to manage their own diabetes	21.9%

Self-reported chronic disease

Adults in Chuuk were asked if they have certain chronic conditions. The self-reported prevalences of these conditions are listed in the table below.

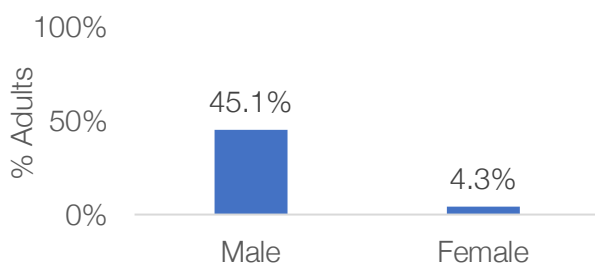
Have you ever been told that you have...	% (95% CI)
Coronary Heart Disease	5.8% (4.8%-7.1%)
Angina	7.2% (6.0%-8.5%)
Heart Attack	2.3% (1.6%-3.1%)
Other Heart Condition	2.7% (2.0%-3.6%)
Stroke	3.2% (2.4%-4.1%)
Emphysema	0.9% (0.5%-1.5%)
Chronic Obstructive Pulmonary Disease (COPD)	1.0% (0.6%-1.6%)
Asthma	7.6% (6.4%-8.9%)
Ulcer	0.3% (0.1%-0.8%)
Gout	0.3% (0.1%-0.7%)
Arthritis	3.5% (2.7%-4.5%)
Cancer	0.2% (0.04%-0.5%)
Tuberculosis (TB)	4.2% (3.3%-5.3%)
Hansen's Disease	0.7% (0.3%-1.1%)

Cigarette Smoking

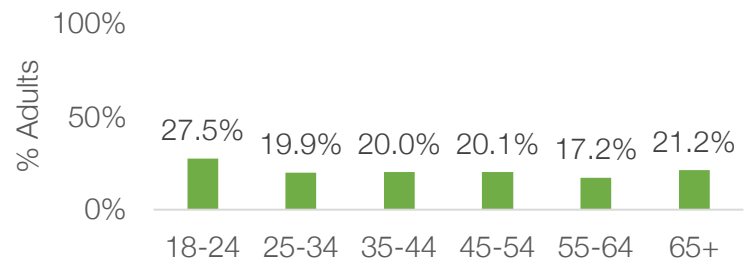
Almost one out of five (21.0%; 95% CI: 19.1%-23.0%) adults in Chuuk reported cigarette smoking in the last 30 days (current smoking). Among current smokers, 56.3% reported smoking every day in the past 30 days. Among current every-day smokers, the average age of smoking initiation was 20 years old, and the average number of cigarettes smoked per day is 15. Cigarette smoking was significantly higher among men, those with lower education levels, and those residing in Faichuk.

Current smoking prevalence (smoked in past 30 days)	21.0%
% of current smokers who smoke every day	56.3%
Average age of initiation among current every-day smokers	20
Average number of cigarettes smoked per day among current every-day smokers	15
% of current smokers who want to quit smoking	64.3%
% of current smoker who have tried to quit smoking in past 12 months	51.4%

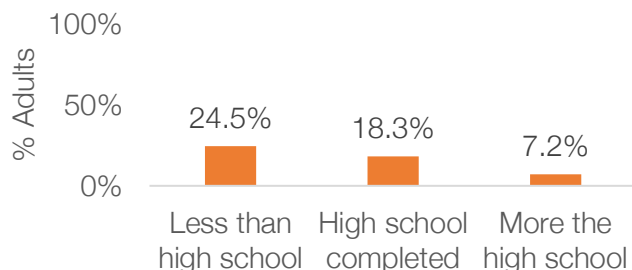
Current Smoking, by Gender



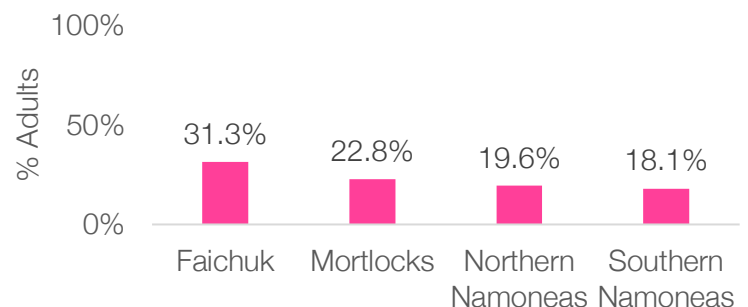
Current Smoking, by Age



Current Smoking, by Education



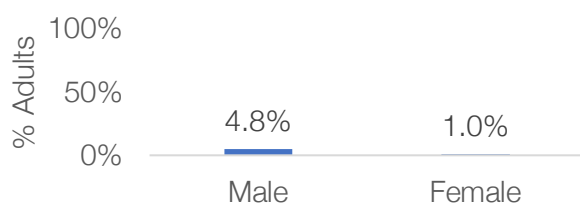
Smoking Status, by Location



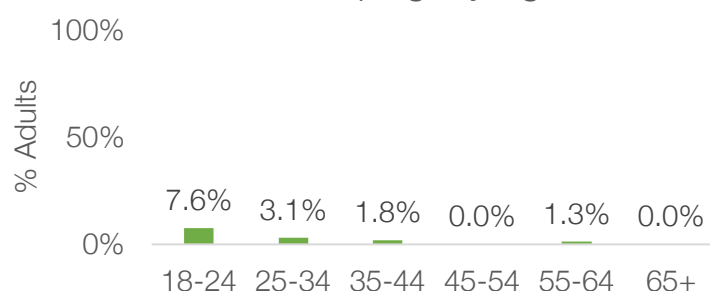
Vaping

The prevalence of current vaping (vaping in the past 30 days) among adults in Chuuk was 2.5% (95% CI: 1.8%-3.4%). Current vaping was significantly higher among men, younger adults, and those residing in the Northern Namoneas.

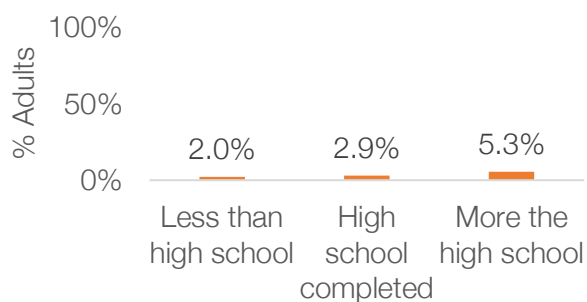
Current Vaping, by Gender



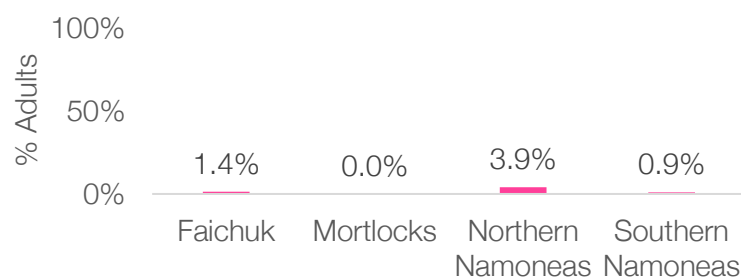
Current Vaping, by Age



Current Vaping, by Education



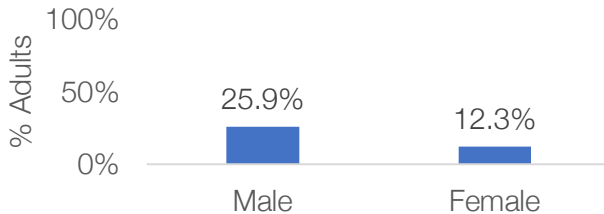
Current Vaping, by Location



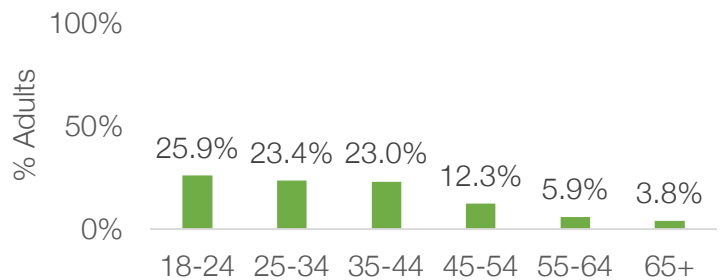
Smokeless Tobacco Use

About one out of five adults in Chuuk (17.9%; 95%CI: 16.1%-19.8%) reported current smokeless tobacco use (use in the past 30 days). Smokeless tobacco use was significantly higher among men, adults <45 years old, and those residing in Faichuk and the Northern Namoneas.

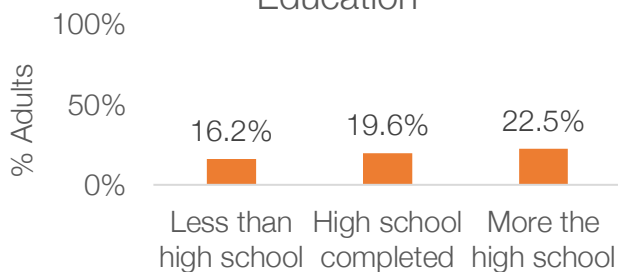
Smokeless tobacco, by Gender



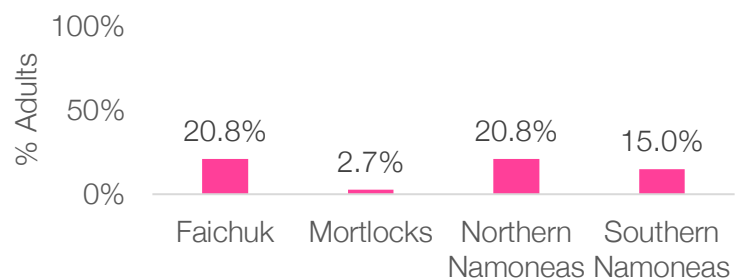
Smokeless tobacco, by Age



Smokeless tobacco, by Education



Smokeless tobacco, by Location



Betel Nut Chewing

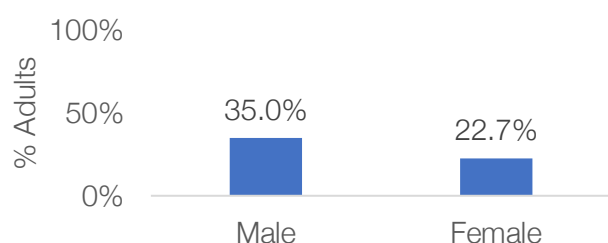
Almost one in three (27.7%; 95% CI: 25.6%-29.9%) adults in Chuuk reported current betel nut chewing (chewing betel nut in the past 30 days). Among current chewers 62.3% reported chewing every day in the past 30 days. Among current every-day chewers, 100.0% add tobacco to their betel nut chew and the average age of chewing initiation was 21 years old. Among every-day chewers who add cigarettes sticks to their chew, the average number of cigarettes sticks chewed per day is 2.

Current betel nut chewing prevalence (chewed in past 30 days)	27.7%
% of current betel nut chewers who chew every day	62.3%
% of current betel nut chewers who add tobacco to their chew	100.0%
Average age of initiation among current every-day chewers	21
# sticks of cigarettes chewed per day among every-day chewers who add cigarettes to their chew	2
% of current betel nut + tobacco users who want to quit	59.2%
% of current betel nut + tobacco users who have tried to quit in past 12 months	52.3%

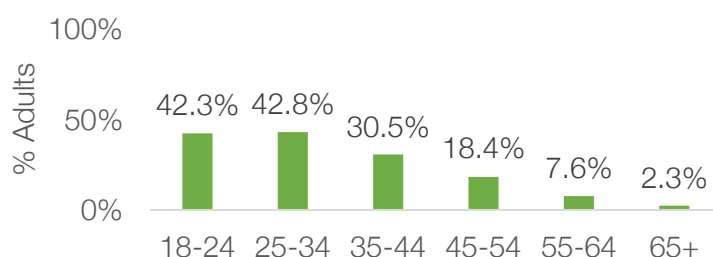
Betel Nut Chewing

Betel nut chewing prevalence in Chuuk was significantly higher among men, younger adults, those with more than a high school education, and those residing in the Northern Namoneas.

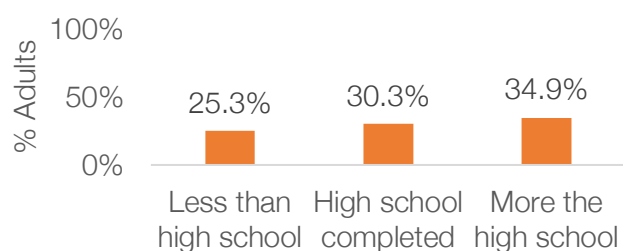
Betel Nut Chewing, by Gender



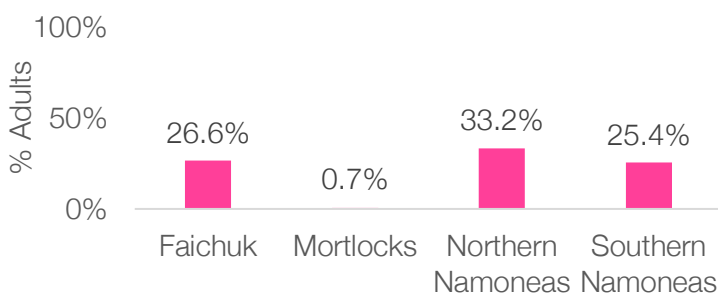
Betel Nut Chewing, by Age



Betel Nut Chewing, by Education

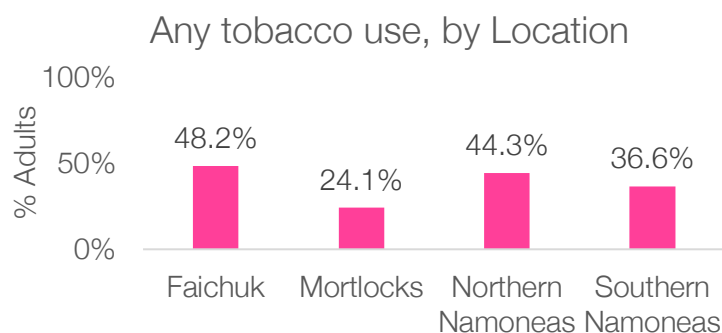
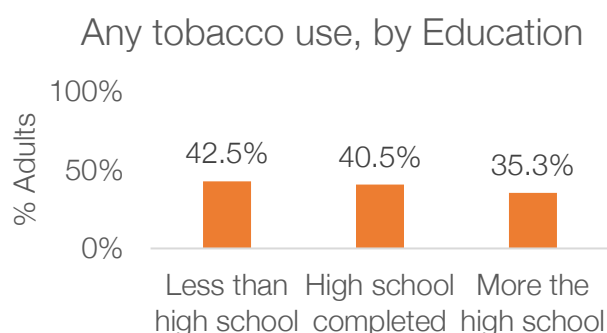
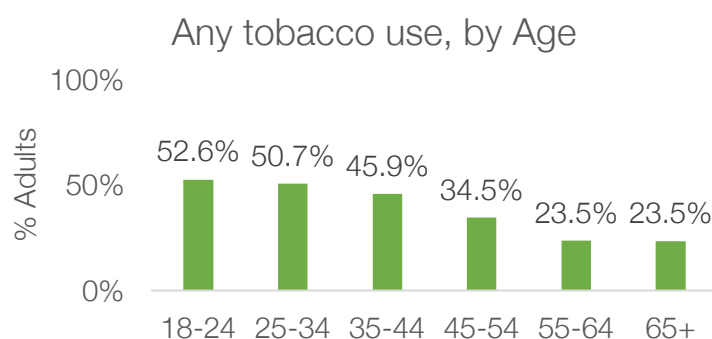
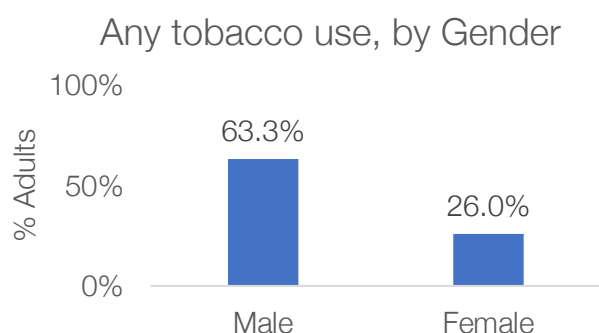


Betel Nut Chewing, by Location



Any Tobacco Use

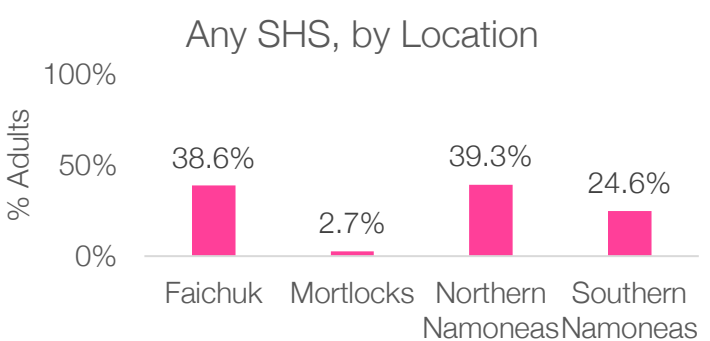
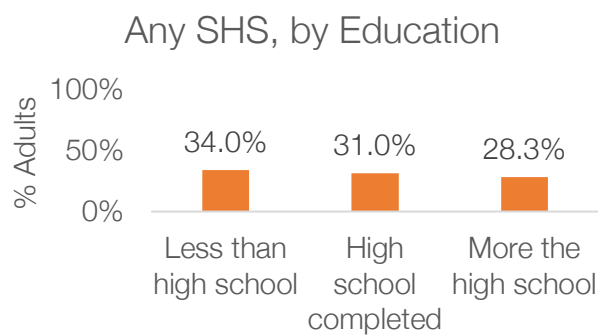
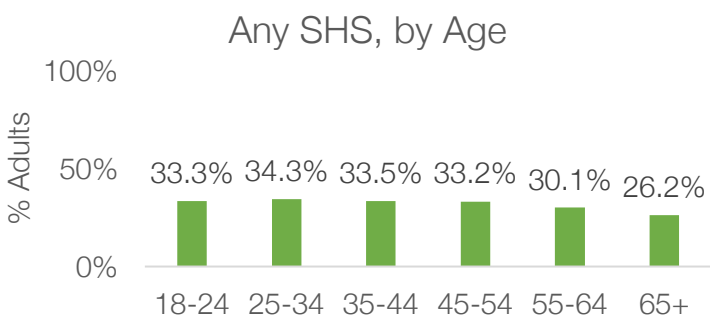
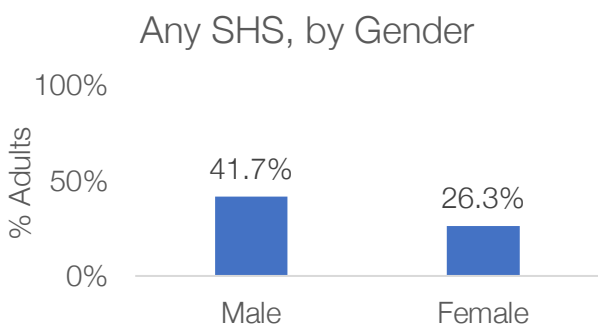
Any tobacco use is defined as smoking cigarettes, chewing smokeless tobacco, chewing betel nut with tobacco, or using another form of tobacco in the past 30 days. Among all adults in Chuuk, 41.3% (95%CI: 38.9%-43.6%) reported using any type of tobacco. Any tobacco use was significantly higher among men, adults <45 years old, and those residing in the Northern Namoneas and Faichuk.



Second-hand Smoke

32.6% (95%CI: 30.4%-34.8%) of adults in Chuuk reported being exposed to second-hand smoke at home, in closed areas at work, or in a vehicle in the past 30 days. Exposure to second-hand smoke was significantly higher among men, those with less than a high school education, and those who reside in the Northern Namoneas and Faichuk.

Exposed to second-hand smoke in the home in the past 30 days	27.7%
Exposed to second-hand smoke in closed areas at work in the past 30 days	8.5%
Exposed to second-hand smoke in a vehicle in the past 30 days	16.6%



Alcohol Use and Binge Drinking

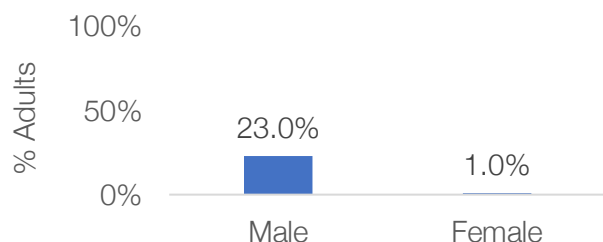
12.4% (95% CI: 8.5%-14.1%) adults in Chuuk reported using alcohol in the last 30 days (current alcohol use). About one in ten (9.9%; 95% CI: 8.5%-11.4%) adults in Chuuk reported binge drinking in the past 30 days (current binge drinking). Therefore, 78.8% of current alcohol users binge drank in the past 30 days. The average age of first drink among current alcohol users is 18 years old. The average number of drinks per day consumed among current alcohol users is 5. The average number of days current alcohol users consumed alcohol in the past 30 days is 7. About one-third (34.4%) of current alcohol users reported driving a vehicle after consuming alcohol in the past 30 days. 1 out of 10 adults (10.0%) in Chuuk reported being a passenger in a vehicle in the past 30 days with someone other than themselves who has consumed alcohol. The most commonly reported types of alcohol being consumed among current alcohol users in Chuuk were hard liquor or spirits (60.6%) and beer (35.2%).

Current alcohol use prevalence (alcohol use in past 30 days)	12.4%
Current binge drinking (drinking 5+ standard drinks [men] / 4+ standard drinks [women] on one occasion) in the past 30 days	9.9%
Average age of first drink among current alcohol users	18
Average number of drinks per day consumed among current alcohol users	5
Average number of days current alcohol users consumed alcohol in the past 30 days	7
Drove a vehicle after they've consumed alcohol in the past 30 days (among current alcohol users)	34.4%
Been a passenger in a vehicle in the past 30 days with a driver other than themselves who has consumed alcohol	10.0%

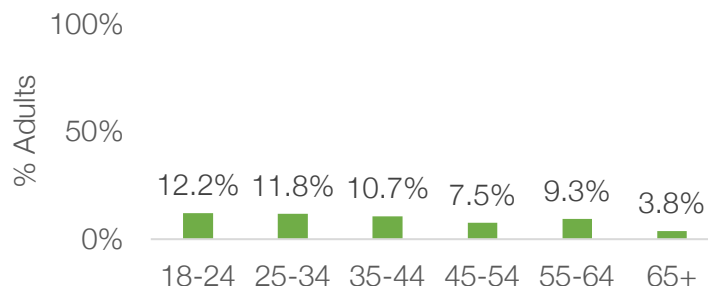
Alcohol Use and Binge Drinking

Binge drinking is defined as drinking 5 or more standard drinks during one drinking occasion among men and drinking 4 or more standard drinks during one drinking occasion among women. Binge drinking in the past 30 days prevalence in Chuuk was 9.9% (95% CI: 8.5%-11.4%) and was significantly higher among men and those who reside in the Northern Namoneas and Faichuk.

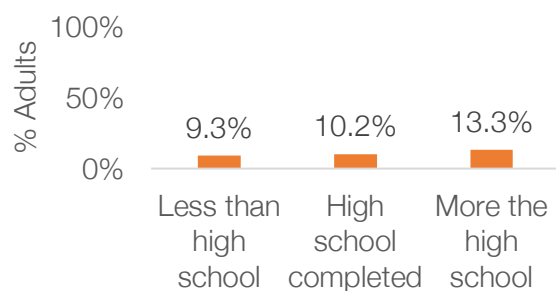
Binge Drinking, by Gender



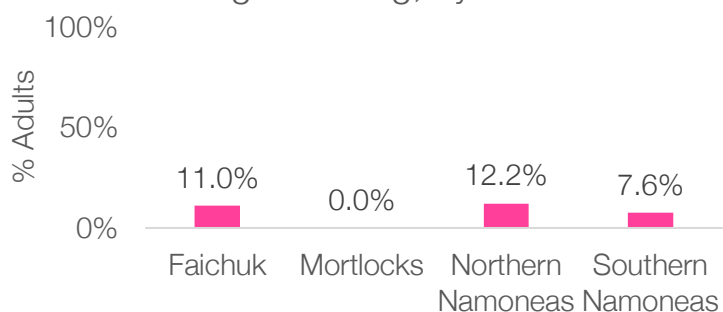
Binge Drinking, by Age



Binge Drinking, by Education



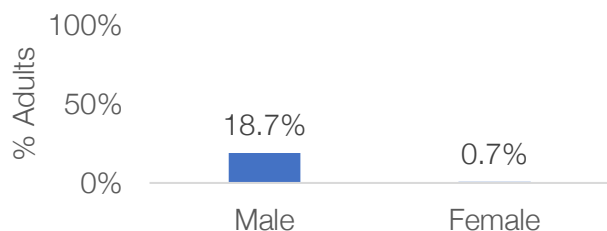
Binge Drinking, by Location



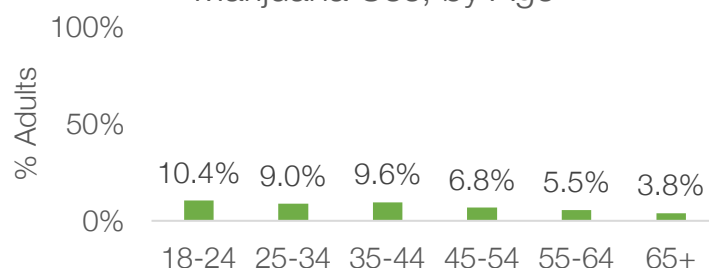
Marijuana Use

Almost one out of ten (8.1%; 95% CI: 6.8%-9.5%) adults in Chuuk reported current marijuana use (marijuana use in the past 30 days). Among current marijuana users, 25.0% reported using marijuana every day. Marijuana use was significantly higher among men and those residing in Faichuk.

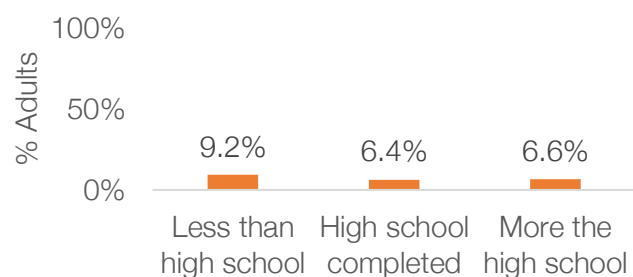
Marijuana Use, by Gender



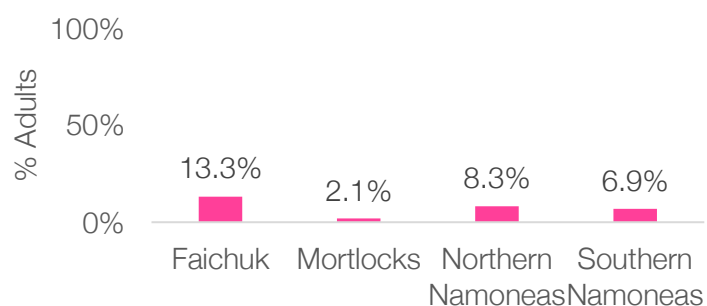
Marijuana Use, by Age



Marijuana Use, by Education



Marijuana Use, by Location



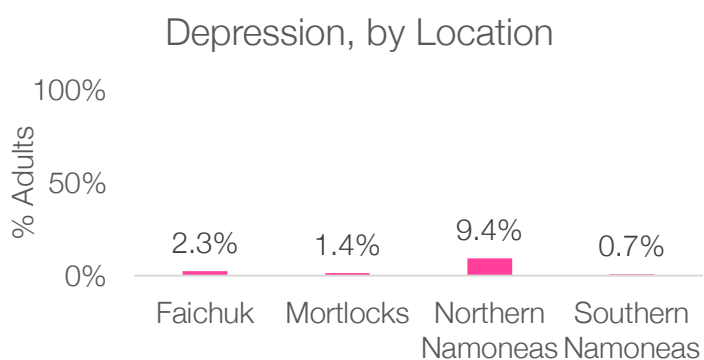
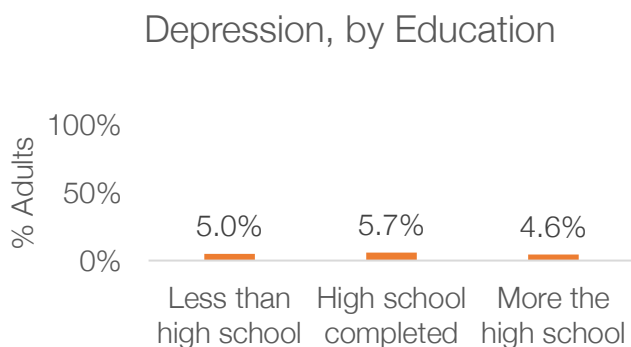
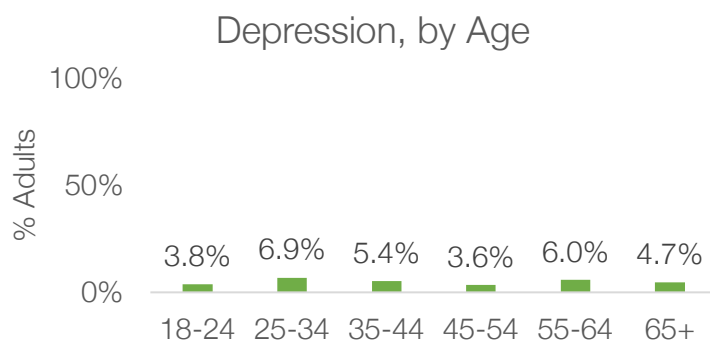
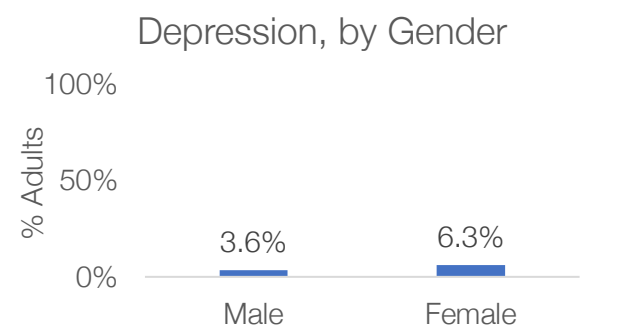
Other Substance Use

Adults in Chuuk reported the use of inhalants (0.5%; 95% CI: 0.2%-1.0%) and prescription drugs (0.7%; 95% CI: 0.4%-1.2%).

Current use (in past 30 days) of inhalants or sniffed/huffed substances such as glue, gasoline, paint thinner, markers, butane, propane	0.5%
Current use (in past 30 days) of prescription drugs such as tramadol, demerol, oxycodone, codeine, or morphine without doctor's orders	0.7%

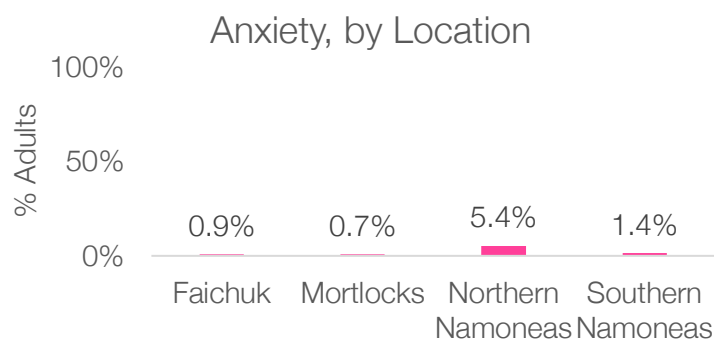
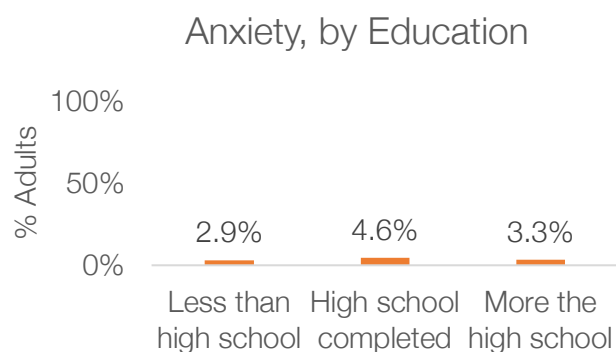
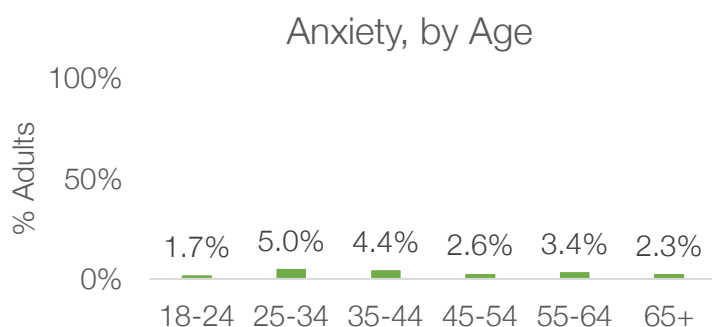
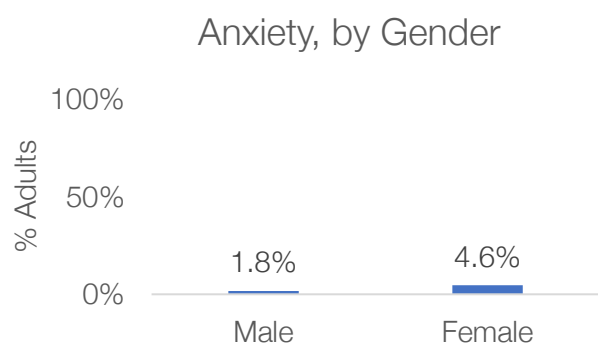
Mental Health: Depression

Participants were asked questions regarding their mental health status. 5.2% (95% CI: 4.2%-6.3%) of adults reported signs of depression. Depression was screened using the PHQ-2. Having depression signs was significantly higher among women and those residing in the Northern Namoneas.



Mental Health: Anxiety

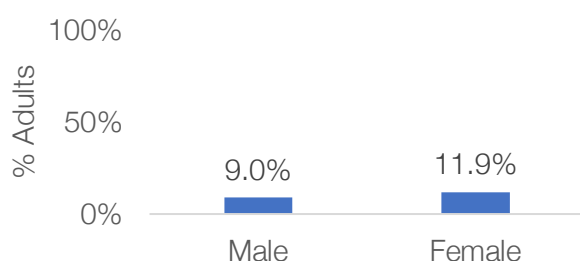
3.5% (95%CI: 2.7%-4.4%) of adults in Chuuk reported signs of anxiety. Anxiety was screened using the GAD-12. Anxiety prevalence was significantly higher among women and those residing in the Northern Namoneas.



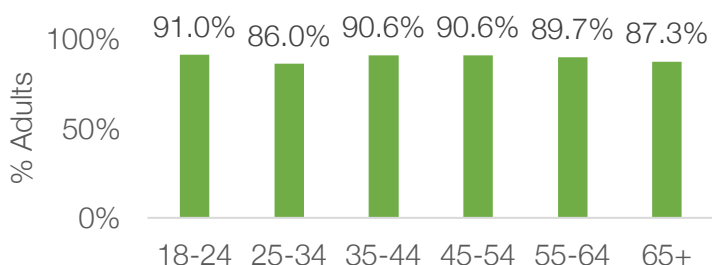
Fruit and Vegetable Consumption

About 9 out of 10 adults in Chuuk (89.3%; 95%CI: 87.7%-89.3%) reported that they consumed less than the recommended daily servings of fruits and vegetables (at least 5 per day). Low fruit and vegetable consumption (<5 servings per day) was significantly higher among those with a high school education or less, and those residing in the Southern Namoneas.

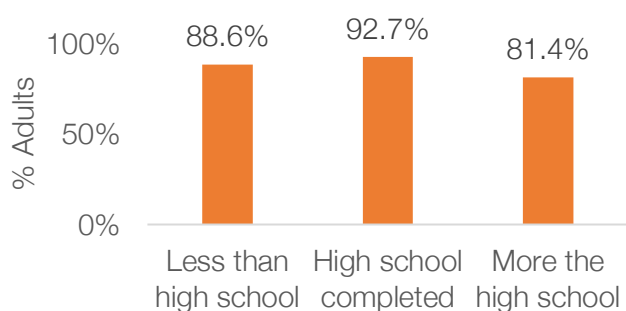
<5 servings FV, by Gender



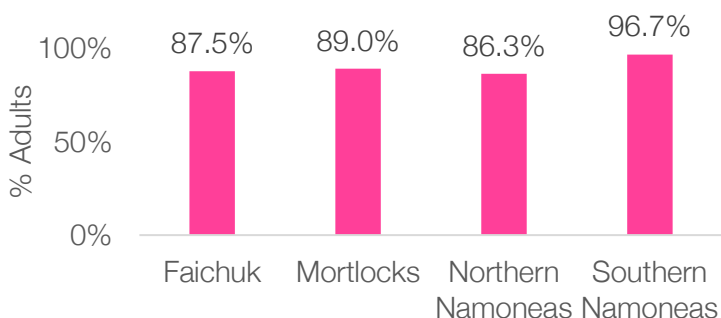
<5 servings FV, by Age



<5 servings FV, by Education

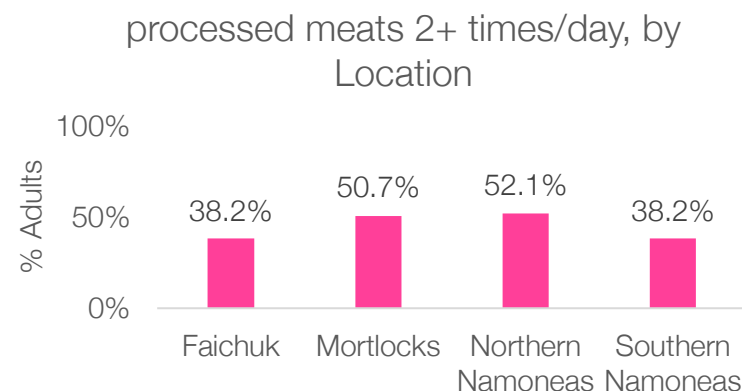
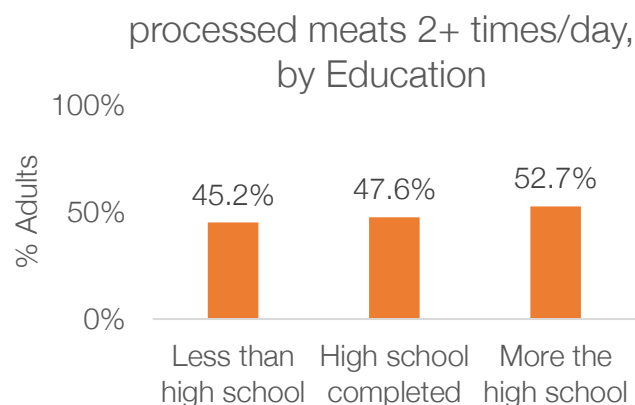
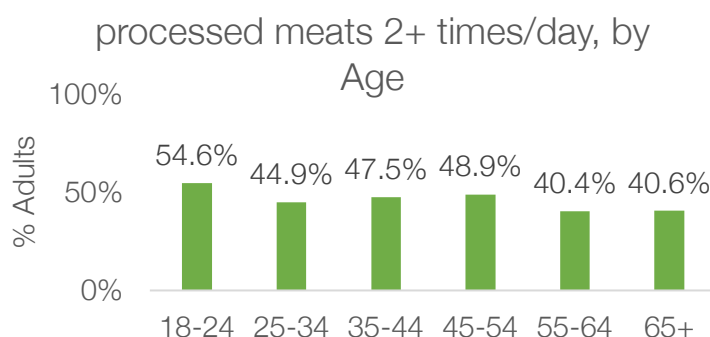
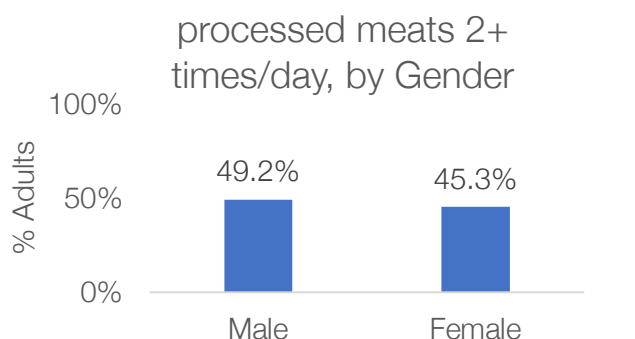
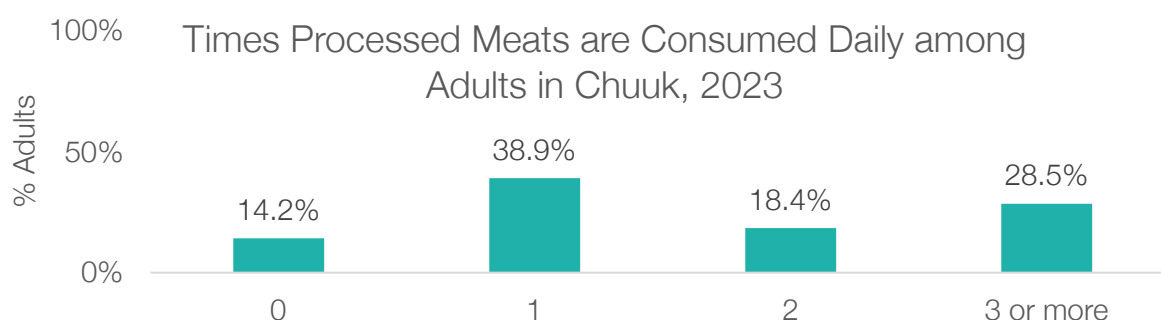


<5 servings FV, by Location



Processed Meat Consumption

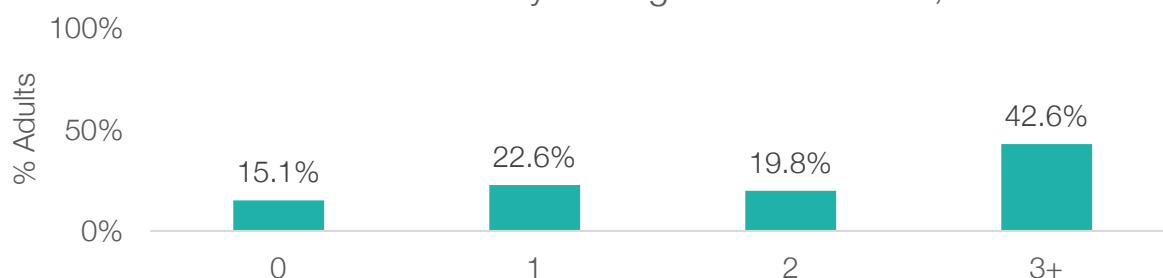
More than eight out of ten adults (85.8%) reported that they consumed processed meats at least once per day. Heavy consumption of processed meats (2+ times per day) was significantly more prevalent among those residing in the Northern Namoneas and 18 – 24 year olds.



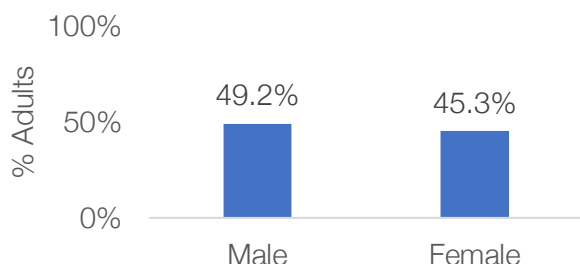
Sugar-Sweetened Beverages

Almost nine out of ten (84.9%) of adults in Chuuk reported that they consumed at least one sugar-sweetened beverage (SSB) each day. Heavy consumption of SSBs (3+ per day) was significantly higher among those aged 18 – 24 years and those residing in the Mortlocks or Northern Namoneas.

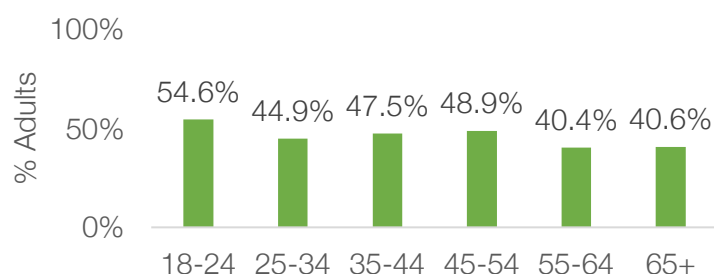
SSBs Consumed Daily among Adults in Chuuk, 2023



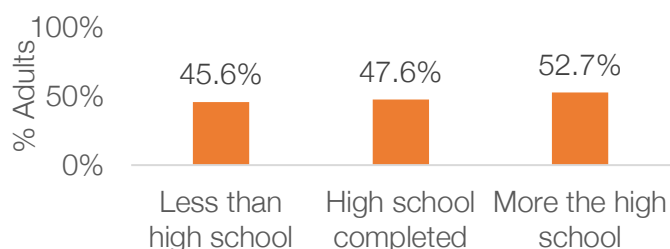
3+ SSBs per day, by Gender



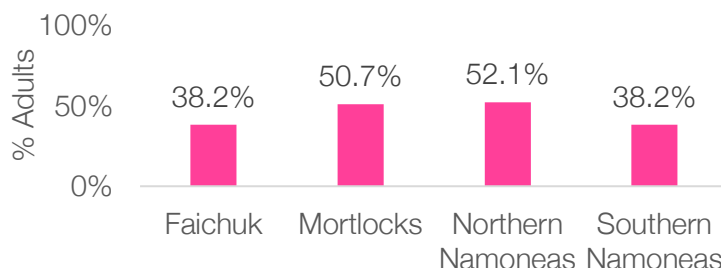
3+ SSBs per day, by Age



3+ SSBs per day, by Education

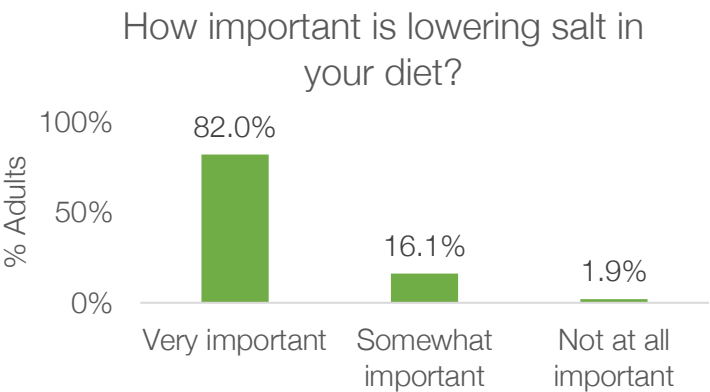
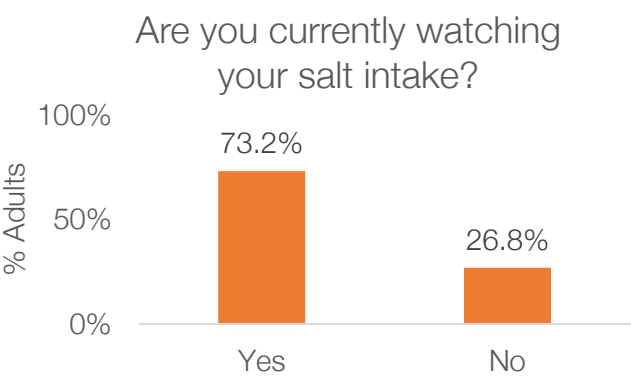
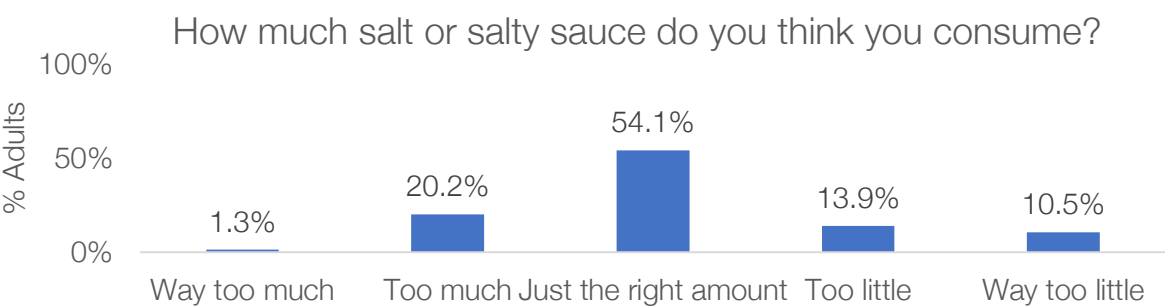
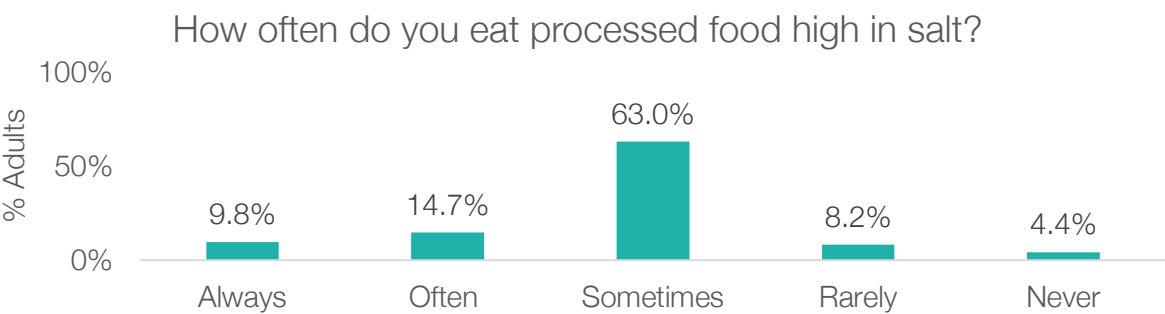


3+ SSBs per day, by Location



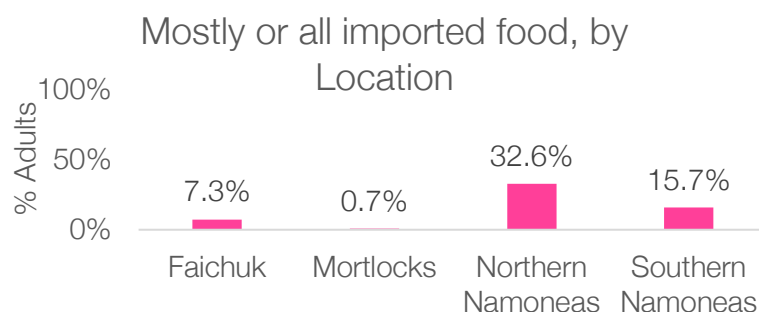
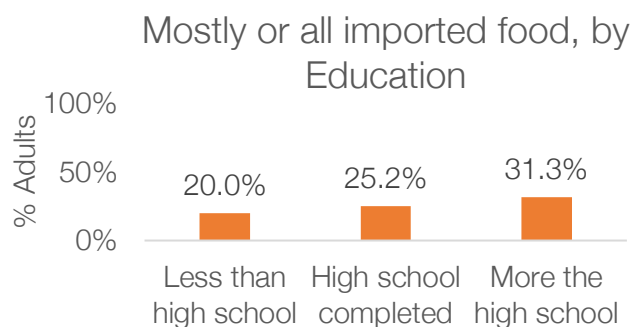
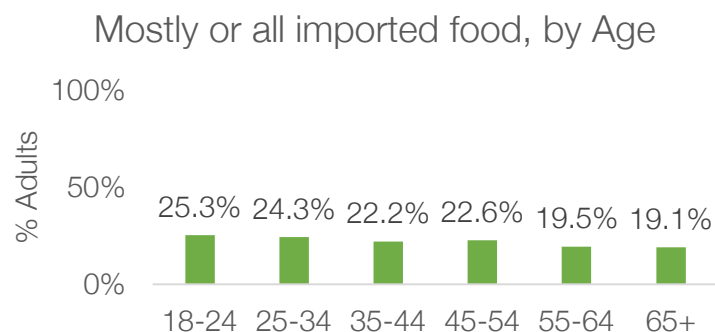
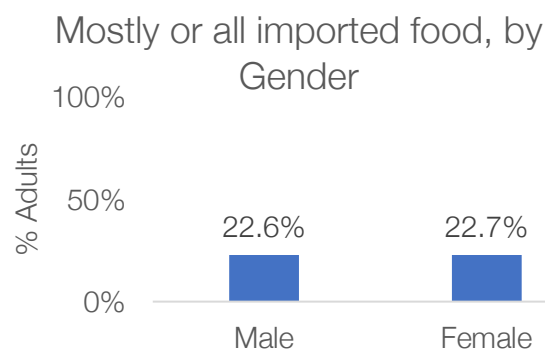
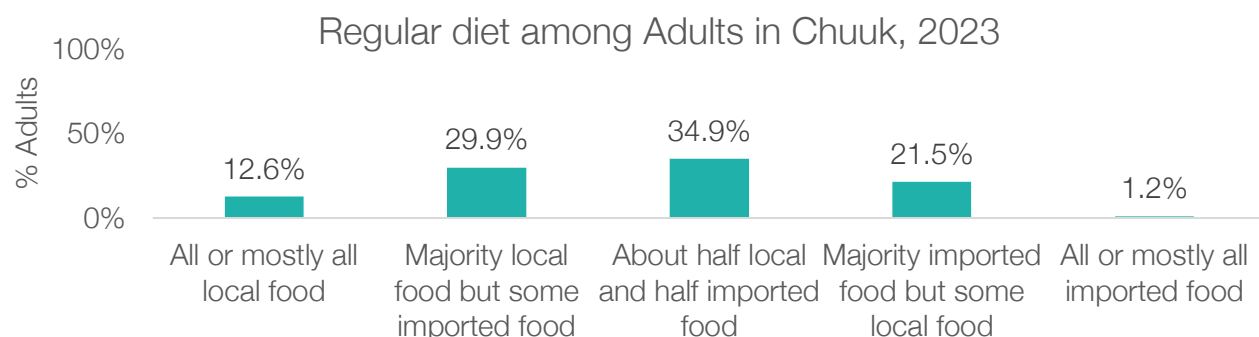
Salt Intake

About one-quarter (24.5%) of adults in Chuuk reported that they always or often consume processed food high in salt and 20.2% reported that they think they consume too much salt or salty sauce. Almost three out of four (73.2%) adults reported that they are currently watching their salt intake, and 82.0% indicated that lowering their dietary salt intake is very important.



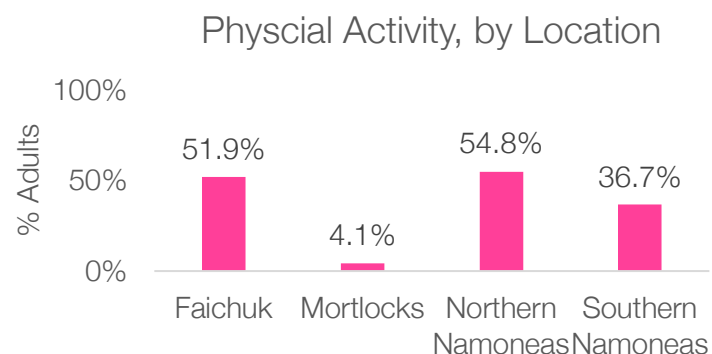
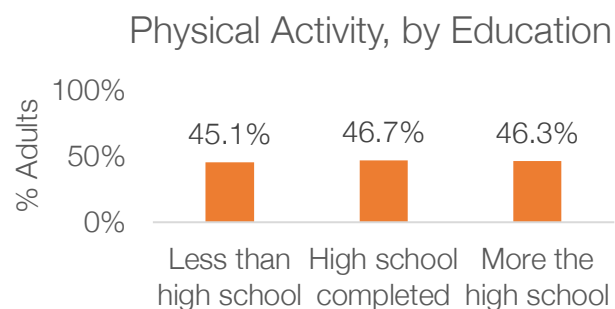
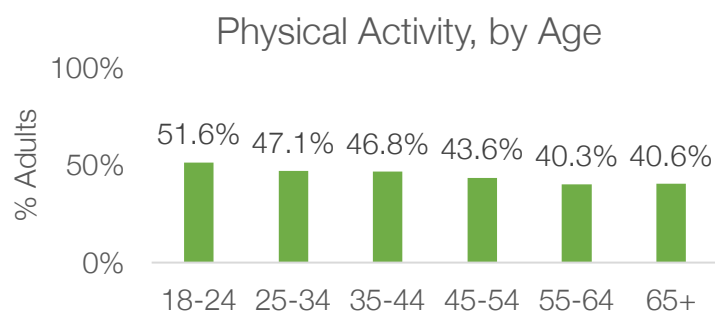
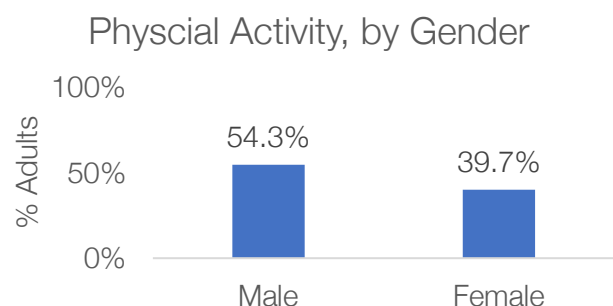
Regular Diet

About one out of four (22.7%; 95%CI: 20.7%-24.7%) adults in Chuuk reported that they consume “majority imported food but some local food” or “all or mostly all imported food”. “Majority or all imported food consumption” was significantly higher among those with more than a high school education and those who reside in the Northern Namoneas.



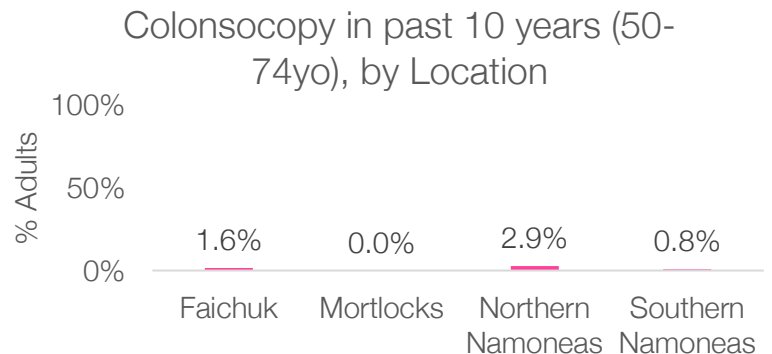
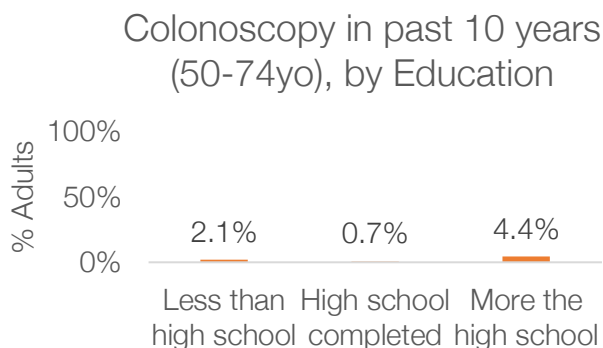
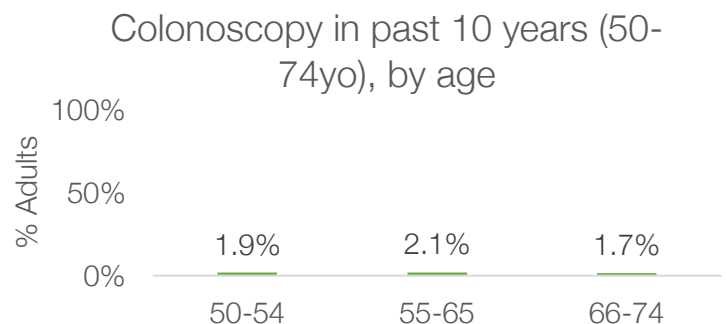
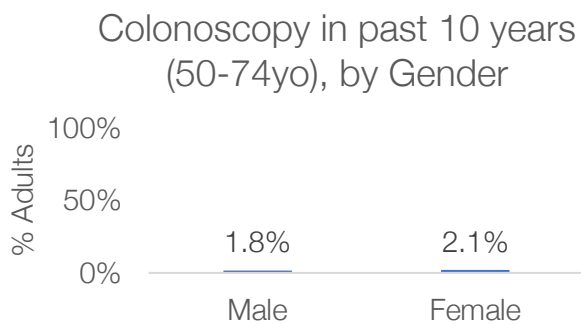
Physical Activity

Among adults in Chuuk, about half (45.7%; 95%CI: 43.4%-48.1%) reported participating in any physical activity for exercise in the past 30 days. Physical activity was significantly higher among men, and those who reside in the Northern Namoneas or Faichuk.



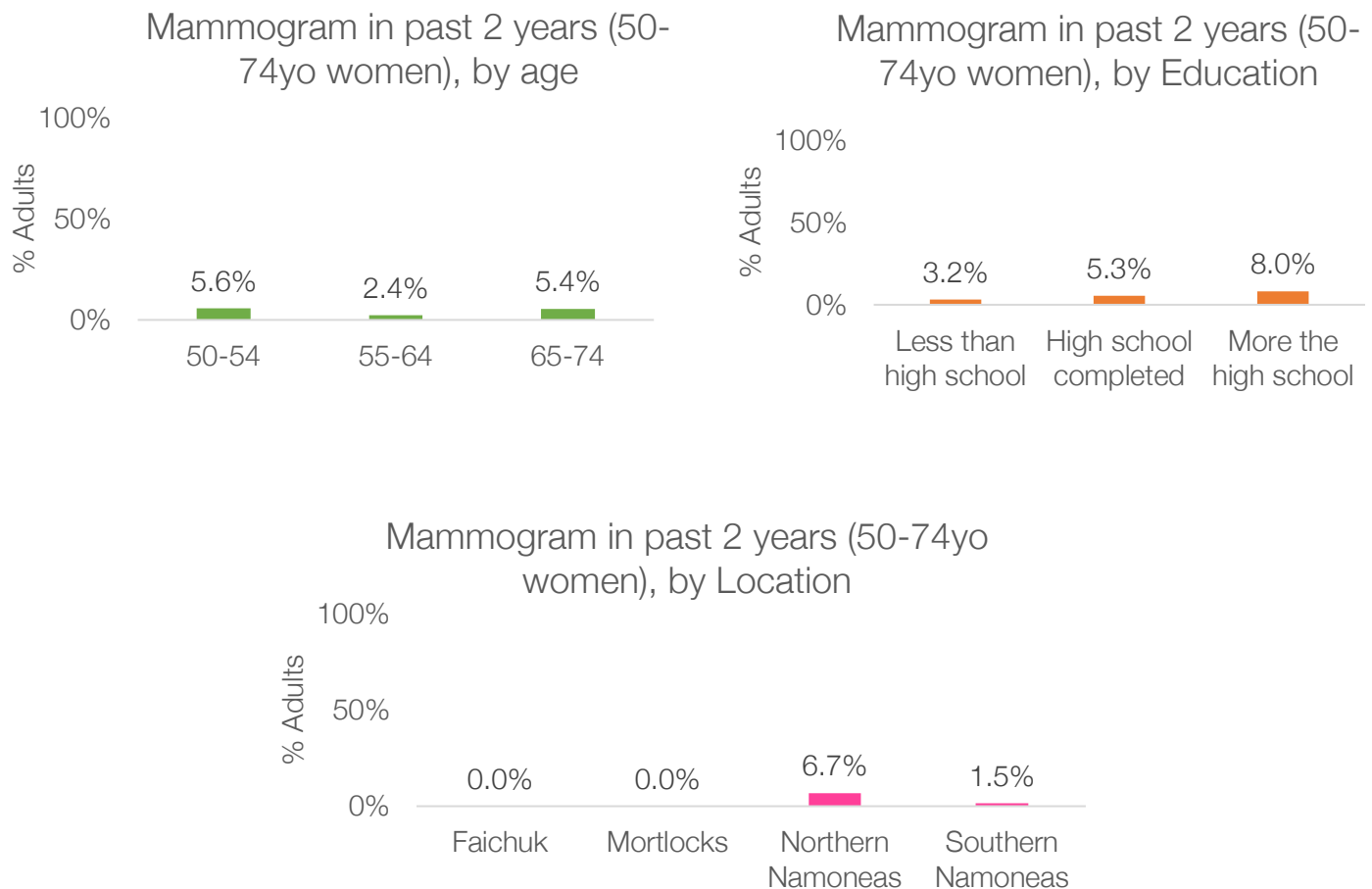
Colon Cancer Screening

Very few adults (2.0%; 95%CI: 0.9%-3.6%) aged 50-74 years in Chuuk have had a colonoscopy in the past ten years or a blood stool test (BST) (0.4%; 95%CI: 0.05%-0.14%) in the past year per the US Preventive Services Task Force (USPTF) guidelines. Overall, 2.3% (95%CI: 1.2%-4.0%) of adults aged 50-74 years old in Chuuk have had either a colonoscopy in the past 10 years or a BST in the past year. There were no statistically significant differences by selected demographic characteristics.



Female Cancer Screening: Mammogram

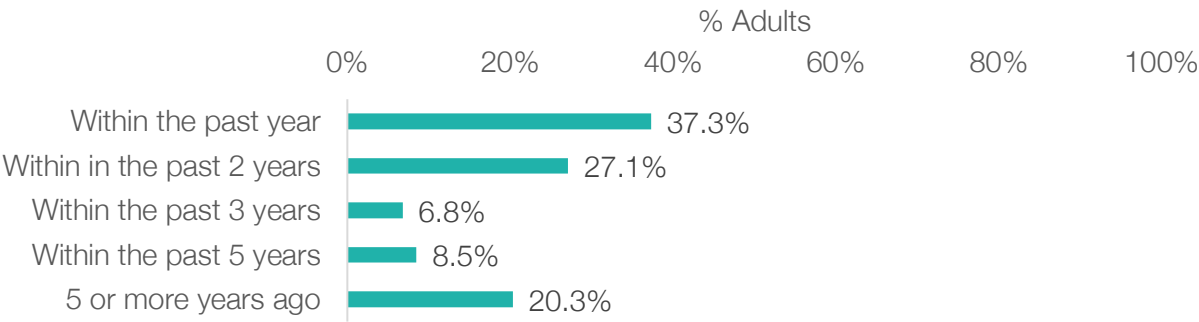
Few women aged 50-74 years (4.2%; 95% CI: 2.2%-7.2%) in Chuuk have received a mammogram in the past two years per USPTF recommendation. Mammogram screening was significantly higher among those living in the Northern Namoneas.



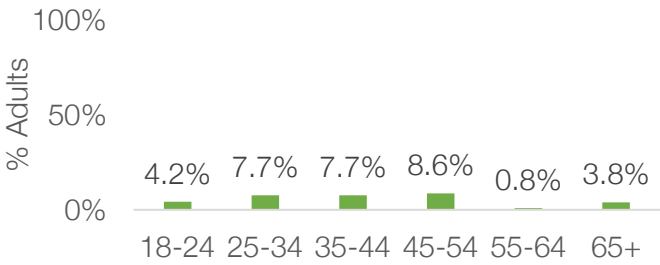
Female Cancer Screening: Clinical Breast Exam

6.2% (95% CI: 4.8%-7.8%) of women in Chuuk have ever had a clinical breast exam. Clinical breast exam prevalence was significantly higher among women 25-54 years old and those residing in the Northern Namoneas.

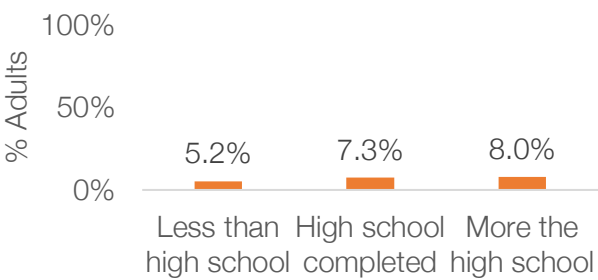
Last CBE among women who reported ever having a CBE, Chuuk, 2023



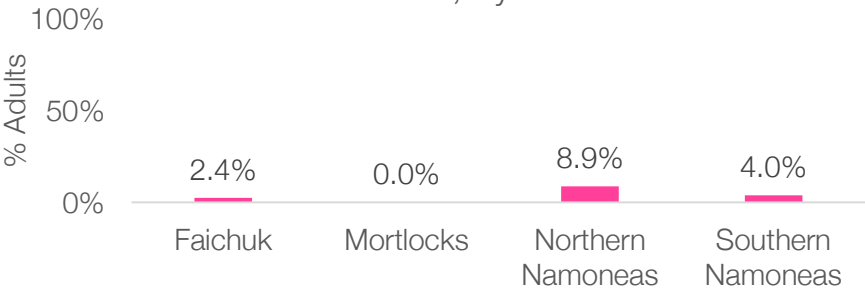
Ever had a CBE, by Age



Ever had a CBE, by Education



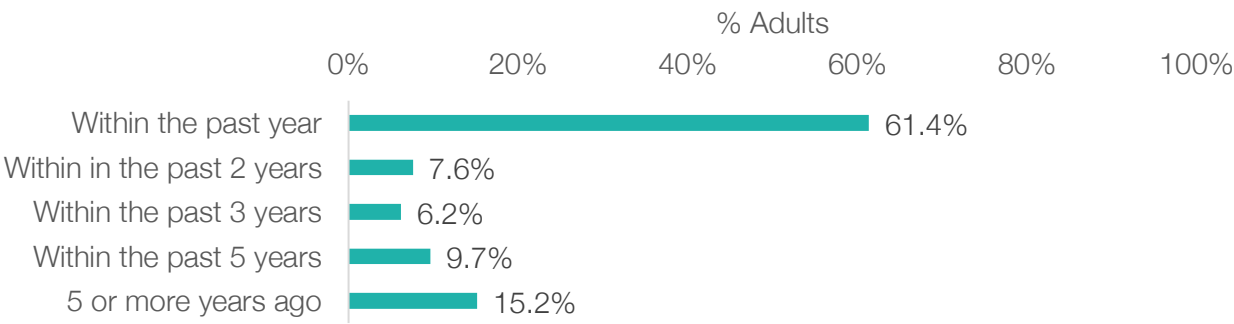
Ever had a CBE, by Location



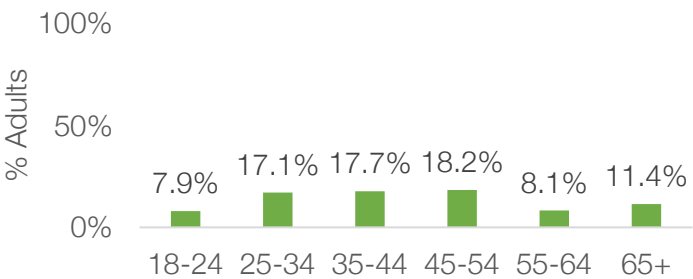
Female Cancer Screening: Self Breast Exam

14.4% (95% CI: 12.3%-16.7%) of women in Chuuk have performed a self-breast exam. Self-breast exam prevalence was significantly higher among women 25-54 years old and those residing in the Northern Namoneas.

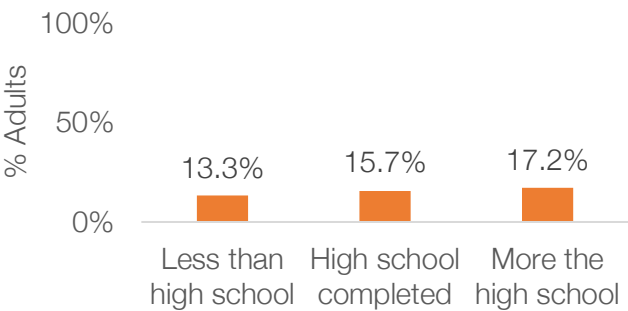
Last SBE among women who reported ever having a SBE, Chuuk, 2023



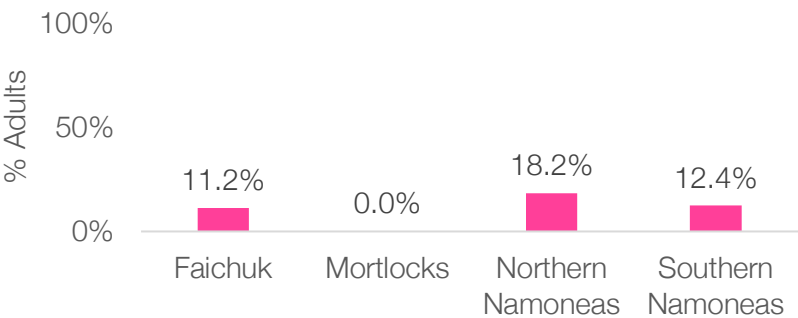
Ever had a SBE, by Age



Ever had a SBE, by Education

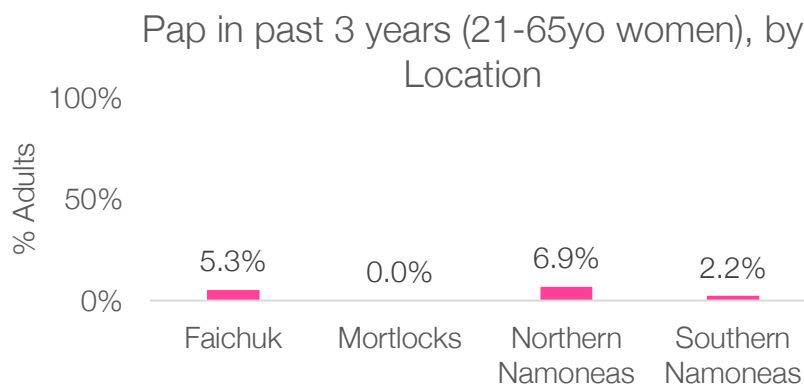
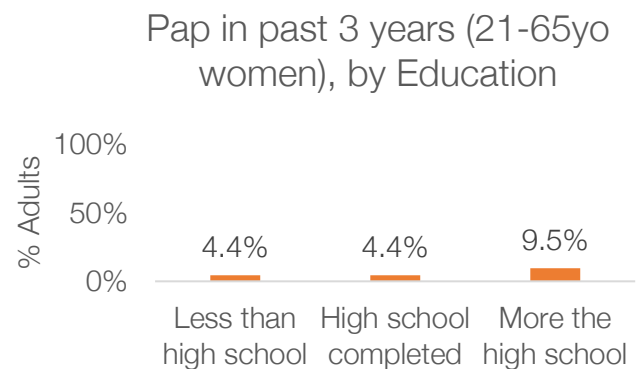
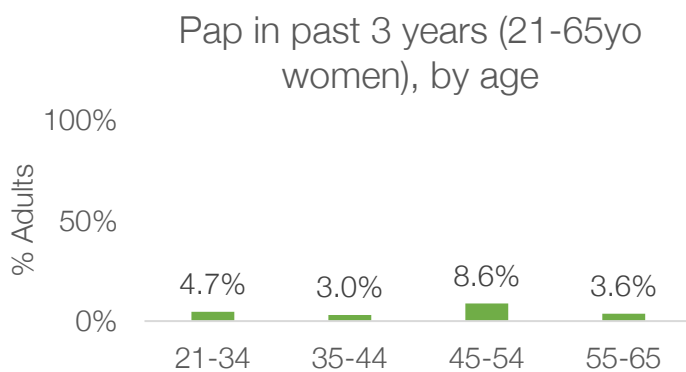


Ever had a SBE, by Location



Female Cancer Screening: Pap Smear

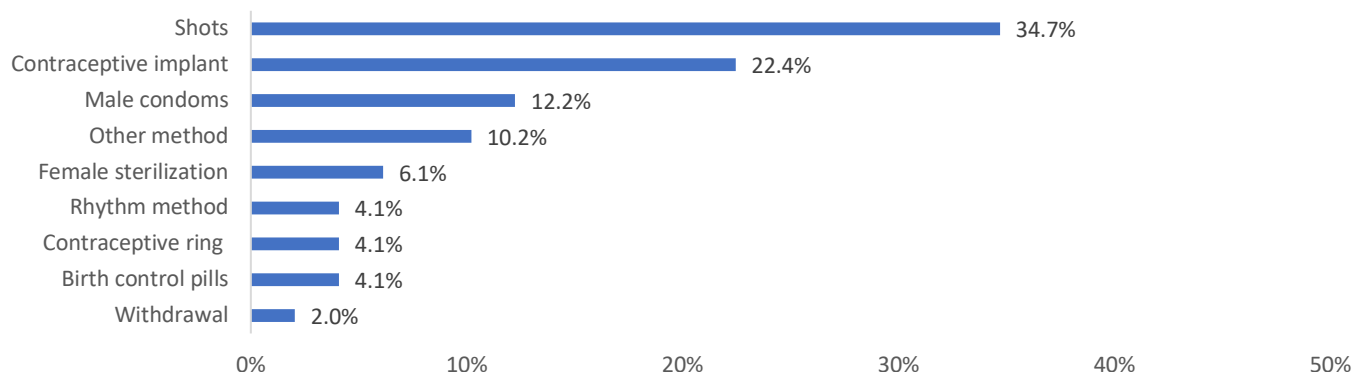
Few women aged 21-65 years (4.9%; 95%CI: 3.6%- 6.6%) in Chuuk reported having a pap smear in the past 3 years (per USPTF guidelines). Having an up-to-date pap smear was significantly higher among women residing in the Northern Namoneas and Faichuk.



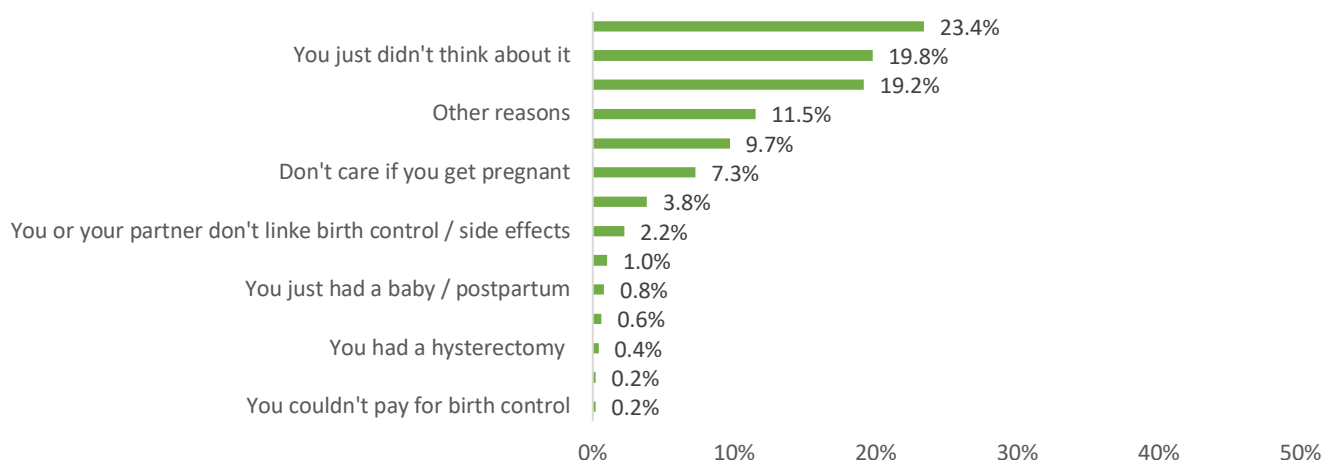
Family Planning

Among sexually active women <50 years old in Chuuk, one in ten (9.2%; 95%CI: 6.9%-11.8%) reported using any method to prevent pregnancy during last intercourse. The most reported types of family methods used were shots (34.7%), contraceptive implants (22.4%), and condoms (12.2%). Among those women who did not use a method to prevent pregnancy, the most reported reasons for not preventing pregnancy were “you and your partner don’t want to use birth control” (19.2%), “you want a pregnancy” (23.4%), and “you just didn’t think about it” (19.8%).

Type of family planning used among sexually active non-pregnant women in Chuuk <50 years old who used family planning during last intercourse



Reasons for not using family planning during last intercourse (among sexually active non-pregnant women in Chuuk <50 years old who reported not using family planning during last intercourse)



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 over or under-reported.
- The sample was a bit more female, younger, and more centrally located in Northern Namoneas than the last Census population estimates. However, the data were not weighted because the most recent Census data were 14 years old, and there were many population changes during the COVID-19 pandemic and emigration.

Strengths:

- Physical and biochemical measurements were conducted for NCD prevalence estimation rather than just self-report.
- Quality and thorough training was provided for all surveyors over 3 days.
- 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.

Challenges:

- This survey sample was based on random sampling from the Chuuk TB+Leprosy Free Campaign. This Campaign attempted to screen all adults for TB and Leprosy, but participation was voluntary and required participants to show up at screening sites. So, this sample was reliant on the Chuuk TB+Leprosy Free Campaign.

Discussion and Recommendations

This adult Hybrid Survey provides much needed information about the status of NCDs and risk factors in Chuuk, 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 Chuuk and the US. Based on these comparisons, it is evident that almost all health indicators are significantly worse in Chuuk compared to the US. The trend data in Chuuk from 2016 to 2023 were also examined, which indicated that almost all core indicators have worsened or remained stagnant. The only indicator that improved was cigarette smoking prevalence. However, the use of tobacco through chewing and e-cigarette use prevalence both increased significantly. Alcohol use indicators remained stagnant, but there was a significant increase in the proportion of adults who consume <5 servings of fruits and vegetables daily. Additionally, female cervical cancer screening rates significantly decreased. When it comes to non-communicable diseases, there was a significant increase in overweight/obesity, and hypertension prevalence, indicating an urgent need for more aggressive strategies to tackle these issues.

A large amount of effort has been given to control of NCDs in Chuuk, 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 given the concerning rise in overweight/obesity, diabetes, and hypertension prevalence.

The Monitoring Alliance for NCD Action (MANA) Dashboard for FSM shows the status of adoption of the critical, evidence-based policies and programs that are known to be effective in controlling NCDs. This 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 raising excise taxes, strengthening smoke-free environments, banning advertising, strengthening sales and licensing, working on tobacco industry interference, and improving tobacco health warnings. To combat obesity, diabetes, and hypertension, measures that need to be done include excise taxes on unhealthy foods (especially sugar-sweetened beverages and processed meats), banning of trans fats, restrictions on marketing of unhealthy foods to children, healthy food policies in schools, compulsory physical education in school curriculum, and stronger enforcement of NCD policies.

In addition to much more aggressive policies to control NCD risk factors, the results of this survey indicates 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 only 19% of people with diabetes and 4% of those with hypertension have their disease under good control, and many adults do not have up-to-date cancer screening (97% for colon cancer, 95% for breast cancer, and 95% 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. Assure that this Hybrid Adult Survey will be conducted every 5 years, in accordance with the NCD Monitoring & Surveillance Plan (next due in 2028).
2. 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 Chuuk.
3. Develop a strategy across health service agencies to monitor care delivery, provide expanded outreach, tracking, and accessible services for care of patients with NCDs.
4. Provide appropriate services and support for substance use and mental health.

Priority areas for health improvement in Chuuk include:

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

Acknowledgements

- Chuuk State Department of Health Services
 - Dr. Bosco Buliche, Director
 - Dr. Dorina Fred, Chief of Public Health
 - Moria Shomour, NCD Coordinator
 - Junior Poch, NCD Surveillance Officer
 - Flosty Lorenzo, NCD Procurement Officer
 - Gina Lokopwe, PREP Coordinator
 - Francina Fabian, NCD Regional Community Health Worker
 - JR Mesin, NCD Community Health Worker
 - Sharry Osi, NCD Community Health Worker
 - Vandcliff Koichy, NCD Community Health Worker
 - Michael Samuel, NCD Nurse
 - Emilinta Aikichy, NCD Nurse
 - Petrin Bethewon, NCD Nurse
 - Adrianna Olap, Student
 - Brianna Olap, Student
 - Gayla Jamila Bisalen, Student
 - Gilya Tiare Bisalen, Student
 - Karmi William, Student
- Chuuk Community Health Centers (CCHC)
 - Inouefich Shomour, CEO-CCHC
 - Aik Samuel, CHC Community Health Worker
 - Bethewon Bethewon, CHC Community Health Worker
 - Arleen Sally, CHC Community Health Worker
 - Sansi Michael, CHC Community Health Worker
- Chuuk State Municipal Mayors and community leaders
- Pacific Island Health Officer's Association (PIHOA)
 - Dr. Haley Cash, NCD Epidemiologist
 - Rasmi Davu, NCD Epidemiologist
- World Health Organization (WHO)
- US Centers for Disease Prevention and Control (TB Division)
- Hawaii Department of Health Tuberculosis (TB) Control Branch
 - Dr. Richard Brostrom Jr., TB Specialist

References

1. Pacific Islands Health Officers Association, Declaring a Regional State of Health Emergency Due to the Epidemic of Non-Communicable Diseases in the United States-Affiliated Pacific Islands- Board Resolution #48-01. 2010.
2. World Health Organisation, Global action plan for the prevention and control of noncommunicable diseases 2013-2020. 2014, WHO: Geneva.
3. World Health Organisation, Social determinants of health: the solid facts (2nd edition), R.Wilkinson and M. Marmot, Editors. 2003, World Health Organisation: Copenhagen.
4. World Health Organisation, Review of Areca (Betel) Nut and Tobacco Use in the Pacific: A Technical Report. 2012: WHO Western Pacific Region.