

# YAP

## Adult Hybrid Survey



**2023**



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Mogethin and greetings from the Yap Department of Health Services.

It is with great pleasure that we take this opportunity to share the results and recommendations of the recently completed 2023 Yap Adult Hybrid Survey.

The survey results provide a simple yet important overview of the prevalence, risk factors, and trends associated with non-communicable diseases (NCD's) like diabetes, hypertension, and cancer.

The insights gleaned from this Survey are more than mere data or numbers. The data is telling us a story about the status of our health. This story should translate into an urgent call to action for evidence-based interventions to halt and even reverse the growing burden of the NCD crisis.

I extend my sincere gratitude to the Pacific Island Health Officer's Association (PIHOA) for their invaluable collaboration with the United States-Affiliated Pacific Islands in guiding non-communicable disease (NCD) surveillance efforts. This survey has enabled the region to achieve a continual gauging of NCD prevalence, observing trends over time and in comparison among jurisdictions, and better identifying specific issues, thereby empowering local governments and partners to address them more effectively. PIHOA's assistance in development, training, and ongoing support for data analysis and reporting has been undoubtedly instrumental to this achievement.

May this report serve as a timely reminder to us all that our health really is our only wealth. Healthy people lead to healthy families, healthy communities and healthy islands, all of which is tied to not only our physical health, but our emotional, mental, social, environmental, cultural and economic health and prosperity.

Working together and recognizing that health services alone cannot fix this NCD crisis is a good start but now we need the engagement of all other sectors that make up the social determinants of health. All sectors outside of health have a role to play in better health for all, as health services can only fix 20% of the NCD crisis, while the other 80% are addressed by social and environmental determinants of health.

Kammagar,

A handwritten signature in black ink, appearing to read "Theophilus Thinnifel".

Theophilus Thinnifel  
Director  
Yap Department of Health Services

# Table of Contents

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Summary	3
Summary Dashboard: Yap vs. US	4
Summary Dashboard: Yap 2013 vs. 2023	5
Introduction	6-7
Survey Methodology	8-9
Sample Summary	10
Demographics	11-12
General Health	13
Access to Care: Annual Check-up	14
Access to Care: Health Insurance	15
Access to Care: Cost Barrier	16
Oral Health	17-18
Overweight/Obesity	19
Hypertension	20-21
Diabetes/Pre-Diabetes	22-24
Cigarette Smoking	25
Vaping	26
Smokeless Tobacco Use	27
Betel Nut Chewing	28
Any Tobacco Chewing	29
Alcohol Use and Binge Drinking	30
Fruit and Vegetable Consumption	31
Processed Meat Consumption	32
Sugar Sweetened Beverage Consumption	33
Regular Diet	34
Female Cancer Screening: Mammogram	35
Female Cancer Screening: Clinical Breast Exam	36
Female Cancer Screening: Pap Smear/VIA	37
Important Notes	38
Discussion and Recommendations	39-40
Acknowledgements	41
References	42

# Summary

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The aim of this report is to assess the current prevalence of non-communicable diseases (NCDs), substance use, and selected risk factors in Yap. We hope this report enables Yap 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 can also greatly contribute to disability and premature death throughout the world. NCDs 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. Over the past few decades there have been drastic changes in lifestyle in Yap, located in the Federated States of Micronesia. Yap 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 and associated NCDs.

Yap undertook its first Hybrid Survey from February 2022 to September 2023. The extended period of data collection was due to delays caused by the COVID-19 pandemic. A total of 1,115 individuals aged 18 years or older participated in the survey. Respondents answered questions about their alcohol and tobacco use, dietary habits, health access, oral health, health conditions, and cancer screening. Additionally, height, weight, Hemoglobin A1c, and blood pressure were measured.

# Yap vs. USA

Here are Yap's 2023 Hybrid Survey prevalence data compared to U.S. prevalence data using the most comparable sources available. Almost all selected indicators have a higher prevalence in Yap compared to the US. E-cigarette use prevalence is lower in Yap compared to the US. Alcohol use in the past 30 days is lower in Yap compared to the US, though the binge drinking prevalence is higher in Yap. Due to a lack of raw data from US sources, statistical analysis could not be performed. Red arrows indicate a worse prevalence in Yap (by at least 3%), green arrows indicate a better prevalence in Yap (by at least 3%), and yellow circles indicate a similar prevalence between Yap and the US (prevalence within 3%).

	Yap (%)	US (%)	Comparison
<b>Current tobacco use (past 30 days)</b>			
Cigarette smoking	23.4	14.0	↑
E-cigarette use	0.6	7.7	↓
Tobacco chewing	75.4	3.4	↑
<b>Current alcohol use (past 30 days)</b>			
Alcohol use (any)	33.2	53.6	↓
Binge drinking (5+ drinks per day)	32.5	17.0	↑
<b>Nutrition</b>			
Consuming fruit <1 time per day	71.2	40.8 <sup>1</sup>	↑
Consuming vegetables <1 time per day	34.2	19.7 <sup>1</sup>	↑
<b>Health and healthcare</b>			
Fair or poor health (self-reported)	50.8	17.0	↑
<u>No</u> medical checkup in the past year	61.4	23.2	↑
<b>Oral health</b>			
<u>No</u> dental visit within past year	84.3	34.2	↑
Extracted permanent teeth due to decay/disease	45.7	40.3	↑
<b>Chronic conditions</b>			
Overweight/obesity	81.9	73.1 <sup>2</sup>	↑
Diabetes (self-reported + undiagnosed)*	16.2	14.7 <sup>3</sup>	○
Hypertension (self-reported + undiagnosed)*	34.1	31.7 <sup>4</sup>	○
<b>Cancer screening</b>			
<u>No</u> Pap smear in the past 3 years (women 21-65 yo)***	79.1	22.3 <sup>5</sup>	↑
<u>No</u> mammogram in the past 2 years (women 50-74 yo)	97.5	21.7 <sup>5</sup>	↑

Source for US comparison: BRFSS 2022 unless noted with <sup>1</sup>BRFSS 2021, <sup>2</sup>NHANES 2017-2018 (adults 20+), <sup>3</sup>CDC National Diabetes Report 2022 (includes diagnosed and undiagnosed diabetes) <sup>4</sup>NHANES 2017-2018 (adults 18+; includes diagnosed and undiagnosed hypertension), <sup>5</sup>BRFSS 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. \*\*\*Pap smear prevalence in Yap also includes Vaginal Inspection with Acetic Acid (VIA).

# Surveillance in Yap: 2013 vs. 2023

The table below compares the 2013 Yap Community Health Assessment (CHA) results to the 2023 Yap Hybrid Survey. Only indicators that could be compared were included in this table, therefore comparisons are limited. 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 18+ YEARS OLD	2013 (%)	2023 (%)	Comparison
<b>Current tobacco use</b>			
Tobacco smoking in the past 30 days	18.3	23.4	↑
Tobacco chewing in the past 30 days	83.3	75.4	↓
<b>Current alcohol use</b>			
Binge drinking in the past 30 days <sup>1</sup>	29.9	32.5	↑
<b>Chronic conditions</b>			
Overweight/obesity <sup>2</sup>	70.7	72.5	↑
Hypertension <sup>3</sup>	30.9	34.1	↑

<sup>1</sup>Binge drinking was defined as having 4 or more drinks on one occasion for women and 5 or more drinks on one occasion for men

<sup>2</sup>Overweight/obesity was determined as a BMI  $\geq 25$  based on measured height and weight

<sup>3</sup>Hypertension was determined by a self-report of medicated hypertension and/or an average blood pressure reading (out of 3 readings) of  $\geq 140/90$

# Introduction

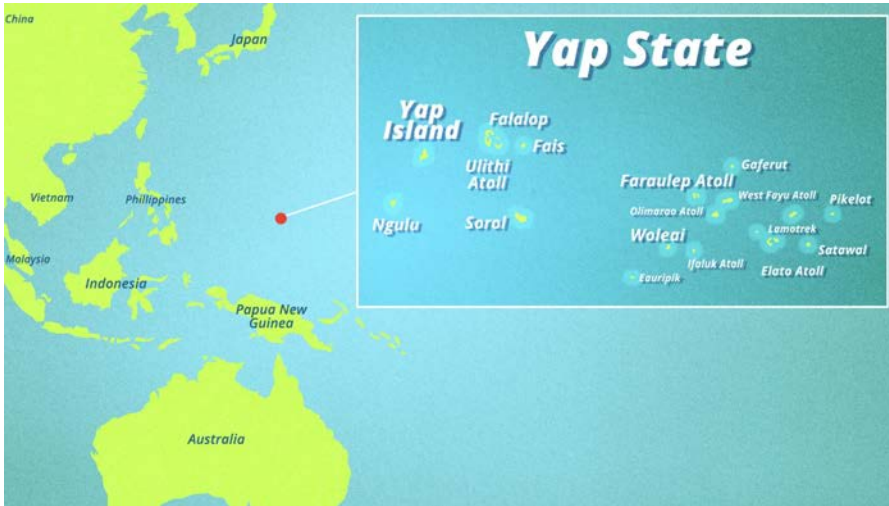
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Non-communicable diseases (NCDs) are the leading causes of morbidity and mortality for adults in the United States Affiliated Pacific Islands (USAPIs) (American Samoa, Guam, Commonwealth of the Northern Mariana Islands [CNMI], Federated States of Micronesia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

Yap 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 1,115 individuals aged 18 years or older participated in the survey. Respondents answered questions about their alcohol and tobacco use, dietary habits, health access, oral health, health conditions, and cancer screening. Additionally, height, weight, Hemoglobin A1c, and blood pressure were measured.



Yap is located in the northern Pacific Ocean southwest of Guam. Yap is a large archipelago of the western Caroline islands. The majority of the population lives on the Yap main island, also known as “Yap Proper” (Rumung, Maap, Gagil-Tamil, and Marbaa’). The remaining population resides on 17

inhabited “outer islands”.

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 - which 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. Yap is made up of 138 islands totaling 46 square miles.

The population of FSM is 102,843 (2010 Census). Yap is the third-most populated state of FSM with 11,377 people. Among these, 7,371 reside on Yap Proper and 4,006 reside in the outer islands. The most populated outer islands are Woleai (1,039), Ulithi (847), and Satawal (501). Overall, the population is quite young with 4,426 people (39%) under 18 years old.



# Survey Methodology

The Yap Hybrid Survey aimed to assess the prevalence of selected NCDs and risk factors according to multiple partner surveillance frameworks.



## Objectives:

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

## Target group

Participants eligible for the Yap Hybrid Survey included all Yap residents aged 18 and older who were able to comprehend either English, Yapese, Ulithian, or Satawalese languages (the survey was available in all four of these languages) and provide consent.

## Data collection

Data collection began on February 3, 2022 and ended on September 22, 2023. A total of 1,115 respondents completed the survey and measurements. All interviews and measurements were performed by trained surveyors hired by the Yap Department of Health Services.



### Sample size determination



The original sample included 850 adults in Yap Proper and 450 adults in the outer islands for a total sample of 1,300.

### Sampling procedures



On Yap proper, half of all households (total households= 1,700) were sampled. One adult from each of these selected households on Yap proper was randomly selected to participate in the Hybrid Survey using KISH methodology. For outer islands, the islands of Ulithi, Fais, and Woleai were selected due to accessibility by flight. All adults in Fais and half of adults in Ulithi and Woleai were randomly selected to participate in the Hybrid Survey.

### Data collection



Surveys were translated and available in Yapese, Ulithian, Satawalese, 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 analyzed 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** (Yap Proper, Fais, Ulithi, Woleai)

# Sample Summary

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The sample collected was similar to population estimates based on the 2010 Census, though the sample had a higher proportion of older age groups, most likely due to higher rates of refusals among younger age groups. Also, the survey had a larger proportion of adults from the outer islands due to higher non-response in Yap Proper (largely due to using outdated Census data which led to many vacant homes in the sample).

	<u>Survey sample</u>	<u>2010 Census data</u> <u>(18 and older)</u>
	n=1,115	n=6,951
<b>Gender</b>		
Male	494 (44.3%)	3,347 (48.2%)
Female	621 (55.7%)	3,604 (51.8%)
<b>Age group</b>		
18-24 years	177 (15.9%)	1,259 (18.1%)
25-34 years	162 (14.5%)	1,591 (22.9%)
35-44 years	218 (19.6%)	1,370 (19.7%)
45-54 years	220 (19.7%)	1,387 (20.0%)
55-64 years	178 (16.0%)	850 (12.2%)
65+ years	160 (14.3%)	494 (7.1%)
<b>Location</b>		
Yap Proper	475 (42.6%)	4,675 (67.3%)
Outer Islands	640 (57.4%)	2,276 (32.7%)
Fais	171 (15.3%)	
Ulithi	184 (16.5%)	
Woleai	285 (25.6%)	

# Demographics

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	N	%
<b>Region</b>		
Yap Proper	475	42.6%
Fais	171	15.3%
Ulithi	184	16.5%
Woleai	285	25.6%
<b>Sex</b>		
Male	494	44.3%
Female	621	55.7%
<b>Age</b>		
18-24	177	15.9%
25-34	162	14.5%
35-44	218	19.6%
45-54	220	19.7%
55-64	178	16.0%
65+	160	14.3%
<b>Marital Status*</b>		
Single, never married	370	33.2%
Married	604	54.2%
Widowed	93	8.3%
Divorced/Separated	48	4.3%
<b>Education*</b>		
Less than high school	400	35.9%
High school completed	517	46.5%
Associate's degree completed	154	13.8%
Bachelor's degree completed	25	2.2%
Graduate or professional degree completed	17	1.5%
<b>Ethnicity</b>		
Yapese- main island	389	34.9%
Yapese- outer island	699	62.7%
Other (non-Yapese)	27	2.4%

**Employment\***

Government employee	206	18.5%
Non-government employee	134	12.0%
Self-employed	35	3.1%
Non-paid (volunteer, subsistence, etc)	7	0.6%
Student	92	8.3%
Homemaker	353	31.7%
Retired	83	7.4%
Unemployed (able to work)	163	14.6%
Unemployed (unable to work)	42	3.8%

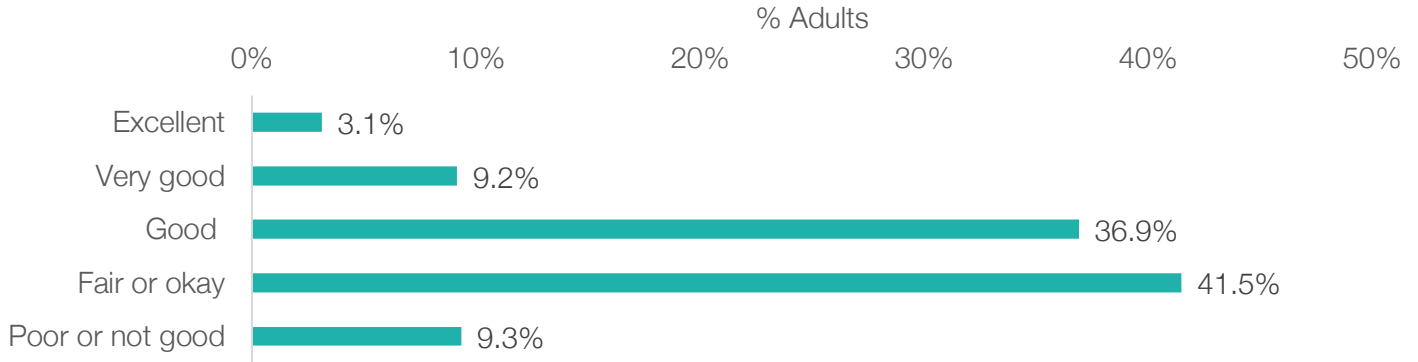
**Income\***

<\$5,000	686	72.0%
\$5,000-\$9,999	174	18.3%
\$10,000-\$14,999	63	6.6%
\$15,000-\$19,999	17	1.8%
\$20,000 or greater	13	1.4%

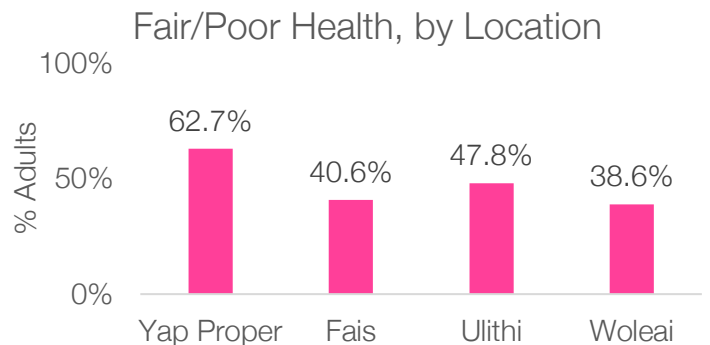
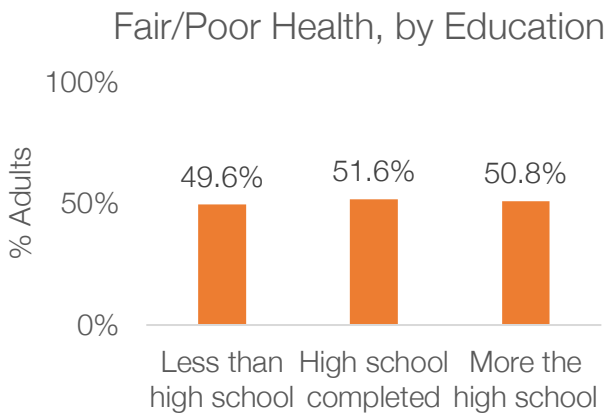
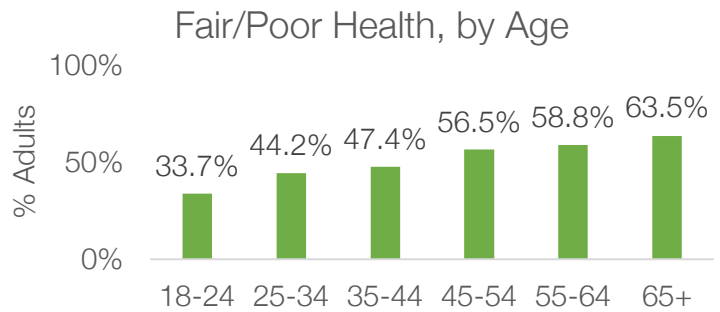
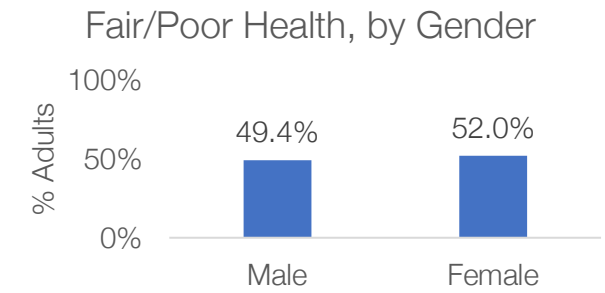
\*2 missing data on education, 162 missing data on income

# General Health

Self-reported health status among adults in Yap, 2023

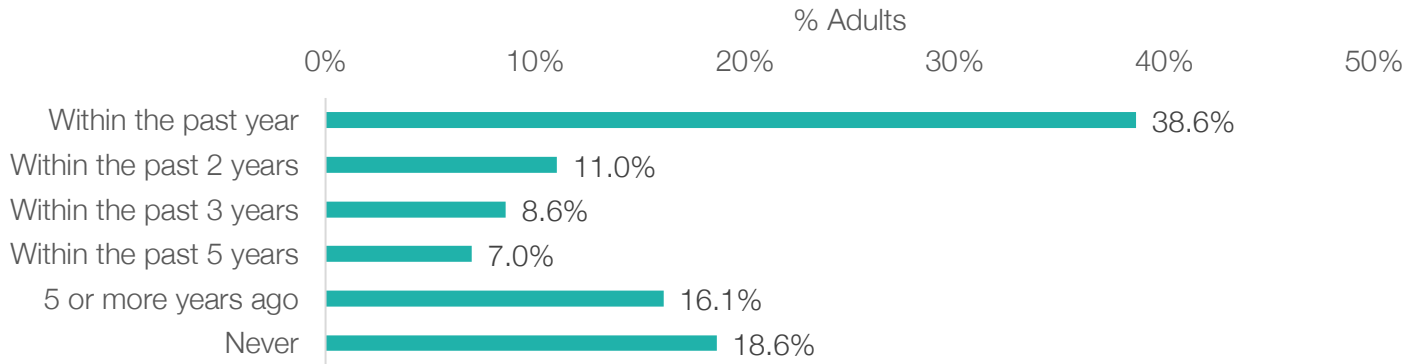


**Approximately half of adults (50.8%; 95% CI: 47.8%-53.8%) in Yap self-reported their health as fair or poor. Fair or poor health significantly increased with age with the highest prevalence among those 65 and older at 63.5% and was significantly higher among those living in Yap Proper.**



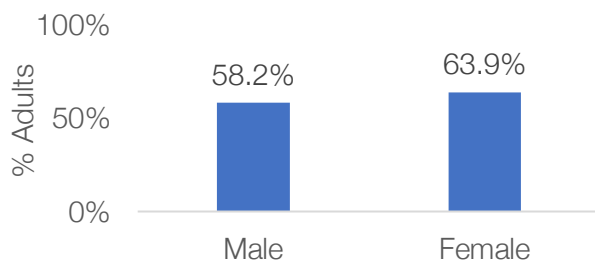
# Access to Care: Annual Checkup

Last annual exam among adults in Yap, 2023

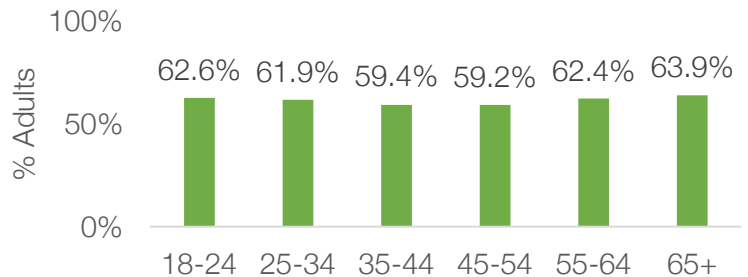


**Over one-third of adults (38.6%; 95%CI: 35.8%-41.6%) in Yap had an annual exam in the past year. Nearly one-quarter of adults (18.6%) have never had an annual exam. Women and those residing in Yap Proper, Fais, and Woleai were significantly more likely to not have had an annual exam in the past year.**

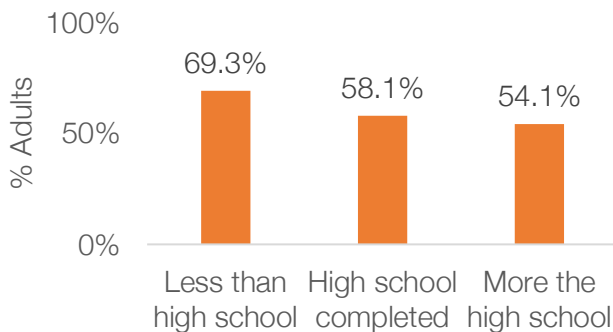
NO annual exam, by Gender



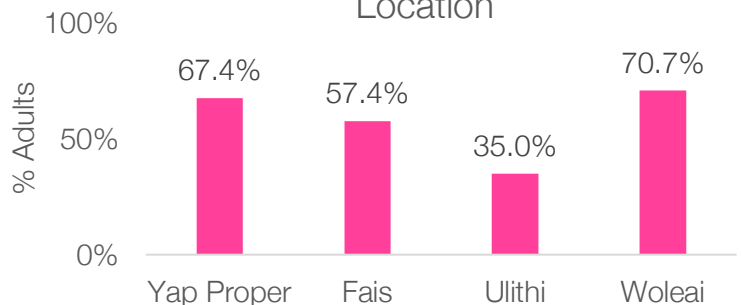
NO annual exam past year, by Age



NO annual exam, by Education

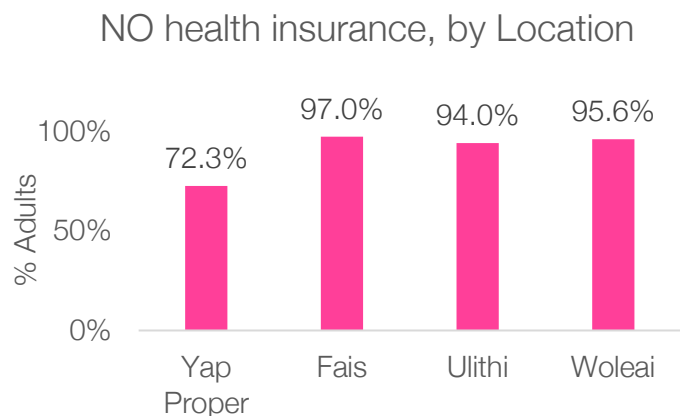
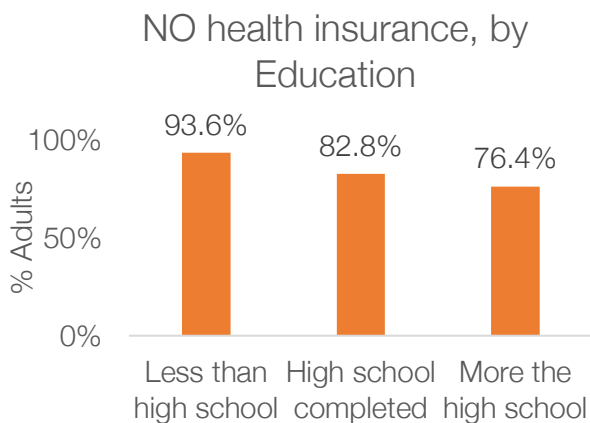
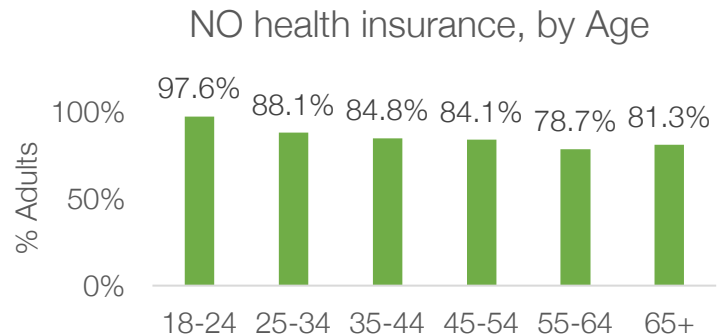
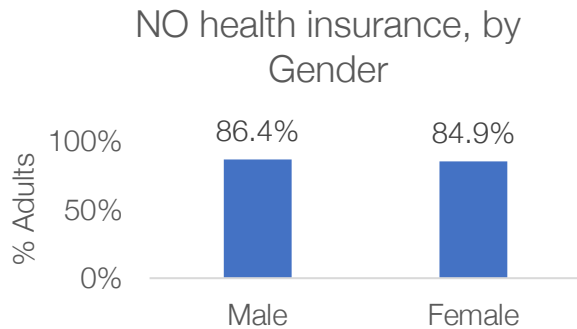


NO annual Exam past year, by Location



# Access to Care: Health Insurance

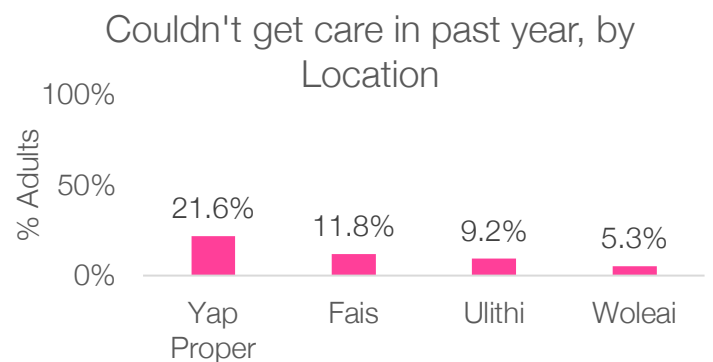
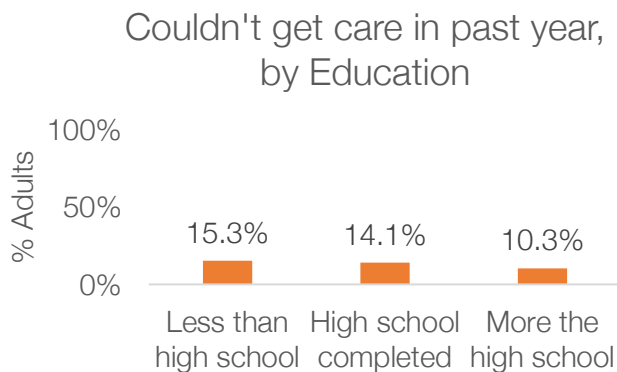
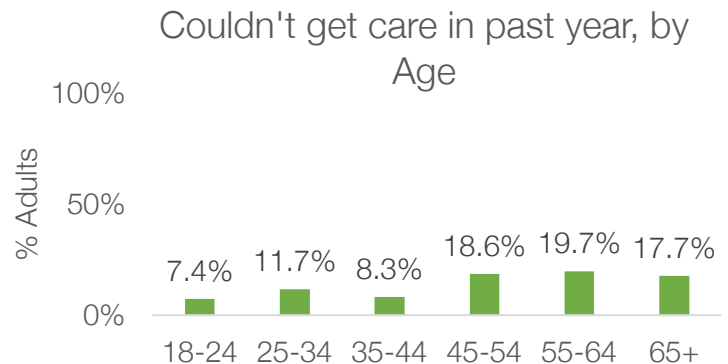
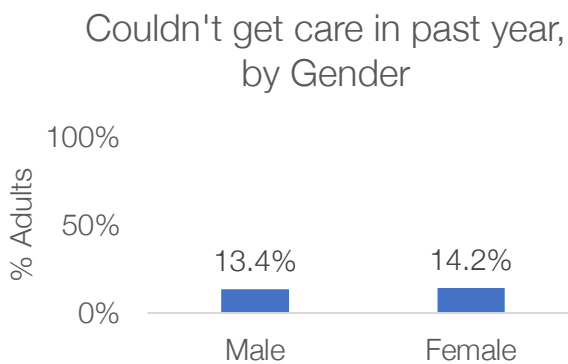
Nearly one out of five adults (14.5%; 95% CI: 12.4%-16.7%) in Yap reported having health insurance. Being uninsured was significantly higher among younger adults, those with a high school education or less, and those residing in Fais, Ulithi, or Woleai.





# Access to Care: Cost Barrier

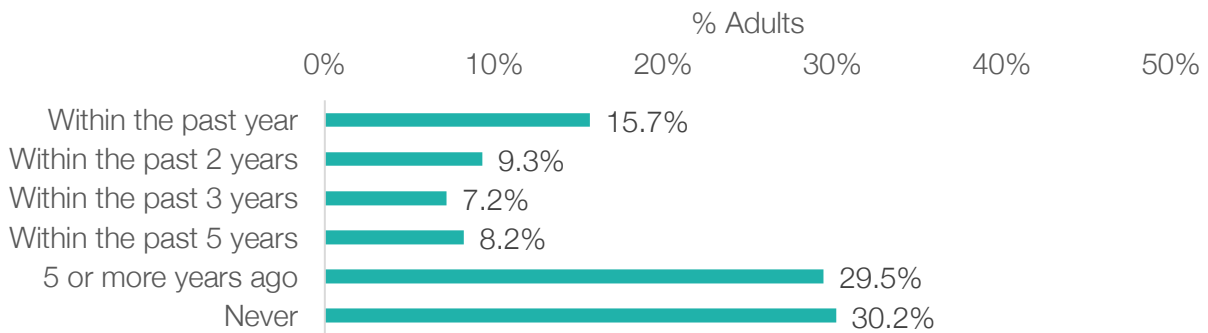
More than one out of ten (13.8%; 95%CI: 11.9%-16.0%) adults in Yap were unable to get healthcare due to cost in the past year. Being unable to access healthcare due to cost was significantly higher among those residing in Yap Proper and older adults.



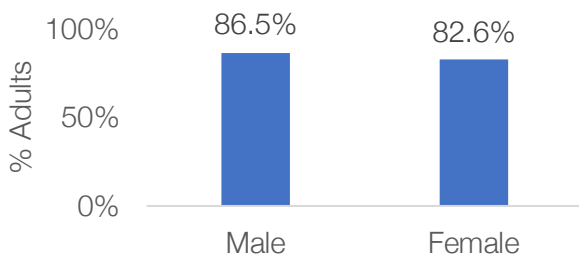
# Oral Health

Fewer than one out of five (15.7%; 95% CI: 13.5%-18.0%) adults in Yap have had a dental visit in the past year. Additionally, 30.2% of adults reported that they have never had a dental visit. NOT having a dental exam in the past year was significantly higher among those with less than a high school education.

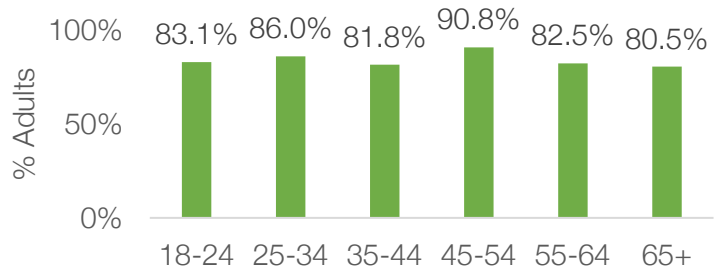
Last dental exam among adults in Yap, 2023



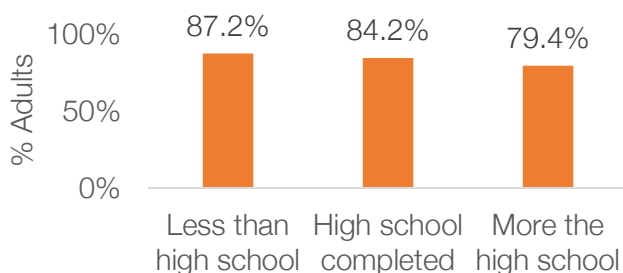
NO dental visit in past year, by Gender



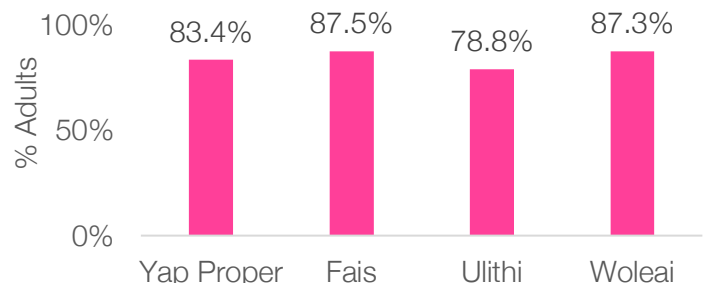
NO dental visit in past year, by Age



NO dental visit in past year, by Education

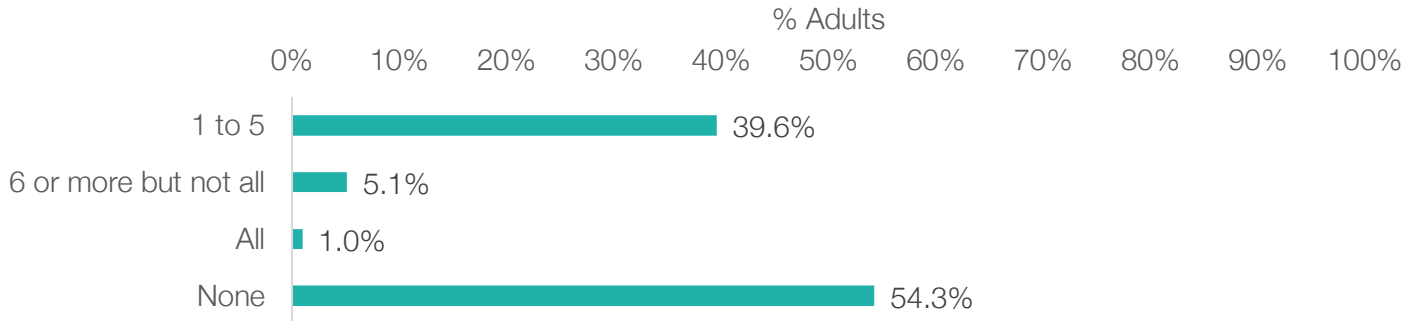


NO dental visit in past year, by Location



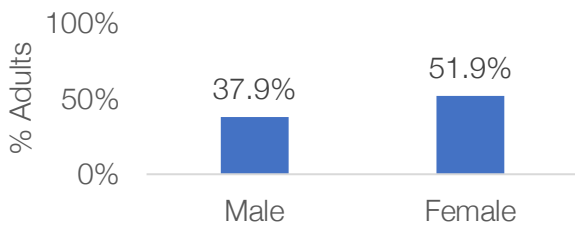
# Oral Health

Number of self-reported missing teeth among adults in Yap 2023

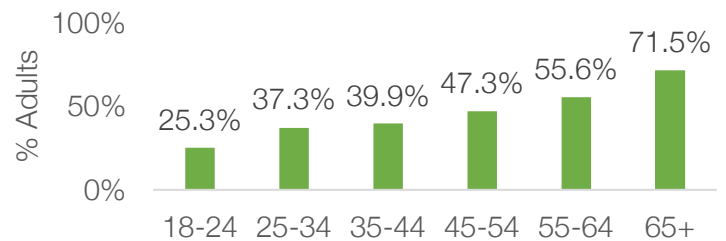


**Nearly a half (45.7%; 95% CI: 42.8% - 48.7%) of adults in Yap self-reported that they have at least one missing tooth due to tooth decay or gum disease. Having at least one missing tooth was significantly higher among women, those 45 years and older, those with less than or more than a high school education, and those residing in Ulithi and Woleai.**

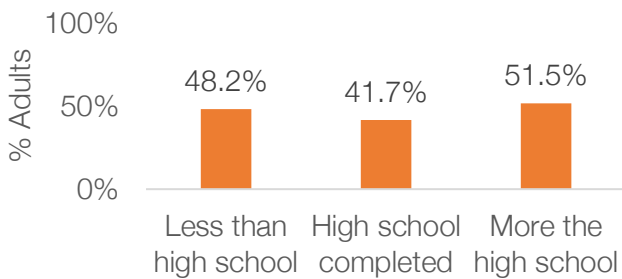
Any missing teeth, by Gender



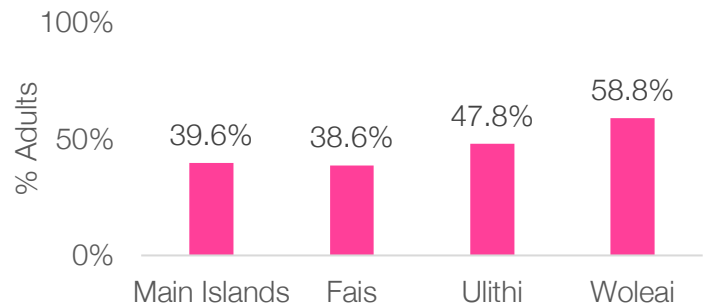
Any missing teeth, by Age



Any missing teeth, by Education

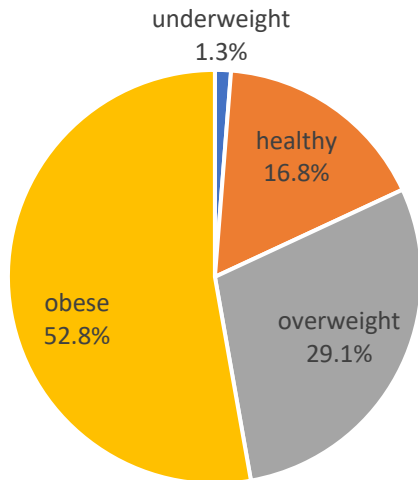


Any missing teeth, by Location



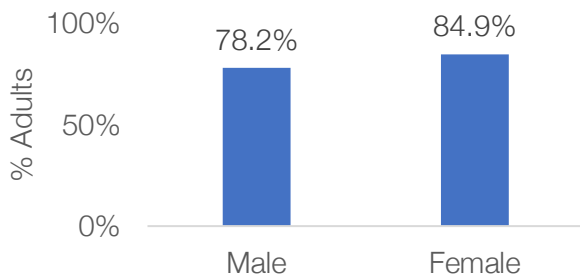
# Overweight / Obesity

BMI categories among adults in Yap, 2023

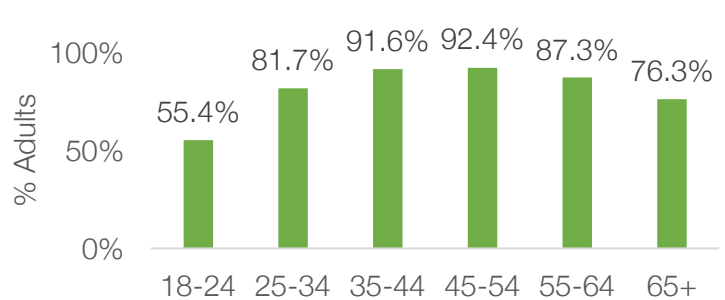


**Body Mass Index (BMI) is calculated based on height and weight measurements. About four out of five (81.9%; 95% CI: 79.4% - 84.2%) adults in Yap were overweight or obese. Overweight/obesity prevalence was significantly higher among women, those aged between 35 to 64 years old, those with higher levels of education, and those residing in Fais.**

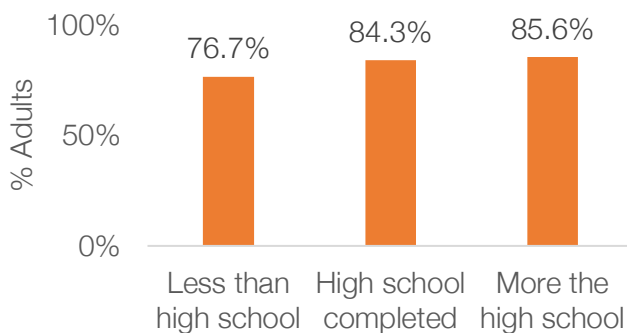
Overweight/obesity, by Gender



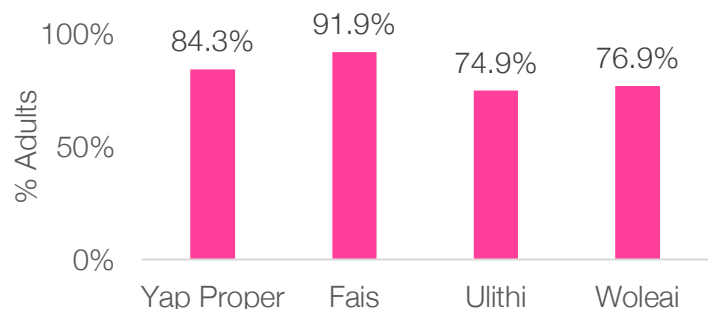
Overweight/obesity, by Age



Overweight/obesity, by Education



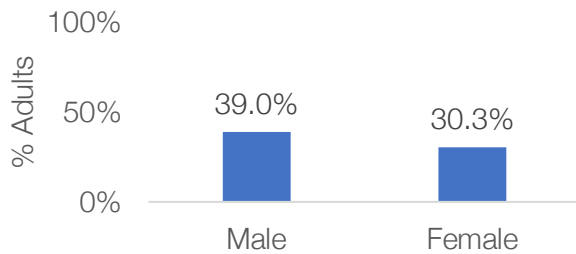
Overweight/obesity, by Location



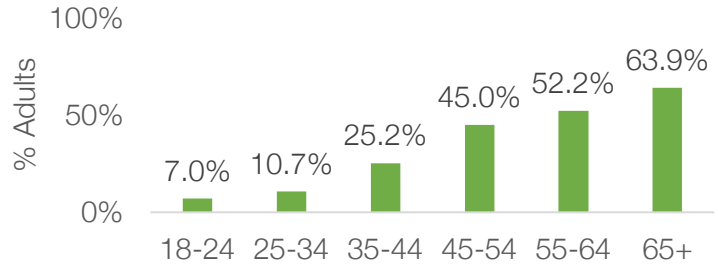
# Hypertension

Over one-third of adults (34.1%; 95% CI: 31.4% - 37.0%) in Yap 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 and was significantly higher among men, those with more than a high school education, and those residing in Yap Proper.

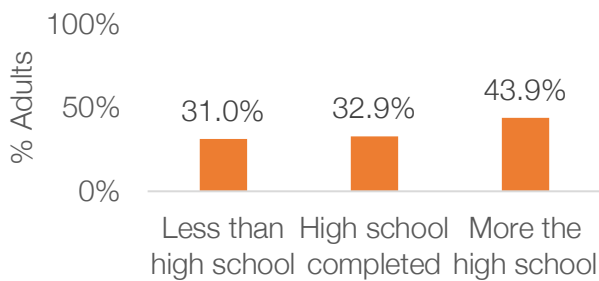
Hypertension, by Gender



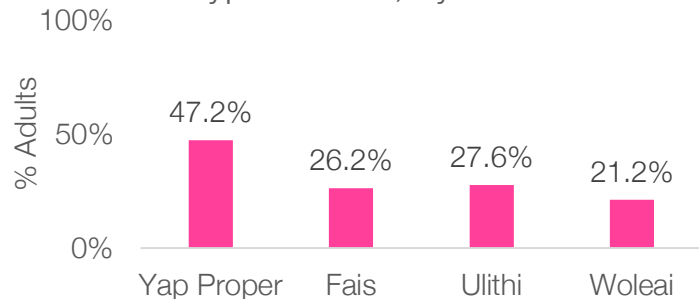
Hypertension, by Age



Hypertension, by Education

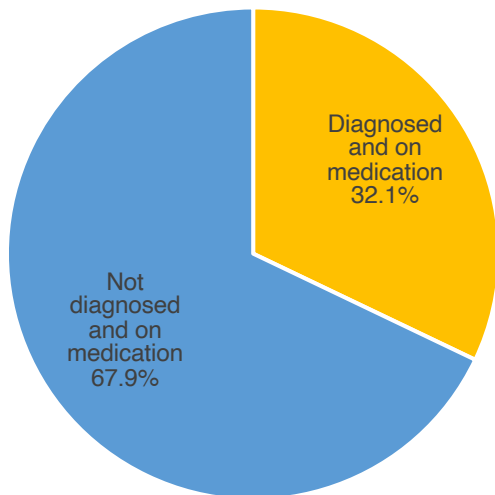


Hypertension, by Location



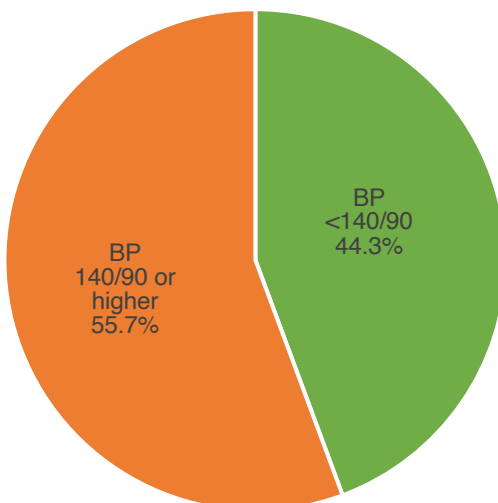
# Hypertension Diagnosis & Control

Diagnosis and medication status among hypertensives



Among the adults in Yap classified as having hypertension, 32.1% of adults reported that they were diagnosed and taking medication for their hypertension. Over two-thirds (67.9%) of adults with hypertension in Yap were not diagnosed and receiving treatment.

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

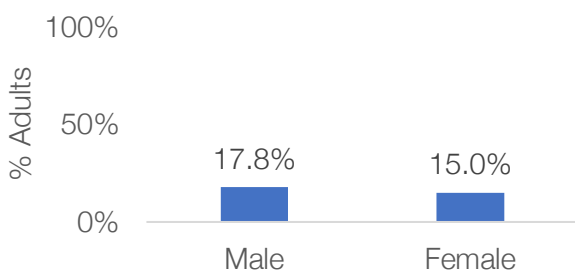


Among those adults who reported that they were diagnosed and taking medication for their hypertension, 55.7% had an uncontrolled blood pressure measurement (average blood pressure [of 3 measurements] during survey was  $\geq 140/90$ ). This indicates that these individuals with hypertension who are on medication are not controlled.

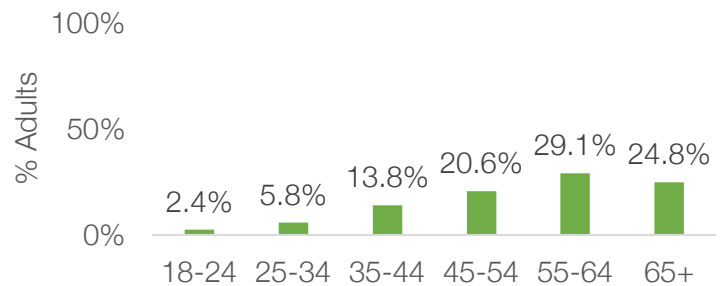
# Diabetes

**16.2% (95% CI: 14.1%-18.6%) of adults in Yap 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 significantly increased with age and was significantly higher among those residing in Yap Proper.**

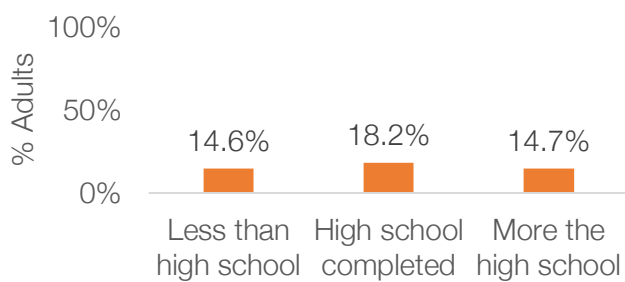
Diabetes, by Gender



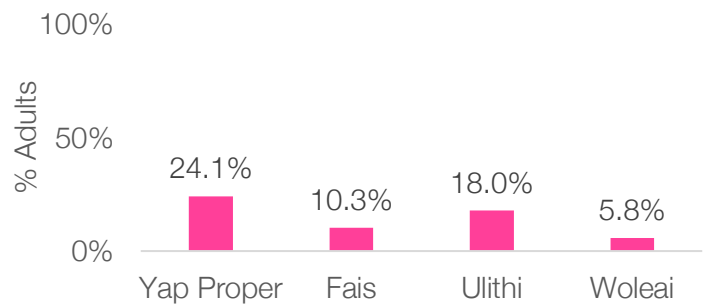
Diabetes, by Age



Diabetes, by Education

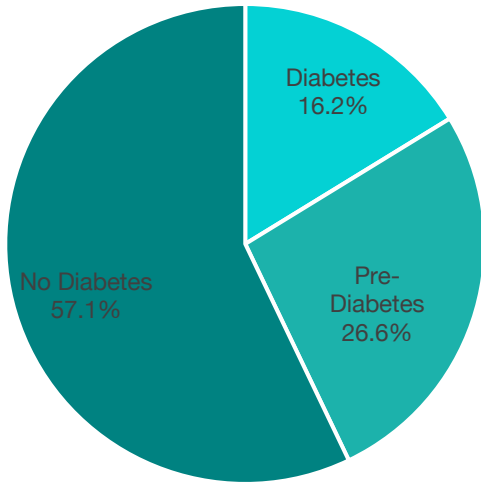


Diabetes, by Location



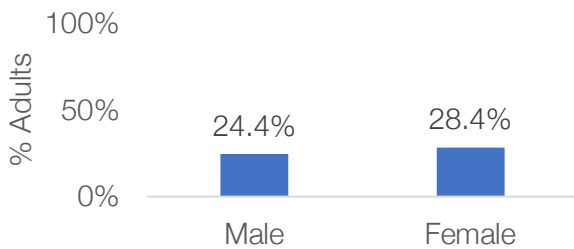
# Pre-diabetes

Adult Diabetes in Yap, 2023

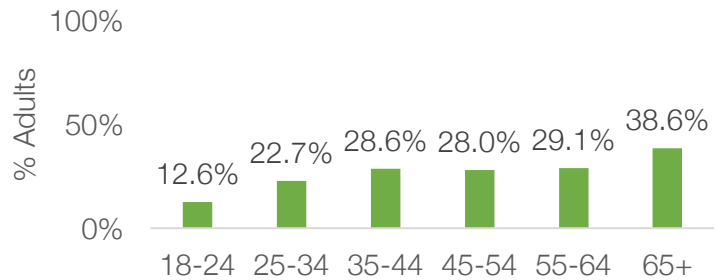


Over one out of four (27.0%; 95% CI: 24.0%-29.4%) adults in Yap were estimated to have pre-diabetes (pre-diabetes prevalence is estimated based on either a self-report of pre-diabetes and/or an A1c measurement of 5.7% - 6.4%). Pre-diabetes prevalence was significantly higher among those 65 or older.

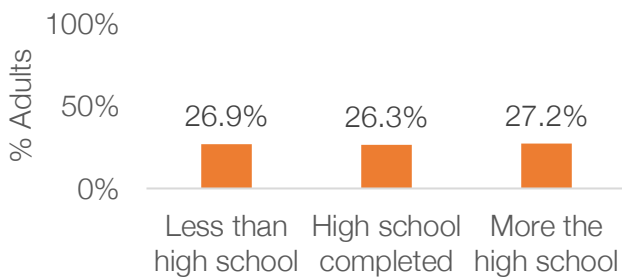
Pre-diabetes, by Gender



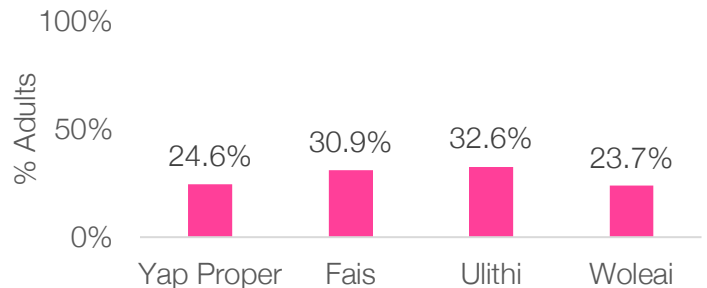
Pre-diabetes, by Age



Pre-diabetes, by Education



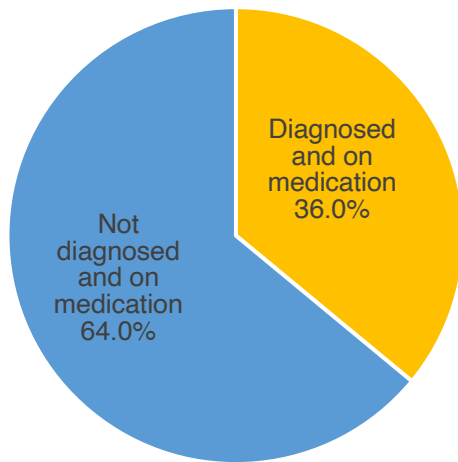
Pre-diabetes, by Location





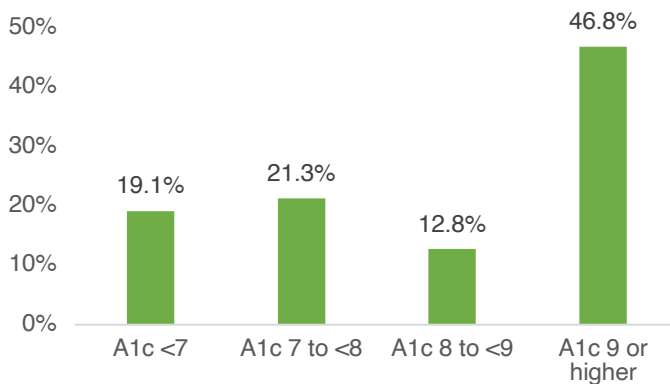
# Diabetes Diagnosis & Control

Diagnosis and medication status among diabetics



Among the adults in Yap classified as having diabetes, 36.0% of adults reported that they were diagnosed and taking medication for their diabetes. Nearly two-thirds (64.0%) of adults with diabetes in Yap are not diagnosed and receiving treatment.

A1c levels among those diabetics who are diagnosed and on medication

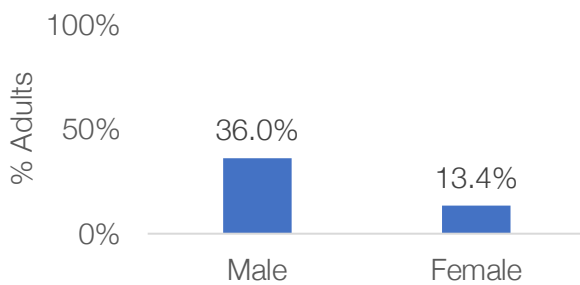


Among the adults in Yap classified as having diabetes who have been diagnosed and are on medication, less than one out of five (19.1%) are reaching the American Diabetes Association (ADA) A1c goal for diabetics of having an A1c <7%.

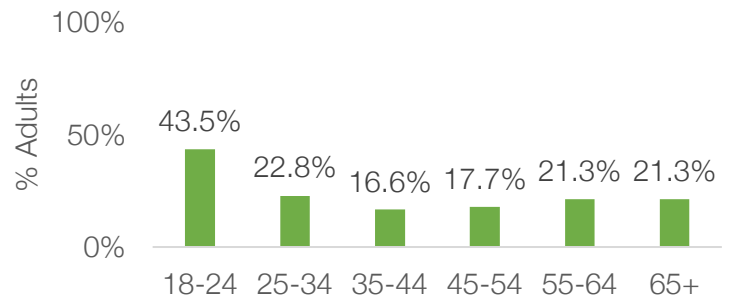
# Cigarette Smoking

Nearly one out of four (23.4%; 95% CI: 21.0% - 26.0%) adults in Yap reported cigarette smoking in the last 30 days (current smoking). Among current smokers, 46.2% reported smoking every day in the past 30 days. Cigarette smoking was significantly higher among men, young adults (18-24 year olds), those with lower education levels, and those residing in the outer islands.

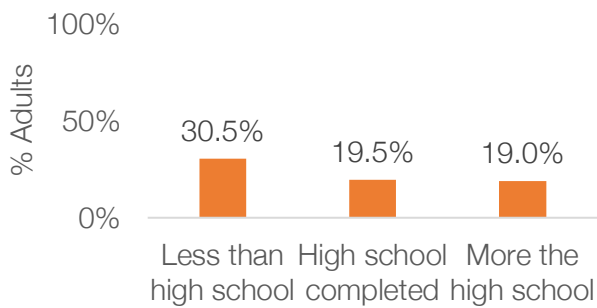
Current Smoking, by Gender



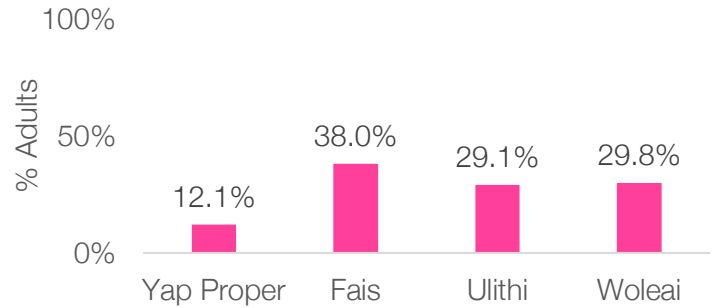
Current Smoking, by Age



Current Smoking, by Education

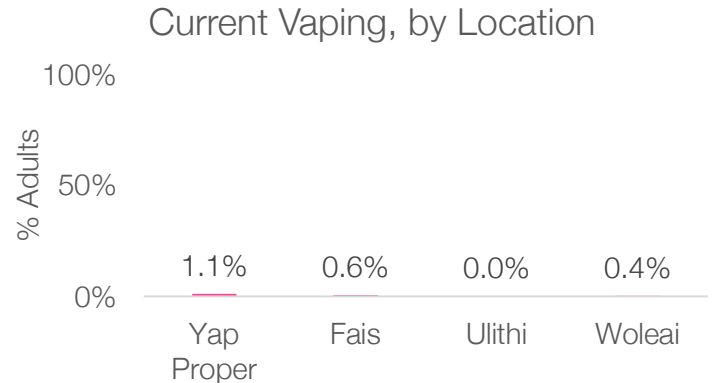
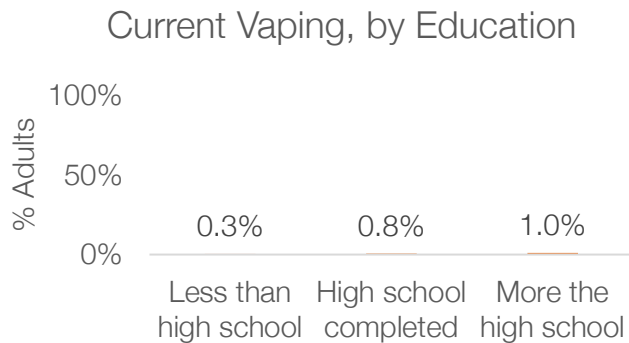
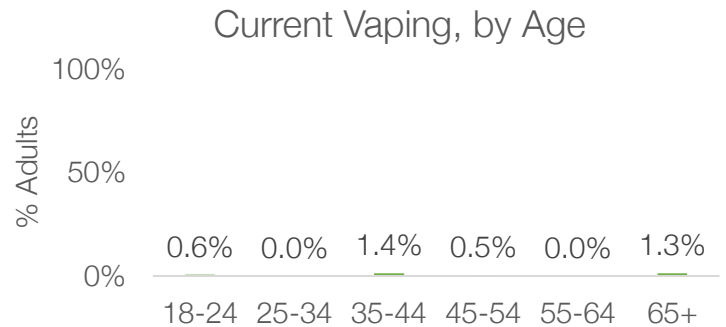
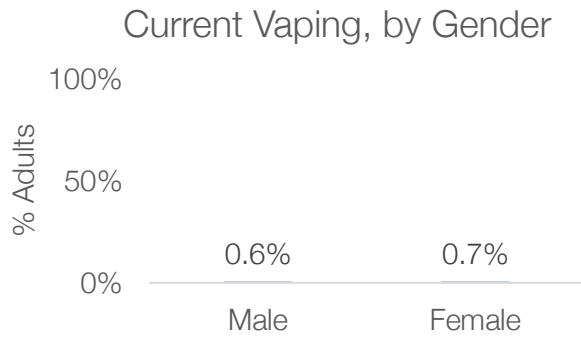


Current Smoking, by Location



# Vaping

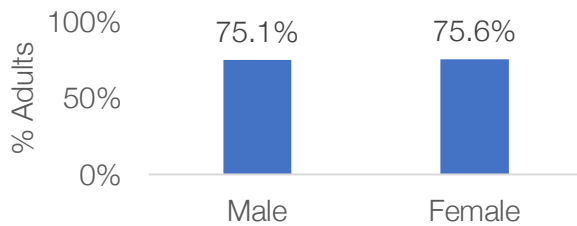
The prevalence of vaping in Yap was 0.6% (95% CI: 0.3%-1.3%). There were no significant differences by selected demographic characteristics.



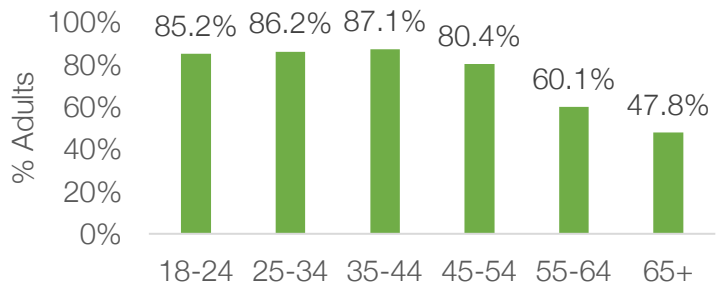
# Smokeless Tobacco Use

Over three out of four adults in Yap (75.4%; 95%CI: 72.7% - 77.9%) reported current smokeless tobacco use (use in the past 30 days). Smokeless tobacco use was significantly higher among adults less than 45 years old, those with only high school completed, and those residing in Ulithi or Woleai.

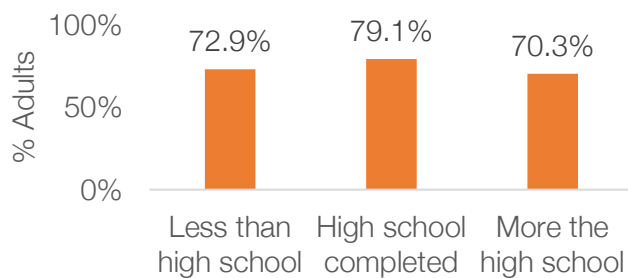
Smokeless tobacco, by Gender



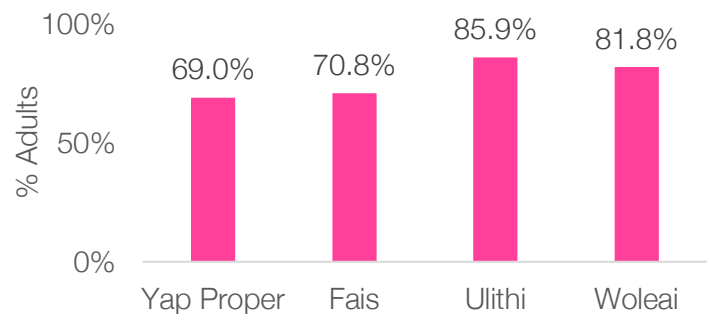
Smokeless tobacco, by Age



Smokeless tobacco, by Education

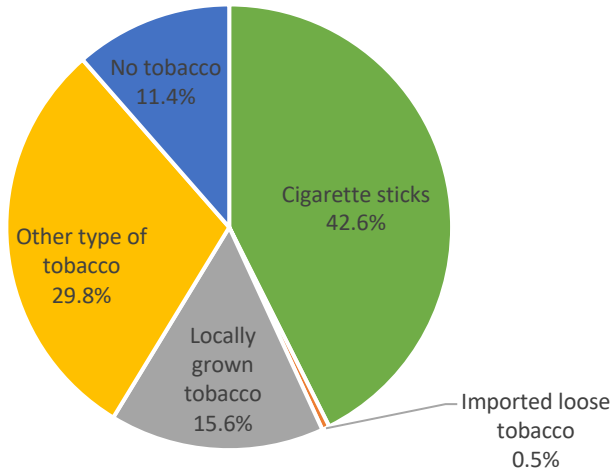


Smokeless tobacco, by Location



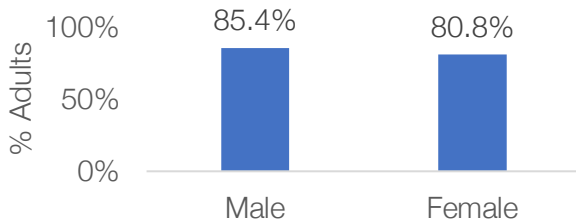
# Betel Nut Chewing

Type of tobacco added to betel nut chew among current betel nut chewers

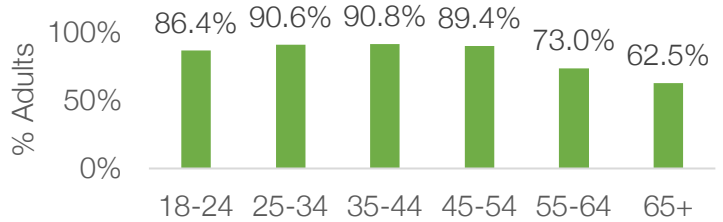


**Most adults (82.9%; 95%CI: 80.5%-85.0%) in Yap are current betel nut chewers. Betel nut chewing prevalence in Yap was significantly higher among men, adults aged less than 55 years old, those who have completed high school only, and those residing in Ulithi or Woleai. Among betel nut chewers, 88.6% reported adding tobacco to their chew. The most reported type of tobacco added to betel nut chew is cigarette sticks.**

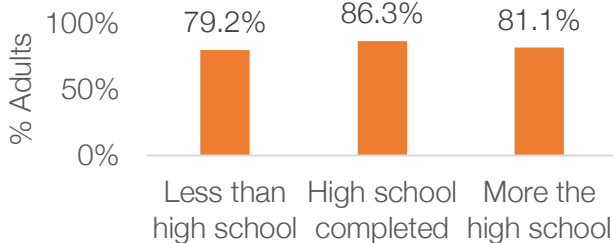
Betel Nut Chewing, by Gender



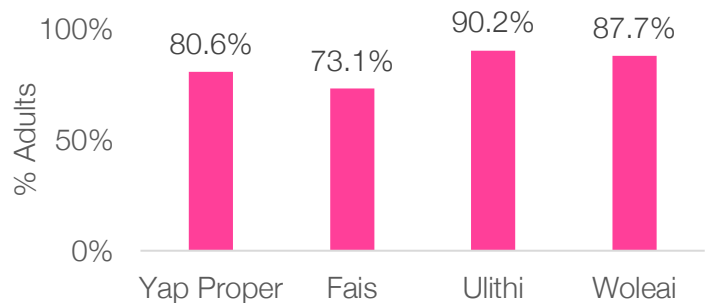
Betel Nut Chewing, by Age



Betel Nut Chewing, by Education



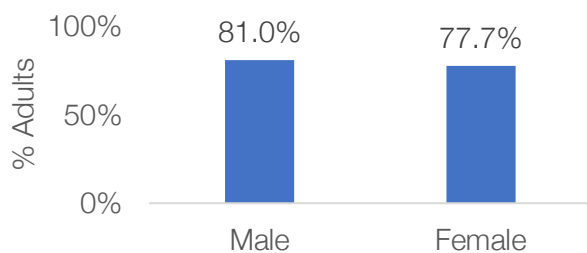
Betel Nut Chewing, by Location



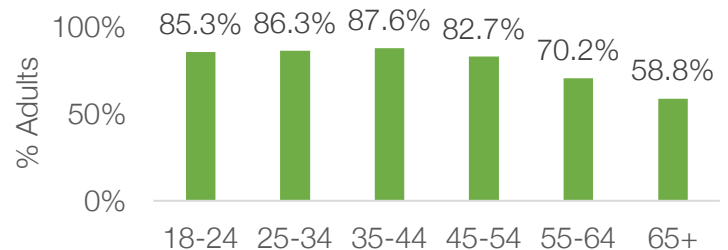
# Any Tobacco Use

Any tobacco use is defined as smoking cigarettes, chewing smokeless tobacco, or chewing betel nut with tobacco. Among all adults in Yap, 79.2% (95%CI: 76.6% - 81.5%) reported using any type of tobacco. Any tobacco use was significantly higher among adults aged less than 55 years old and those residing in Ulithi or Woleai.

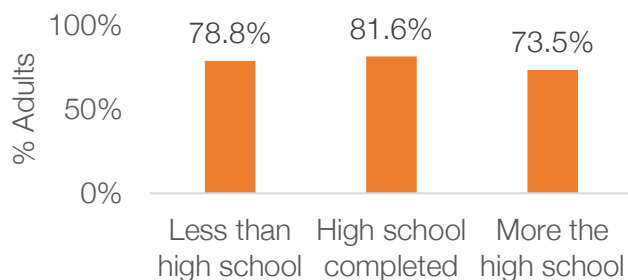
Any tobacco use, by Gender



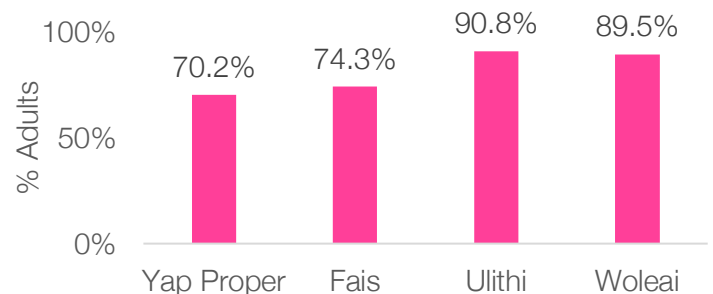
Any tobacco use, by Age



Any tobacco use, by Education



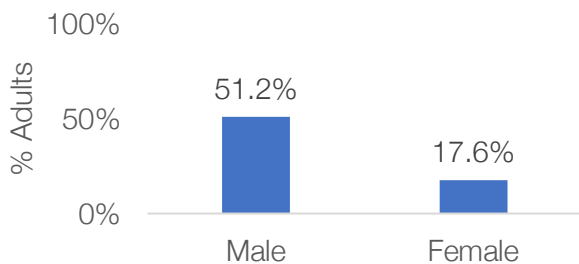
Any tobacco use, by Location



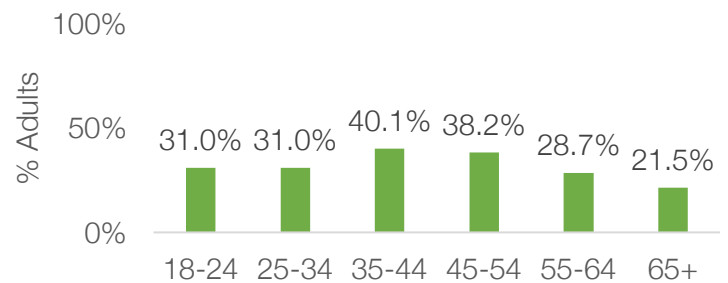
# Alcohol Use and Binge Drinking

Among adults in Yap, about one out of three (33.2%; 95%CI: 30.4%-36.1%) reported consuming alcohol in the past 30 days, and 32.5% (95%CI: 29.7%-35.3%) reported binge drinking (having 5 or more [men] or 4 or more [women] drinks per an occasion in the past 30 days). Binge drinking prevalence in Yap was significantly higher among men, adults aged 35 to 54 years old, those with a high school education or more, and those residing in the Yap Proper, Ulithi, and Woleai.

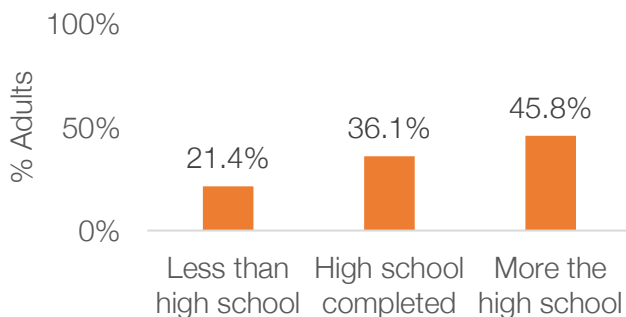
Binge Drinking, by Gender



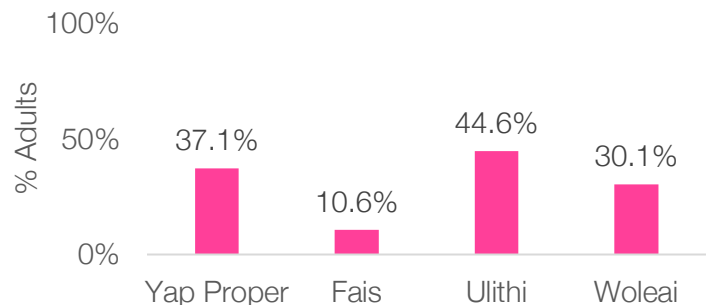
Binge Drinking, by Age



Binge Drinking, by Education



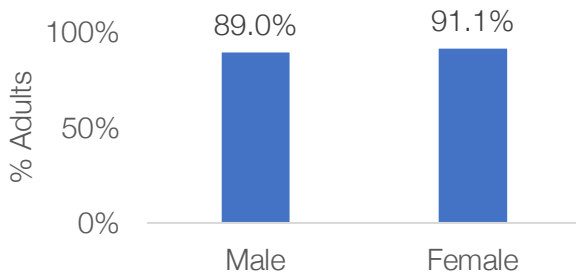
Binge Drinking, by Location



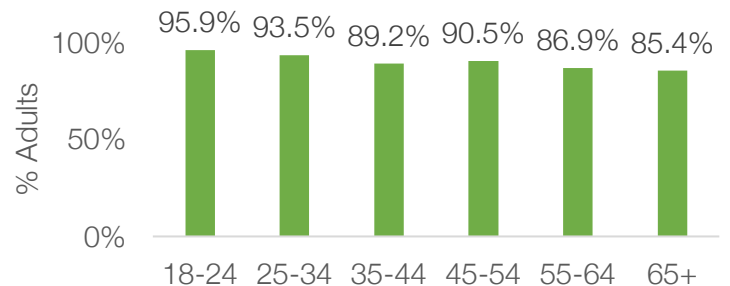
# Fruit and Vegetable Consumption

Approximately 9 out of 10 adults in Yap (90.2%; 95%CI: 88.3% - 91.9%) 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 younger than 25 years old and those residing in the outer islands.

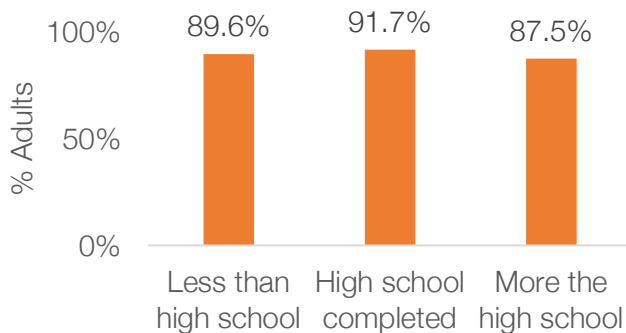
<5 servings FV, by Gender



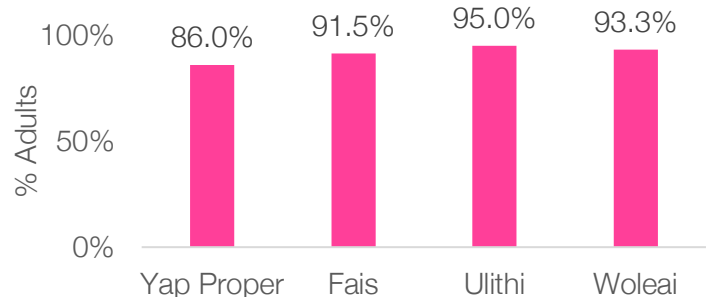
<5 servings FV, by Age



<5 servings FV, by Education



<5 servings FV, by Location

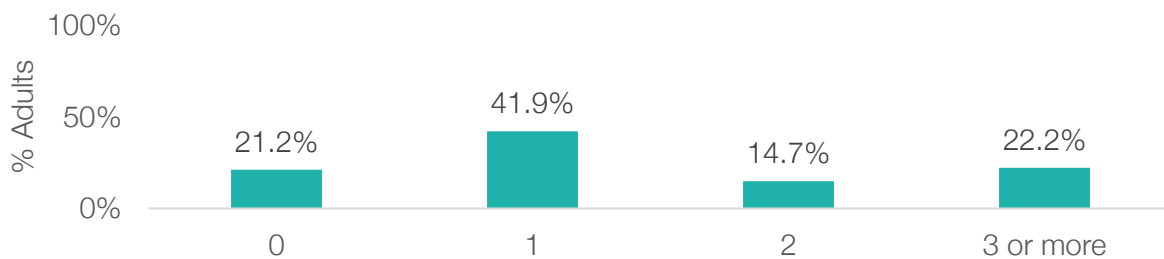




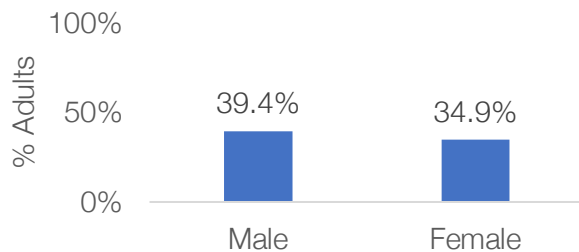
# Processed Meat Consumption

Almost two out of five adults (36.9%; 95%CI: 34.0%-39.8%) reported that they consumed processed meats two or more times per day. Heavy consumption of processed meats (2+ times per day) was significantly more prevalent among those aged 18 to 34 years old and those residing in Yap Proper.

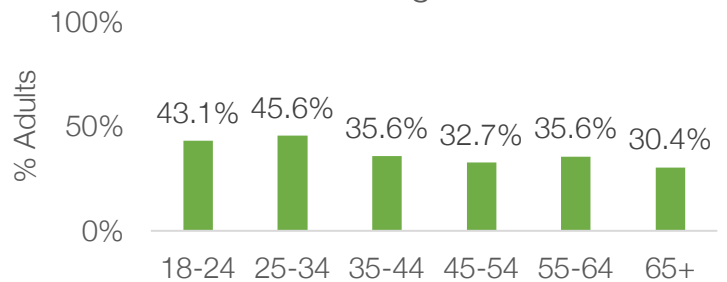
Times Processed Meats are Consumed Daily among Adults in Yap, 2023



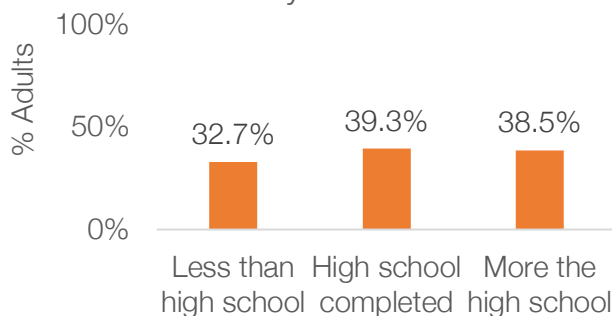
processed meats 2+ times/day, by Gender



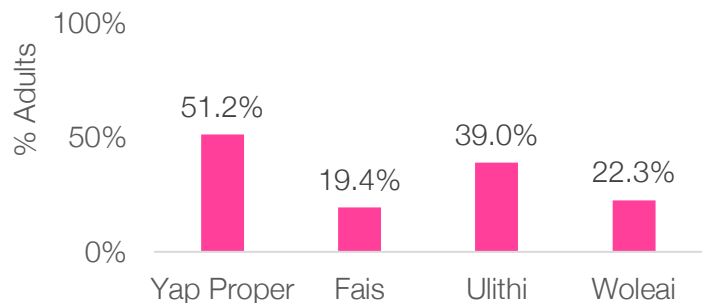
processed meats 2+ times/day, by Age



processed meats 2+ times/day, by Education



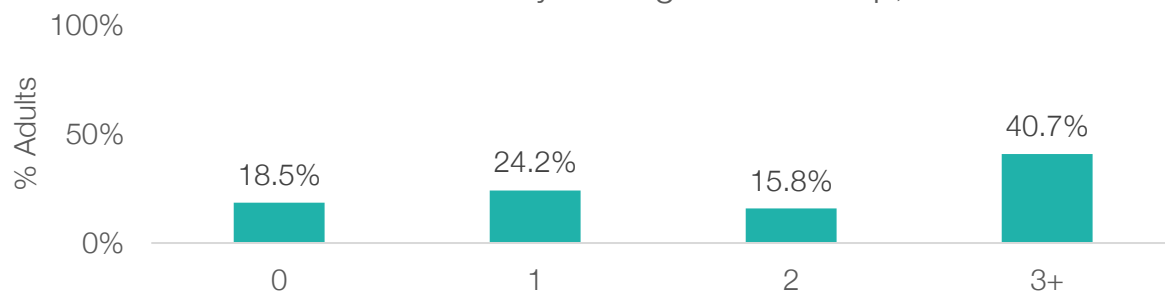
processed meats 2+ times/day, by Location



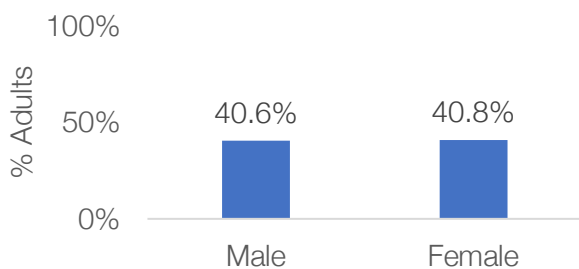
# Sugar-Sweetened Beverages

About two out of five (40.7%; 95%CI: 37.8%-43.7%) adults in Yap reported that they consumed 3 or more sugar-sweetened beverages (SSBs) per day. Heavy consumption of SSBs (3+ per day) was significantly higher among younger adults (<35 years old) and those residing in Woleai.

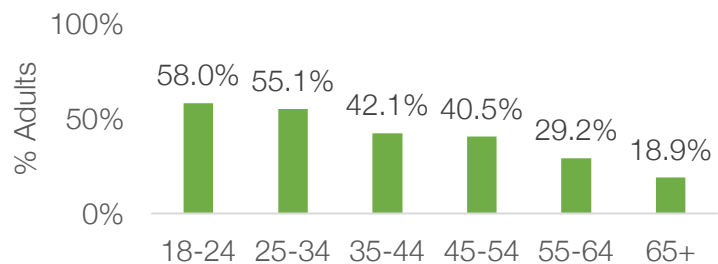
SSBs Consumed Daily among Adults in Yap, 2023



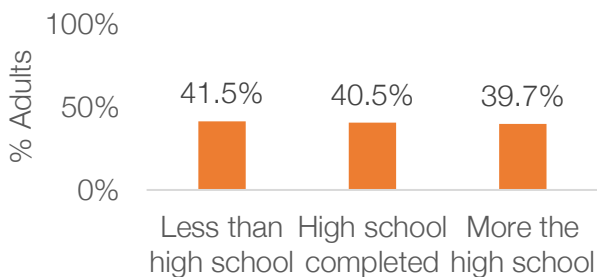
3+ SSBs per day, by Gender



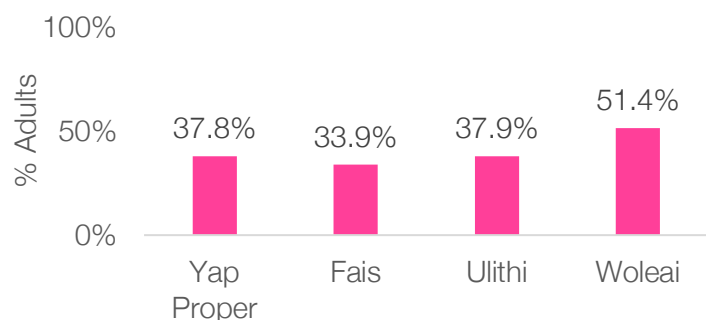
3+ SSBs per day, by Age



3+ SSBs per day, by Education



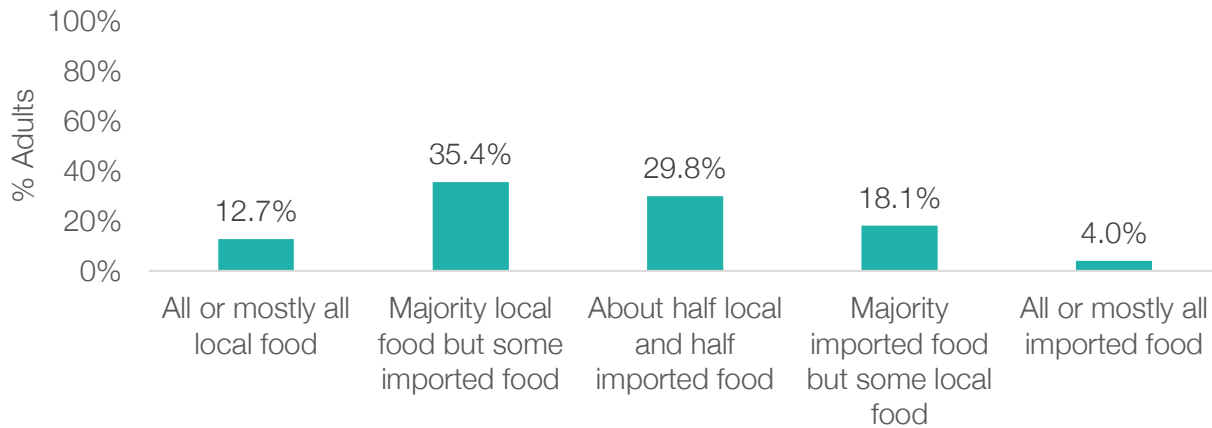
3+ SSBs per day, by Location



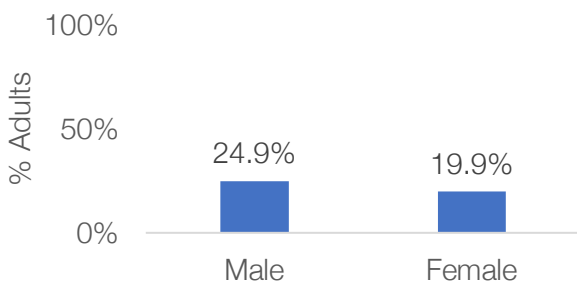
# Regular Diet

Nearly one out of four (22.1%; 95%CI: 19.7%-24.7%) adults in Yap reported that they consume a majority of imported food but some local food or all or mostly all imported food. Majority or all imported food consumption was significantly higher among men, those between the ages of 25 to 54 years, those with more than a high school education, and those who reside in Ulithi.

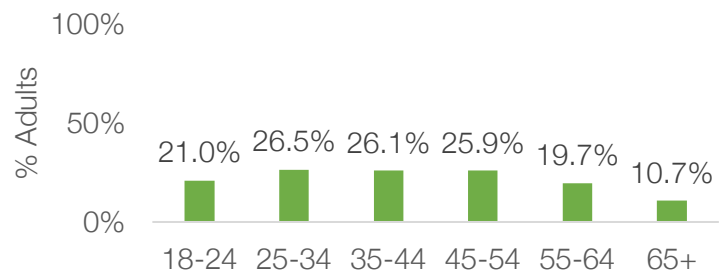
Regular diet among Adults in Yap, 2023



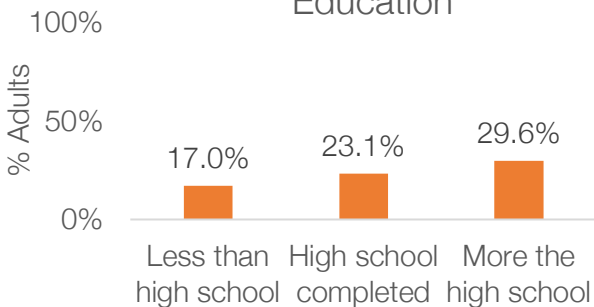
Mostly or all imported food, by Gender



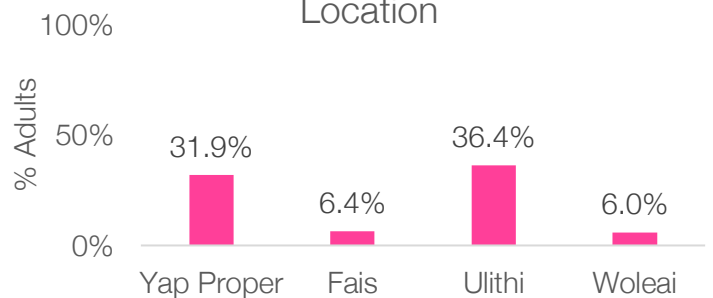
Mostly or all imported food, by Age



Mostly or all imported food, by Education

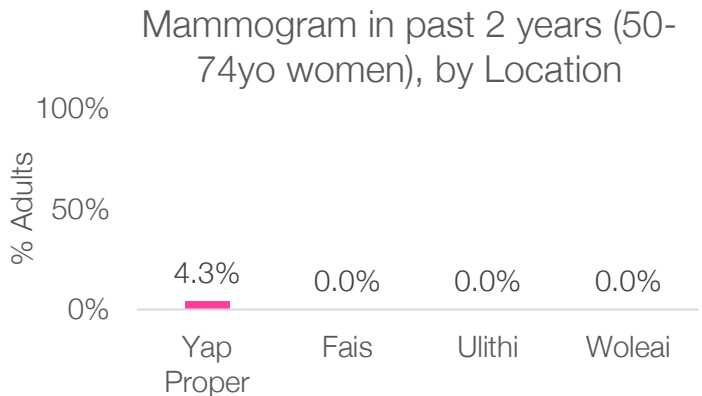
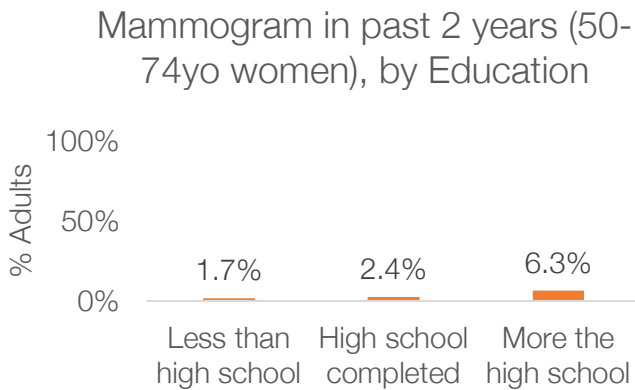
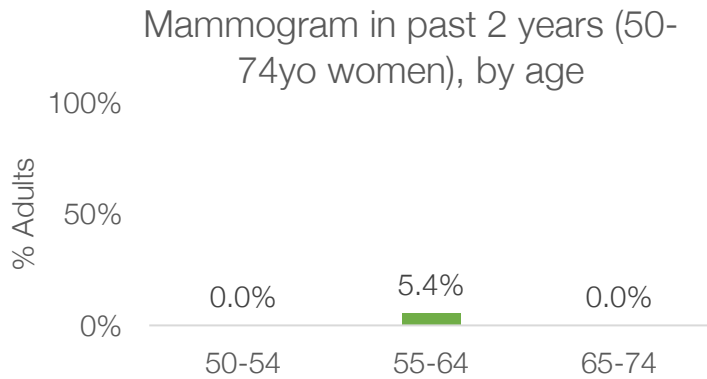


Mostly or all imported food, by Location



# Female Cancer Screening: Mammogram

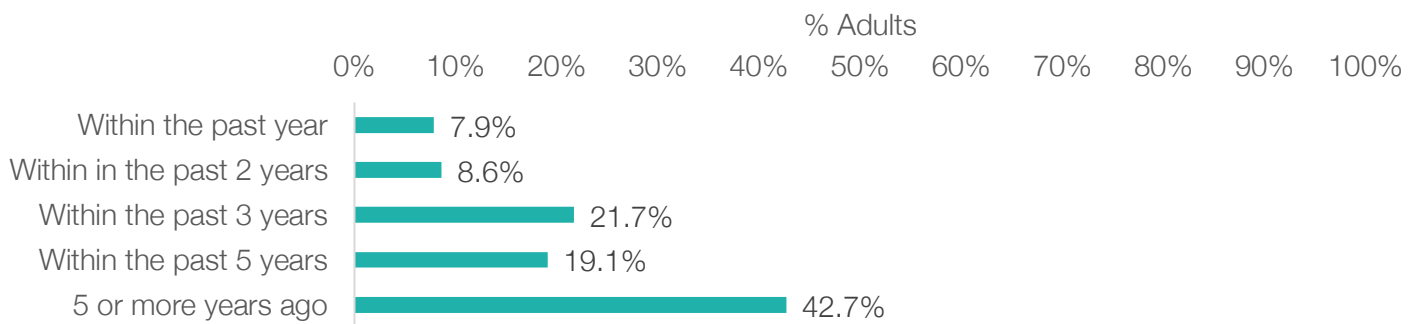
Very few women (2.5%; 95% CI: 0.9%-5.5%), aged 50 to 74 years, in Yap have received a mammogram in the past two years per the US Preventative Services Task Force (USPSTF) recommendation.



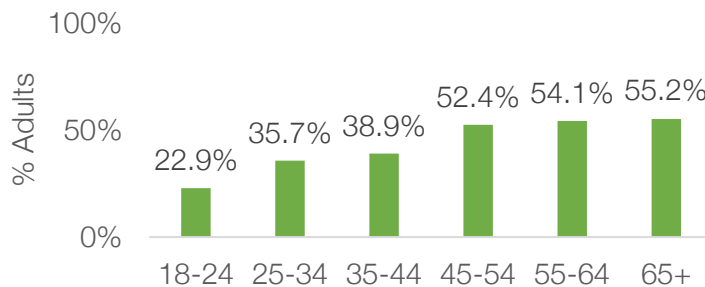
# Female Cancer Screening: Clinical Breast Exam

Nearly half (44.0%; 95% CI: 40.0% - 48.0%) of women in Yap reported ever having a clinical breast exam. Ever having a clinical breast exam prevalence was significantly higher among women aged older than 44 years, those with a high school degree or higher, and those residing in Yap Proper.

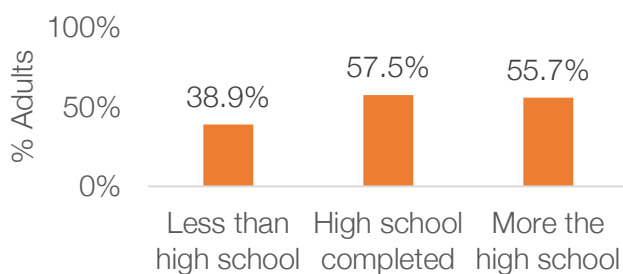
Last CBE among women who reported ever having a CBE



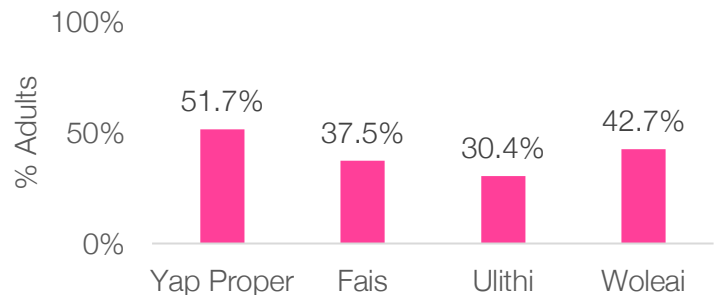
Ever had a CBE, by Age



Ever had a CBE, by Education

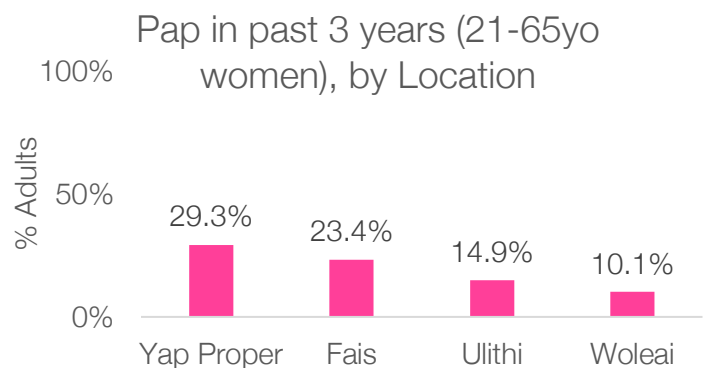
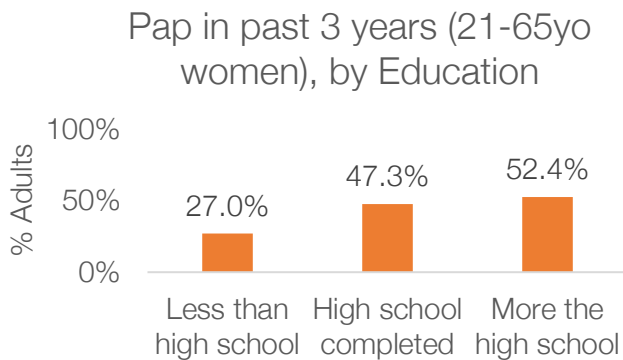
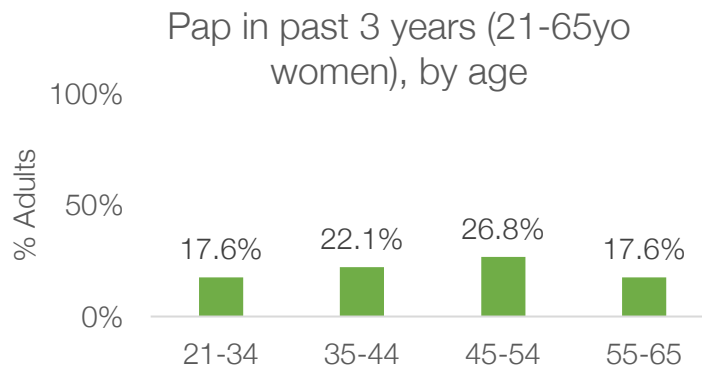


Ever had a CBE, by Location



# Female Cancer Screening: Pap Smear

About two out of five women (20.9%; 95%CI: 17.4%-24.8%), aged 21-65 years in Yap had a pap smear or visual inspection with acetic acid (VIA) in the past 3 years (per USPSTF guidelines). Having an up-to-date cervical cancer screening was significantly higher among women with a high school education or more and those residing in Yap Proper.



# Important Notes About the Survey

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## Limitations:

- A good portion of the data collected are self-reported, thus bias may exist, specifically on the more sensitive topics about substance use. Therefore, certain indicators may be over or under-reported.
- The sample was comprised of relatively more females, and the outer islands are over-represented. 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 due to emigration.

## Strengths:

- Physical and biochemical measurements were conducted for NCD prevalence estimation rather than only through self-reported data collection.
- Quality and thorough training was provided for all surveyors over the course of three days.
- The 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:

- Due to the COVID-19 pandemic, there was a gap in data collection between the outer islands and the main islands.
- There were challenges locating households and addressing vacant households. This is due to the fact that the Census data available were from 2010 and there has been significant emigration from Yap since then.

# Discussion and Recommendations

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This adult Hybrid Survey provides much-needed information about the status of NCDs and risk factors in Yap, which complements data from youth school surveys (that provide a picture of how well we are protecting youth from the 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 Yap and the US. Based on these comparisons, it is evident that almost all health indicators are significantly worse in Yap compared to the US. The trend data in Yap from 2013 to 2023 were also examined, which indicated that almost all core indicators (for which we have comparable data) have worsened. The only indicator that improved was tobacco chewing prevalence. However, the use of tobacco through cigarette smoking increased significantly. Additionally, binge drinking prevalence increased significantly. 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 Yap, 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 given the concerning rise in overweight/obesity and hypertension prevalence, and the high prevalence of diabetes.

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 control includes, 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 indicate that there is a 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 15% of people with diabetes and 14% of those with hypertension have their disease under good control, and many adults do not have up-to-date



cancer screening (97% for breast cancer, and 79% for cervical cancer). Much more aggressive efforts are needed to ensure that more adults receive the screening services they need for cancer prevention and access to follow-up and care that those with diabetes and hypertension need to protect them from complications and death. It should be noted that Yap lacks some of the medical technology and specialized medical professionals necessary for some of these screening tests (for example there is no mammogram machine in Yap), therefore alternative technologies should be explored when necessary. Additionally, there have been challenges with stock outs of screening supplies for procedures such as Pap/VIA, so there is a need to strengthen supply monitoring systems, and improve systems for procurement in order to ensure steady supplies for disease screening.

### **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 Yap.
3. Develop a strategy across health service agencies to monitor care delivery, and provide expanded outreach, tracking, and accessible services for the care of patients with NCDs.
4. Provide appropriate services and support for substance use and mental health.

### **Priority areas for health improvement in Yap 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 Yap.
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

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- Neighboring Island Chiefs and residents of Fais; Falalop, Ulithi; and Falalop, Woleai
- Neighboring Island Hybrid Survey team
- Main Island Hybrid Survey team
- Yap Cancer Program
- Non-Communicable Disease (NCD)/Diabetes Program
- Yap Dept. of Health Services administration and Public Health Division
- Wa'ab Community Health Center CEO and his staff
- Wa'ab Healthy Lifestyle Coalition (WHLC)
- Pacific Island Health Officers' Association (PIHOA)
- US Centers for Disease Control and Prevention (CDC)
- The Pacific Community (SPC)

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