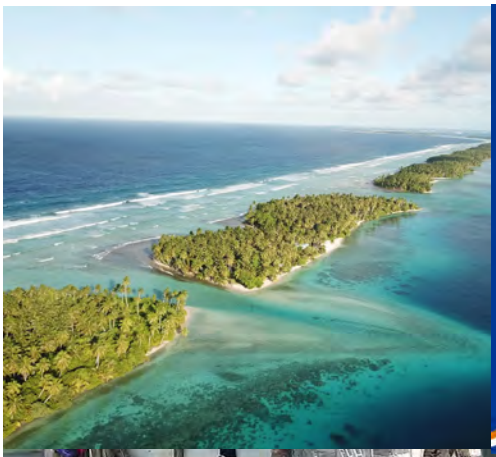
Republic of the Marshall Islands

Adult Hybrid Survey




2023

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JOINT MESSAGE OF APPRECIATION FOR THE 2023 RMI NCD HYBRID SURVEY

Iokwe Aoelp,

On behalf of the Ministry of Health and Human Services, we express our deepest gratitude to each and every partner and stakeholder who has contributed to the success of the *2023 RMI NCD Hybrid Survey*. Your unwavering commitment, expertise, and collaboration have been instrumental in ensuring that this survey is not just a collection of data, but a powerful tool that will drive the transformation of our nation's health.

The information gathered through this survey is more than just numbers; it is the foundation upon which we will build targeted and effective strategies to combat non-communicable diseases (NCDs) in the Republic of the Marshall Islands. This is a pivotal moment in our journey toward improving the health and well-being of our people, and we could not have reached this point without the dedication and hard work of all involved.

We are especially thankful to our key partners, including the Marshall Islands Epidemiology and Prevention Initiative (MIEPI), the Pacific Island Health Officers Association (PIHOA), and the Centers for Disease Control and Prevention (CDC). Our gratitude also extends to the traditional leaders, mayors, councils, and communities of Majuro, Kwajalein, Arno, Kili, Wotje, and Jaluit Atolls, whose leadership and support were essential to this success. We also honor the efforts of the 2023 Hybrid Surveyors, whose invaluable contributions have made this survey possible.

While the prevalence of NCD risk factors remains a significant challenge, we are committed to building on this data to address the root causes of these diseases at every level—individual, community, and national. As we continue this critical work, we are reminded of *Kumiti Ejmour—Health is a Shared Responsibility*. This work will require the ongoing dedication and partnership of all stakeholders, as well as the collective will of our people. Together, we have the power to make meaningful, lasting changes for a healthier future.

Let us continue to unite in this mission. With your continued support, we will pave the way to a future where NCDs are reduced, managed, and ultimately prevented, creating a healthier, more vibrant Marshall Islands for generations to come.

Hon. Ota Kisino
Minister of Health and Human Services

Francyne Wase-Jacklick
Secretary of Health and Human Services

Summary

The aim of this report is to assess the current prevalence of non-communicable diseases (NCDs) and selected risk factors in The Republic of Marshall Islands (RMI). We hope this report enables RMI to better understand its burden of disease, monitor trends, and understand health disparities to improve the nation's wellbeing 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. NCDs, substance use, 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. Diabetes is a major concern in RMI. The hospital is overburdened with diabetes patients, often presenting at late stages, and requiring amputation and dialysis (not available in-country). The outer islands present a challenge for healthcare delivery and data collection, especially for NCDs. A lot of resources are used for late-stage diabetes treatment. Nutrition is a real challenge due to limited land and very little food produced locally. There is a significant reliance on imported foods that are often processed, nutrient poor, and calorie dense. Although NCDs are a priority in RMI, other health issues should not be overlooked, to include maternal-child health issues, child malnutrition, sexually transmitted infections, mental health, and infectious disease.

The Republic of the Marshall Islands undertook a novel population-based household survey that combined NCD and associated risk factor indicators for the first time in 2018. Therefore, this was the second round of this survey, so trend data are now available. In this 2023 survey, a total of 2,678 individuals aged 18 years or older participated in the survey from the islands of Majuro, Kwajalein, Arno, Jaluit, Wotje, and Kili. Although all islands were not surveyed, the islands included contain 86% of the overall population of RMI. Respondents answered questions about their alcohol and tobacco use, other substance use, dietary habits, physical activity, health access, oral health, health conditions, and cancer screening. Additionally, height and weight, Hemoglobin A1c, and blood pressure were measured.

RMI vs. USA

Here are RMI's 2023 Hybrid Survey prevalence data compared to U.S. prevalence data using the most comparable sources available. Due to lack of raw data from the US, statistical analysis could not be performed. It should be noted that almost all selected indicators had a higher prevalence in RMI compared to the US highlighting substantial health disparities.

	RMI %	US %	Comparison
Current tobacco use (past 30 days)			
Cigarette smoking	21.2	14.0	↑
Smokeless tobacco use*	16.6	3.4	↑
E-cigarette use	5.8	7.7	↓
Current alcohol use (past 30 days)			
Alcohol use (any)	21.7	53.6	↓
Binge drinking (5+ drinks per day)	17.2	17.0	○
Nutrition			
Consuming fruit <1 time per day	68.6	40.8[1]	↑
Consuming vegetables <1 time per day	69.8	19.7[1]	↑
Health and healthcare			
Fair or poor health (self-reported)	26.3	17.0	↑
No medical checkup in the past year	60.0	23.2	↑
Oral health			
No dental visit within past year	72.2	34.2	↑
Extracted permanent teeth due to decay/disease	80.0	40.3	↑
Chronic conditions			
Overweight/obesity	73.0	73.1[2]	○
Diabetes (self-reported + undiagnosed)**	28.5	14.7[3]	↑
Hypertension (self-reported + undiagnosed)**	25.1	31.7[4]	↓
Cancer screening			
No Pap smear in the past 3 years (women 21-65 yo)***	73.0	22.3[5]	↑
No mammogram in the past 2 years (women 50-74yo)	77.3	21.7[5]	↑

*Smokeless tobacco use in RMI is defined as use of smokeless tobacco and/or chewing betel nut with tobacco.
**Diabetes prevalence is estimated based on either a self-report of diabetes for which the patient is taking medication and/or a single fasting blood sugar of 126mg/dL or higher (2018) and/or A1c of 6.5% 2023) during the survey; Hypertension prevalence is estimated based on either a self-report of hypertension for which the patient is taking medication and/or a measured average blood pressure (of 3 readings) of ≥140/90.
***In RMI, cervical cancer screening is classified as having a Pap or Vaginal Inspection by Acetic Acid (VIA)
Source for US comparison: BRFSS 2022 unless noted with [1]BRFSS 2021, [2]NHANES 2017-2018 (adults 20+), [3]CDC National Diabetes Report 2022 (includes diagnosed and undiagnosed diabetes) [4]NHANES 2017-2018 (adults 18+; includes diagnosed and undiagnosed hypertension), [5]BRFSS 2020

Surveillance in RMI:

The table below compares the 2018 RMI Hybrid Survey prevalence data to the 2023 RMI Hybrid Survey prevalence data. Chi-square tests were used to generate p-values to test for significant changes. Of all indicators compared, eight worsened (chewing tobacco, using betel nut, alcohol use, binge drinking, having a well visit in the past year, having a dental visit in the past year, cervical cancer screening, and hypertension) and three improved (fruit & vegetable consumption, sugar-sweetened beverage consumption, and self-reported fair or poor health status).

	2018%	2023%	p-value	Comparison
Current tobacco and betel nut use				
Cigarette smoking in past 30 days	22.6	21.2	0.23	○
Chewing tobacco in past 30 days	13.1	16.6	<0.01	↑
Used betel nut in past 30 days	13.8	17.0	<0.01	↑
Used e-cigarettes in past 30 days	5.5	5.8	0.15	○
Current alcohol use				
Alcohol use in past 30 days	16.3	21.7	<0.01	↑
Binge drinking in past 30 days	14.8	17.2	0.01	↑
Nutrition				
<5 servings of fruits and vegetables per day	94.5	90.7	<0.01	↓
2+ sugar sweetened beverages per day	54.6	50.9	<0.01	↓
General Health and Healthcare Access				
Self-reported fair or poor health	31.6	26.3	<0.01	↓
Well visit in the past year	48.5	40.0	<0.01	↓
Oral Health				
Dental visit in the past year	38.5	27.8	<0.01	↓
Any missing teeth due to tooth decay or gum disease	79.9	80.0	<0.01	○
Cancer Screening				
Pap or VIA in past 3 years (21-65yo women)	33.6	27.0	<0.01	↓
Mammogram past 3 years (50-74yo women)	22.0	22.7	0.83	○
Colonoscopy in past 10 years (50-74yo)	7.9	5.9	0.14	○
Chronic conditions				
Overweight/obesity	72.5	73.0	0.68	○
Diabetes (self-reported on meds or ≥126mg/dL)	26.8	28.5	0.16	○
Hypertension (self-reported on meds or ≥140/90)	21.0	25.1	<0.01	↑

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]) [1].

On May 25, 2010, the Pacific Island Health Officers Association (PIHOA) declared a Regional State of Health Emergency due to the epidemic of non-communicable diseases in the USAPIs due to the fact that NCDs account for around 70-75% of all deaths in the region [2]. The NCDs of concern in the USAPIs include diabetes, heart disease, stroke, cancer, and chronic obstructive pulmonary disease [2,3]. Risk factors for developing NCDs within these island jurisdictions are among the highest in the world. This includes tobacco use, poor diet, sedentary lifestyles, and binge drinking [2]. In most of the USAPIs, betel nut (which is carcinogenic to human) chewing with or without tobacco is also identified as a significant health problem [4].

Diabetes is a major concern in the RMI. The diabetes epidemic has been linked to lifestyle changes such as, increased dietary fat intake, reduced fiber intake, and reduced physical activity. Other factors such as socioeconomic status, degree of urbanization, and access to health care have also been shown to affect the prevalence of diabetes on these islands [5]. Hospitals are overburdened with diabetes patients, who often present at late stages, oftentimes requiring amputation and dialysis.

Key components of PIHOA's response to the NCD crisis include strengthening NCD surveillance systems and building epidemiologic capacity to improve data quality and reporting in the USAPIs. Prior to the development of the Hybrid Survey, the last NCD adult population-based survey in RMI was conducted in 2002. Due to the need for current NCD and risk factor prevalence data, the Marshall Islands Epidemiology Prevention Initiative (MIEPI), a local NGO, and the RMI Ministry of Health and Human Services (MoHHS) combined efforts to develop and implement an adult population-based Hybrid Survey initially in 2018, then again in 2023. Other support was provided by PIHOA, the Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), the Association of State and Territorial Health Officials (ASTHO), and the Pacific Community (SPC). The Hybrid survey was developed to assess NCD risk factors and NCD conditions through self-diagnosis, as well as physical and biochemical measurements.

The Republic of the Marshall Islands (RMI) is comprised of 24 coral atolls, with a total of 1,156 individual islands and islets located in the North Pacific Ocean. The major district centers are Majuro, Ebeye, Wotje, and Jaluit. The islands are made up of coral caps set on the rims of submerged volcanoes. RMI has a total land area of 70 square miles that are scattered over the country's Exclusive Economic Zone of over 750,000 square miles [6].

Image source: http://www.spc.int/our-members/marshall-islands/

The Republic of Marshall Islands has been a sovereign nation since 1986 with a Compact of Free Association with the U.S. Majuro is the capitol and largest city of RMI. Majuro and Kwajalein are accessible by international airlines. Flights between these islands and 26 other outer islands are also available through Air Marshall Islands airlines [6]. The population of RMI is 41,575 (2021 Census). A majority of the population (78%) resides on Majuro and Kwajalein atolls. The poulation density on these two atolls is quite high. Majuro has a total land mass of 3.75 square miles with a population of 22,873 (6,099 people/mile^2). Kwajalein is comprised of 97 islands and islets and has a land area of 6.33 square miles [7]. Ebeye, an island on Kwajalein atoll is the most populous with 9,739 people on 0.12 square miles (81,158 people/m^2). Although the fertility rate in RMI is quite high, the population is decreasing due to out migration.

Accessibility to healthcare for the residents of RMI is mixed. While private clinics are available, the majority of RMI residents use the public healthcare system. There are two hospitals, one in Majuro and one in Ebeye. The are 56 outer island health centers managed by the hospital in Majuro by the Office of Outer Islands. Information from these offices are communicated to the Majuro Hospital via radio. Lastly, there are 5 outer island health centers that are managed by the 177 healthcare program for victims of nuclear fallout. The 177 healthcare program is a U.S. federal grant that supports U.S. doctors to manage these health centers.

Survey Methodology

The RMI Hybrid Survey aimed to assess the prevalence of selected NCDs, risk factors, and substance use, which includes questions from validated instruments such as the Behavioral Risk Factor Surveillance System (BRFSS), STEPwise approach to Surveillance (STEPS), and National Health and Nutritional Examination Survey (NHANES), as well as locally developed questions as needed.

Objectives

1. Inform the community on NCD and risk factor current prevalence and trends
2. Use these data to prioritize and tailor NCD prevention programs
3. Support further research on NCD risk and protective factors in RMI
4. Use these data to monitor progress in the fight against NCDs in RMI

Target group

Participants eligible for the RMI Hybrid survey will include all RMI residents aged 18 years and over residing in Majuro, Kwajalein, Arno, Jaluit, Wotje, and Kili who were able to comprehend either English or Marshallese and provide consent.

Data collection

Data collection began on August 17, 2023 and ended on December 21, 2023. A total of 2,678 respondents completed the survey and measurements. All interviews and measurements were performed by trained surveyors recruited by the Marshall Islands Epidemiology Prevention Initiative (MIEPI).

Sample size

The original sample included 3,065 adults. Sample size was determined based on overall adult populations on selected islands in the Republic of the Marshall Islands. (Majuro = 1638; Ebeye = 627; Kili = 200 Wotje = 200; Jaluit = 200; Arno = 200). The final response rate was 82.0%).

Sampling procedures

Stage 1: Households were identified at random according to geographical stratification in Majuro and Ebeye. The country was stratified into two major groups, Urban (Majuro and Ebeye) and Rural (all outer islands). In Majuro and Ebeye, households were randomly sampled from the 2021 Census household listing.
Stage 2: In Majuro and Ebeye, one individual was selected at random from each household using the KISH table method. All adults in Kili, Arno, Wotje, and Jabwor, Jaluit atolls were included in the sample because the adult populations are about 200 each on these atolls.

Data collection

Surveys were translated and available in Marshallese and English. Data were collected by trained surveyors using face-to-face questionnaires followed by physical and biochemical measurements conducted at central locations the following morning for fasting 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 weekly basis at the MIEPI Office.

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, 45-55 yo, 55-64 yo, 65+ yo)
- **gender** (male, female)
- **location** (Majuro, Kwajalein, Arno, Jaluit, Kili, Wotje)
- **education** (high school education or less, more than high school education)

Sample Summary

The sample randomly selected to participate in the Republic of the Marshall Islands (RMI) Hybrid Survey appears to be representative of the total population in RMI. The demographic distributions of the 2021 Census are relatively similar to the distributions of the survey sample demographics.

	Survey sample	2021 Census data (ages 18+)
	n=2,869	n=24,747
Gender		
Male	1,318 (49%)	12,595 (51%)*
Female	1.360 (51%)	12,152 (49%)
Age group		
18-24 years	517 (19%)	5,391 (22%)
25-34 years	573 (21%)	5,523 (22%)
35-44 years	608 (23%)	5,686 (23%)
45-54 years	484 (18%)	4,129 (17%)
55-64 years	329 (12%)	2,552(10%)
65+ years	167 (6%)	1,466 (6%)
Atoll		
Majuro	1,389 (52%)	23,156 (55%)*
Kwajalein	487 (18%)	9,789 (23%)
Outer Atolls	802 (30%)	9,473 (22%)

* Census data reported for all ages

Demographics

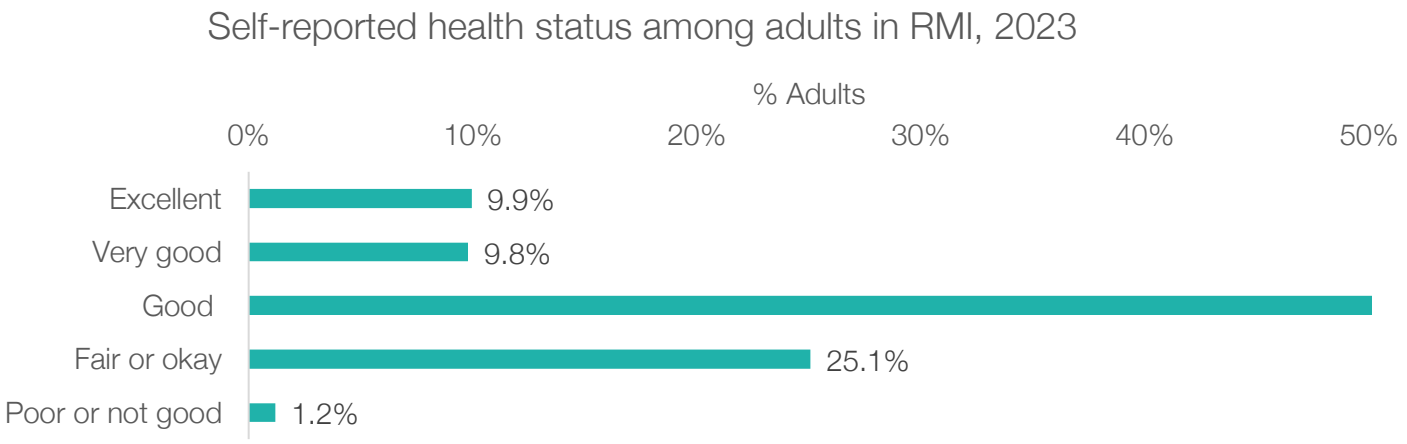
	N	%
Atoll		
Majuro	1,389	51.9%
Ebeye	487	18.2%
Arno	194	7.2%
Jaluit	211	7.9%
Wotje	200	7.5%
Kili	197	7.4%
Sex		
Male	1,318	49.2%
Female	1,360	50.8%
Age		
18-24	517	19.3%
25-34	573	21.4%
35-44	608	22.7%
45-54	484	18.1%
55-64	329	12.3%
65+	167	6.2%
Marital Status*		
Single, never married	792	29.6%
Married	1,742	65.1%
Widowed	104	3.9%
Divorced/Separated	37	1.4%
Education*		
Never attended school	36	1.3%
Primary school (Elementary) completed	199	7.4%
Middle school completed	792	29.6%
High school or GED completed	1,266	47.3%
Vocational/Technical training school completed	40	1.5%
College or university completed	434	16.2%
Ethnicity		
Marshallese	2,550	95.2%
Other	128	4.8%

Employment*		
Government employee	673	25.1%
Non-government employee	438	16.4%
Self-employed (including copra processing fishing, handicraft making)	246	9.2%
Non-paid (volunteer, subsistence, etc)	27	1.0%
Student	205	7.7%
Homemaker	426	15.9%
Retired	135	5.0%
Unemployed (able to work)	406	15.2%
Unemployed (unable to work)	121	4.5%
Household Income*		
Less than $5,000	424	28.3%
$5,000 and - $9,999	385	25.7%
$10,000 and - $14,999	245	16.4%
$15,000 and - $19,999	153	10.2%
$20,000 or greater	291	19.4%

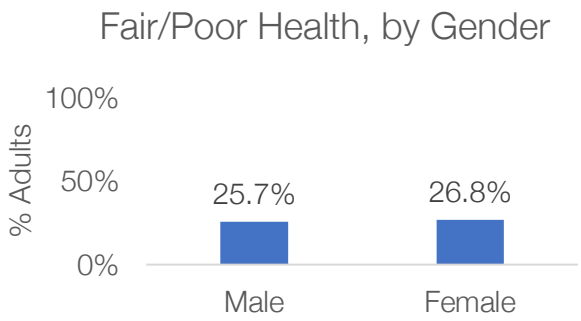
*3 missing data on marital status, 2 missing data on education, 1 missing data on employment status, 1,180 missing data on household income

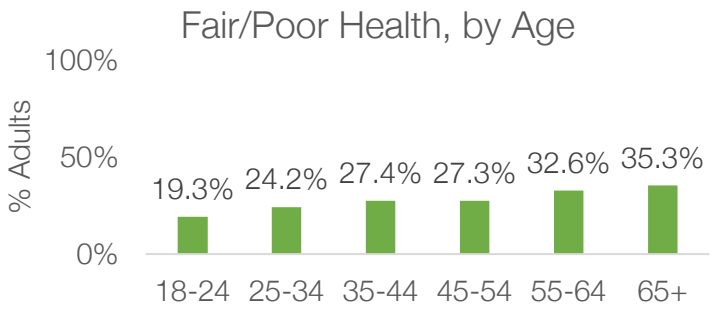
General Health

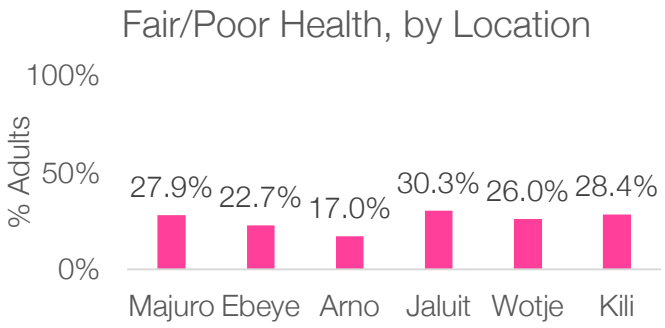
More than one out of four adults in RMI (26.3%; 95%CI: 24.6%-28.0%) self-reported their general health to be fair or poor.

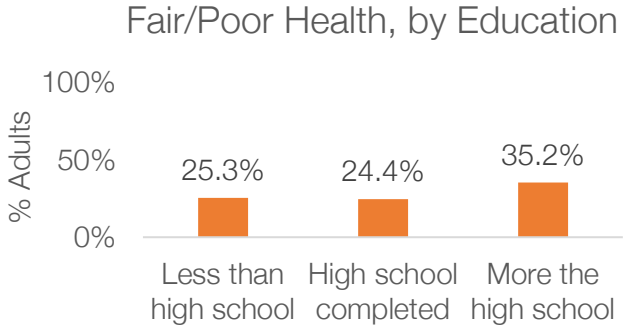


When we examine self-report of fair or poor health by demographics, we find that fair/poor health prevalence significantly increases with age, is significantly higher among those with more than a high school education, and significantly varies by location.



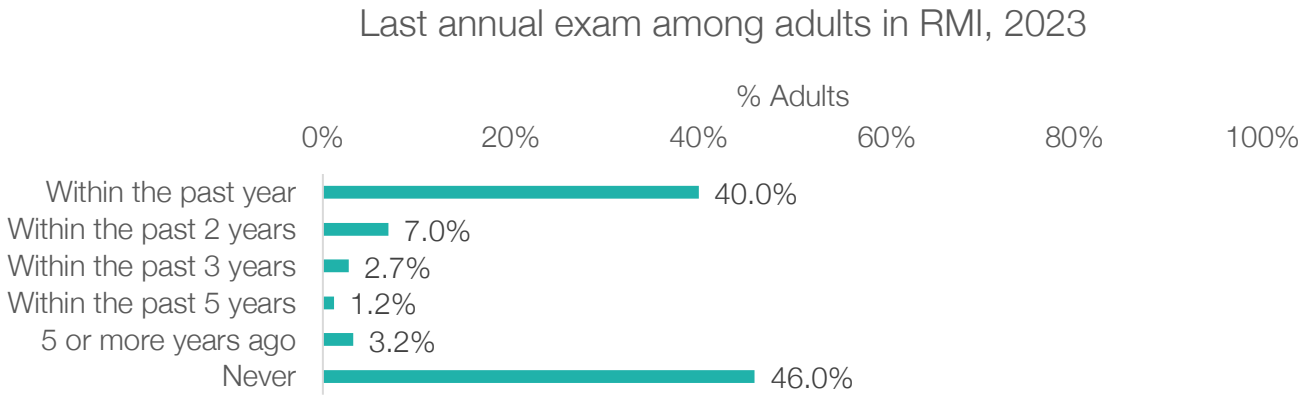




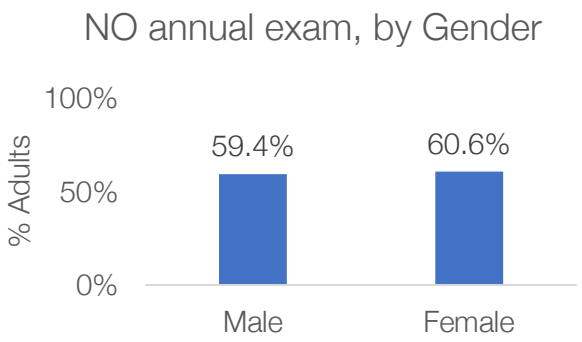


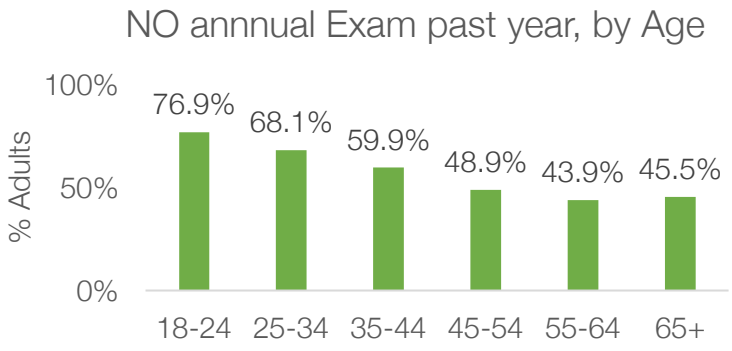
Annual Exam

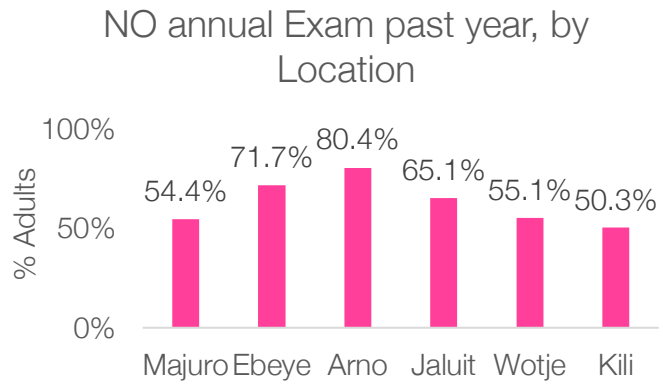
Overall, three out of five (60.0%; 95%CI: 58.1%-61.9%) of adults in RMI did not receive an annual checkup in the past year, and almost half (46.0%) of adults have never had an annual checkup.

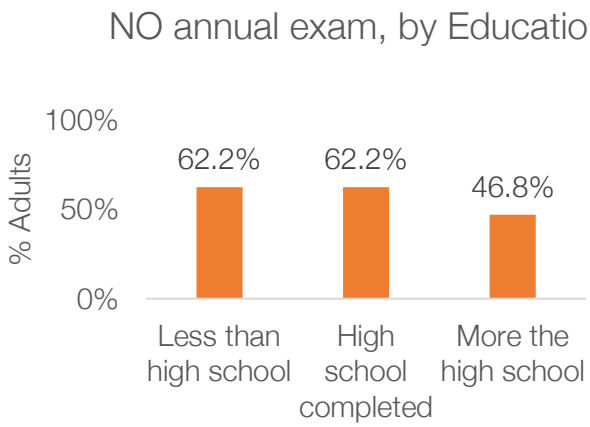


Not having an annual exam is significantly higher among younger adults and those with a high school education or less. There is also significant variation by location.



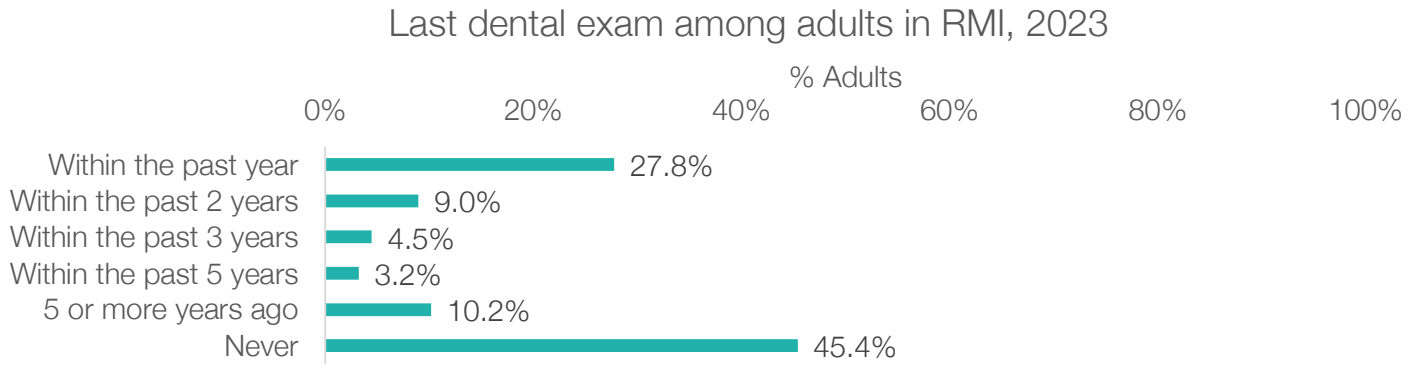




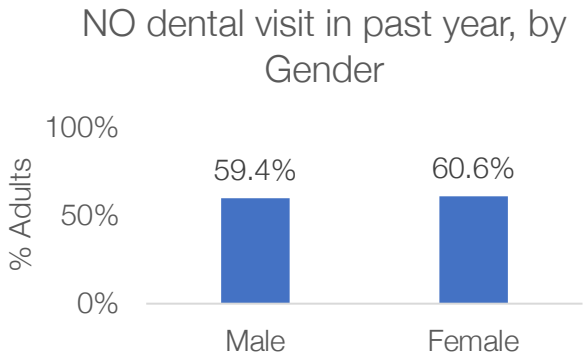


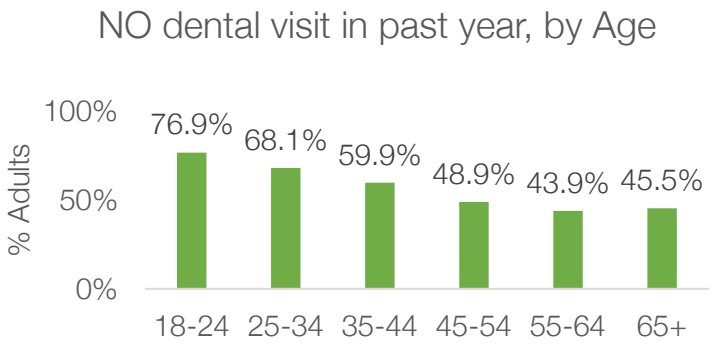
Oral Health

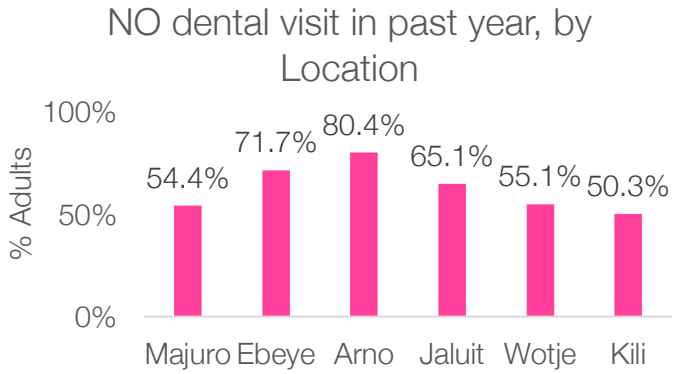
Fewer than one out of three adults in RMI (27.8%; 95%CI: 26.1%-29.5%) had a dental visit in the past year. Almost half of adults (45.4%) in RMI have never seen a dentist.

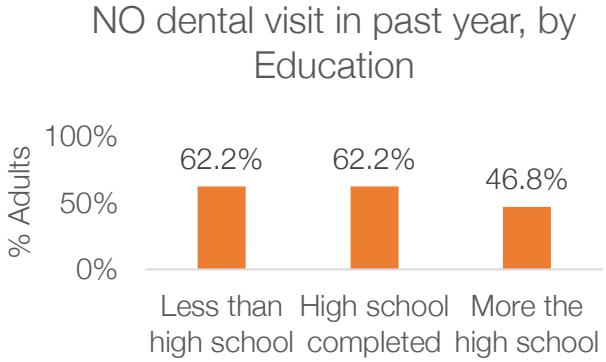


Not having a dental visit in the past year is significantly higher among younger adults and those with a high school education or less. There is also significant variation by location.



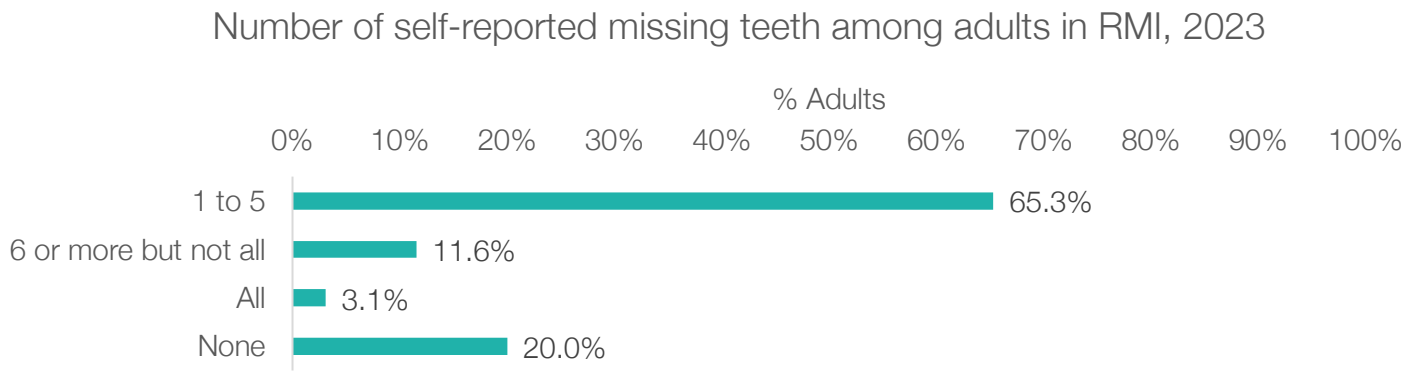




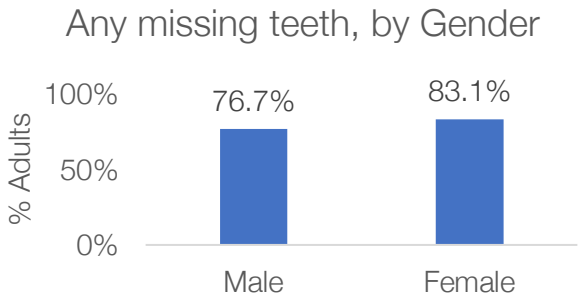


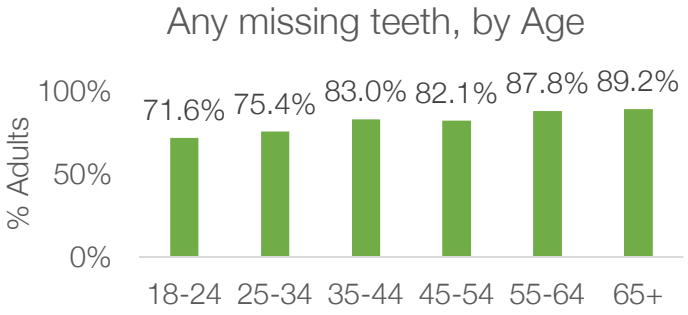
Oral Health

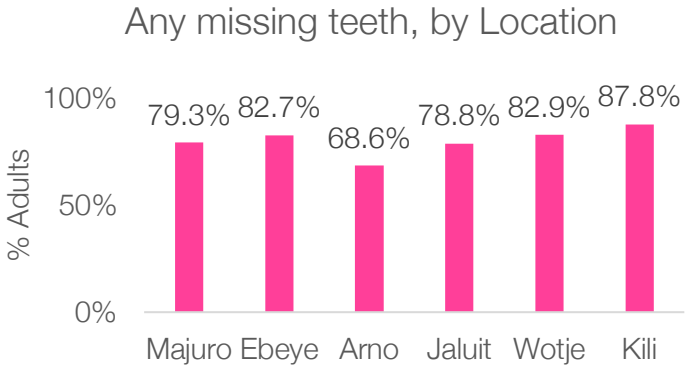
Eight out of ten (80.0%; 95%CI: 78.4%-81.5%) of adults in RMI reported missing at least one tooth due to tooth decay or gum disease.

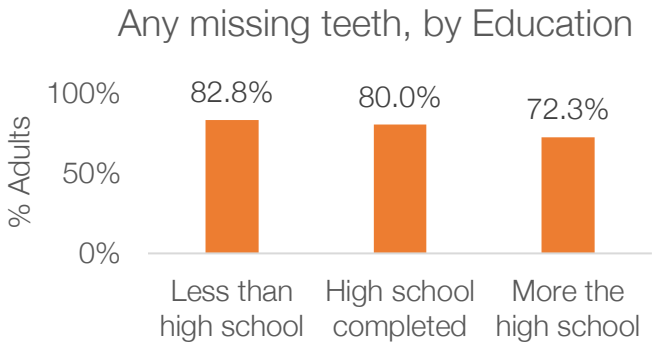


Having at least one missing tooth is significantly higher among women, older adults, and those with a high school education or less. There is also significant variation by location.





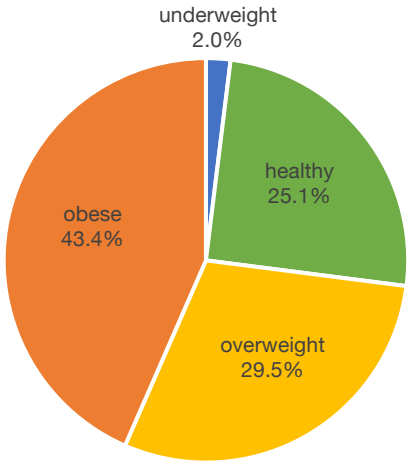




Overweight/Obesity

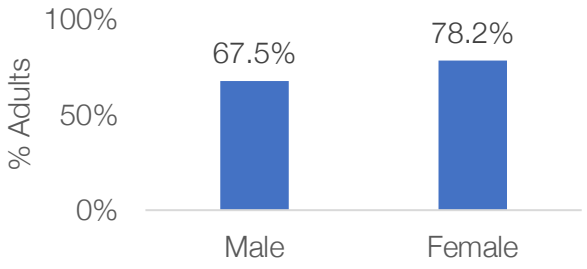
Body Mass Index (BMI) is calculated based on height and weight measurements. Based on these measurements, almost three out of every four (73.0%; 95%CI: 71.2%-74.7%) adults in RMI are overweight or obese.

BMI categories among adults in RMI, 2023

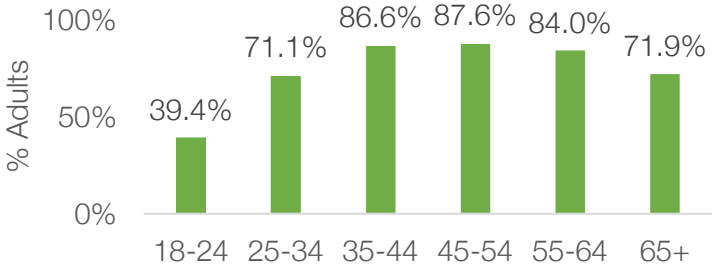


Women, those in middle age groups, and those with more than a high school education have a significantly higher prevalence of overweight/ obesity.

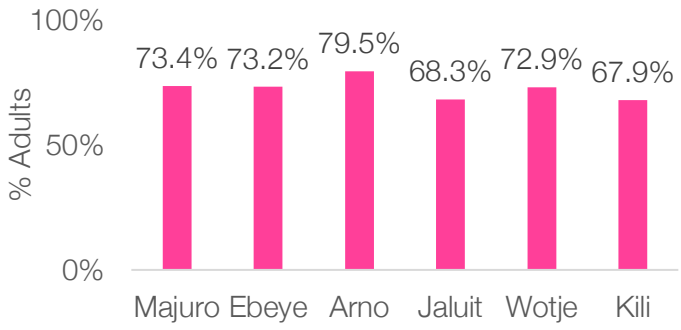
Overweight/obesity, by Gender



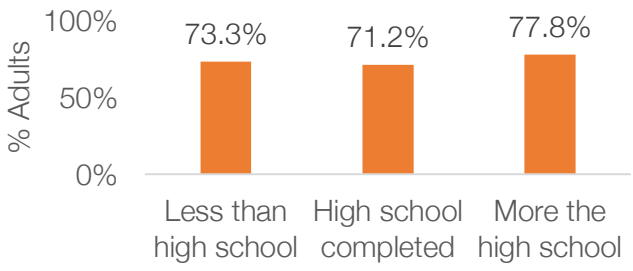
Overweight/obesity, by Age



Overweight/obesity, by Location



Overweight/obesity, by Education



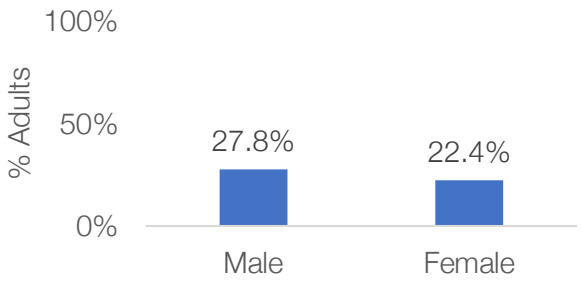
Hypertension

One out of every four adults (25.1%; 95%CI: 23.4%-26.8%) in RMI had high blood pressure (≥140/90) during screening or self-reported having hypertension* for which they took medication.

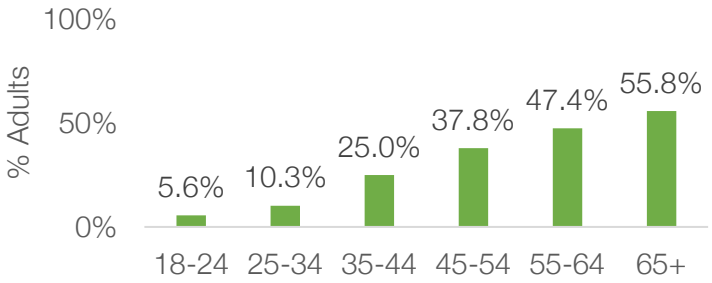
* Hypertension prevalence is estimated based on either a self-report of hypertension for which the patient is taking medication and/or a measured average blood pressure (of 3 readings) of ≥140/90.

Hypertension prevalence is significantly higher among men and significantly increases with age, with over half (55.8%) of adults 65 and older having hypertension. Hypertension prevalence significantly varies by location with the highest prevalence in Ebeye at 31.8%. Hypertension prevalence also significantly varies by education with higher prevalence in those with less than or more than a high school education.

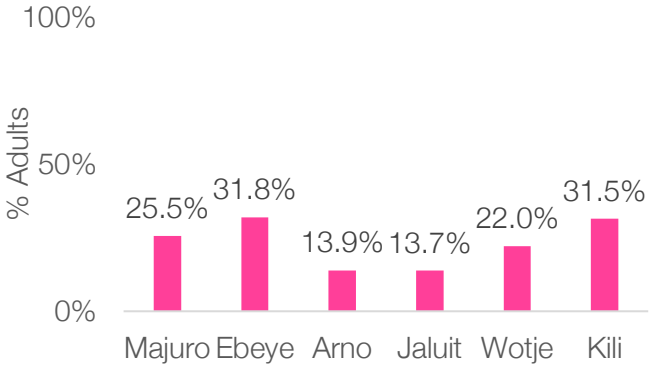
Hypertension, by Gender



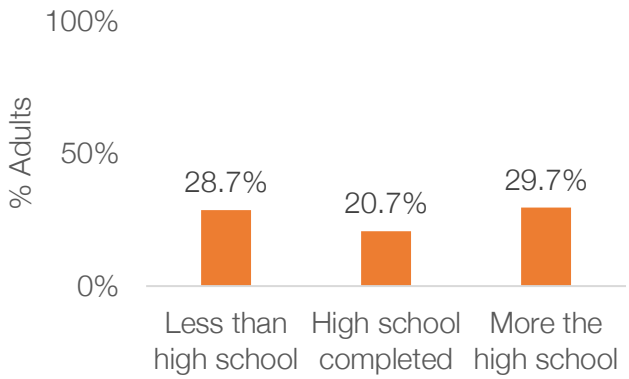
Hypertension, by Age



Hypertension, by Location



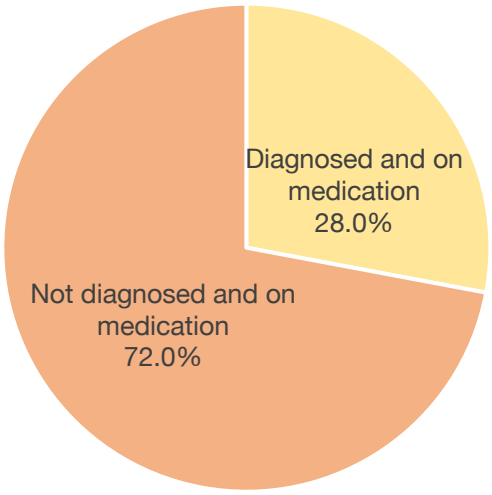
Hypertension, by Education



Hypertension Diagnosis & Control

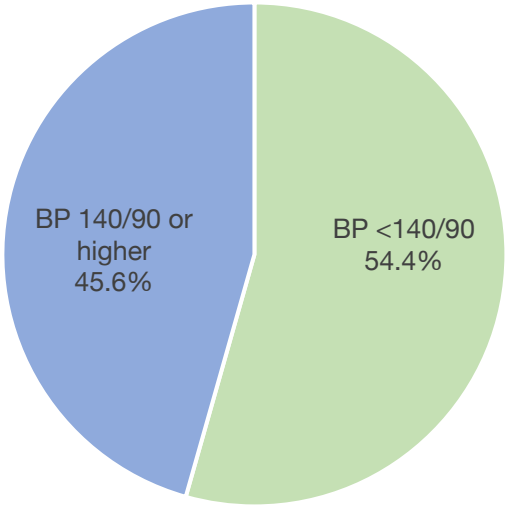
25.1% of the adult population in RMI is estimated to have hypertension. Among those adults in RMI estimated to have hypertension, almost three out of four (72.0%) are undiagnosed.

Diagnosis and medication status among hypertensives in RMI, 2023



Among those adults who are diagnosed and taking medication, almost half (45.6%) remain uncontrolled (average blood pressure [of 3 measurements] during survey was ≥140/90).

Blood pressure levels among those hypertensives who are diagnosed and on medication in RMI, 2023

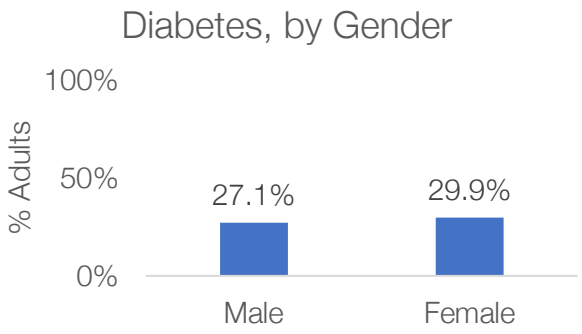


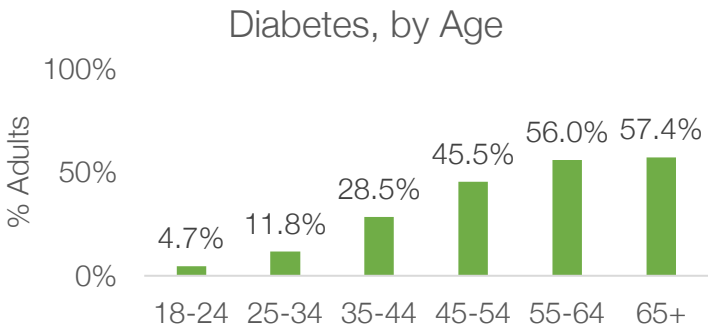
Diabetes

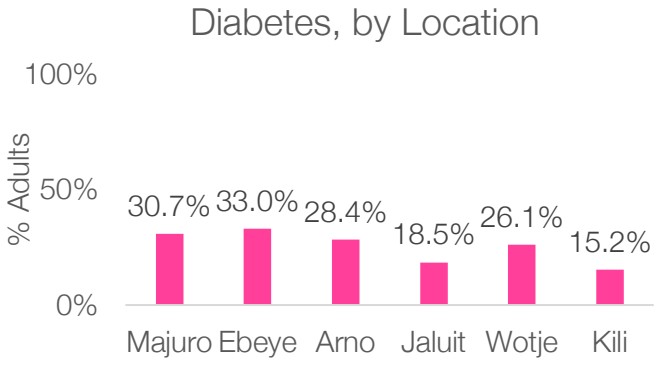
28.5% (95%CI: 26.8%-30.3%) of adults had measured high Hemoglobin A1c (HbA1c) (≥6.5%) or self-reported having diabetes* for which they were taking medication.

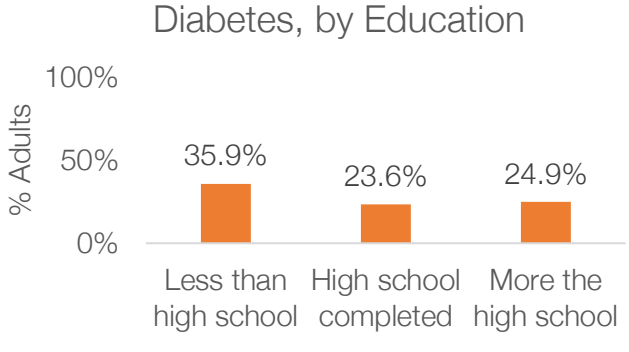
*Diabetes prevalence is estimated based on either a self-report of diabetes for which the patient is taking medication and/or an HbA1c of 6.5% or higher during the survey.

Diabetes prevalence significantly increases with age, with a prevalence of 57.4% among those 65 and older. In addition, there is a significantly higher prevalence of diabetes among those with less than a high school education, and significant differences by location with the highest prevalence in Ebeye at 33.0%.





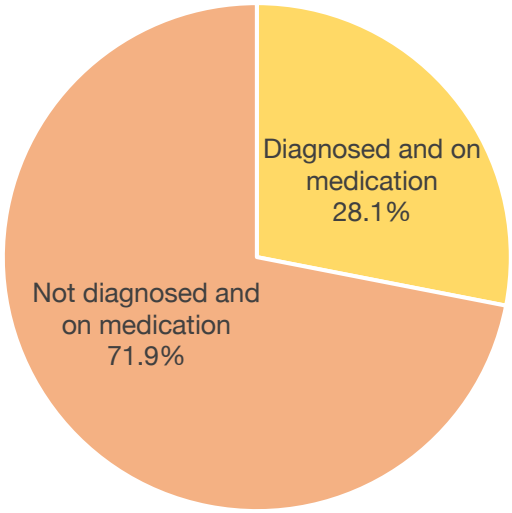




Diabetes Diagnosis & Control

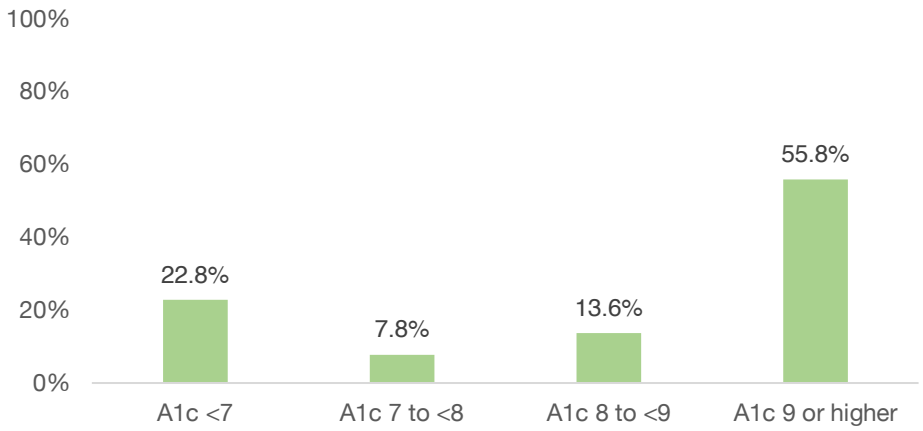
28.5% of the adult population in RMI is estimated to have diabetes. Among those adults estimated to have diabetes, almost three out of four (71.9%) are not diagnosed and on medication.

Diagnosis and medication status among diabetics in RMI, 2023



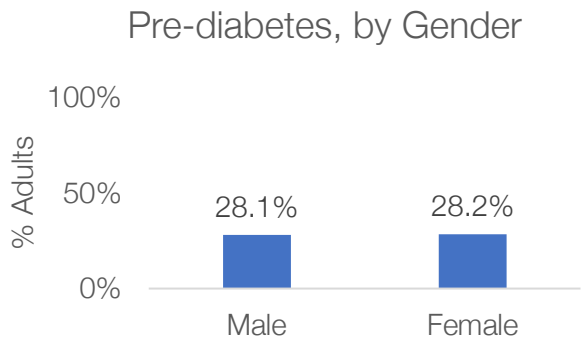
Among those adults in RMI who are diagnosed and taking medication for diabetes, the majority of them (77.2%) remain uncontrolled (HbA1c 7% or higher during survey).

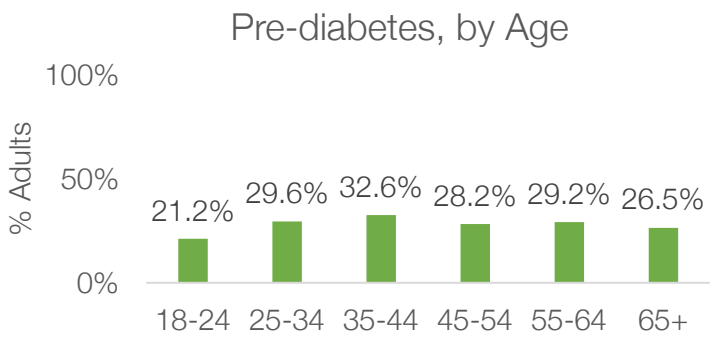
A1c levels among those diabetics who are dignosed and on medication in RMI, 2023

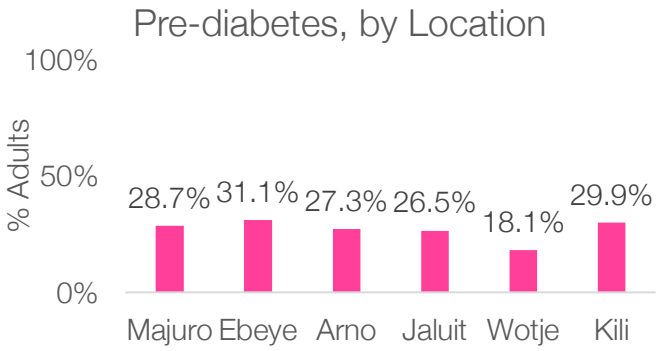


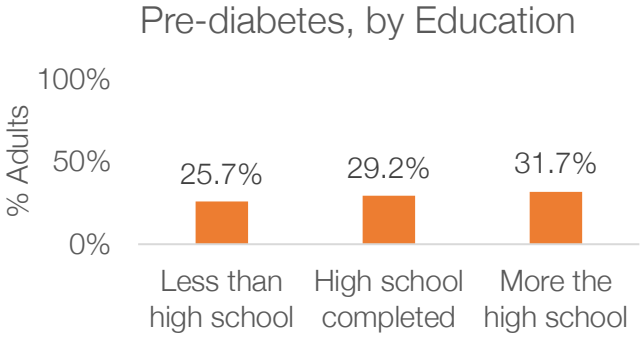
Pre-Diabetes

28.2% (95%CI: 26.5%-29.9%) of adults have measured Hemoglobin A1c (HbA1c) of 5.7%-6.4% or self-reported having pre-diabetes. Pre-diabetes prevalence is significantly higher among those 25-44 years old and those with a high school degree or more. There is also significant variation in pre-diabetes prevalence by location.









Diabetes Management

Among adults with who self-reported having diabetes in RMI, 30.5% reported current use of insulin, 43.6% reported current use of diabetes medication, and 55.6% reported current use of insulin and/or medication. Additionally, 38.9% of self-reported diabetics reported current use of herbal or traditional medication. Almost two-thirds of self-reported diabetics (62.5%) reported that they saw a doctor in the past 12 months for their diabetes. Additionally, in the past 12 months among self-reported diabetics, 36.4% had their HbA1c checked by a health professional, 23.1% had a foot check by a health professional, and 29.5% had an eye exam. Overall, 19.9% of self-reported diabetics reported that they ever took a class on how to manage their diabetes.

Among those who self-reported being diagnosed with diabetes:	
Reported current use of insulin	30.5%
Reported current use of medication (not insulin)	43.6%
Reported current use of insulin and/or medication	55.6%
Reported current use of herbal or traditional medicine	38.9%
Saw a doctor in past 12 months for their diabetes	62.5%
Had HbA1c checked by a health professional in past 12 months	36.4%
Had a foot check by a health professional in past 12 months	23.1%
Had an eye exam in past 12 months	29.5%
Ever took a class on how to manage diabetes	19.9%

Self-Reported Chronic Disease

Selected chronic disease conditions are listed below with their self-reported prevalence.

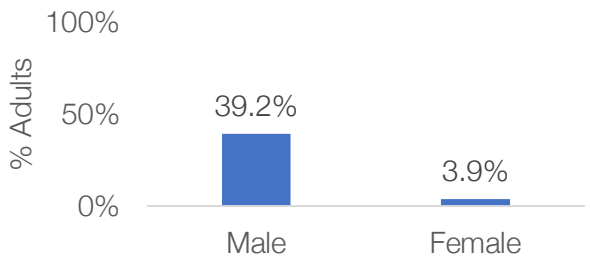
	%	95% Confidence Interval
Heart Disease	5.7	4.9, 6.7
Stroke	2.1	1.6, 2.8
Lung condition	3.4	2.7, 4.1
Asthma	10.2	9.1, 11.5
Ulcer	8.5	7.0, 9.1
Gout	8.1	7.1, 9.2
Arthritis	6.6	5.7, 7.6
Chronic Kidney Disease	3.2	2.6, 4.0
Cancer	0.9	0.6, 1.4

Cigarette Smoking

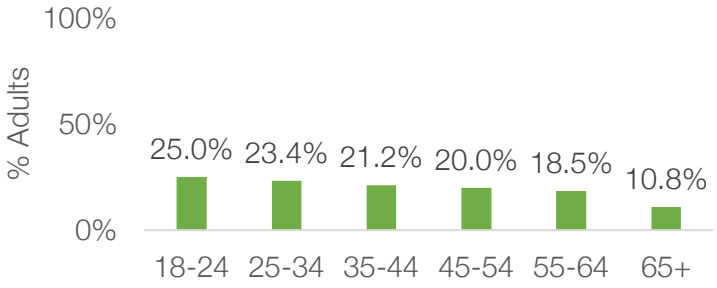
About one out of five (21.2%; 95%CI: 19.7%-22.8%) adults in RMI reported cigarette smoking in the past 30 days. Most of these adults (79.5%) smoke every day. Smoking prevalence is significantly higher among men and younger adults.

Among current smokers:	
Average number of cigarettes smoked per day among every day smokers	**7**
Average age of smoking initiation among every day smokers	**20**
% of smokers who have tried to quit smoking in the past 12 months	**63.1%**
% of smokers who want to quit smoking	**78.3%**
% of smokers who have received tobacco cessation assistance from a healthcare provider	**5.3%**

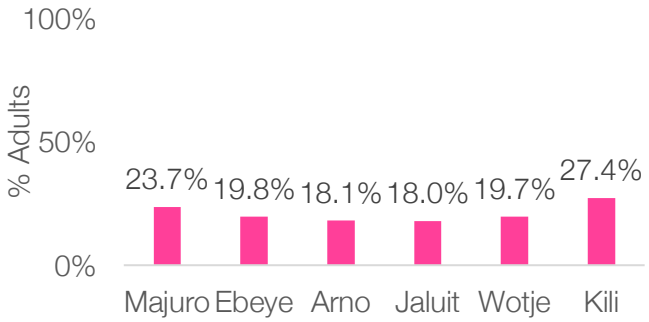
Current Smoking, by Gender



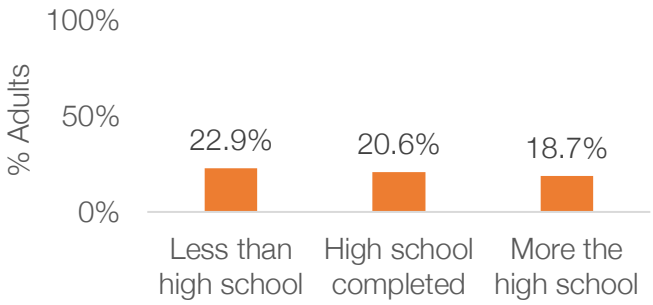
Current Smoking, by Age



Smoking Status, by Location

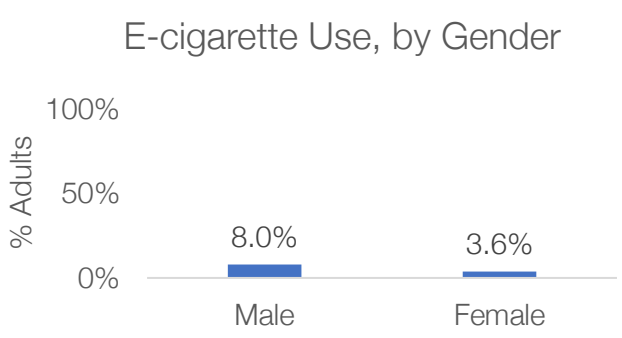


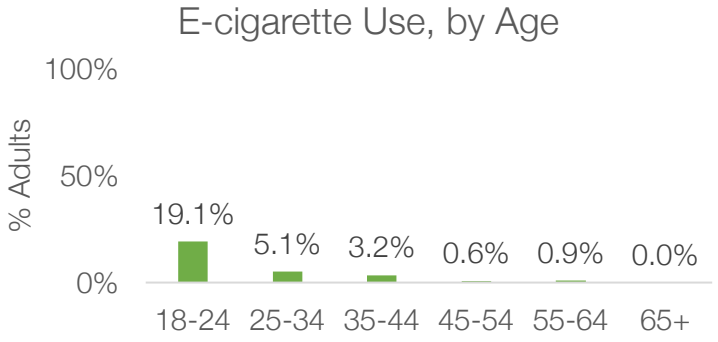
Current Smoking, by Education

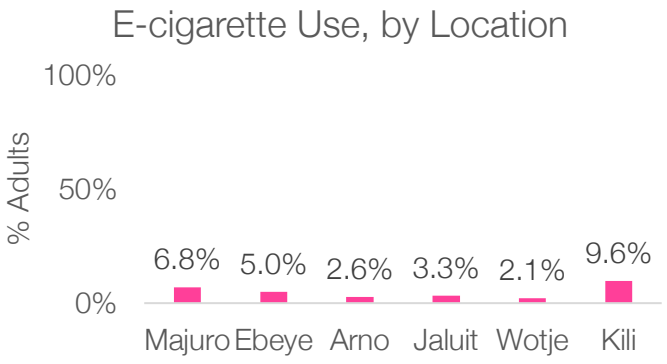


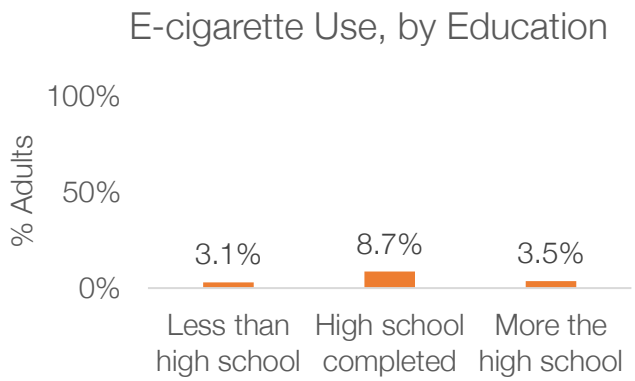
E-Cigarette Use

5.8% (95%CI: 4.9%-6.7%) of adults in RMI reported use of e-cigarettes in the past 30 days, and 30.9% of these adults were everyday users. E-cigarette use is significantly higher among men, adults 18-24 years old, and those who completed high school. There is also significant variation by location.





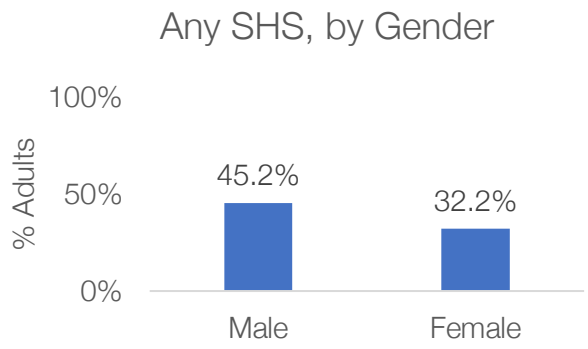


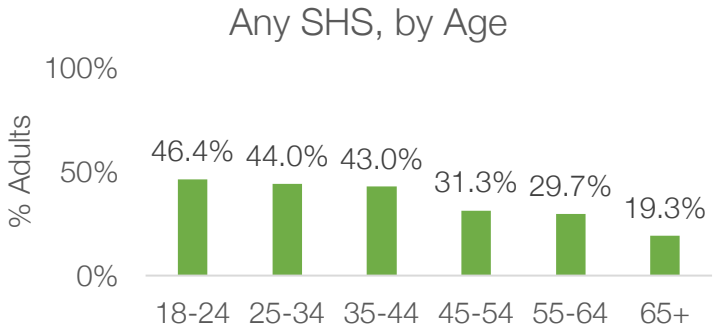


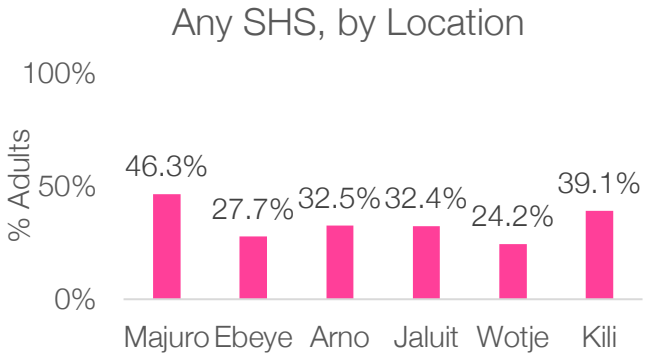
Second-Hand Smoke Exposure

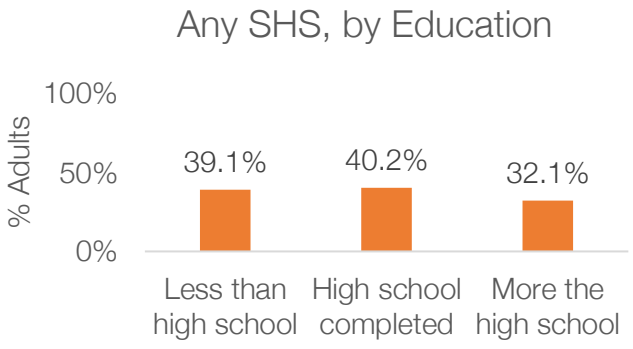
More than one-third (38.8%; 95%CI: 36.8%-40.5%) of all adults in RMI reported some exposure to second-hand smoke (SHS) at home, at work, and/or in a vehicle in the past 30 days. SHS exposure is significantly higher among men, younger adults, those with a high school education or less. There is also significant variance in SHS prevalence by location.

Exposed to second-hand smoke at home	19.1%
Exposed to second-hand smoke at work	15.3%
Exposed to second-hand smoke in a vehicle	24.4%
Exposed to second-hand smoke at home, work, and/or in a vehicle	38.6%





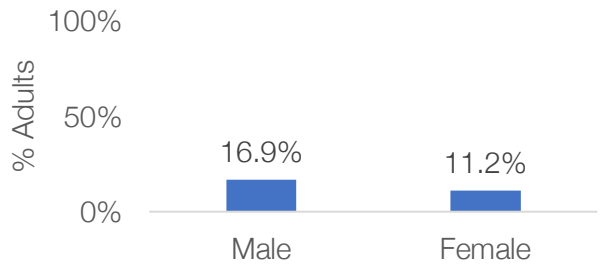




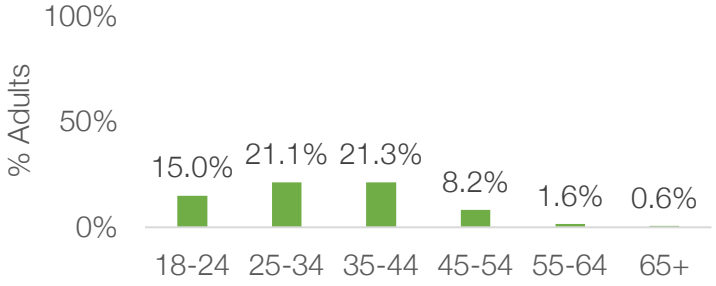
Smokeless Tobacco Use

Smokeless tobacco use in the past 30 days was reported by 14.0% (95%CI: 12.7%-15.4%) of all adults in RMI. Smokeless tobacco use is significantly higher among men, those less than 45 years old, and those who completed high school only. There is also significant variation in smokeless tobacco use prevalence by location.

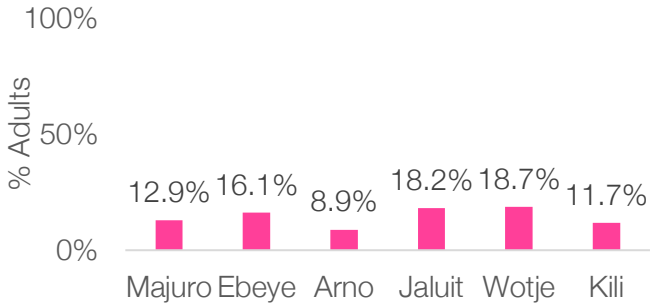
Smokeless tobacco, by Gender



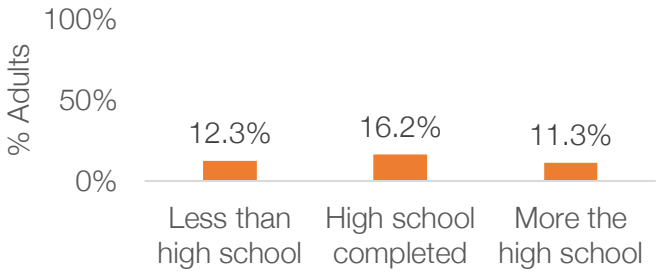
Smokeless tobacco, by Age



Smokeless tobacco, by Location

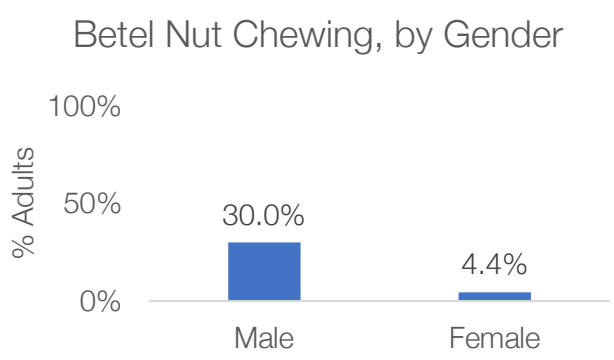


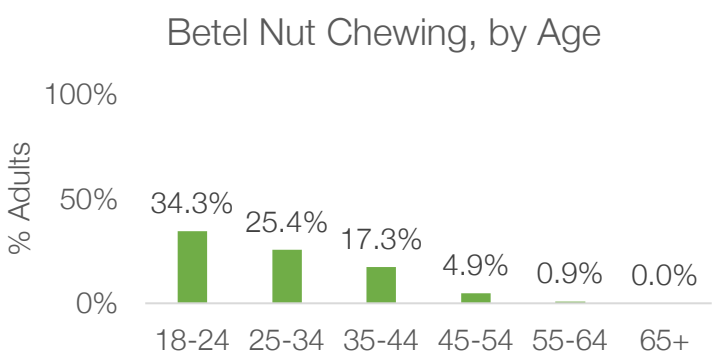
Smokeless tobacco, by Education

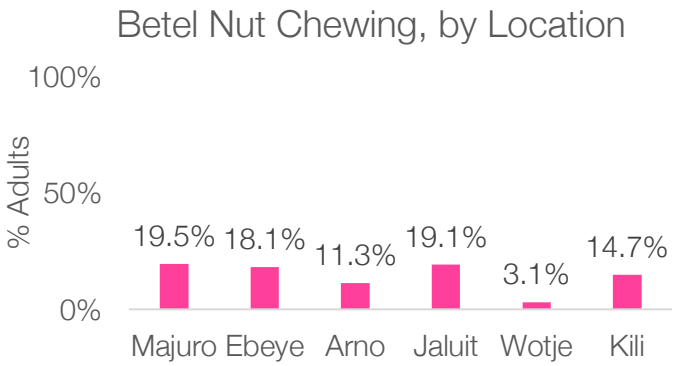


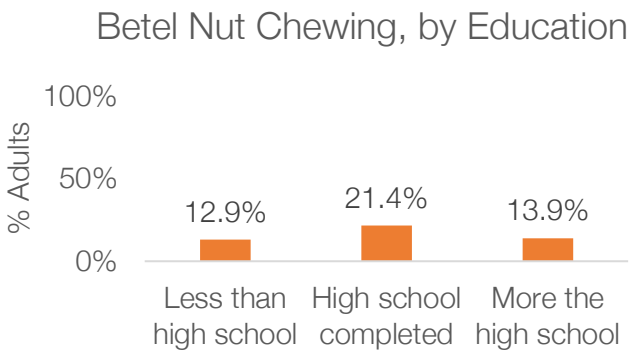
Betel Nut Use

17.0% (95%CI: 15.6%-18.5%) of adults in RMI reported betel nut use in the past 30 days. Betel nut chewing prevalence is significantly higher among men, younger adults, and those who completed high school only. There is also significant variation in betel nut use prevalence by location.









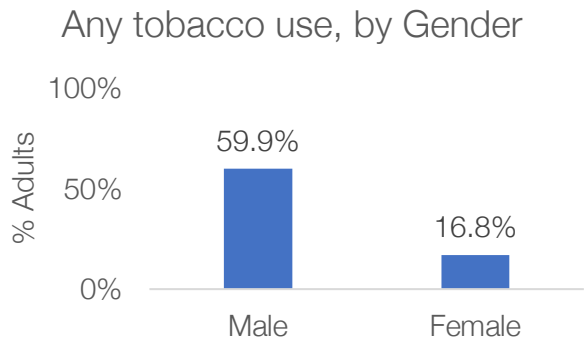
Betel Nut Use

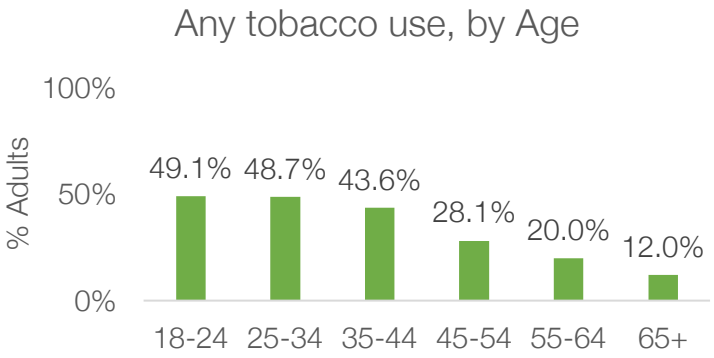
More than half of those adults who reported chewing betel nut chew daily (57.3%). The average age of first use among those who chew betel nut every day is 20. Among current betel nut chewers, 58.9% reported that they tried to quit chewing betel nut in the past 12 months and 68.0% reported that they want to quit chewing betel nut. Almost all betel nut users (98.0%) add tobacco to their betel nut chew. Almost all the betel nut with tobacco users (99.1%) use cigarette sticks as their primary tobacco type. Among those who chew betel nut with cigarette sticks, the average number of cigarette sticks chewed per day is 4.

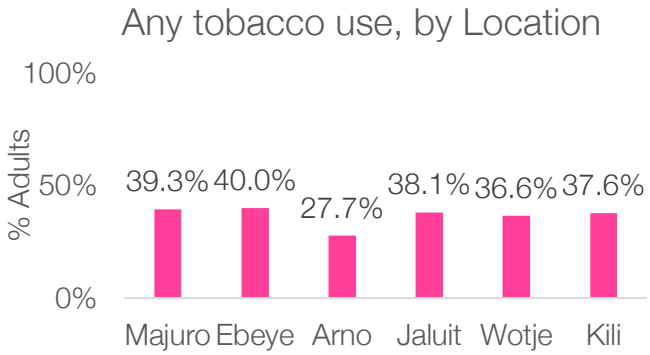
Among current betel nut chewers:	
Chew betel nut every day	**57.3%**
Average age at first use among every day chewers	**20**
Tried to quit using betel nut in the past 12 months	**58.9%**
Want to quit using betel nut	**68.0%**
Add tobacco to their betel nut chew	**98.0%**
Use cigarette sticks as primary tobacco type in their betel nut chew among those who reported adding tobacco to their betel nut chew	**99.1%**
Average number of cigarette sticks chewed per day among those who chew betel nut with cigarettes	**4**

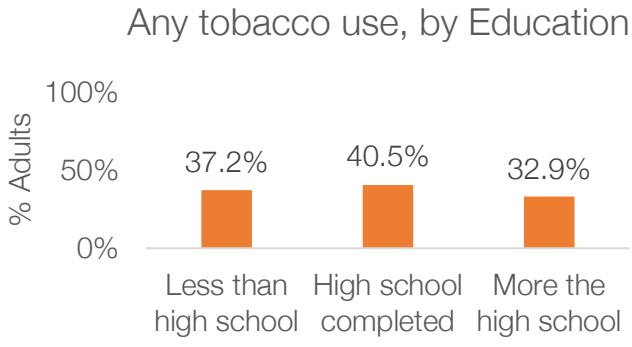
Overall Tobacco Use

Almost two out of three (38.1%; 95% CI: 36.3%-40.0%) of adults in RMI reported using any form of tobacco (smoke, chewing tobacco, or chewing betel nut with added tobacco). Tobacco use is more prevalent among men, young adults, more educated individuals, and those with a high school education or less.







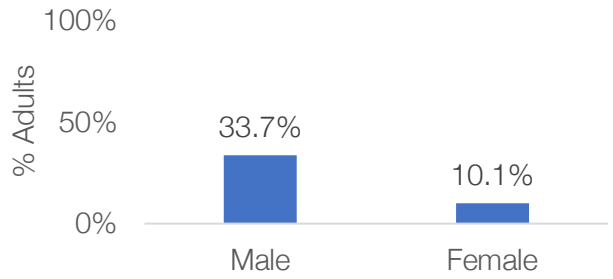


Alcohol Use and Binge Drinking

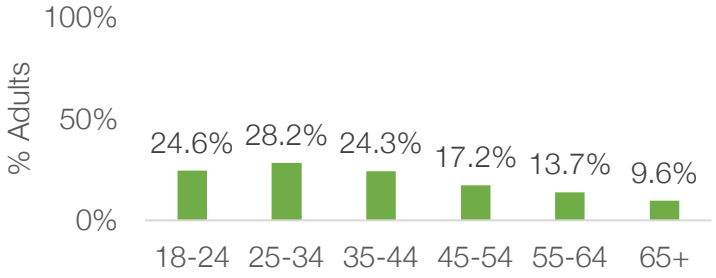
More than one out of five (21.7%; 95%CI: 20.1%-23.3%) adults in RMI reported alcohol use in the past 30 days. Among current drinkers, the average age of alcohol use initiation is 19; the average number of drinks consumed per day is 6; the average number of days alcohol was consumed in the past 30 days was 7; and 17.6% reported driving a vehicle after they have consumed alcohol in the past 30 days. Alcohol use is significantly higher among men and adults <45 years old. Alcohol use prevalence increased significantly by education level, and there is significant variation by location.

Average age of alcohol consumption initiation among current alcohol users	19
Average number of drinks consumed per day (among days that alcohol is consumed) among current drinkers	6
Average number of days alcohol was consumed in the past 30 days among current drinkers	7
Drove a vehicle after you've consumed alcohol in the past 30 days (among current drinkers)	17.6%
Been a passenger in a vehicle with a driver other than yourself who has consumed alcohol	13.0%

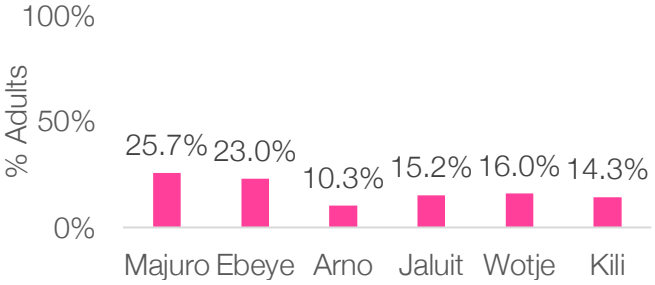
Alcohol Use, by Gender



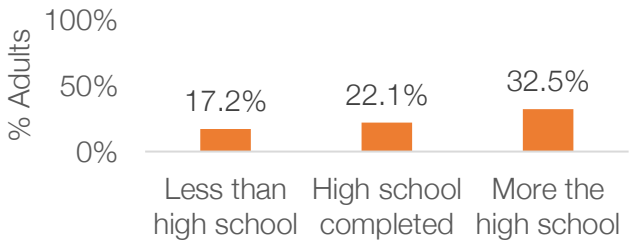
Alcohol Use, by Age



Alcohol Use, by Location

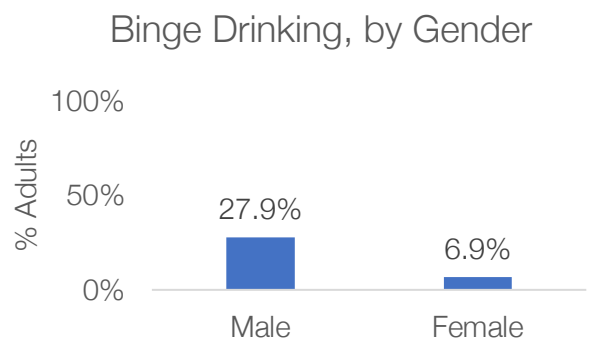


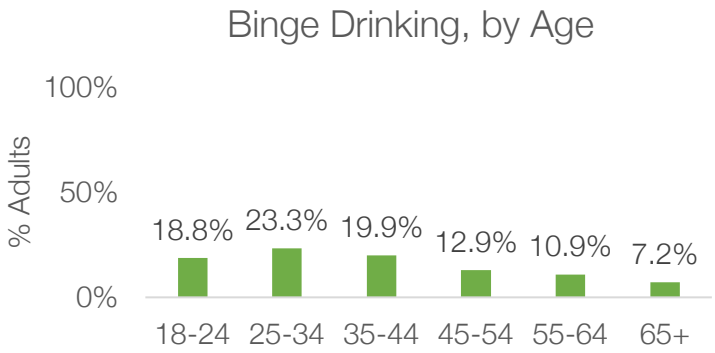
Alcohol Use, by Education

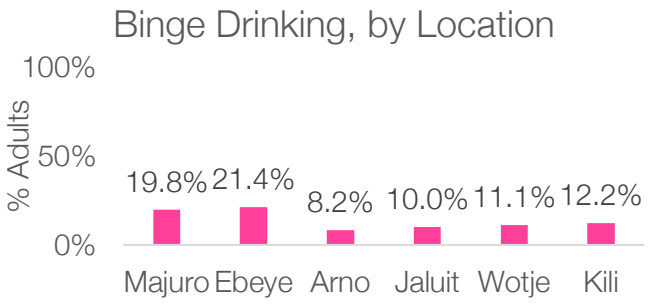


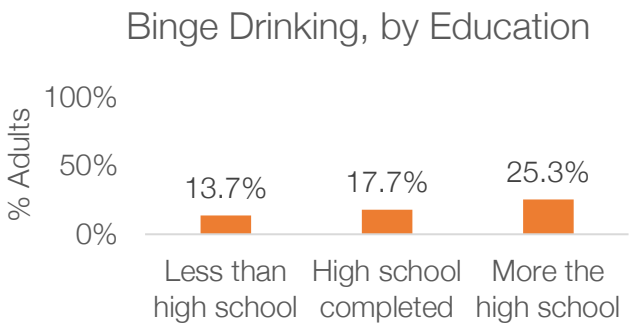
Alcohol Use and Binge Drinking

Almost two out of five (17.2%; 95% CI: 15.8%-18.7%) adults in RMI reported binge drinking (5 or more standard drinks per one drinking occasion among men; 4 or more standard drinks per one drinking occasion among women). Binge drinking prevalence is significantly higher among men, adults younger than 45 years, and those residing in Majuro and Ebeye. Additionally, binge drinking prevalence significantly increases with education.



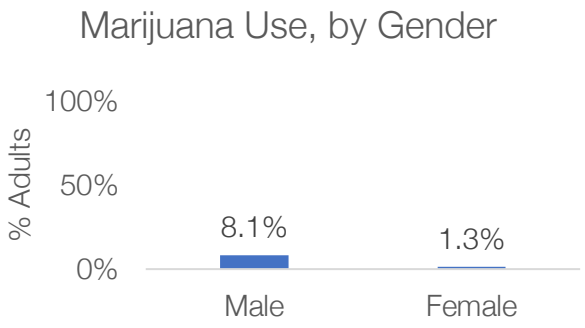


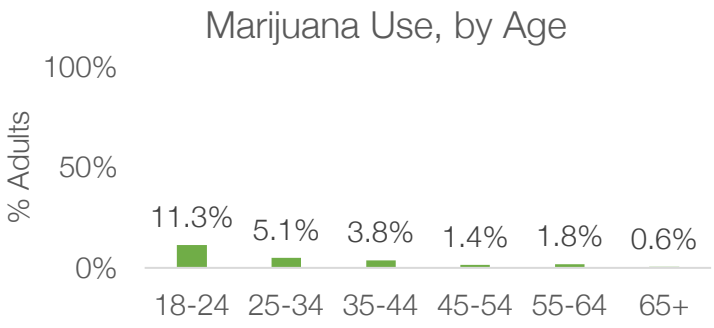


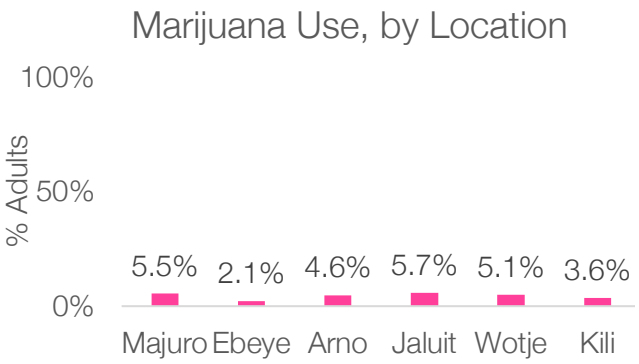


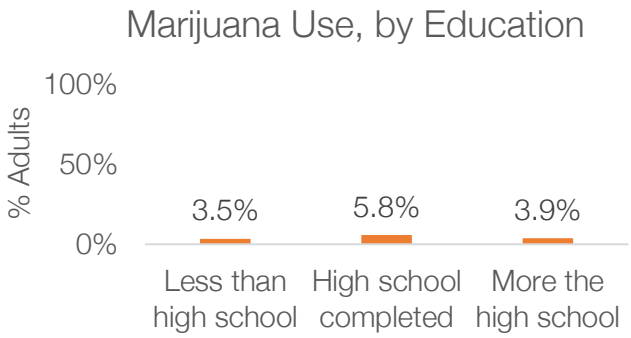
Marijuana Use

Almost one out of twenty adults (4.6%; 95%CI: 3.9%-5.5%) in RMI reported using marijuana in the past 30 days. Among these users, 20.2% reported using marijuana every day in the past 30 days. Marijuana use is significantly higher among men, young adults, and those who completed high school only.



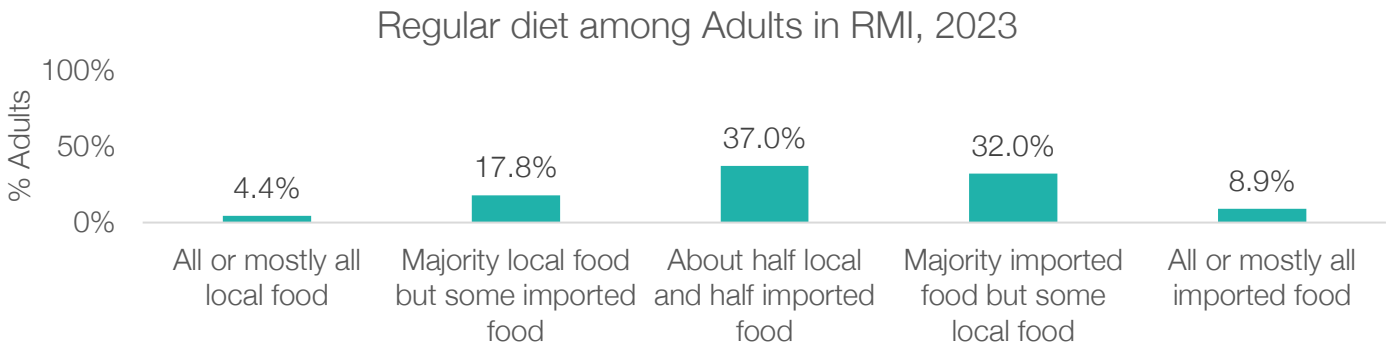




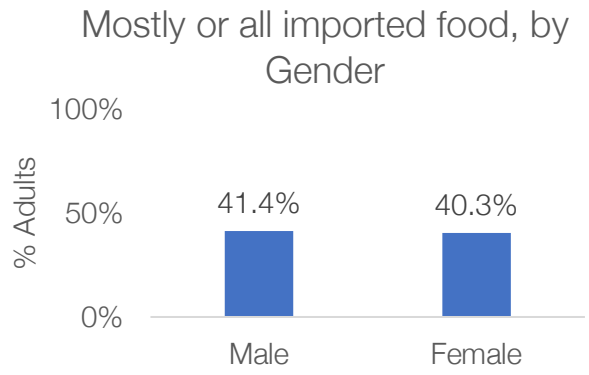


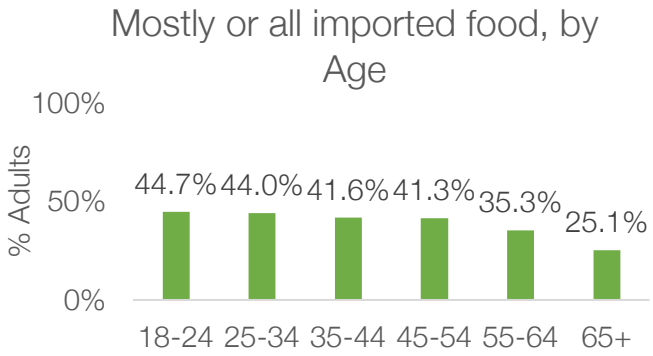
Regular Diet

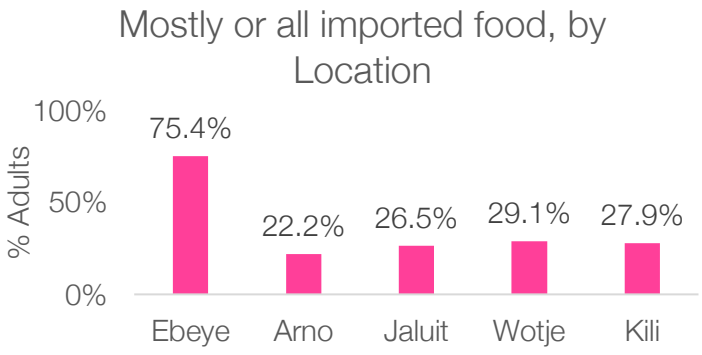
More than two out of five adults in RMI (40.8%; 95%CI: 39.0%-42.7%) reported eating a majority imported food or all or mostly all imported food. Only 4.4% of adults in RMI eat all or mostly all local food.

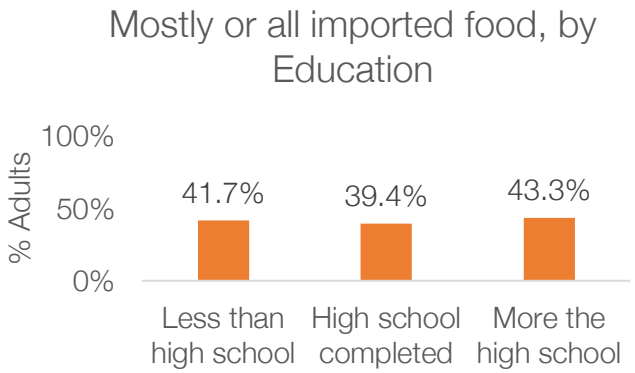


A diet consisting of a majority of imported food is significantly more prevalent among younger adults, and those residing in Ebeye.



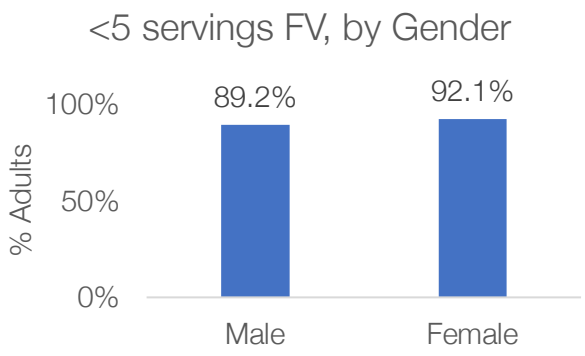


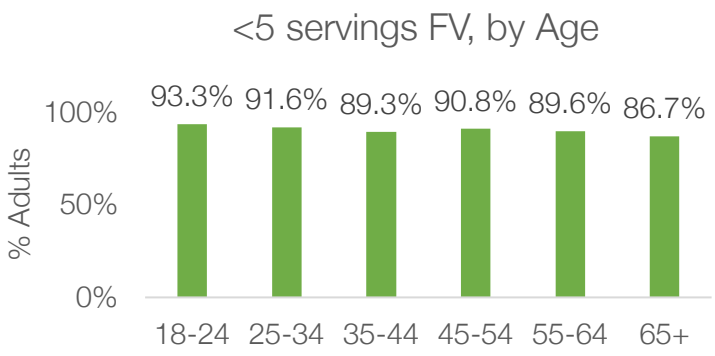


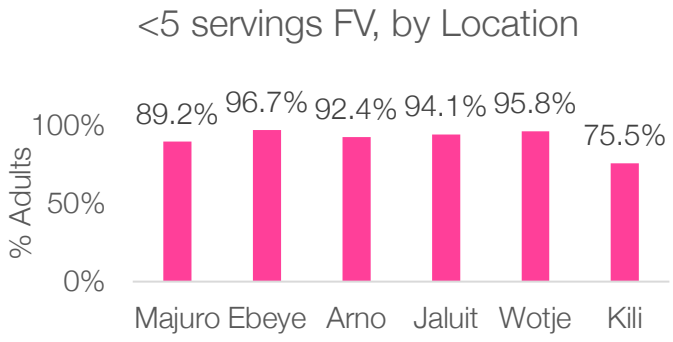


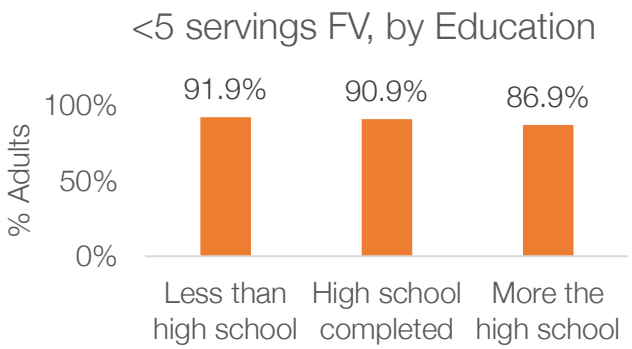
Fruit and Vegetable Consumption

Most of adults in RMI (90.7%; 95%CI: 89.5%-91.8%) reported consuming fewer than 5 servings of fruits and vegetables per day. Consuming <5 servings of fruit and vegetables per day is significantly more prevalent among women and younger adults. There is also significant variation by location.



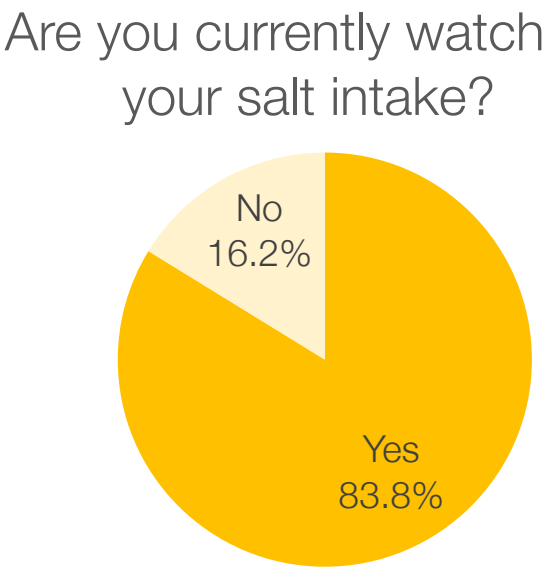


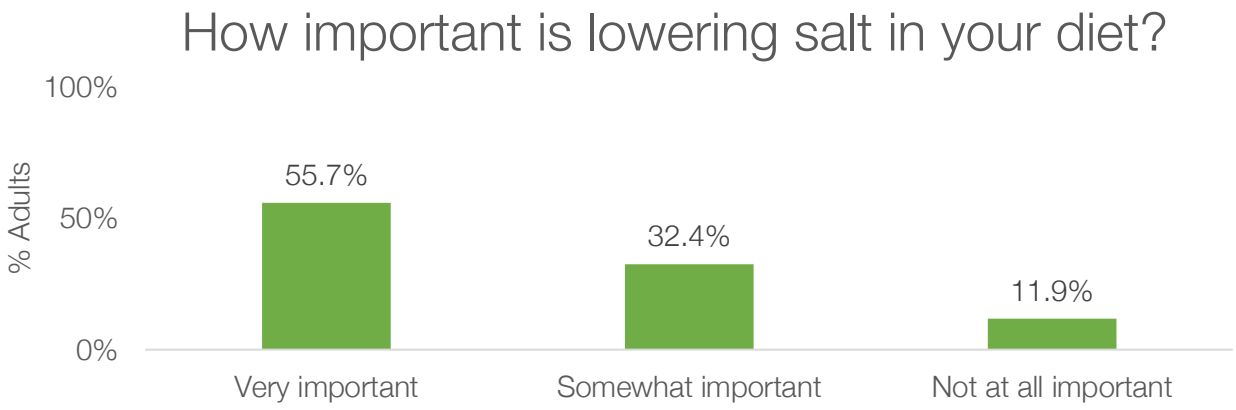




Sodium

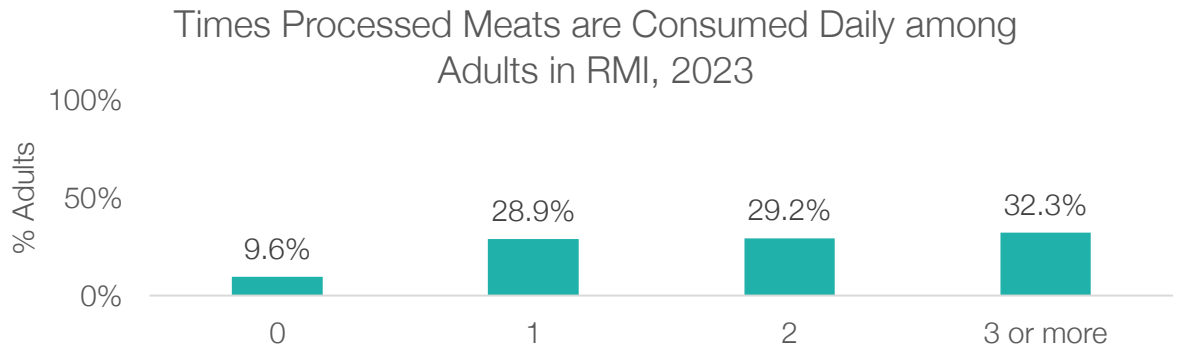
Most of adults (83.8%) in RMI reported that they are currently watching their salt intake. Over half (55.7%) of adults in RMI indicated that lowering salt in their diet is very important, and an additional 32.4% indicated that lowering salt in their diet is somewhat important.



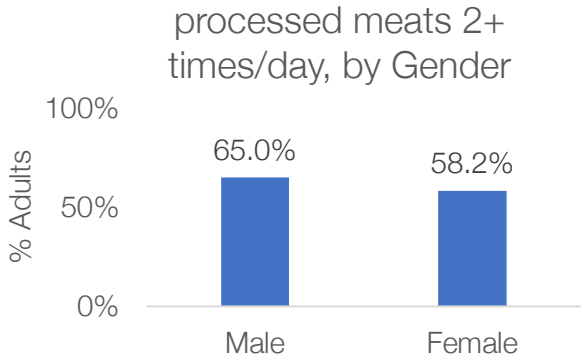


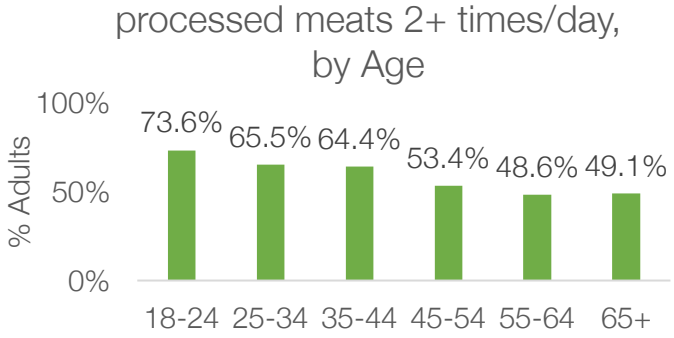
Processed Meat Consumption

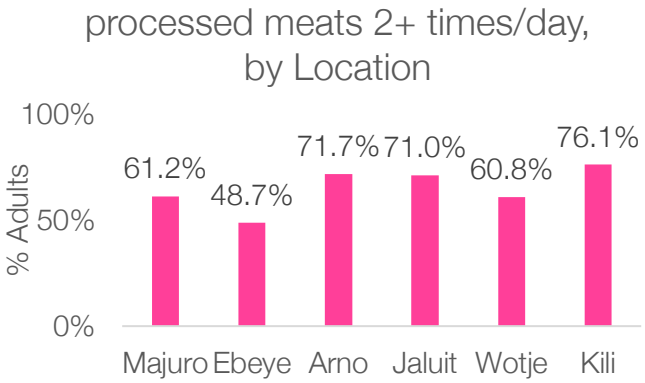
Most adults in RMI (91.4%) reported that they consume processed meat (defined as packaged or canned modified meat products such as spam, hotdogs, vienna sausages, etc.) at least once per day.

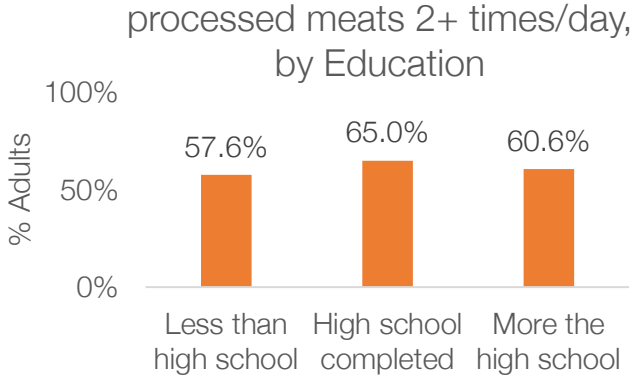


Heavy consumption of processed meats (2+ times per day) is significantly more prevalent among men, younger adults, and those with a high school only education. There is also significant variation by location.



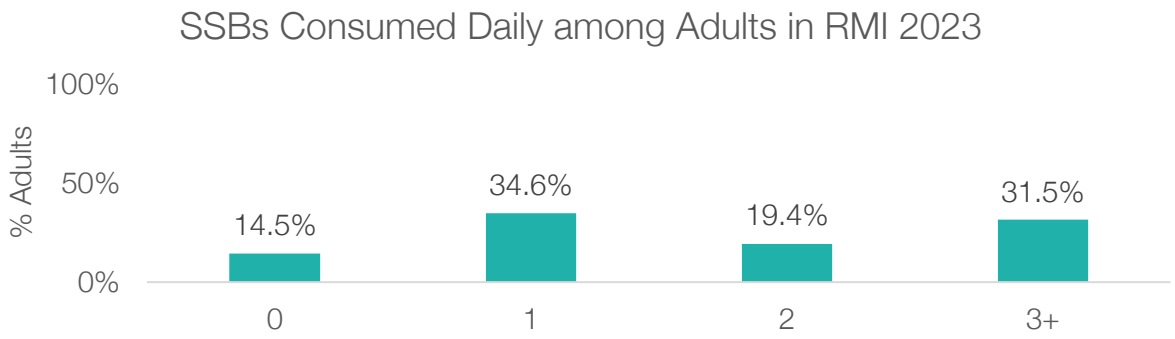




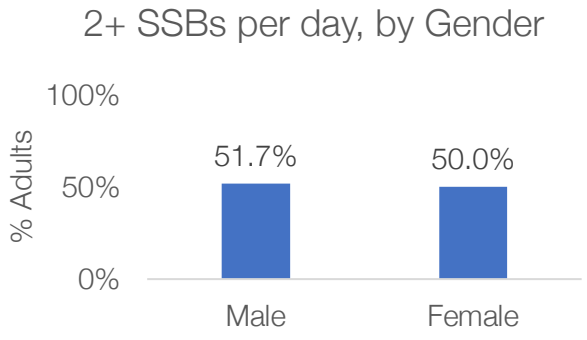


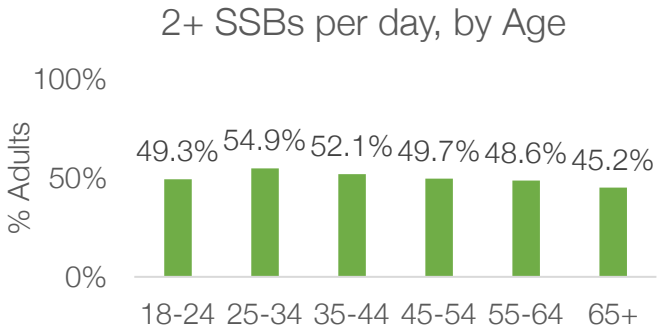
Sugar-Sweetened Beverages

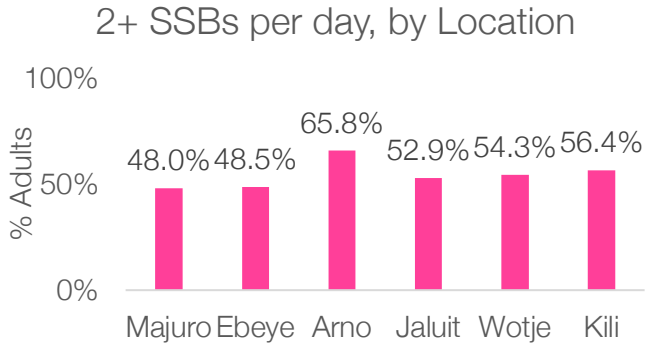
Most adults (85.5%) in RMI reported that they consume at least one serving of a sugar-sweetened beverage (SSB) each day. Over half (50.9%; 95%CI: 48.9%-52.8%) of adults reported that they consume 2 or more SSBs daily.

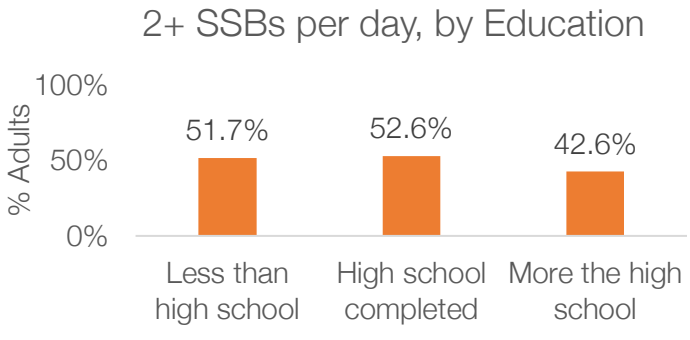


Heavy consumption of SSBs (2+ daily) is significantly more prevalent among those with a high school education or less, and there is significant variation by location.



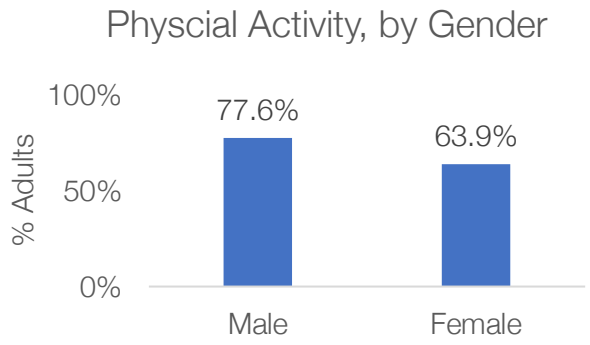


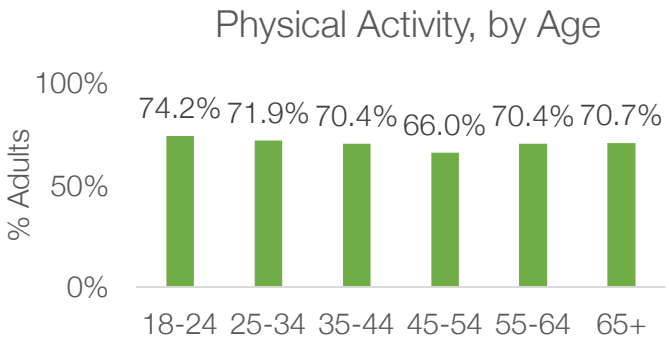


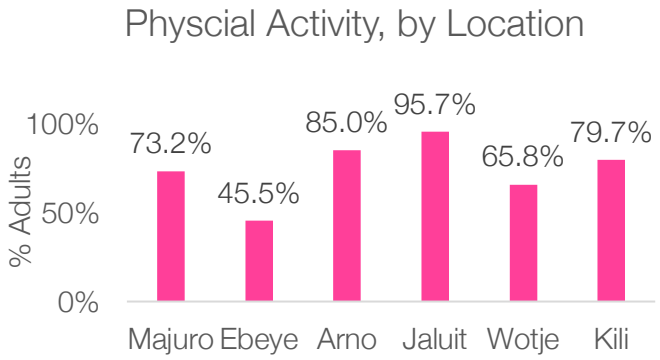


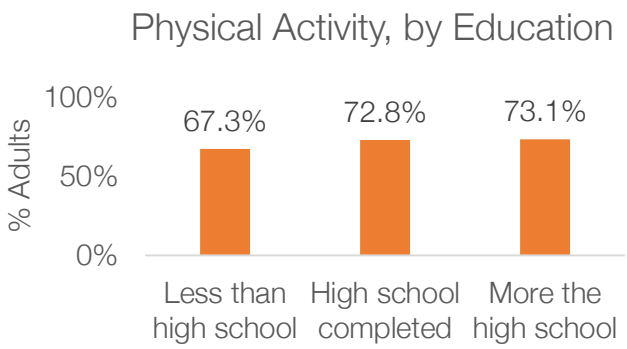
Physical Activity

In RMI, more than two-thirds (70.7%; 95%CI: 68.9%-72.4%) of adults reported that they participated in any physical activity specifically for exercise in the past 30 days. Physical activity is significantly higher among men and those with less than a high school education. Additionally, there is significant variation by location.





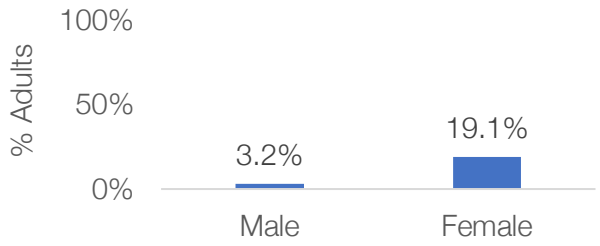




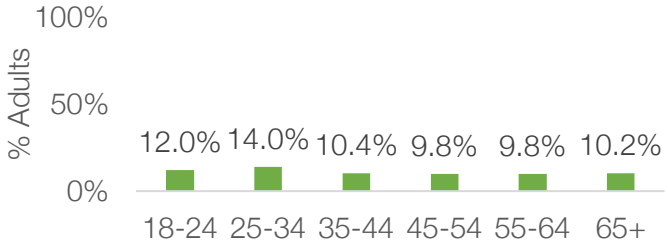
HPV Vaccination

About one in ten (11.3%; 95%CI: 10.1%-12.5%) adults in RMI reported that they have received vaccination for Human Papilloma Virus (HPV). Prevalence of HPV vaccination is significantly higher among women and in atolls outside of Majuro.

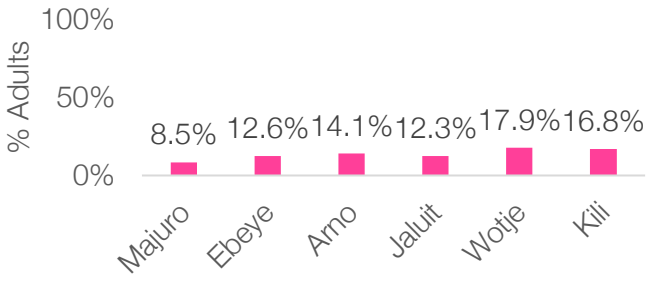
HPV vaccination, by Gender



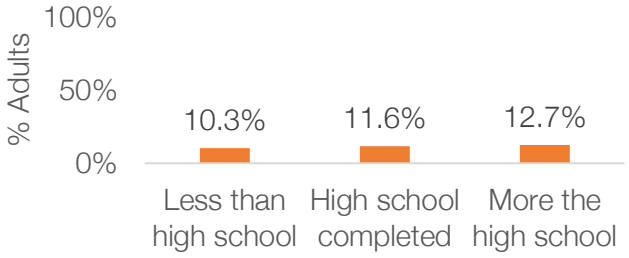
HPV vaccination, by Age



HPV vaccination, by Location

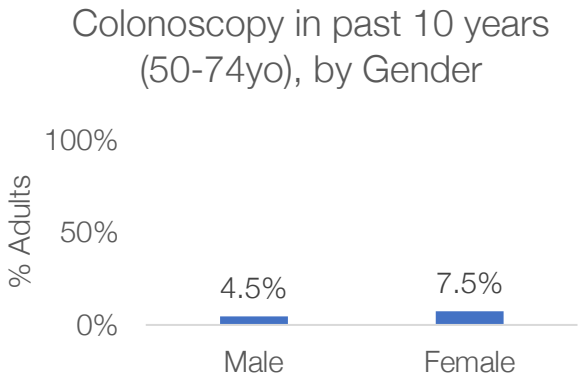


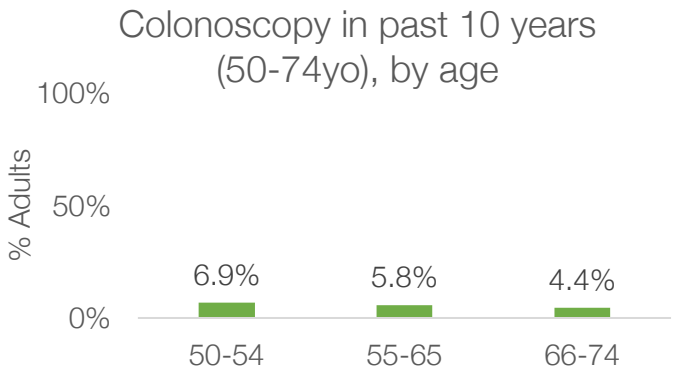
HPV vaccination, by Education

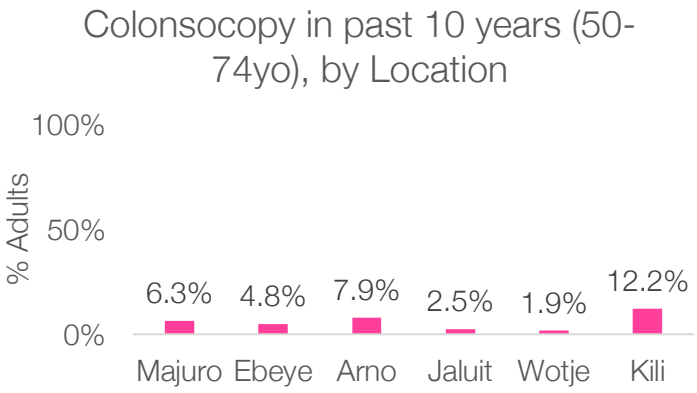


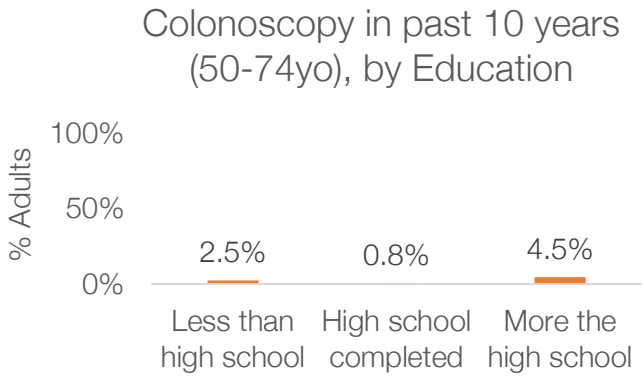
Colon Cancer Screening: Colonoscopy

Although colonoscopy is not available in RMI, 3.9% of all adults in RMI reported that they have ever had a colonoscopy. Among those aged 50-74 years old, 6.7% reported that they have ever had a colonoscopy, and 5.9% (95%CI: 4.2%-7.9%) have had a colonoscopy in the past 10 years in compliance with the US Preventative Task Force (USPTF) guidelines at the time of this survey. There are no significant differences in up-to-date colonoscopy between demographic groups examined.



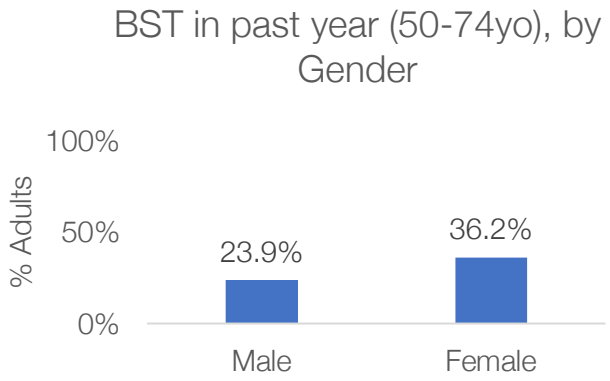


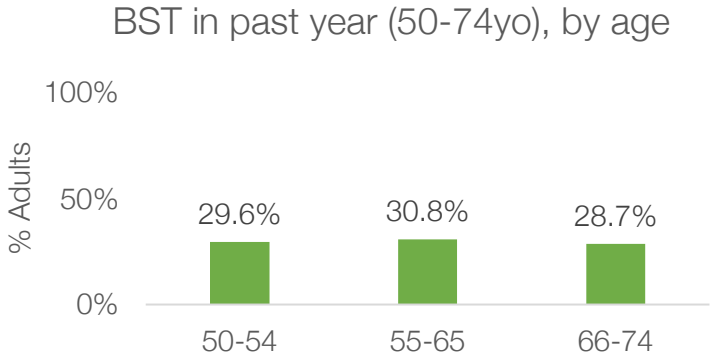


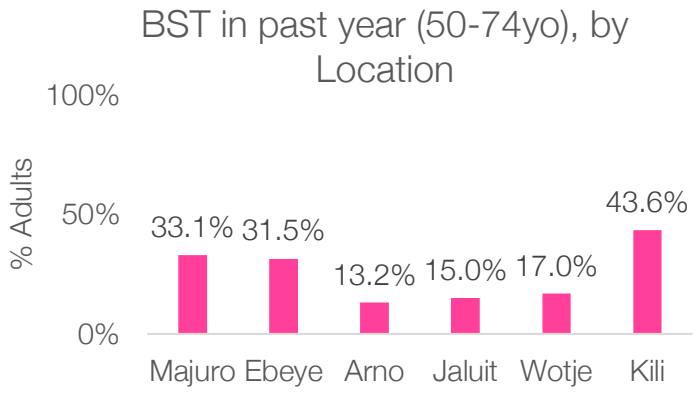


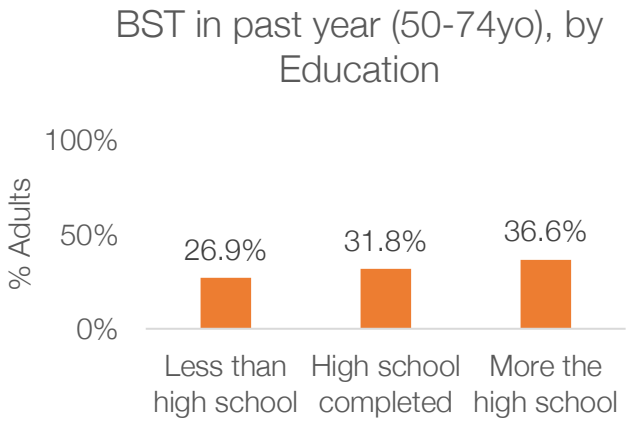
Colon Cancer Screening: Blood Stool Test

About half (49.8%) of adults in RMI have never received a Blood Stool Test (BST) and about half (52.9%) of those aged 50-74 years old have ever had a BST. One out of three (30.0%; 95%CI: 26.6%-33.5%) adults 50-75 years old in RMI meet the American Cancer Society recommendation of receiving a Blood Stool Test once per year. Having an up-to-date BST among those 50-74 years old is significantly higher among women. Additionally, there is significant variation by location.



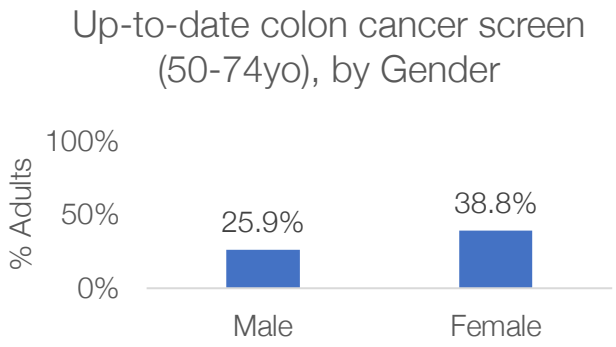


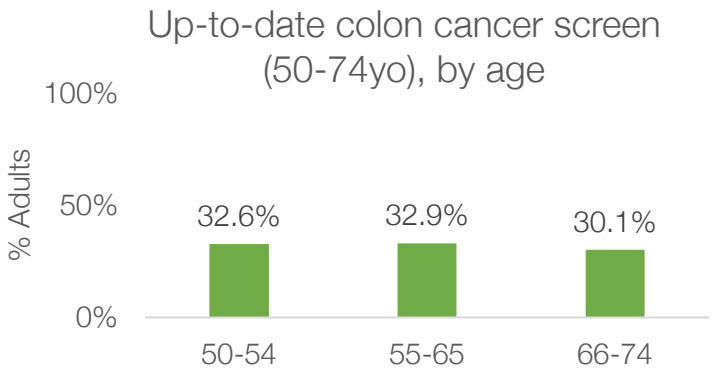


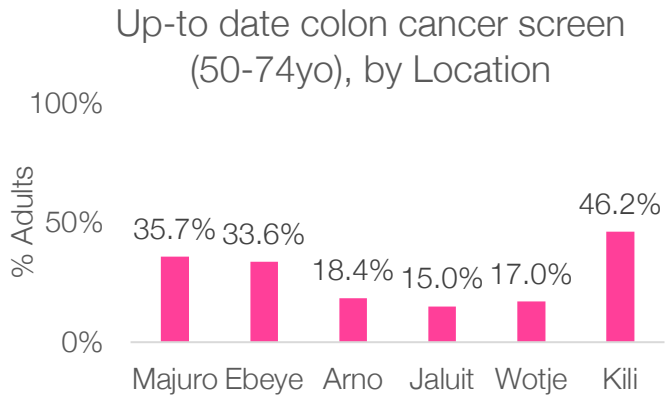


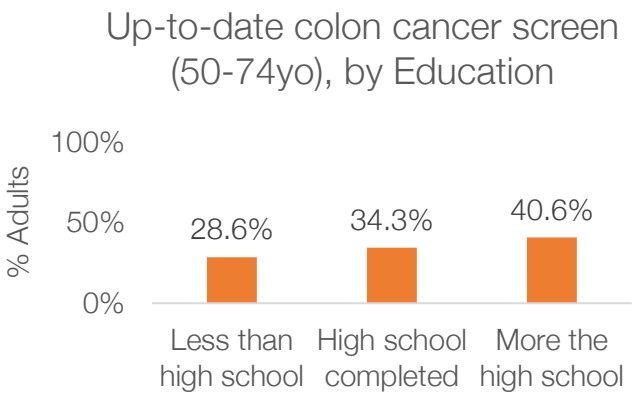
Colon Cancer Screening: Any Screening

About one-third (32.3%; 95%CI: 28.8%-35.9%) of adults 50-74 years old reported to have had a colonoscopy in the past 10 years and/or a BST in the past year. Up-to-date colon cancer screening was significantly more prevalent among women, and those residing in Majuro, Ebeye, and Kili.



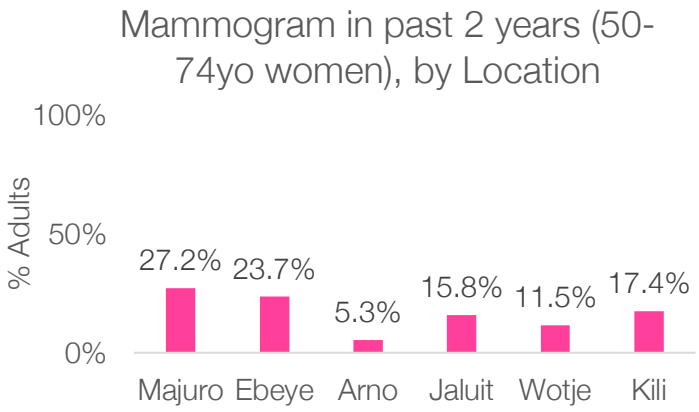


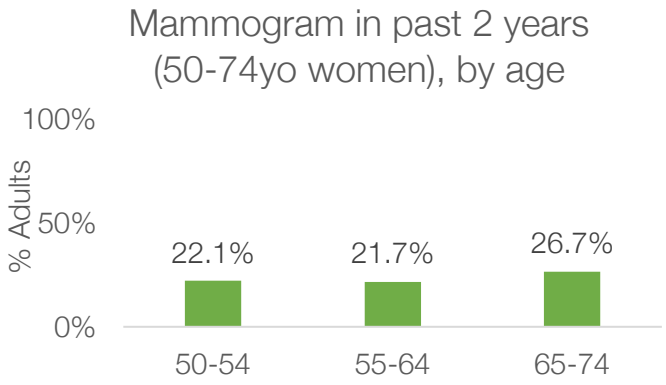


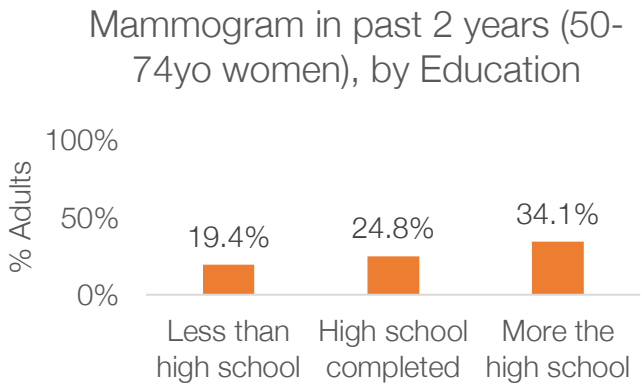


Female Cancer Screening: Mammogram

Among all women, 27.3% reported that they have ever had a mammogram, and among women aged 50-74 years old, 40.8% have ever had a mammogram. Among women aged 50-74 years old, 22.7% (95%CI: 18.4%-27.5%) have had a mammogram in the past year per USPTF guidelines at the time of this survey. There are no significant differences in up-to-date mammogram between demographic groups examined, although there are trends by education and location.



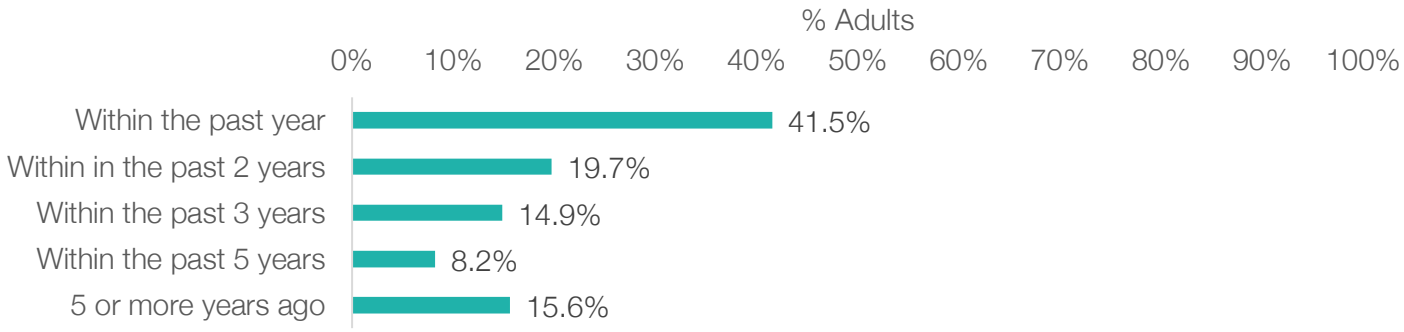




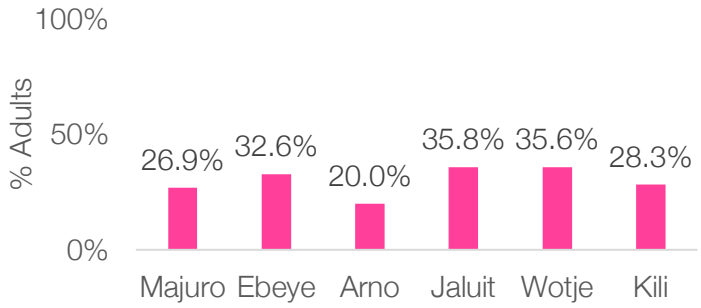
Female Cancer Screening: Clinical Breast Exam

Almost 1 in 3 (29.0%) women in RMI have ever had a clinical breast exam (CBE). Among those who have ever had a CBE, 41.5% reported that their last CBE was within the past year. Prevalence of ever having a CBE is significantly higher among older women, and there is significant variation by location.

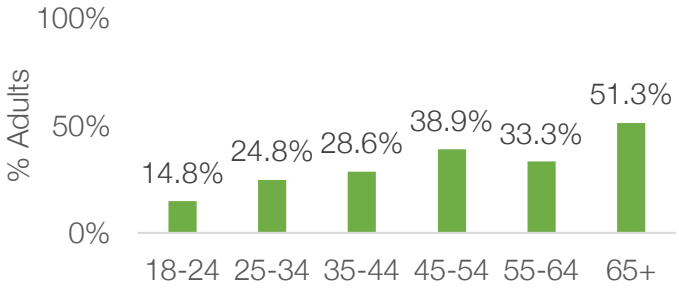
Last CBE among women who reported ever having a CBE



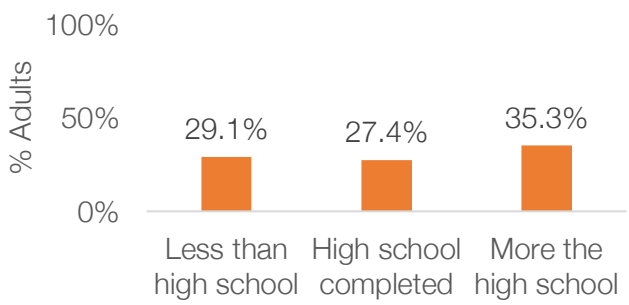
Ever had a CBE, by Location



Ever had a CBE, by Age

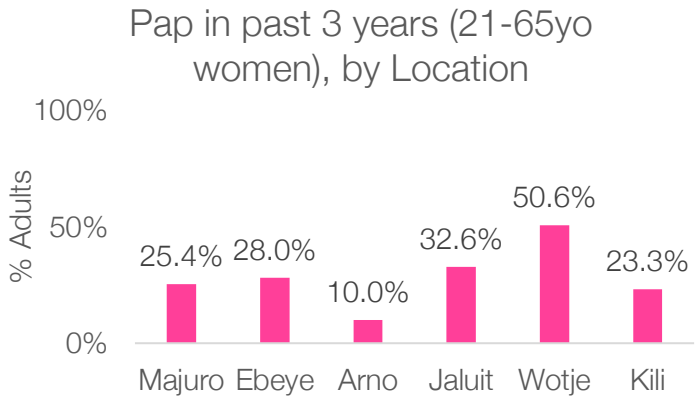


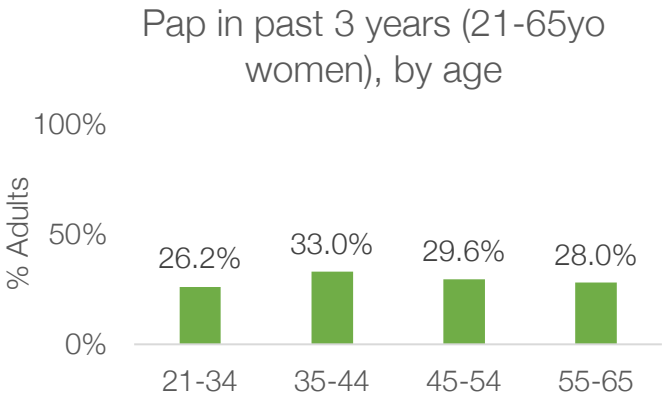
Ever had a CBE, by Education

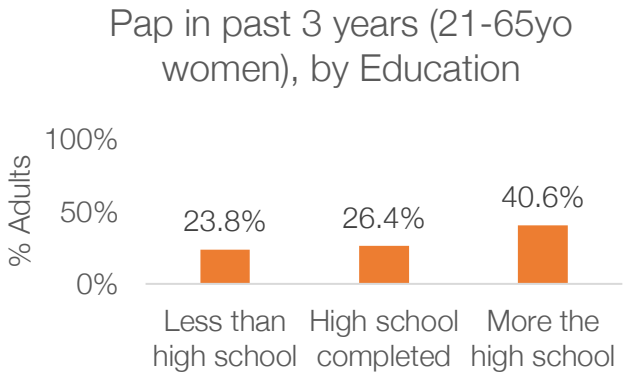


Female Cancer Screening: Pap/VIA

About one-third (35.6%) of all women in RMI reported that they have ever had a pap test or vaginal inspection with acetic acid (VIA) test to screen for cervical cancer. Among women 21-65 years old, 38.7% reported that they have ever had a pap or VIA test, and 27.0% (95%CI: 24.5%-29.7%) have had a pap or VIA test in the past 3 years per USPTF guidelines at the time of this survey. Up-to-date pap/VIA is significantly higher among those with more than a high school education, and there is significant variation by location.







Important notes about survey

Limitations:

- A good portion of the data collected are self-reported, thus bias may exist.
- Not all of the outer atolls could be surveyed, therefore these data do not represent all of the RMI. However, the majority of the population (86%) was eligible for sampling, and some of the outer atolls (Arno, Jaluit, Wotje, and Kili) were sampled to reflect all outer atolls.
- The census databased used in this survey was from 2011, the 2021 census was not available during the survey data collection period.

Strengths:

- Physical and biochemical measurements were conducted for NCD prevalence estimation rather than just self-report.
- Sample size was exceptionally large and included approximately 12% of all adults residing in RMI.
- Quality and thorough training provided for all surveyors).
- Use of tablets ensured data collection was clean, efficient, and timely.
- There were successful partnerships and collaboration between internal and external stakeholders.
- The majority of the randomly selected participants were agreeable to taking part in the survey, resulting in a high response rate.
- To ensure quality and authentic collection of data, checks were run consistently on the data, and supervisors implemented several validation strategies.

Challenges:

- For Majuro and Ebeye (urban centers), it was a challenge to find selected participants who were listed on the census household list. It was also difficult to find selected participants who had a fulltime job or who were attending school. Surveyors found it difficult to find them at home during the day and during revisits in the evening. Multiple house visits were therefore necessary.
- The A1C strips had to be kept at a cool temperature during transport from house to house and when taking the measurement. The test strips also have relatively short expiration dates, so they need to be used efficiently.
- During the survey data collection period, MoHHS rolled out a different survey at the same time. This caused some participants to refuse to be surveyed citing survey fatigue and/or mistrust.
- There were some foreign nationals with limited English-speaking skills who were selected participants for the survey. The survey was not available in languages other than English and Marshallese, so not all of these participants could be surveyed.

Recommendations

As previously mentioned, non-communicable diseases are the leading causes of morbidity and mortality in the U.S. Affiliated Pacific Islands, which includes the RMI [1]. Based on the results found, it is apparent that many RMI residents are currently suffering from various NCDs and their lifestyle may be contributing to these morbidities. Overweight/obesity, tobacco use, and poor diet have been identified as prevalent risk factors for developing NCDs in the RMI. Evidence-based programs and policies targeting adults and youth may be particularly effective in reducing the prevalence of NCDs in the RMI.

High prevalence of NCDs, specifically diabetes is apparent. Additionally, there appear to be many individuals with undiagnosed NCDs in the population. Among those diagnosed with diabetes or hypertension, control of these conditions appears to be poor. Programs that encourage individuals to seek professional care for screening and treatment of NCDs are recommended. Additionally, evidence-based self-management programs should be considered.

Prevalence of NCDs may also be impacted by limited medical resources in this small island nation such as lack of medical specialists, lack of appropriate equipment and technicians, and lack of laboratory testing supplies and capacity. This is especially true in the smaller outer islands. These limited resources may be contributing to the low prevalence of medical screenings, including mammograms, pap smear/VIA, and colonoscopies.

Priority areas for health improvement in the RMI include:

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

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  - Wotje Atoll Local Government
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- The Pacific Community
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