# Pohnpei <br> <br> Federated States of Micronesia 

 <br> <br> Federated States of Micronesia}

## Adult Hybrid Survey



2019

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## Summary

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

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

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

In Pohnpei, there has not been a population-based NCD adult survey with physical and biochemical measurements since 2008. Therefore, a new survey was greatly needed to evaluate progress. This information is vital in order to prioritize public health programs and select appropriate interventions.

Pohnpei undertook a novel population-based household survey that combined NCD and associated risk factor indicators in 2019. A total of 1536 individuals aged 18 years or older participated in the survey. Respondents answered questions about their alcohol and tobacco use, other substance use, dietary habits, physical activity, health access, oral health, health conditions, mental health, reproductive health, and cancer screening. Additionally, height and weight, waist circumference, fasting blood glucose, total cholesterol, and blood pressure were measured.

## Pohnpei vs. USA

Here are Pohnpei's 2019 Hybrid Survey prevalence data compared to U.S. prevalence data using the most comparable sources available.

|  | Pohnpei \% | US \% | Comparison |
| :---: | :---: | :---: | :---: |
| Current tobacco use (past 30 days) Cigarette smoking | 19.8 | 16.1 | $\uparrow$ |
| Current alcohol use (past 30 days) <br> Alcohol use (any) <br> Binge drinking (5+ drinks per day) | $\begin{aligned} & 25.1 \\ & 23.3 \end{aligned}$ | $\begin{aligned} & 53.8 \\ & 16.2 \end{aligned}$ | $\begin{aligned} & \downarrow \\ & \uparrow \end{aligned}$ |
| Nutrition <br> Consumed fruit less than 1 time per day Consumed vegetables less than 1 time per day | $\begin{aligned} & 87.9 \\ & 84.6 \end{aligned}$ | $\begin{aligned} & 36.6^{1} \\ & 18.1^{1} \end{aligned}$ | $\begin{aligned} & \uparrow \\ & \uparrow \end{aligned}$ |
| Health and healthcare <br> Fair or poor health (self-reported) <br> No medical checkup in the past year | $\begin{aligned} & 29.1 \\ & 54.0 \end{aligned}$ | $\begin{aligned} & 17.3 \\ & 33.0 \end{aligned}$ | $\begin{aligned} & \uparrow \\ & \uparrow \end{aligned}$ |
| Oral health <br> No dental visit within past year Extracted permanent teeth due to decay/disease | $\begin{aligned} & 70.3 \\ & 70.8 \end{aligned}$ | $\begin{aligned} & 32.4 \\ & 41.1 \end{aligned}$ | $\begin{aligned} & \uparrow \\ & \uparrow \end{aligned}$ |
| Chronic conditions <br> Overweight/obesity <br> Diabetes (self-reported + undiagnosed)** <br> Hypertension (self-reported + undiagnosed)** <br> Measured high total cholesterol ( $\geq 240 \mathrm{mg} / \mathrm{dL}$ ) | $\begin{gathered} 77.2 \\ 22.8 \\ 22.5 \\ 5.8 \end{gathered}$ | $\begin{aligned} & 71.6^{2} \\ & 12.2^{3} \\ & 33.2^{2} \\ & 12.4^{3} \end{aligned}$ | $\begin{aligned} & \uparrow \\ & \uparrow \\ & \downarrow \\ & \downarrow \end{aligned}$ |
| Cancer screening <br> No Pap smear in the past 3 years (women 21-65 yo) ${ }^{* * * *}$ <br> No mammogram in the past 2 years (women $50-74$ yo) | $\begin{aligned} & 71.8 \\ & 96.5 \end{aligned}$ | $\begin{aligned} & 19.8 \\ & 21.7 \end{aligned}$ | $\begin{aligned} & \uparrow \\ & \uparrow \end{aligned}$ |
| Source for US comparison: BRFSS 2018 unless noted with ${ }^{1}$ BRFSS 2017, ${ }^{2}$ NHANES 2015-2016 (adults 20+), ${ }^{3}$ NHANES 2011-2014 (adults 20+), **Diabetes prevalence is estimated based on either a self-report of diabetes for which the patient is taking medication and/or a single fasting blood sugar of $\geq 126 \mathrm{mg} / \mathrm{dL}$ during the survey; Hypertension prevalence is estimated based on either a self-report of hypertension for which the patient is taking medication and/or a measured average blood pressure (of 3 readings) of $\geq 140 / 90$, ***Pap smear prevalence in Pohnpei includes VIA test. NOTE: Statistically significant differences could not be determined due to the fact that BRFSS comparison data are based on median values of the 50 US States + DC. Therefore, differences of $2 \%$ were considered to be comparatively different. |  |  |  |

## Surveillance in Pohnpei

The table below compares the 2008 Pohnpei STEPS prevalence data to the 2019 Pohnpei Hybrid prevalence data for adults 25-64 years old. Note that the 2008 Pohnpei STEPS data and the 2019 Pohnpei Hybrid data both include data from ages 25-64 only so that trends can be directly compared. Chi-square tests were used to generate p-values to test for significant changes.

|  | $2008 \%$ | $2019 \%$ | p-value | Comparison |
| :--- | :---: | :---: | :---: | :---: |
| Current tobacco use <br> Cigarette smoking <br> Chewing betel nut (with or without tobacco) | 29.2 | 21.3 | $<0.01$ | $\downarrow$ |
| Current alcohol use <br> Alcohol use in past 12 months | 25.7 | 46.0 | 0.20 |  |
| Chronic conditions | 59.9 | 80.4 | $<0.01$ | $\uparrow$ |
| Overweight/obesity | 24.7 | 23.5 | 0.50 | $\uparrow$ |
| Diabetes (self-reported on meds or <br> $\geq 126 m g / d L)$ | 22.9 | 21.6 | 0.40 | $\uparrow$ |
| Hypertension (self-reported on meds or <br> $\geq 140 / 90$ ) | 29.6 | 34.5 | 0.02 | $\uparrow$ |
| Measured elevated cholesterol ( $\geq 190 \mathrm{mg} / \mathrm{dL})$ |  |  |  |  |

## Introduction

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


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

As previously mentioned, the last NCD adult population-based survey was conducted in 2008. This was a STEPS survey supported primarily by the World Health Organization (WHO). Over time, other support partners have requested NCD and other health indicator data from Pohnpei that have not been collected and therefore cannot be provided.

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

For this survey, the FSM National and the Pohnpei Department of Health and Services provided local support. Funding and/or technical support was provided primarily by PIHOA, CDC, SPC, and WHO.

Pohnpei is one of four states that make up the Federated States of Micronesia (FSM), along with the states of Chuuk, Kosrae, and Yap. Pohnpei is home to the capital of FSM, Palikir. With an area of 129 square miles, it is the largest island in the FSM and also the most developed. Pohnpei is divided into six municipalities: Kitti, Kolonia, Madolenihmw, Nett, Sokehs, and U.


The total population of Pohnpei is 36,196 ( 2010 census). The majority of the population $(34,789)$ reside on the main island, whereas 1,407 reside in the outer islands. Over half ( $56.2 \%$ ) of the population of Pohnpei is less than 25 years of age [7]. According to the 2010 census, there were 18,371 males (50.8\%) and 17,825 (49.2\%) females. As of 2010, the growth rate of Pohnpei was $0.45 \%$.


## Survey Methodology

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

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

## OBJECTIVES

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

## TARGET GROUP

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

## Sampling procedures <br> Multi-stage sampling was be used to recruit participants in this survey. This procedure is described in detail below <br> Stage 1: Geographical Stratification and Household Sampling <br> All municipalities were sampled based on adult population size within Enumeration Areas based on most recent population estimates of these areas based on the FSM Integrated Agriculture Census. Only Enumeration Areas on Pohnpei proper were used (outer islands were excluded from the sample). Individual households were then randomly selected from the Pohnpei household listings from the 2016 FSM Integrated Agriculture Census that mapped all households in Pohnpei.

Stage 2: Selection of the individual from the household for the Hybrid survey
Kish methodology was used for random selection of one adult per selected household. Step 1: Ask for the age and sex of all adults living the household (Start with youngest person in the household, exclude those visiting and do not live in the household; also exclude those who would be unable to provide consent)
Step 2: Put a rank for each individual aged 18 years and over following the rules below:
First, put a rank for males from the oldest to the youngest
Second, put a rank for females from the oldest to the youngest
Step 3: Use Kish grid to identify selected participant based on rank.
Data collection

Data were collected by trained surveyors contracted by a local nursing organization, Lien Kampahn Roson Mwahu. All surveyors underwent an extensive one-week training. Interviews were conducted in either Pohnpeian or English in the home on the day of the home visit, then an appointment was made for an early morning visit to collect fasting blood measurements. Data were collected from June to October 2019.

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

Data Descriptive statistics were produced for all variables. Outliers were checked, validated, cleaning and rectified.
A data dictionary was created to explain the indicators and data codes.

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

- age group ( $18-24$ years old, $25-34$ yo, $35-44$ yo, $45-55$ yo, $55-64$ yo, $65+$ yo)
- gender (male, female)
- municipality (Kitti, Kolonia, Madelenihmw, Nett, Sokehs, U)
- education (less than high school education, completed high school education, more than high school education)
[Due to the age of the most recent Census data, large sample size, and ability to analyze locally, these data were not weighted.]


## Sample Summary

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

## Survey sample $\quad \underline{2010}$ Census data <br> (18 and older)

$$
n=1,536
$$

n=20,799

Gender

Male
Female
Age group
18-24 years
25-34 years
35-44 years
45-54 years
55-64 years
$65+$ years
Municipality*
Kitti
Kolonia
Madolenihmw
Nett
Sokehs
U

306 (19.9\%)
235 (15.3\%)
279 (18.2\%)
287 (18.7\%)
277 (18.0\%)
152 (9.9\%)

6,470 (18.7\%)
6,068 (17.6\%)
5,662 (16.4\%)
6,542 (18.9\%)
6,640 (19.2\%)
3,192 (9.2\%)
*Municipality data for Pohnpei is for all ages on Pohnpei proper only

## Demographics

| Gender | $\underline{n}$ | $\underline{\%}$ |
| :--- | :---: | :---: |
| Male | 661 | 43.0 |
| Female | 875 | 57.0 |

## Education

Less than high school 801
52.2
$\begin{array}{lll}\text { High school } & 532 & 34.6\end{array}$
Associate's degree $167 \quad 10.9$
$\begin{array}{ll}\text { Bachelor's degree } 28 & 1.8\end{array}$
$\begin{array}{lll}\text { Graduate or professional degree } & 7 & 0.5\end{array}$
Ethnic Background
Pohnpeian $1498 \quad 97.5$
$\begin{array}{lll}\text { Other } & 38 & 2.5\end{array}$
Marital Status
Single, never married $271 \quad 17.6$
Married 1,058
68.9
Widowed
Divorced/separated
1529.9
Divorced/separated 55
Employment Status
Government employee $226 \quad 14.7$
Non-government employee $224 \quad 14.9$
Self-employed $327 \quad 21.3$
Non-paid (volunteer, subsistence, etc.) 8
Student 89
5.6
Homemaker $187 \quad 12.2$
Retired
Unemployed (able to work)
$79 \quad 5.1$
Unemployed (unable to work)
$326 \quad 21.2$
Unemployed (unable to work) $73 \quad 4.8$

## Demographics

| Military Status | $\underline{n}$ | $\underline{\%}$ |
| :--- | :---: | :---: |
| Active Duty | 14 | 0.9 |
| Reservist | 0 | 0.0 |
| Veteran | 4 | 0.3 |
| Retired | 4 | 0.3 |
| Never Served | 1,512 | 98.4 |
|  |  |  |
| Religion |  |  |
| Congregational Christian Church | 31 | 2.0 |
| Catholic | 815 | 53.1 |
| UCCP Protestant | 561 | 36.5 |
| Seventh Day Adventist | 16 | 1.0 |
| LDS/Mormon | 32 | 2.1 |
| Pentecostal/AOG | 21 | 1.4 |
| Baptist | 31 | 2.0 |
| Other | 26 | 1.7 |
| None | 3 | 0.2 |
|  |  |  |
| Household Income | 724 | 47.1 |
| < \$5,000 | 488 | 31.8 |
| \$5,000 to < \$10,000 | 167 | 10.9 |
| \$10,000 to < \$15,000 | 49 | 3.2 |
| \$15,000 to < \$20,000 | 34 | 2.2 |

NOTE: some Ns may not total 1,536 due to responses of "don't know" or "refused"

## General Health

About one-third (29.1\%) of adults in Pohnpei self-reported their general health to be fair or poor.

Self-reported health status among Adults in Pohnpei, 2019


There was statistically significant variation of self-reported fair or poor health by gender, age, and municipality. There was no statistically significant difference by education levels.

Fair or poor health, by Gender


Fair or poor health,


Fair or poor health, by Age


Fair or poor health, by Municipality



## Access to Care: Annual Checkup

Overall, a little over half (54.0\%) of adults in Pohnpei did not receive an annual checkup in the past year, and one out of every five of adults (21.4\%) have never had an annual checkup.

Last Annual Exam among Adults in Pohnpei, 2019


Younger adults (<45 years old), those with less than high school education (23.8\%), and residents of Nett (29.2\%) had a higher prevalence of never having an annual exam. There was no statistically significant difference by gender.



No Annual Exam, by Age


No Annual Exam, by Municipality


## Access to Care: Health Insurance

## Health Insurance Status among Adults in Pohnpei, 2019

Two thirds (66.9\%) of the adult population in Pohnpei reported that they did not have any kind of health insurance.


Adults with less than high school education had the highest prevalence (80.0\%) of no health insurance. Kolonia had the lowest prevalence (54.9\%) of residents without health insurance. Older adults aged 65 years or older had the lowest prevalence of adults without health insurance There was no statistically significant difference between gender.



No Health Insurance, by Age


No Health Insurance, by Municipality


## Access to Care: Health Care Barriers

$40 \%$ of adults in Pohnpei reported that they could not see a doctor because of health care costs in the past year.

More women (42.5\%) than men reported not being able to see a doctor due to

Health Care Costs as a Barrier in Pohnpei, 2019

health care costs. Adults with less than high school education (40.9\%) and residents of Madolenihmw (46.0\%) and $U$ (46.7\%) had the highest prevalence of not seeing a doctor due to health care costs. Young adults 18-24 years old had the lowest prevalence ( $31.8 \%$ ) of not seeing a doctor due to health care costs.


## Oral Health

About one third adults (29.7\%) in Pohnpei had a dental visit in the past year. About one out of every five adults (20.8\%) have never seen a dentist. 70.8\% of adults in Pohnpei have had at least one tooth removed due to tooth decay or gum disease.

Last Dental Exam among Adults in Pohnpei, 2019


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


## Overweight / Obesity

Body Mass Index (BMI) is calculated based on height and weight measurements. Based on these measurements, about 3 out of 4 (77.2\%) of adults in Pohnpei were overweight or obese.

BMI Categories among Adults in Pohnpei, 2019


More women than men were overweight/obese. Middle aged adults (35-54 years old) had the highest prevalence of overweight/obesity among all age groups. There were no significant differences observed by education or municipality.


## Waist Circumference

Unhealthy waist circumference is defined as more than 40 inches for males and more than 35 inches for non-pregnant females. Almost two thirds of adults in Pohnpei (60.5\%) had an unhealthy waist circumference.

Waist Circumference among Adults in Pohnpei, 2019


Women (83.6\%) had a much higher prevalence of unhealthy waist circumference compared to men. Older adults aged 65 years and older had the highest prevalence ( $71.7 \%$ ) of unhealthy waist circumference. There were no significant differences observed by education or municipality.


## Hypertension

Almost one out of five adults (22.5\%) in Pohnpei had high blood pressure ( $2140 / 90$ ) during screening or selfreported having hypertension* for which they took medication.

* Hypertension prevalence is estimated based on either a self-report of hypertension for which the individual is taking medication and/or a measured average blood pressure (of 3 readings) of $\geq 140 / 9$

Adult Hypertention in Pohnpei, 2019


Hypertension prevalence increased greatly with age, with about half of adults 65 years and older having hypertension. Those with less than high school education and more than high school education had higher prevalence of hypertension. There were no significant differences observed by gender or municipality.


## Hypertension Diagnosis \& Control

Among the adults in Pohnpei classified as having hypertension, 58.4\% of adults did not report that they had been diagnosed with hypertension. $16.8 \%$ of individuals classified as having hypertension reported that they were diagnosed and taking medication for their hypertension, and $24.7 \%$ reported that they had been diagnosed, but were not currently on medication for their hypertension.

Diagnosis Status among Adults with Hypertension in Pohnpei, 2019


Among those adults who reported that they were diagnosed and taking medication for their hypertension, $84.9 \%$ had an uncontrolled blood pressure measurement (average blood pressure [of 3 measurements] during survey was $\geq 140 / 90$ ). This indicates that these individuals with hypertension are not controlled.

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

Diagnosed on meds, controlled $15 \%$


## Diabetes

22.7\% of adults in Pohnpei were estimated to have diabetes. 25.4\% of adults were estimated to have prediabetes.
*Diabetes prevalence is estimated based on either a selfreport of diabetes for which the patient is taking medication and/or a single fasting blood sugar of $126 \mathrm{mg} / \mathrm{dL}$ or higher during the survey. Pre-diabetes is estimated based on either a self-report of pre-diabetes and/or a single fasting blood sugar of $100-125 \mathrm{mg} / \mathrm{dL}$ during the survey.

Adult Diabetes in Pohnpei, 2019


Diabetes prevalence increased with age, with about one-third of all adults 55 years and older having diabetes. Those with less than high school education and more than high school education had higher prevalence of diabetes. There were no statistically significant differences between gender and municipalities.


## Diabetes Diagnosis \& Control

Among those individuals classified as having diabetes, $67.0 \%$ were not diagnosed. $17.4 \%$ reported having diabetes and currently being on medication for their diabetes, and $15.5 \%$ reported that they had been diagnosed with diabetes but were not currently taking medication for their diabetes.

## Diagnosis Status among Adults with Diabetes in



Among those adults in Pohnpei who reported being diagnosed with diabetes and on medication for their diabetes, 4 out of 5 ( $81.0 \%$ ) had a high measured fasting blood sugar ( $126 \mathrm{mg} / \mathrm{dL}$ or higher during survey). This indicates that these diabetics are not controlled.

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


## Diabetes Management

Among adults with who self-reported having diabetes in Pohnpei, about one in three adults (35.0\%) have not seen a health professional for their diabetes in the past year.

Doctors Appointment for Diabetes in the past year in Pohnpei, 2019


Over half of adults (63.9\%) with self-reported diabetes in Pohnpei did not check their blood sugar levels in the past year. Two thirds of adults (66.7\%) with self-reported diabetes have not had their HbA1c check by a health professional in the past year.

Blood Sugar Self-Check in the past year in Pohnpei, 2019


HbA1c check by Professional in the past year in Pohnpei, 2019


## Diabetes Management

Among adults who self-reported as having diabetes in Pohnpei, four out of five diabetics ( $80.0 \%$ ) have never checked their feet for sores or irritations; $72.6 \%$ have not had a health professional check their feet for any sores or irritations in the past year.

Frequency of Foot Self-Check for Sores or Irritations in Pohnpei, 2019


Foot Check by Professional in the past year in Pohnpei, 2019


Among adults who self-reported as having diabetes in Pohnpei, 58.7\% had never had an eye exam in which their pupils were dilated; half of self-reported diabetics (52.9\%) have never taken a course or class on how to manage diabetes themselves.


## Total Cholesterol

23.8\% of adults in Pohnpei had "elevated" total cholesterol ( $2200 \mathrm{mg} / \mathrm{dL}$ ) during screening; 5.8\% had "high" total cholesterol ( $2240 \mathrm{mg} / \mathrm{dL}$ ).

Adult Total Cholesterol in Pohnpei, 2019


Elevated total cholesterol prevalence was highest among women, adults aged 45 and older, those with less than high school education or more than high school education, and residents of $U$.


Elevated Cholesterol ( $\geq 200$ $\mathrm{mg} / \mathrm{dL})$, by Education


Elevated Cholesterol ( $\geq 200 \mathrm{mg} / \mathrm{dL}$ ), by Age


Elevated Cholesterol ( $\geq 200 \mathrm{mg} / \mathrm{dL}$ ), by Municipality


## Self-Reported Chronic Disease

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

|  | 95\% Confidence Interval |  |  |
| :--- | :---: | :---: | :---: |
| Ulcer | 7.0 | 5.7 | 8.2 |
| Gout | 6.1 | 4.8 | 7.3 |
| Arthritis | 5.2 | 4.0 | 6.3 |
| Asthma | 4.7 | 3.6 | 5.8 |
| Tuberculosis (TB) | 3.9 | 2.9 | 4.8 |
| Coronary Heart Disease | 2.2 | 1.4 | 2.9 |
| Angina | 2.0 | 1.3 | 2.7 |
| Other Heart Condition | 2.0 | 1.3 | 2.7 |
| COPD | 1.9 | 1.2 | 2.6 |
| Stroke | 1.9 | 1.2 | 2.6 |
| Heart Attack | 1.3 | 0.7 | 1.9 |
| Emphysema | 1.1 | 0.6 | 1.6 |
| Cancer | 0.5 | 0.1 | 0.8 |

## Chronic Kidney Disease

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

Adult Chronic Kidney Disease in
Pohnpei, 2019
Chronic Kidney Disease
$3 \%$

No Chronic Kidney
Disease 97\%

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


## Cigarette Smoking

About one out of five (19.8\%) adults in Pohnpei reported cigarette smoking in the last 30 days. $65.9 \%$ of these adults smoke every day. The average age adults started smoking among current smokers in Pohnpei was 18 years old.


Smoking prevalence was significantly higher among men (30.2\%) compared to women (12.0\%). Adults aged 45 to 54 years had the highest prevalence of cigarette smoking (23.8\%). There was significantly higher prevalence of smoking among those will less than high school education (22.7\%) and residents of in Sokehs (29.7\%) and Nett (25.2\%).


## Other Tobacco Use \& Smoking Cessation Behavior

Among those who smoke manufactured cigarettes, one third (34.8\%) reported smoking one pack ( 20 sticks) or more a day.

100
$\begin{array}{ll} & 80 \\ \text { 号 } & 60 \\ \text { 훈 } & 40 \\ \text { oे } & 40\end{array}$
20
0


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

| Other Tobacco Behavior | $\underline{n}$ | $\underline{\%}$ |
| :--- | :---: | :--- |
| E-cig, PV, or electronic nicotine in past 30 days | 19 | 1.2 |

Among smokers, about four out of five adults (78.1\%) in Pohnpei reported that they wanted to quit. Three out of five ( $60.6 \%$ ) smokers reported that they tried quitting.

Reported information on Smoking Cessation behavior among Adults in Pohnpei, 2019


100

## Second-Hand Smoke Exposure

About one third (34.5\%) of all adults in Pohnpei reported any sort of exposure to second-hand smoke (SHS) at home, in a vehicle, or at work in the past 7 days.

Adult Second-Hand Smoke Exposure in Pohnpei, 2019


The most common place of second-hand smoke exposure was in the home (24.0\%). $22.8 \%$ of adults reported second-hand smoke exposure in a vehicle and $14.2 \%$ of adults reported second-hand smoke exposure at work.

SHS Exposure among Adults in Pohnpei, 2019


## Betel Nut Chewing

Almost half ( $43.1 \%$ ) of adults in Pohnpei reported chewing betel nut in the past 30 days. Of these betel nut chewers, $75.2 \%$ reported chewing every day. The average age adults started chewing among current chewers in Pohnpei was 18 years old.

Betel Nut Chewing Status among Adults in Pohnpei, 2019


Chewing prevalence was significantly higher among men (54.9\%) compared to women. Adults who complete high school had a significantly higher prevalence of betel nut chewing ( $48.8 \%$ ) compared to those with less than or more than a high school education. Chewing prevalence was much higher among younger adults. Residents of Kitti (50.7\%), Nett (47.0\%), and Madolenihmw (45.9\%) had the highest prevalence of chewers.

Chewing Status, by Gender


Chewing Status, by Education


Chewing Status, by Age
100

Chewing Status, by Municipality


## Other Betel Nut Use \& Cessation Behavior

Almost all current betel nut chewers add tobacco to their betel nut chew (93.7\%). The majority of current betel nut chewers add cigarette sticks to their betel nut.

| *Type of tobacco used with betel nut | $\underline{\mathrm{n}}$ | $\underline{\%}$ |
| :--- | :---: | :---: |
| Cigarette Stick | 606 | 94.5 |
| Other Type of Tobacco | 1 | 0.2 |
| No Tobacco | 34 | 5.3 |

Among those who chew betel nut with tobacco, it takes most chewers (75.5\%) 3 days or less to chew one pack of cigarettes. One quarter of chewers (25.5\%) reported chewing a pack within one day.

Number of Days to chew 1 pack of cigarettes among Chewers in Pohnpei, 2019



Among betel nut chewers, three out of four adults (74.8\%) in Pohnpei reported that they wanted to quit. About two thirds (64.9\%) of betel nut chewers reported that they tried quitting.

Reported information on Betel Nut Chewing Cessation behavior among Adults in Pohnpei, 2019


## Any Tobacco Use

About half of adults in Pohnpei (52.2\%) chewed or smoked tobacco in the past 30 days.

Any tobacco use (smoking or chewing) was significantly higher among men (65.1\%)

Any Tobacco Use among Adults in Pohnpei, 2019

compared to women. Any tobacco use was more prevalent among adults younger than 45 years. There was significantly higher prevalence of tobacco use among those who completed high school or less education. Any tobacco was more common among residents of Kitti (59.0\%) and Nett (58.9\%).


Tobacco Use, by Education


Tobacco Use, by Age


Tobacco Use, by Municipality


## Alcohol Use and Binge Drinking

One quarter ( $25.1 \%$ ) of adults in Pohnpei reported alcohol use in the past 30 days. 2.2\% of adults reported drinking alcohol every day in the past 30 days. $23.3 \%$ of adults reported binge drinking in the past 30 days. The average age that adults started drinking among those who drank in the past 30 days in Pohnpei was about 18 years old.
*(binge drinking is defined as drinking 4 or more standard drinks on one occasion for women and 5 or more standard drinks on one occasion for men)


Binge drinking was most prevalent among men, adults 25-44 years old, and adults who completed more than high school. There was no statistically significant difference in binge drinking by municipality.

Binge Drinking, by Gender


Binge Drinking, by Education


Binge Drinking, by Age

$$
100
$$

$$
\begin{aligned}
& \frac{0}{5} \\
& \frac{0}{0} \\
& \frac{1}{2} \\
& 0
\end{aligned}
$$



Binge Drinking, by Municipality


## Drinking and Driving

6.7\% of adults in Pohnpei reported drinking and driving in the past 30 days. This is more than a quarter (26.8\%) of adults who reported drinking in the past 30 days. About 1 in 10 (11.4\%) of adults in Pohnpei reported being a passenger with a driver who had been drinking in the past 30 days.

Drinking and Driving Status among Adults in Pohnpei, 2019

More men, adults 25-44 years old, and adults who completed high school or more reported having drank and drove in the past 30 days. There was no statistically significant difference in binge drinking by municipality.


## Sakau Use (Non-Ceremonial)

About half (48.9\%) of adults in Pohnpei reported using non-ceremonial sakau in the past 30 days. $6.4 \%$ of adults said they drank non-ceremonial sakau everyday in the past 30 days.

Sakau Status among Adults in Pohnpei, 2019


Men had a higher prevalence of using non-ceremonial sakau in the past 30 days compared to women. Adults aged 25-44 years old had the highest prevalence of non-ceremonial sakau use. Residents of Nett reported the highest prevalence of non-ceremonial sakau use.


## Other Substance Use

6.1\% of adults in Pohnpei reported using marijuana. Less than $1 \%$ of adults reported using either inhalants or prescription drugs without doctor's orders.
Other Substance Use ..... n ..... \%
Marijuana ..... 94 ..... 6.1Inhalants or sniffed/huffed substances such as glue,gasoline, paint thinner, markers, or butane
Prescription drugs such as tramadol, demerol, oxycodon, codeine (Tylenol 3, or morphine without a doctor's orders

4 0.3

5
0.3

## Regular Diet

43.3\% of adults in Pohnpei reported eating a majority imported food or all or mostly all imported food. $26.5 \%$ of adults reported eating about half local food and half imported food. $30.3 \%$ of adults in Pohnpei eat majority or all or mostly all local food.

Regular Diet among Adults in Pohnpei, 2019


A diet consisting of a majority of imported food was more prevalent among younger adults, more educated adults, and residents of Madolenihmw and Kolonia. No statistically significant differences were found by gender.


## Fruit and Vegetable Consumption

87.4\% of adults in Pohnpei consumed less than the recommended daily servings of fruits and vegetables (at least 5 per day), and almost one third (28.3\%) consumed no or very little ( $<1$ serving) fruits and vegetables daily.

> Daily Fruit and Vegetable Consumption among Adults in $$
\text { Pohnpei, } 2019
$$



Very low fruit and vegetable consumption ( $<1$ serving per day) was more prevalent among adults living in Kitti (35.3\%). Older adults aged 65 years and older had the lowest prevalence of very low fruit and vegetable consumption. There were no statistically significant differences by education or municipality.




## Processed Meat Consumption

Most adults in Pohnpei ( $90.8 \%$ ) consumed processed meats (defined as packaged or canned modified mean products such as spam, hotdogs, vienna sausages, etc.) at least once per day. Two-thirds (68.6\%) consume processed meats two or more times per day.


Heavy consumption of processed means ( $2+$ times per day) was more prevalent among younger adults and residents of U . There were no statistically significant differences by gender or education.


## Sodium

66.6\% of adults in Pohnpei reported that they were currently watching their salt intake. Over half of adults reported always or often adding salt, salty seasoning, or salty sauce in cooking or preparing food (60.3\%) and always or often adding salt or salty sauce to food before eating it (60.5\%). Over one third (40.2\%) of adults in Pohnpei always or often eat processed food high in salt. Over one third (39.6\%) also believe they consume way too much or too much salt or salty sauce.


About half of adults (52.2\%) in Pohnpei felt that lowering their dietary salt intake is very important.

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


## Sugar-Sweetened Beverages

Most adults (87.6\%) in Pohnpei consumed at least one sugar-sweetened beverage (SSB) each day. More than one third (38.0\%) consumed 3 or more serving of SSBs daily.

SSBs Consumed Daily among Adults in Pohnpei, 2019
100


Heavy consumption of SSBs (3+ SSB servings daily) was most prevalent among adults who completed high school or had less than high school education. No significant differences were found by gender, age, or municipality.

3+ SSBs Daily, by Gender



## Physical Activity

In Pohnpei, more than half (59.0\%) of adults did not engage in any physical activity specifically for exercise in the past month. One quarter of adults (24.4\%) engaged in physical activity on some days (1-20 days), while $16.6 \%$ participated in physical activity for exercise majority of days (21-30 days) in the past month.

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


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


## Type of Physical Activity

Among adults who were physically active, specifically for exercise in the past 30 days in Pohnpei, walking was the most prevalent form of physical activity done for exercise (67.6\%). In addition, 20.5\% of adults in Pohnpei reported that they play sports to stay physically active. A small proportion reported running, jogging, swimming, or other activities.

Types of Physical Activity, among Adults in Pohnpei, 2019


Among adults in Pohnpei who reported playing sports, the most common sports reported were basketball (38.2\%), volleyball (25.2\%), and baseball (7.6\%).

Types of Sports Played among Adults in Pohnpei, 2019


## Colon Cancer Screening: Colonoscopy

Most adults 50-75 years old in Pohnpei (96.7\%) have never received a colonoscopy. $2.9 \%$ of adults 50-75 years meet the American Cancer Society recommendation for receiving a colonoscopy every 10 years.

Last Colonoscopy among Adults (50-75 years) among
96.7



Adults in Pohnpei, 2019

Never within the past 10 years 10 or more years ago
Adults with more than a high school education (7.9\%) had the highest prevalence of recommended colonoscopy (every 10 years). There were no statistically significant differences in colonoscopy prevalence between gender, age, or municipality.


## Colon Cancer Screening: Blood Stool Test

Most adults in Pohnpei (91.4\%) have never received a Blood Stool Test. 3.9\% of adults 50-75 years old met the American Cancer Society recommendation of receiving a Blood Stool Test once per year.

Last Blood Stool Test among Adults (50-75 years) in Pohnpei, 2019


.
3.9
0.7
$\begin{array}{ccc}\text { Never } \quad \text { within past year } \\ \text { within past } 2 & \text { within past } 3 & \text { within past } 5 \\ \text { years } & \text { years } & \text { years more years }\end{array}$
Adults with more than a high school education (9.5\%) and residents of Kolonia (9.1\%) had the highest prevalence of recommended Blood Stool Test (once per year). There were no statistically significant differences in blood stood test prevalence between gender or age.

Blood Stool Test in the past year, by Gender


Blood Stool Test in the past

| $\bigcirc$ | 100 | year, by Education |  |  |
| :---: | :---: | :---: | :---: | :---: |
| 只 80 |  |  |  |  |
| \% 60 |  |  |  |  |
| $\begin{aligned} & \frac{\pi}{5} \\ & \frac{0}{0} \\ & \frac{1}{1} \\ & 0 \circ \end{aligned}$ | 40 |  |  |  |
|  | 20 | 3.7 | 1.6 | 9.5 |
|  | 0 | 工 | T |  |
|  |  | High school or less | Completed high school | More than high school |

Blood Stool Test in the past year, by Age

Blood Stool Test in the past year,


## Any Colon Cancer Screening

Among adults 50－75 years old in Pohnpei， $6.3 \%$ have had a colon cancer screening．Any colon cancer screening is defined as someone who has had a blood stool test in the past year and／or a colonoscopy in the past 10 years．

Any Colon Cancer Screenng in past 10 years among adults（ $50-75$ yo）in Pohnpei， 2019


Adults with more than a high school education（17．5\％）and residents of Kolonia （11．7\％）and U（13．7\％）had higher prevalence of receiving a colon cancer screening．There was no significant difference between gender or age．

Any Colon Cancer Screening in past 10 years，by Gender

| ○ 100 |  |  |
| :---: | :---: | :---: |
| ¢ 80 |  |  |
| － 60 |  |  |
| $\frac{0}{5} 40$ |  |  |
| $\bigcirc 20$ | 6.3 | 6.3 |
| 0 |  |  |
|  | Male | Female |

Any Colon Cancer Screening in past 10 years，by Education


Any Colon Cancer Screening in past 10 years，by Age past 10 years，by Age

$$
7
$$

Any Colon Cancer Screening in past 10 years，by Municipality


## Female Cancer Screening: Mammogram

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

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


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

Mammogram in past 2 years, by Education


Mammogram in past 2 years, by Age


Mammogram in past 2 years,


## Female Cancer Screening: Pap Smear or VIA

28.1\% of women aged 21-65 years in Pohnpei had a Pap Smear or vaginal inspection with acetic acid (VIA) test in the past 3 years (per USPTF recommendation); About half (51.8\%) have never had a Pap Smear or VIA test.


In Pohnpei, the recommendation for receiving a Pap Smear or VIA was met more often by younger women (<40 years old) and residents of Madolenihmw. There was no statistically significant difference in pap smear or VIA test by education.

Pap Smear or VIA in past 3 years, by Education



Pap Smear or VIA in past 3 years, by Municipality


## Female Cancer Screening: Clinical Breast Exam

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

Last Clinical Breast Exam (CBE) among Women in Pohnpei, 2019


## Family Planning

$92.8 \%$ of women younger than 50 years old in Pohnpei reported not being pregnant at the time of the survey. Of these non-pregnant women, about one third ( $30.1 \%$ ) reported having used a birth control method to prevent pregnancy and more than half (65.2\%) reported not having used any birth control method. The remaining women were not sexually active (3.9\%) or had a same sex partner (0.2\%).

Any birth control method used to keep from getting pregnant among nonpregnant women in Pohnpei, 2019


Among non-pregnant women who had used a birth control method, the most prevalent method were shots (e.g. Depo-Provera) and contraceptive implant (e.g. Implanon).


## Family Planning

Among non-pregnant women who had not used a birth control method, the most common reason for not using a birth control method was that the woman "just didn't think about it" or they had their tubes tied.

Reasons for not using Birth Control Method among Non-Pregnant Women Not using Birth Control Methods in Pohnpei, 2019


## Women's Health

39.7\% of women in Pohnpei reported not becoming pregnant after more than 12 months of trying. $3.7 \%$ said they were diagnosed with problems in ovulation or menstruation.

Reported information on Pregnancy Difficulties among Women in Pohnpei, 2019


Among women who have had at least one pregnancy, $17.0 \%$ of women reported having at least one miscarriage. $16.0 \%$ of women reported having given birth to a stillborn. $1.3 \%$ had an ectopic pregnancy.

Reported information on adverse pregnancy/birth outcomes among Women in Pohnpei, 2019


About 1 out of 50 women reported having been diagnosed with chlamydia and about 1 out of 50 women reported having been diagnosed with gonorrhea. 8.3\% of women reported being diagnosed with Pelvic Inflammatory Disease (PID).

| Sexually Transmitted Infection (STI) | $\underline{n}$ | $\underline{\%}$ |  |
| :--- | :--- | :--- | :--- |
| Chlamydia |  | 15 | 1.7 |
| Gonorrhea |  | 16 | 1.8 |
| Pelvic Inflammatory Disease (PID) |  | 72 | 8.3 |

## Mental Health: Depression

Participants were asked questions regarding their mental health status. 7.5\% of adults reported signs of depression. Signs of depression was defined as having little interest or pleasure in doing things and/or feeling down, depressed or hopeless nearly every day and/or more than half the days in the past two weeks.

Signs of Depression among adults in
Pohnpei, 2019


Depression was most prevalent among residents of Nett (12.9\%). There were no significant differences in prevalence of experiencing signs of depression between gender, age, or education level.

Signs of Depression, by Gender


Signs of Depression, by Education


Signs of Depression, by Age


Signs of Depression, by Municipality


## Mental Health: Anxiety

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

Signs of Anxiety among adults in Pohnpei, 2019


Anxiety was most prevalent among women (6.8\%) and those 65 years and older (8.4\%). There were no significant differences in prevalence of experiencing signs of anxiety between education level or municipality.

Signs of Anxiety, by Age


Signs of Anxiety, by Municipality



# Important notes about survey 

## Limitations:

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


## Strengths:

- Physical and biochemical measurements were conducted for NCD prevalence estimation rather than just self-report.
- Quality and thorough training (four full days) was required 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.
- There was substantial support from local leadership.
- The survey team was mostly made up of health workers who were able to assist with accurate health translations, understand the health questions, and were dedicated to collecting high quality health data to assist with their programs.
- Pohnpei is a small island, so it was easy to identify households and track participants


## Challenges:

- Some houses were difficult to find. It would be helpful to have surveyors familiar with certain municipalities help to locate those households.
- There were challenges with transportation and getting to more remote parts of the island.
- There was non-compliance to some of the questions due to the sensitivity of the questions.
- Sometimes it was difficult to get participants in for the measurements after their interview.


## Discussion and Recommendations

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

Comparing the results of the present survey with data from the US helps to paint a picture of health disparities that exist between Pohnpei and the US. Based on these comparisons, it is evident that smoking prevalence in Pohnpei is worse than the US and chewing betel nut with tobacco is a significant concern, especially among youth and young adults. The overall prevalence of alcohol consumption in Pohnpei is lower than the US, though the binge drinking prevalence is higher. It is clear that there is lower utilization of preventive health (to include annual exams and oral health) in Pohnpei compared to the US, which may be contributing to the higher prevalence of self-reported fair or poor health among adults in Pohnpei. Also, when examining oral health indicators in Pohnpei, it was clear that dental visits in Pohnpei are much less common than in the US, and this is likely contributing to the higher proportion of adults living with missing teeth due to infection or decay. Although prevalence of hypertension and elevated cholesterol are lower in Pohnpei compared to the US, the overweight/obesity and diabetes prevalence in Pohnpei is significantly higher than the US. Accordingly, fruit and vegetable consumption prevalence was lower in Pohnpei compared to the US. Finally, female cancer screening prevalence is much lower in Pohnpei compared to the US, especially with breast cancer screening.

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

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

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

In addition to much more aggressive policies to control NCD risk factors, the results of this survey indicate that there is large "protection gap" in the delivery of health services designed to screen for and control the damage done by NCDs. The findings of this survey indicate that $3 \%$ of people with diabetes and $15 \%$ of those with hypertension have their disease under good control, and that only a small fraction of target age groups have been screened for early detection of common cancers ( $6 \%$ for colon cancer, $5 \%$ for breast cancer, and $28 \%$ for cervical cancer). Much more aggressive efforts are needed to assure that most adults receive the screening services they need for cancer prevention, and to provide the follow-up and care that those with diabetes and hypertension need to protect them from complications and death.

## Recommendations:

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

## Priority areas for health improvement in Pohnpei include:

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

## Acknowledgements

We would like to extend our most sincere gratitude and appreciation to all those who contributed to the success of this Pohnpei State NCD Hybrid Survey. We would like to start by recognizing the FSM Department of Health and Social Affairs at the National level, Pohnpei State Department of Health and Social Services, Division of Primary Health Care especially the Non-Communicable Disease Program at the state level, and last but not the least, each Respected Municipal government, traditional leaders and Church Leaders at the grass root level of society, and most especially to the People of Pohnpei. Thank you very much.

We must also extend words of appreciation to our international colleagues from PIHOA for their assistance and continued support during the process of planning, implementation and result dissemination of this Pohnpei NCD Hybrid survey. We warmly welcome your invaluable comments and input and most especially to PIHOA for your help and assistance.

We would like to thank the Pohnpei State Department of Health Services and Social Services, Director Mr. Kapilly Capelle, for endorsing the survey, the endless support, encouragement, and leadership. We would also recognize and give thanks to Chief of Primary Health care Division for the host and endless support as well.

A big Kalahngan to the Pohnpei NCD Hybrid Surveyors (Public Health Staff), for their dedication and hard work without which, Pohnpei would not be able to complete this work. Thank you for the hard work that each one of you contributed in the overall success of this survey. We must say that the survey has been very lengthy and very time and energy consuming. However, regardless of the many tasks and the very busy schedules for many of you, we were able to complete the work as planned and today we can see the product of that collaborative and concerted efforts of the many individuals and parties (National, State, and Local). Congratulation to you all for the job well done.

We would also like to thank Lien Kempahn Roson Mwahu for their fiscal management support during the survey.

Let's continue to work together to improve the overall health of OUR PEOPLE, OUR HOME, OUR STATE, the BEAUTIFUL ISLAND OF POHNPEI and mostly in the prevention and control of NCDs and their risk factors.

Kalahngan.

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## APPENDIX I: Details on indicators

| Variable | Source question | Classifications used in this report |
| :---: | :---: | :---: |
| Gender | Gender | The following responses were used: <br> - Male <br> - Female |
| Education | What is highest level of formal education you have completed? | The following responses were used: <br> - Less than high school <br> - High school <br> - Associate's degree completed <br> - Bachelor's degree completed <br> - Graduate or professional degree completed |
| Ethnic background | What is your ethnic background? | The following responses were used: <br> - Pohnpeian <br> - Other |
| Marital Status | Which best describes your current marital status? | The following responses were used: <br> - Single, never married <br> - Married <br> - Widowed <br> - Divorced/separated |
| Employment Status | Which best describes your current employment? | The following responses were used: <br> - Government employee <br> - Non-government employee <br> - Self-employed <br> - Non-paid (volunteer, subsistence, etc.) <br> - Student <br> - Homemaker <br> - Retired <br> - Unemployed (able to work) <br> - Unemployed (unable to work) |
| Military Status | What is your military status? | The following responses were used: <br> - Active duty <br> - Reservist <br> - Veteran <br> - Retired <br> - Never served |
| Religion | What is your religion? | The following responses were used: <br> - Congregational Christian Church <br> - Catholic <br> - Methodist <br> - Seventh Day Adventist <br> - LDS/Mormon <br> - Pentecostal/AOG <br> - Muslim |


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


| Waist Circumference | Measured waist circumference were used. | Males were categorized as having unhealthy waist if they had a measure of 40 inches or more. Non-pregnant females were categorized as having unhealthy waist if they had a measure of 35 inches or more. |
| :---: | :---: | :---: |
| Hypertension | Measured blood pressure and selfreported high blood pressure and medication status was used to categorize hypertension. | Individuals were categorized as having hypertension if their measured BP was $\geq 140 / 90$ and/or if they self-reported being diagnosed with hypertension and were taking medication for their hypertension |
| High blood sugar or diabetes | Measured fasting blood glucose and selfreported diagnosis of diabetes and medication status was used to categorize high blood sugar/diabetes. | Individuals were categorized as having diabetes if their fasting blood glucose was $\geq 126 \mathrm{mg} / \mathrm{dL}$ and/or if they selfreported being diagnosed with diabetes and were on medication for their diabetes. |
| Diabetes Health Appointment | About how many times in the past 12 months have you seen a doctor, nurse, or other health professional for your diabetes? | The following responses were used: <br> - 1 time <br> - 2-3 times <br> - $4-5$ times <br> - 6 or more times <br> - None |
| HbA1c | A test for "A one C" (HbA1c) measures the average level of blood sugar over the past three months. About how many times in the past 12 months has a doctor, nurse, or other health professional checked you for "A one C"? | The following responses were used: <br> - 1 time <br> - 2-3 times <br> - $4-5$ times <br> - 6 or more times <br> - None |
| Diabetes foot self-check | About how often do you check your feet for any sores or irritations? Include times when checked by a family member or friend, but do NOT include times when checked by a health professional. | The following responses were used: <br> - At least one time per day <br> - At least one time per week <br> - At least one time per month <br> - At least one time per year <br> - Never |
| Diabetes foot checked by health professional | About how many times in the past 12 months has a health professional checked your feet for any sores or irritations? | The following responses were used: <br> - 1 time <br> - 2-3 times <br> - 4-5 times <br> - 6 or more times <br> - None |


| Diabetes Eye Exam | When was the last time you had an eye exam in which the pupils were dilated? This would have made you temporarily sensitive to bright light. | The following responses were used: <br> - Within the past month (any time less than one month ago) <br> - Within the past year (1 month but less than 12 months ago <br> - Within the past 2 years (1 year but less than 2 years ago) <br> - 2 or more years ago <br> - Never |
| :---: | :---: | :---: |
| Diabetes Management Class | Have you ever taken a course or class in how to manage your diabetes yourself? | Yes or no |
| High Total Cholesterol | Measured total cholesterol was used. | If total cholesterol was $\geq 190 \mathrm{mg} / \mathrm{dL}$ the individual was classified as having elevated total cholesterol. If total cholesterol was $\geq 240 \mathrm{mg} / \mathrm{dL}$ the individual was classified as having high total cholesterol. |
| Low HDL Cholesterol | Measured HDL cholesterol was used. | If HDL cholesterol was $<40 \mathrm{mg} / \mathrm{dL}$ the individual was classified as having low HDL. |
| Arthritis | Have you ever been told by a doctor that you have $\qquad$ ? | Yes or no |
| Gout |  |  |
| Asthma |  |  |
| Coronary heart disease |  |  |
| Other heart disease |  |  |
| Tuberculosis (TB) |  |  |
| COPD |  |  |
| Stroke |  |  |
| Ulcer |  |  |
| Angina |  |  |
| Heart Attack |  |  |
| Cancer |  |  |
| Emphysema |  |  |
| Chronic Kidney Disease | Have you ever been told by a doctor or other health professional that you had weak or failing kidneys? Do not include kidney stones, bladder infections, or incontinence. | Yes or no |
| Cigarette Use | During the past 30 days, on how many days did you smoke cigarettes? | $\begin{aligned} & 0 \text { days= no use } \\ & 1-29 \text { days= some use } \\ & 30 \text { days= everyday use } \end{aligned}$ |
| Cigarette sticks smoked | On average, how many cigarette sticks do you smoke each day? | The following responses were used: <br> - 1-4 sticks <br> - 5-9 sticks <br> - 10-19 sticks <br> - 1 pack (20 sticks) |


| Want to quit cigarette use | Do you want to quit smoking cigarettes? | Yes or no |
| :---: | :---: | :---: |
| Try to quit cigarette use | During the past 12 months, have you stopped smoking for one day or longer because you were trying to quit smoking cigarettes? | Yes or no |
| Betel nut use | During the past 30 days, on how many days did you chew betel nut? | 0 days= no use <br> 1-29 days= some use <br> 30 days= everyday use |
| Type of tobacco used with betel nut | What kind of tobacco do you most often add to your betel nut chew? | The following responses were used: <br> - Cigarette sticks <br> - Imported loose tobacco <br> - Locally grown tobacco <br> - Other type of tobacco |
| Cigarette use frequency with betel nut | How many days does it take for you to chew one pack of cigarettes or one pouch of loose tobacco? | The following responses were used: <br> - 1 day <br> - 2 days <br> - 3 days <br> - 4-6 days <br> - 7 or more days |
| Want to quit betel nut use | Do you want to quit chewing betel nut? | Yes or no |
| Try to quit betel nut use | During the past 12 months, have you stopped chewing for one day or longer because you were trying to quit chewing betel nut? | Yes or no |
| E-cigarette use | During the past 30 days, on how many days did you use E-Cigarettes or a personal vaporizer (PV), or electronic nicotine? | 0 days= no use <br> 1-30 days= use |
| Home $2^{\text {nd }}$ hand smoke | During the past 30 days, on how many days did someone other than you smoke tobacco inside your home while you were at home? | $\begin{aligned} & 0 \text { days= no exposure } \\ & 1-30 \text { days= some exposure } \end{aligned}$ |
| Work $2^{\text {nd }}$ hand smoke | During the past 30 days, on how many days did you breathe tobacco smoke at your workplace from someone else other than you who was smoking tobacco? | 0 days= no exposure <br> 1-30 days= some exposure |
| Vehicle ${ }^{\text {nd }}$ hand smoke | During the past 30 days, on how many days did you ride in a vehicle where someone other than you was smoking tobacco? | $\begin{aligned} & 0 \text { days= no exposure } \\ & 1-30 \text { days= some exposure } \end{aligned}$ |
| Any $2^{\text {nd }}$ hand smoke exposure | Answered yes to any of the $2^{\text {nd }}$ hand smoke questions | Yes or no |
| Alcohol consumption | During the past 30 days, on how many days did you have at least one standard drink of any alcohol? | 0 days= no use <br> 1-29 days= some use <br> 30 days= Everyday use |


| Binge alcohol frequency | During the past 30 days, how many days did you have: <br> - for men: <br> - Five or more standard alcoholic drinks? <br> - for women: <br> - Four or more standard alcoholic drinks? | 0 days= no binge <br> 1-29 days= some binge <br> 30 days= Everyday binge |
| :---: | :---: | :---: |
| Drink and Drive | During the past 30 days, on how many days have you driven a vehicle after you've consumed alcohol? | 0 days = did not drink and drive 1-30 days $=$ did drink and drive some days |
| Passenger drink and drive | During the past 30 days, on how many days have you been a passenger in a vehicle with a driver other than yourself who has consumed alcohol? | 0 days = was not a passenger in a car with a driver who consumed alcohol $1-30$ days $=$ was a passenger in a car with a driver who consumed alcohol |
| Non-ceremonial sakau use | During the past 30 days, on how many days did you have at least one standard drink of non-ceremonial sakau? | $\begin{aligned} & 0 \text { days = no use } \\ & 1-30 \text { days = use } \end{aligned}$ |
| Marijuana drug use | During the past 30 days, report on how many days you used any of the following substance: $\qquad$ | No use= 0 days Use= 1 or more days |
| Inhalant drug use |  |  |
| Prescription drug use |  |  |
| Regular Diet | How much of your regular diet is made up of local/traditional foods (such as local fish, taro, breadfruit, banana, tangerine, etc)? | The following responses were used: <br> - All or mostly all local food <br> - Majority local food but some imported food <br> - About half local and half imported food <br> - Majority imported food but some local food <br> - All or mostly all imported food |
| Fruit and vegetable consumption | Sum of usual daily fruit consumption and daily vegetable consumption. | $<1$ serving $1-<3$ servings $3-<5$ servings 5 or more servings |
| Processed meat consumption | In a regular day, how many times do you eat processed meats? This does not include canned fish. | 0 servings <br> 1 serving <br> 2 or more servings |
| Salt use when cooking or preparing food | How often is salt, salty seasoning or a salty sauce added in cooking or preparing foods in your household? | The following responses were used: <br> - Always <br> - Often <br> - Sometimes <br> - Rarely <br> - Never |


| Adding salt to prepared food | How often do you add salt or a salty sauce such as soy sauce to your food right before you eat it or as you are eating it? | The following responses were used: <br> - Always <br> - Often <br> - Sometimes <br> - Rarely <br> - Never |
| :---: | :---: | :---: |
| Processed food high in salt | How often do you eat processed food high in salt? | The following responses were used: <br> - Always <br> - Often <br> - Sometimes <br> - Rarely <br> - Never |
| Perception of salt consumption | How much salt or salty sauce do you think you consume? | The following responses were used: <br> - Way too much <br> - Too much <br> - Just the right amount <br> - Too little <br> - Way too little |
| Watching salt intake | Most of the sodium or salt we eat comes from processed foods and foods prepared in restaurants. Salt also can be added in cooking or at the table. Are you currently watching or reducing your sodium or salt intake? | Yes or no |
| Lowering salt intake | How important to you is lowering the salt in your diet? | The following responses were used: <br> - Very important <br> - Somewhat important <br> - Not at all important |
| Sugar-sweetened beverage consumption | In a regular day, how many sugary drinks do you drink? This does not include diet drinks made with artificial sweeteners. | 0 servings <br> 1 serving <br> 2 servings <br> 3 or more servings |
| Physical Activity | During the past 30 days, other than your regular job, on how many days did you participate in any physical activities or exercises such as running, Zumba, sports, walking, or going to the gym, specifically for exercise? | $\begin{aligned} & 0 \text { days = No physical activity } \\ & 1-10 \text { days } \\ & 11-20 \text { days } \\ & 21-30 \text { days } \end{aligned}$ |
| Colonoscopy screening | How long has it been since your last colonoscopy? | The following responses were used for those adults 50+: <br> - Within past year <br> - Within past 2 years <br> - Within past 3 years <br> - Within last 5 years <br> - Within past 10 years <br> - 10 or more years ago <br> - Never |


| Blood stool test | A blood stool test is a test that determines whether the stool contains blood. How long has it been since your last blood stool test? | The following responses were used for those adults 50+: <br> - Within past year <br> - Within past 2 years <br> - With past 3 years <br> - Within last 5 years <br> - 5 or more years ago <br> - Never |
| :---: | :---: | :---: |
| Mammogram screening | How long has it been since you had your last mammogram? | The following responses were used for those women 50-74: <br> - Within past year <br> - Within past 2 years <br> - Within past 3 years <br> - Within past 5 years <br> - 5 or more years ago <br> - Never |
| Clinical breast exam | A clinical breast exam is when a doctor, nurse, or other health professional feels the breasts for lumps. How long has it been since your last clinical breast exam? | The following responses were used for those women: <br> - Within past year <br> - Within past 2 years <br> - Within past 3 years <br> - Within last 5 years <br> - 5 or more years ago <br> - Never |
| Pap smear or VIA | How long has it been since you had your last Pap test? | The following responses were used for those women 21-65: <br> - Within past year <br> - Within past 2 years <br> - Within past 3 years <br> - Within last 5 years <br> - 5 or more years ago <br> - Never |
| Birth control use | Did you or your partner do anything the last time you had sex to keep you from getting pregnant? | Yes or no |
| Type of birth control | What did you or your partner do the last time you had sex to keep you from getting pregnant? (if multiple methods, select first method on the list) | The following responses were used for those women: <br> - Female sterilization (ex. Tubal ligation, Essure, Adiana) <br> - Male sterilization (vasectomy) <br> - Contraceptive implant (ex. Implanon) <br> - Levonorgestrel (LNG) or hormonal IUD (ex. Mirena) <br> - Copper-bearing IUD (ex. ParaGard) <br> - IUD, type unknown <br> - Shots (ex. Depo-Provera) <br> - Birth control pills, any kind <br> - Contraceptive patch (ex. Ortho |


|  |  | Evra) <br> - Contraceptive ring (ex. NuvaRing) <br> - Male condoms <br> - Diaphragm, cervical cap, sponge <br> - Female condoms <br> - Not having sex at certain times (rhythm or natural family planning) <br> - Withdrawal (or pulling out) <br> - Foam, jelly, film, or cream <br> - Emergency contraception (morning after pill) <br> - Other method |
| :---: | :---: | :---: |
| Reasons not using birth control | Some reasons for not doing anything to keep you from getting pregnant the last time you had sex might include wanting a pregnancy, not being able to pay for birth control, or not thinking that you can get pregnant. What was your main reason for not doing anything the last time you had sex to keep you from getting pregnant? | The following responses were used for those women: <br> - You didn't think you were going to have sex <br> - You just didn't think about it <br> - Don't care if you get pregnant <br> - You want a pregnancy <br> - You or your partner don't want to use birth control <br> - You or your partner don't like birth control/side effects <br> - You couldn't pay for birth control <br> - You had a problem getting birth control when you needed <br> - Religious reasons <br> - Lapse in use of a method <br> - Don't think you or your partner can get pregnant (infertile or too old) <br> - You had tubes tied (sterilization) <br> - You had a hysterectomy <br> - Your partner had a vasectomy (sterilization) <br> - You are currently breastfeeding <br> - You just had a baby/postpartum <br> - You are pregnant now <br> - Same sex partner <br> - Other reasons |
| Unable to become pregnant | At any time did you try for more than 12 months and not become pregnant? | Yes or no |


| Ovulation or menstruation problems | Has a nurse, doctor or other medical care provider ever told you that you had problems with ovulation or menstruation, that is, your female cycle? | Yes or no |
| :---: | :---: | :---: |
| Ectopic pregnancy | Were you ever told that you had an ectopic pregnancy (tubal pregnancy that resulted in a miscarriage)? | Yes or no |
| Miscarriage | How many resulted in a miscarriage? | ```No miscarriage = 0 Ever had a miscarriage = 1 or more``` |
| Stillborn | How many pregnancies resulted in a stillborn infant/baby? | No stillborn = 0 <br> Ever had a stillborn = 1 or more |
| Chlamydia | Have you ever been told by a nurse, doctor or other medical provider that you had a sexually transmitted infection (STI) called chlamydia? | Yes or no |
| Gonorrhea | Have you ever been told by a nurse, doctor or other medical provider that you had a sexually transmitted infection called gonorrhea? | Yes or no |
| Pelvic inflammatory disease (PID) | Have you ever been treated with antibiotics for an infection in your fallopian tubes, womb, or ovaries, also called a pelvic infection, pelvic inflammatory disease, or P.I.D.? | Yes or no |
| Depression | Over the last 2 weeks, how often have you been bothered by any of the following problems? <br> - Little interest or pleasure in doing things <br> - Feeling down, depressed or hopeless | The following responses were used: <br> - Never <br> - Several days <br> - More than half the days <br> - Nearly everyday |
| Anxiety | Over the last 2 weeks, how often have you been bothered by any of the following problems? <br> - Feeling nervous, anxious or on edge <br> - Not being able to stop or control worrying | The following responses were used: <br> - Never <br> - Several days <br> - More than half the days <br> - Nearly everyday |

## APPENDIX II: Names of Surveyors

1. Aieleen Mauricio
2. Angeline S. Henry
3. Angie loanis
4. Apaisang Dolon
5. Artina George
6. Brandon Jim
7. Cecilia Primo
8. Consuelo Elias
9. Delpihn Abraham
10. Dodihse Peter
11. Edelynn Ringlen
12. Francisco Kerman
13. Helden Lipai
14. Hinden Alexander
15. Jesse Johnny
16. Kathrine Harry
17. Lihno Setik
18. Mailani Kusto
19. Marcy Lorrin
20. Maryallen S. Donre
21. Maryrose S. Johnny
22. Masaly Andon
23. Megan Paulino
24. Mercedes Gilmete
25. Olsen John
26. Pertina S. Albert
27. Rupina Obed
28. Serlino Wichep
29. Shellyann Saimon
30. Stephanie F. Kapiriel
31. Sylvia Benjamin
32. Veronica Andon

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