

Ulithi Atoll Health Assessment: A Peek at the Health of Rural Micronesia

W. Thane Hancock, MD, MPH*
A. Mark Durand, MD, MPH**
Arthur Yolwa, MD***
Josey Sagury***
Clotilda Legthar***
Mihi Ratima PhD****
Kelly Wachi MD*****
Aparajita Adhikary, DO*****
Mikela Yarawamai*****
Ana Yarawamai*****
Gregory Maskarinec, PhD*****

*Wa'ab Community Health Center, Yap State, Federated States of Micronesia, PO Box 148, Colonia, Yap, 96943 FSM, Phone: 691-350-2115, Fax: 691-350-3444, cell: 691-950-5920, e-mail: thanehancock@gmail.com. **Dept. of Health Services, Yap State, Federated States of Micronesia, PO Box 148, Colonia, Yap, FSM, 96943, Phone: 691-350-2115, Fax: 691-350-3444 email: durand@mail.fm. ***Dept. of Health Services, Yap State, Federated States of Micronesia, PO Box 148, Colonia, Yap, FSM, 96943, Phone: 691-350-2115, Fax: 691-350-3444. ****Harvard Medical School's Center of Excellence in Women's Health, c/o Brigham and Women's Hospital, 1620 Tremont Street, Boston, MA 02120, Phone: 617-732-5759, e-mail: mratima@partners.org. *****University of Hawai'i, John A Burns School of Medicine Department of Internal Medicine, 1356 Lusitana Street, Honolulu, Hawai'i 96813, Phone: 808-586-2000 e-mail: kellyw@hawaii.edu. *****University of Hawai'i, John A Burns Department of Pediatrics, 1319 Punahou St., 7th Floor, Honolulu, Hawai'i 96826, Phone: 808-983-6000, e-mail: raji49@yahoo.com. *****Oceania Community Health, PO Box 2366, Kailua-Kona, Hawaii 96745, Phone 808-386-2266, email: info@oceaniahealth.org. *****Oceania Community Health, PO Box 2366, Kailua-Kona, Hawaii 96745, Phone 808-386-2266, email: info@oceaniahealth.org. *****University of Hawai'i, John A. Burns School of Medicine Department of Family Medicine and Community Health, 95-390 Kuahelani Ave, Mililani, HI, 96943, Phone 808 627-3230, e-mail: gregory.maskarinec@gmail.com

Abstract

Background: The health challenges of Micronesians are generally well known. However, most of the health related data collection occurs in the population centers and relatively little is known about the health of the residents of Micronesia's rural outer islands. This is of particular concern in the Federated States of Micronesia (FSM) where a large portion of the population lives on the outer islands. To gain a better understanding of the health issues facing the isolated outer islands of Micronesia, a health survey was performed on Ulithi Atoll in Yap, FSM. **Methods:** A survey was created by the Yap State Health Department and members of the Ulithian community. The survey was carried out on two of the four inhabited islands of Ulithi Atoll in July 2004. Both island communities actively participated in the survey providing translation and data gathering assistance. **Results:** It was estimated that a >90% response rate for both islands was achieved. Analysis demonstrated that relative to the U.S., the atoll's population experienced high rates of obesity (45%), hypertension (29%), and smoking (55%). Sixty-six percent of men surveyed reported alcohol use versus 16% of women. Use of alcohol was markedly lower on Fatharai Island where a Chief had mandated abstinence. Preventative health screening was limited with over 80% of women without a pap smear in the past 2 years. In addition, the community identified finances and transportation as the main difficulties in accessing healthcare.

Conclusion: Overall, the research identified a number of health issues that require closer attention, in particular hypertension, overweight, obesity, alcohol misuse, smoking prevalence, betel nut/tobacco chewing, and domestic violence. There is indication that the community may be ready to address some of these issues. The value of community action within cultural frameworks is apparent, and there may be potential to extend culturally based approaches to address a broader range of issues. (PHD 2007 Vol 14 No 1 Pages 57 - 65)

Introduction

There is little reliable data to give an accurate picture of the health status of rural Micronesia. While headcounts of the outer island residents receiving treatment at

population center clinics provides some indication of disease prevalence, this provides at best a hazy picture of community health status and little indication of lifestyles and health-related behaviors in rural communities. This is especially pertinent given the rapid social changes affecting the islands. Movement from a traditional subsistence lifestyle to a more sedentary "modern" lifestyle has often been identified as

responsible for problems in Micronesian health.^a The introduction of imported foods, tobacco, and alcohol, alongside reduced physical activity symbolizes this “modern” lifestyle. Because of their relative isolation, the rural communities in Micronesia have been slower to adopt these lifestyle changes and it was often assumed that this was health protective. However, over time increasingly rural communities are transitioning to a “modern” lifestyle. There is little to no data on the health status of these communities.

To gain a better understanding of the health of rural Micronesia a health assessment was done on Ulithi Atoll in Yap State, Federated States of Micronesia (FSM). The survey was designed to get a picture of basic health statistics such as population height, weight, and blood pressure, and to collect information on health behaviors including alcohol use, tobacco use, and betel nut chewing.

Yap State is the westernmost state of the FSM. Yap State is composed of Yap Proper and approximately 66 outer islands and atolls, 22 of which are inhabited. Yap State stretches approximately 600 miles, encompassing 500,000 square miles of area. However, because of the small size of the islands, Yap State consists of only 45.8 square miles of land area.^b According to the 2000 Preliminary Census of the FSM, the population of Yap State is 11,241. Yap Proper is the population center with approximately 60% of the population. The other 40% of the population resides on the outer islands. Ulithi Atoll is an outer island of Yap located 100 miles northeast of Yap Proper. The 2000 census estimated the atoll to have a population of 1,016. The atoll is comprised of 35

islands, however only four of those islands are currently inhabited; Falalop, Azor, Mogmog, and, Fatharai (Figure 1). The population of Ulithi fluctuates with the movement of students during the school year.

Methods (A)

The health assessment project was initiated and supervised by the Yap State Department of Health. It utilized a survey tool initially developed to survey the community of Yap Proper. The survey tool was translated into Ulithian and pre-tested with four Ulithian community members residing on Yap Proper. The collection techniques were approved by the Yap State Department of Health following consultation with local community health leaders to ensure that the survey would be conducted in a culturally acceptable manner.

The study was conducted on the two islands in July 2004 with the assistance of members of the local communities and volunteers from Oceania Community Health. Community agreement to take part in the survey was sought and secured prior to the initiation of fieldwork.

On Fatharai the assessment was directed by Clotilda Legthar, the island’s community health aid. Because the population often moved between households in the small village it was decided by Clotilda Legthar that it would be best to invite potential participants to a central community center where interviews would be conducted. Women and children were interviewed on one day and the men were interviewed the following day. Those who were unable to attend the interviews at the community center were given the option of being interviewed in their homes.

On Mogmog, the survey was directed by the island’s medic, Josey Sagury, and the island’s physician, Dr. Arthur Yolwa. Community members were invited to be interviewed at the community health dispensary. Josey Sagury coordinated the interviews so that households came to the dispensary a few at a time. The men were interviewed by a male interviewer, and the women by a female interviewer. It was estimated by the co-coordinator, who has a good knowledge of the local community, that only 20 residents were not interviewed as they were off island collecting food for an upcoming feast.

Blood pressures were collected using manual sphygmomanometers. Hypertension was defined as a systolic blood pressure of >140 or diastolic blood pressure of >90. Severe hypertension was defined as a blood pressure >160 or diastolic blood pressure >110.

Figure 1. Map of Ulithi Atoll, Yap State, Federated States of Micronesia

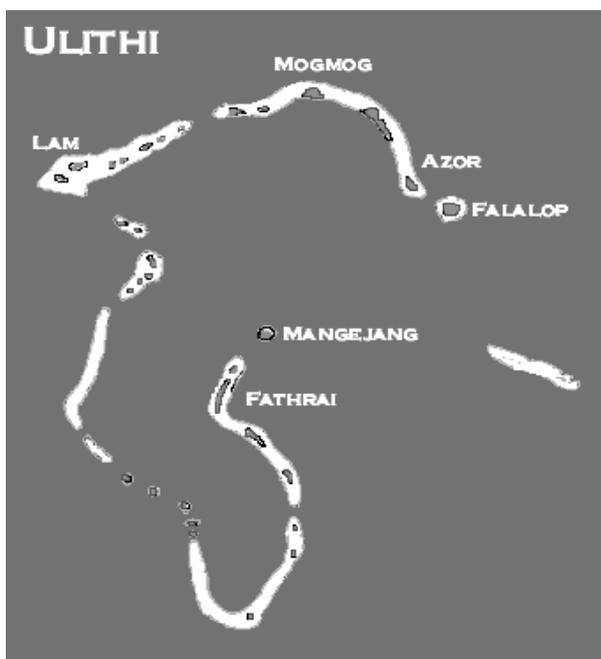


Table 1. Total Number of Individuals Surveyed

Island	Male	Female	Total	% Female
Fatharai	58	61	119	51.26
Mogmog	90	92	182	50.55
Total	148	153	301	50.83

Weight was calculated using a portable scale that was checked for accuracy with the Yap Hospital scale, prior to the survey. Body mass index (BMI), an estimate of body fat based on height and weight, was calculated using the standard kilograms divided by the square of height in meters. Consistent with usual standards, overweight was defined as a BMI ≥ 25 . Obese was defined as a BMI ≥ 30 .

Blood sugars on Fatharai were taken using a One Touch Ultra® blood sugar monitor. Random blood sugars were taken on all participants aged 35 years or more. Prior to testing the accuracy of the monitor was checked using control solution. Random blood sugars ≥ 200 were considered elevated.

Results (A)

Population (B)

The total number of people surveyed on Mogmog and Fatharai were 301 (Table 1). These numbers represent the individuals on the island at the time of the survey. As noted previously, there were an estimated 20 people who were not surveyed on Mogmog. In addition, there may be individuals who were spending the summer in other locations at the time of the survey.

The community is predominately composed of younger individuals with 43% of the population under the age of 18. This compares to 26% of the U.S. population being under the age of 18 in the 2000 census.^c The islands' populations were 49% male and 51% female. This is consistent with the Yap State trend noted in the 2000 census, with 49% male (5,508) population, and 51% (5,733) female.^d

Blood Pressure (B)

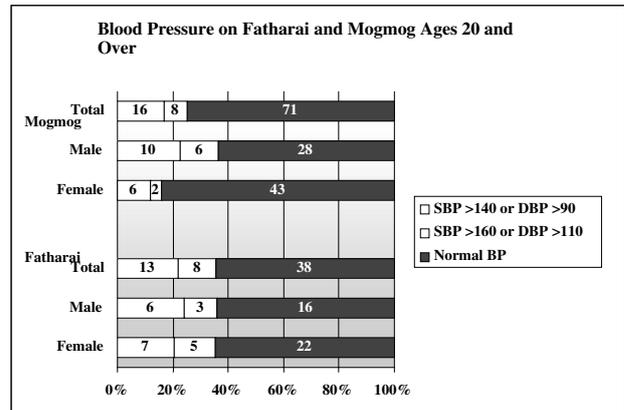
Blood pressure readings demonstrated that 29% of people on Fatharai and Mogmog aged 20 years and over had hypertension. This compares with a U.S. rate of 25.2% for the same age group.^e Approximately 10% of individuals on the two islands had severe hypertension. This elevated rate of blood pressure may be due to high rates of tobacco and alcohol use. Although the numbers are not large enough to be statistically significant, it is interesting that the rate of hypertension is 15% in Mogmog females, compared to a rate of 35% for all other groups (Figure 2). This may be linked to the significant differences in alcohol consumption between the two groups. There are no major differences in

smoking rates by gender.

Blood Sugar (B)

Because of a lack of supplies, random blood sugars were only collected on individuals on Fatharai aged 35 and over. On Fatharai, 5.2% of individuals aged 35 and over had elevated blood sugars. This compares with a U.S. prevalence of diabetes of 5.9%. Although one random fasting blood sugar does not meet the American

Figure 2

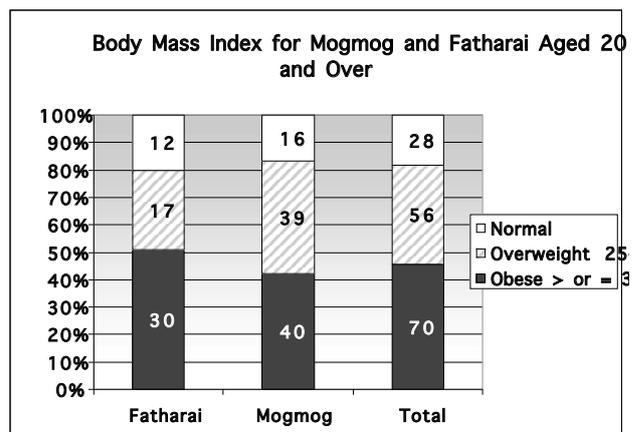


Diabetes Association definition for diabetes (two random blood sugar readings of ≥ 200 [mg/dl] with symptoms of diabetes mellitus, or a fasting blood sugar reading of ≥ 126 [mg/dl] on 2 occasions, or 2 hour postload glucose readings of ≥ 200 [mg/dl])^f it may suggest a prevalence of diabetes of around 5%.

Body Mass Index (B)

The average BMI for individuals aged 20 years and over on the two islands was 30. One hundred and twenty six of 154 individuals (82%) were overweight or obese with

Figure 3.



a BMI ≥ 25 , and 70 of 154 (45%) were obese with a BMI ≥ 30 (Figure 3).

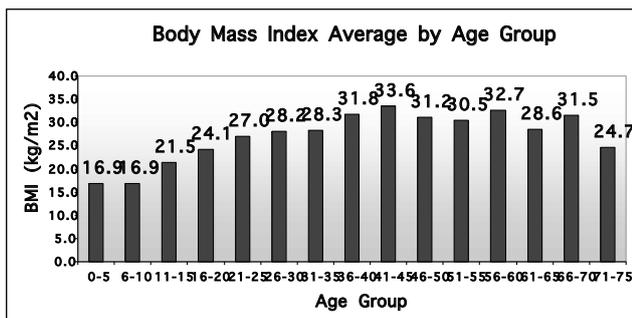
On Mogmog, 79 of 95 (83%) were overweight or obese, and 42% met the criteria for obesity. On Fatharai, 47 of

59 (80%) were overweight or obese, and 51% met the criteria for obesity (Figure 3).

This compares to a U.S. prevalence of 66.3% overweight or obese, and 32.2% obese.⁹ The average BMI is 30 for Fatharai and Mogmog for persons aged 20 and over are similar to the average BMI of 31 revealed in a 1994 survey of Kosrae, another island state of the FSM.^h

When examining BMI by age group, the average BMI for those aged 36-60 years is >30, meeting the criteria for

Figure 4.



obesity (Figure 4).

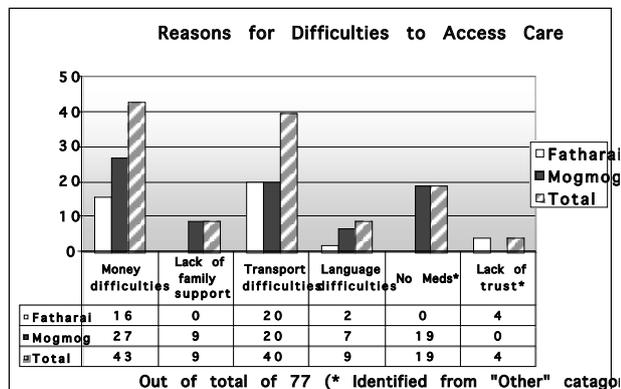
Access to Care (B)

Individuals on both islands were asked if they had difficulty accessing healthcare. The survey contained the examples of possible reasons for poor healthcare access; these were “money difficulties, lack of family support, transportation difficulties, language difficulties, insurance problem and other.”

Forty percent of individuals aged 15 years and over stated they had difficulties. The main reasons were financial and transportation difficulties.

On Mogmog Island, 45% reported difficulties in accessing healthcare. On Mogmog, money difficulties,

Figure 5.



transportation difficulties, and lack of medications at the local dispensary were the top three reasons (Figure 5).

On Fatharai, 34% reported difficulties. On Fatharai, the main three reasons were money difficulties, transportation difficulties and lack of trust (Figure 5). In the “other” category, the most commonly identified difficulties were lack of medications and lack of trust.

Cervical Screening (B)

Of the women surveyed aged 15 years and over, 79 of 94 (84%) reported that they had not had a pap smear in the past two years.

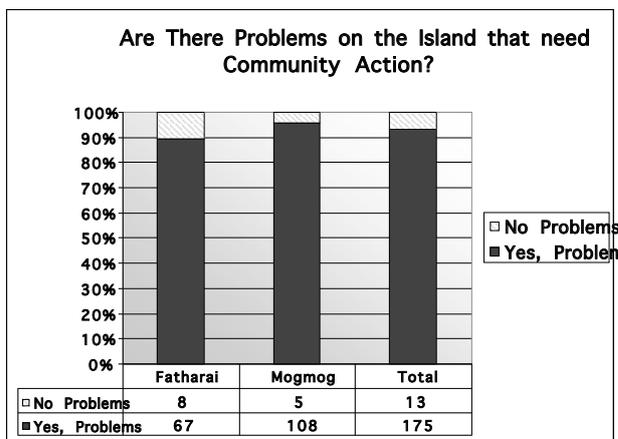
On Fatharai, 32 of 37 (86%) were without a pap smear in the past two years. On Mogmog 47, of 57 (82%) were without a pap smear. This compares with approximately 15% of women in the U.S. not being properly screened.

Family Planning (B)

Of the women surveyed aged 15 to 55 years (at risk for pregnancy by age), 18% indicated use of some form of birth control. An additional 17% of women were interested in using family planning methods.

On Mogmog, 20% used family planning and 15% of women were interested in using birth control in the future. Therefore, 35% of the women aged 15-55 years

Figure 6.



surveyed on Mogmog were interested in some form of birth control.

On Fatharai, 16 % used family planning and 22 % of women were interested in using it in the future. Thus 38% of the women aged 15-55 years surveyed on Fatharai were interested in some form of birth control.

This compares with a median prevalence of 84% for birth control use in the U.S. (percentage of women at risk for pregnancy who said they or their partner were using some method of birth control).^j

Community Action Issues (B)

Survey participants were asked to identify health-

related concerns on the island. The survey instrument contained the following list of examples of possible community problems, "...alcohol, suicides, child abuse and neglect, elderly abuse and neglect, violence against women, tobacco use by teens, marijuana and other." Of those surveyed aged 15 years and over, 93% indicated that there were problems on the island that required community action (Figure 6). The three most common community problems identified were alcohol misuse, teenage smoking and marijuana use.

On Mogmog, 96% felt there were community problems. The three main problems were alcohol abuse, teen

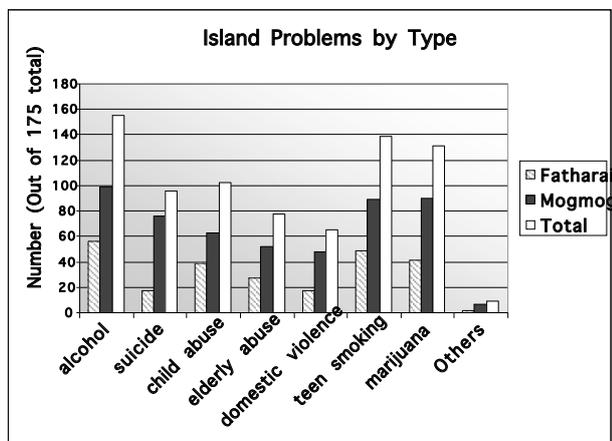
Table 2. Island Problems Identified by Island

Island	Alcohol	Suicide	Child abuse	Elderly abuse	Domestic violence	Teen smoking	Marijuana	Others
Fatharai	56	17	39	27	17	49	41	2
Mogmog	99	76	63	52	48	89	90	7
Total	155	96	102	78	65	139	131	9

smoking and marijuana (Table 2 & Figure 7).

On Fatharai, 89% felt there were problems. The three main problems were alcohol abuse, teen smoking and marijuana (Table 2 & Figure 7).

Figure 7.



When only examining the female responses, 6 of 37 (16%) of the women from Fatharai identified violence against women as a problem. However, on Mogmog, 41 of 57 (71%) of women identified violence against women as a problem. Therefore, 50% of all the women surveyed identified violence against women as a problem.

Other self-identified problems were: cultural change, no toilets, diet changes, children up late at night, home abortions, high blood pressure, tobacco chewing with betel nut, erosion, and pollution of the ocean.

Alcohol (B)

Of people surveyed aged 18 years and over, 41%

indicated that they drank alcohol. By gender 18% of women drank versus 66% of the male respondents.

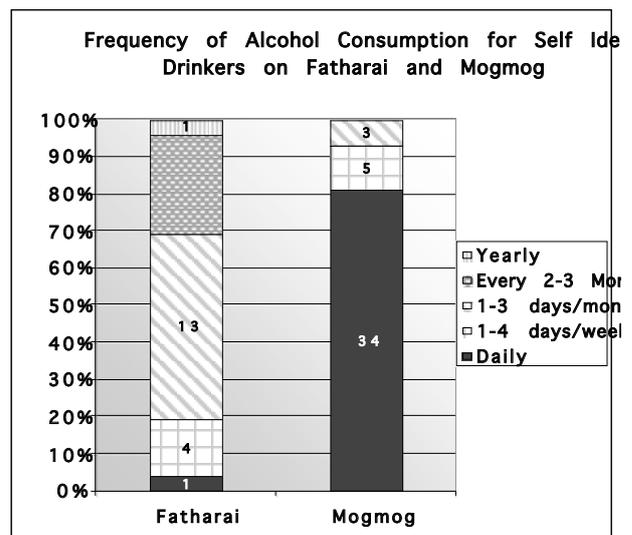
On Mogmog, where alcohol use is permitted among the men, 73% are drinkers. While it is not culturally acceptable for women to drink alcohol, 11% of female respondents indicated alcohol use.

On Fatharai, where drinking alcohol has been banned for both men and women, 54% of the men drink while 28% of the females drink. Alcohol use, in face of the bans, likely represents drinking when visiting other islands rather than "covert" use. However, "covert" use does occur.

Of note, none of the individuals interviewed under the age of 18 indicated that they drank alcohol.

On Mogmog, the frequency of drinking was much greater than on Fatharai with over 80% drinking daily (Figure 8). Of those that drank daily on Mogmog, the majority had

Figure 8.

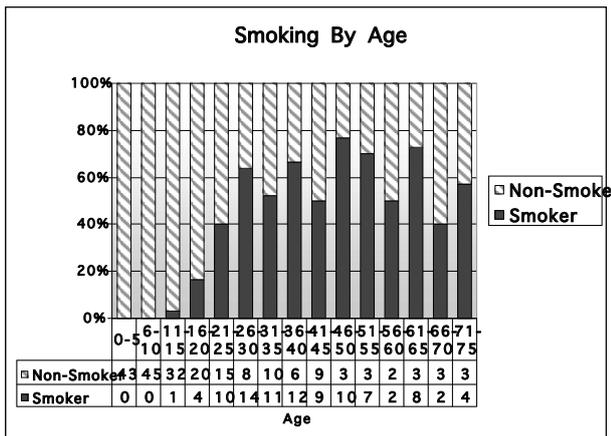


4-8 drinks per drinking episode.

Smoking (B)

The prevalence of smoking for all individuals aged 18 years and over was 55% on the islands. Mogmog had higher rates of smoking than Fatharai, 57% vs. 50% respectively. This compares to a smoking prevalence of 22.5% for U.S. adults.^k On Fatharai, 54% of females smoked and 49% on Mogmog. Of note, 2% under the age of 18 indicated that they smoked (3 of 133). Smoking rates increase substantially after the age of 20, from a rate of 16% in the 16-20 age group to 40% and greater in all other age groups (Figure 9).

Figure 9.

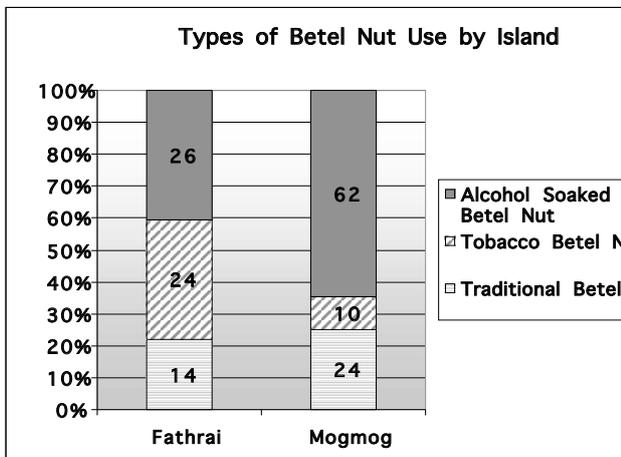


Betel Nut (B)

Betel nut is a type of palm nut traditionally chewed in Yap (as well as other parts of the Pacific and Asia.) It is chewed with powdered lime (in Yap, made from burnt coral) and pepper leaf. The combination of the three ingredients produces psychoactive effect similar to smoking a cigarette. Traditionally, only these three ingredients were used. Now tobacco is often added as a fourth ingredient, sometimes after it has been soaked in alcohol.

The survey showed that 81% of individuals aged 15 years and over used betel nut on the islands. Mogmog and Fatharai had similar rates of use, 82% and 81% respectively. Of those that used betel nut, only 24% used the traditional mixture of betel nut, lime and pepper leaf. Seventy six percent added tobacco to their betel nut. Of those that added tobacco 71% soak it in alcohol first. There was a higher rate of soaking tobacco in alcohol for betel nut chewing on Mogmog (Figure 10).

Figure 10.



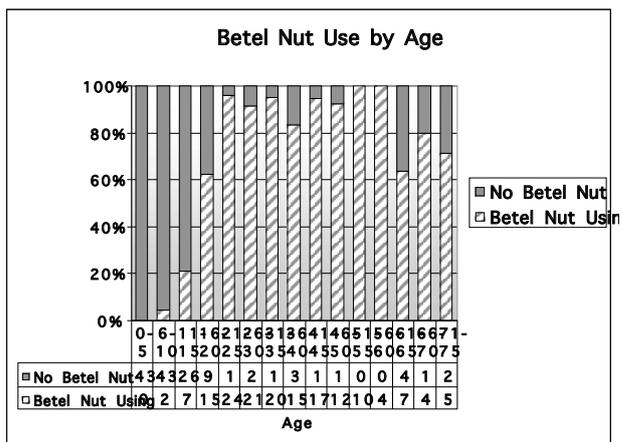
On the islands, betel nut use appears to begin at an earlier age than smoking or drinking with 7% of

individuals aged 15 years and under admitting betel nut use (Figure 11).

Discussion (A)

The Islands have a youthful population structure relative to the U.S. This is not unusual in other parts of the developing world. This characteristic of the community should be considered in the development of public health interventions. For example, existing youth groups may provide a vehicle for high impact public health interventions.

Figure 11.



This research indicates that the outer islands have a high rate of hypertension overall. This could be related to the high rates of tobacco and alcohol use identified in the study. What is interesting is the apparently low rate of hypertension among the women of Mogmog. This may be related to their low rates of alcohol consumption.

While it should be noted that overall numbers of survey participants were not large, the rate of hyperglycemia was 5.2%. If this is close to the rate of diabetes in the communities, this would be substantially lower than the rate of diabetes in “urbanized” areas of Micronesia. For instance the rate of diabetes in Ebeye of the Marshall Islands has been estimated at 20% for those aged 30 years and over.¹ This may represent a beneficial effect of the traditional subsistence lifestyle that persists in the outer islands. However, further research would be required to accurately gauge diabetes prevalence in rural Micronesia. It would be worthwhile to compare prevalence rates between rural and “urbanized” populations to investigate the extent of any differences and the reasons for any identified difference.

Despite the apparent lower rates of hyperglycemia, the outer island lifestyle on Ulithi does not seem to improve population BMI profiles. For both islands and genders,

there were high rates of overweight and obesity, even when compared to U.S. standards. However, the prevalence of overweight and obesity appear to be consistent with those of other Pacific Island communities. It should be noted that there are ethnic differences in the extent to which universal BMI standards reflect the risk of obesity-related disease. There is a growing body of evidence that the associations between BMI, percent body fat, and health risks vary across ethnic groups.^m Also, in some individuals BMI can be a poor indication of obesity as a fit individual with high lean mass could have an elevated BMI.

When examining access to care lack of money and transportation were listed as key barriers to healthcare. Other reasons included lack of medications, lack of trust and language difficulties. All of these factors highlight the difficulty of delivering healthcare across the isolated, distant and culturally diverse communities of the outer islands. Transportation is essential for the movement of patients and supplies in the outer islands. Most transportation is provided by a state government run ship that visits the outer islands once every two months. In addition, there is a small air service operated by Pacific Missionary Airlines that services the outer islands biweekly in addition to emergent health evacuations. The movement of patients is important because only primary medical care is available in the outer islands. All complex cases, including primigravid women, are referred to Yap Proper for medical care. The cost of healthcare becomes an issue for many when traveling to Yap is required. If a patient is evacuated, the air services are provided free of charge by Pacific Missionary Airways, however, family members must self-fund travel to Yap Proper. This is often cost prohibitive. In non-emergent situations, outer islanders may feel pressure to access healthcare from Yap Proper. This is likely due to a more reliable supply of medications and greater choice of health providers. Since the survey was conducted, the Yap Health Department has moved two previously Yap Proper based physicians to the outer islands to improve access to care. A small number of respondents indicated a lack of trust in their healthcare providers. Since this study, the Yap Department of Health Services has increased the amount of training offered to outer island health professionals. Most of this education has been via single side band radio. The additional training has the potential to contribute to increasing the community's trust in their health providers.

The State of Yap has a limited number of pap smears (300) allocated each year through its contract with Clinical Laboratories in Hawaii this enables coverage of around 12% of the women aged 20 years

The low rates of cervical screening relate to poor resources for obtaining and evaluation of cervical smears. The State of Yap has a limited number of pap smears (300) allocated each year through its contract with Clinical Laboratories in Hawaii this enables coverage of around 12% of the women aged 20 years and over. Due this limitation, screening is only available for expectant mothers, and patients who visit the family planning and gynecology clinics.ⁿ Recently there has been lobbying to increase the number of pap smears available to the FSM.

While the survey indicated that the percentage of women interested in family planning was low relative to the United States, the results may underestimate interest in birth control. Birth control is likely to be a culturally sensitive issue and data collection through face-to-face interviews may have therefore led to a degree of underreporting. Another possible explanation may be strong influence of the Catholic Church in the islands. Of the total population of Yap 60% is Catholic.^o This percentage is much higher on Ulithi Atoll where all churches are Catholic.

The low rate of family planning in the outer islands likely accounts in part for the higher percentage of the population being under the age of 18.

The community listed several issues as island concerns. It is generally recognized that there are high levels of alcohol consumption among Micronesians. Both surveyed communities identified alcohol misuse as the most important community problem, indicating that there may be a high degree of community readiness to address the concern and therefore reduce alcohol consumption. The high rate of alcohol use among the men of Mogmog is consistent with trends across Micronesia. The much lower rates of drinking in Fatharai and among the women of Mogmog indicate there is much potential to reduce alcohol misuse. Both of these lower rates are due to "cultural interventions" put in place. Chief of Fatharai using his cultural authority inherent to his role placed a ban on alcohol consumption on the island. On Mogmog, it is considered culturally inappropriate for women to consume alcohol. This suggests that cultural beliefs and values may provide a vehicle for future public health initiatives that support behavioral change. The Fatharai intervention involved an action that was developed within the cultural paradigm of Ulithi Atoll. It utilized the customary power of the Chief

to implement health protecting “rules” for the island community. This is similar to the Polynesian concepts of tapu (restricted access) and noa (free access) that, some argue, functioned as a public health system by providing a framework for acceptable and unacceptable behavior for individuals and communities.^p This type of intervention differs from the usual approach in the U.S. whereby a “mainstream” program is adapted to be culturally acceptable to various ethnic groups through, for example, the translation of program materials. Rather, this intervention was uniquely Ulithian, developed within an Ulithian paradigm, and therefore specifically tailored for an Ulithian community. Certainly, pre-colonization indigenous societies had traditional public health systems already in place to deal with the health challenges of the time. Many of the principles underlying those systems have retained relevance to the present day, and can form the basis for a public health approach to meet modern challenges. There is a small, but growing literature base on these types of culturally derived interventions most notably in the indigenous communities of New Zealand, Australia, the U.S. and Canada. New Zealand Maori have demonstrated success in utilizing cultural interventions as a modern public health tool. For instance, a program developed completely within a Maori model was successful in lowering asthma morbidity in a rural Maori community.^q It is apparent that similar public health interventions that utilize customary systems and principles are likely to be successful in rural Micronesia.

Another striking feature of the survey results is the high number of women on Mogmog that identified violence against women as a problem. This is an important result that justifies further investigation. Domestic violence is not often publicly discussed among the Micronesian community. The high rate of alcohol use among Mogmog men may contribute to increased rates of domestic abuse. Further work is required, not only to identify the extent to which domestic violence is a problem on the islands but more importantly to facilitate the development of community-based interventions to address the problem.

Smoking rates in the outer island community are very high, over twice the rate found in the U.S. As a primary modifiable risk factor for a range of chronic diseases, smoking cessation should be actively pursued in rural Micronesia. This may be difficult as tobacco has been engrained in Micronesia since exposure to Western traders in the 1500's. Much of the smoking in the outer

islands uses locally grown tobacco that is then wrapped in newspaper. The effects of smoking the newsprint dye are unknown.

Although identified as a carcinogen, betel nut chewing is considered a part of Yapese tradition. This is evident by the high rates of betel nut use, even on the outer islands where it cannot be grown. It would be extremely difficult to stop betel nut chewing without affecting the larger culture and individuals' self-identification as being Yapese. However, adding tobacco to betel nut is not a Yapese cultural tradition. No doubt, this increases the cancer risk of chewing and may be a behavior that should be targeted for future public health interventions.

We acknowledge there are limitations to the study. While the numbers of survey participants are small, it should be noted that over 90% of the two communities participated therefore results are representative for these communities. Due to language and literacy issues as well as cultural preferences, interviews were carried out face-to-face. While there was a high level of interaction between the interviewer and respondent which may have impacted data quality, this was an interview style that was considered to be culturally appropriate.

Overall, the research has identified a number of health issues that require closer attention, in particular hypertension, overweight and obesity, alcohol misuse, smoking prevalence, betel nut chewing, and domestic violence. There is some indication that there may be a high degree of community readiness to address some of these issues. The value of community action within cultural frameworks is apparent, and there may be potential to extend culturally-based approaches to address a broader range of issues. Public health action on Ulithi is however constrained by the limitations imposed by small island isolation and limited health resources available. Survey participants indicated that financial and transport issues were barriers to obtaining healthcare. However, culturally-based interventions that are tailored to the particular needs of the communities, such as increased training of health professionals to enhance community trust and the reduction of alcohol misuse have much potential in the short, medium and long term. There is clearly much value in the implementation of broader public health action to address these community defined health priorities.

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There is some indication that there may be a high degree of community readiness to address some of these issues

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