

# Hawai'i Journal of Medicine & Public Health

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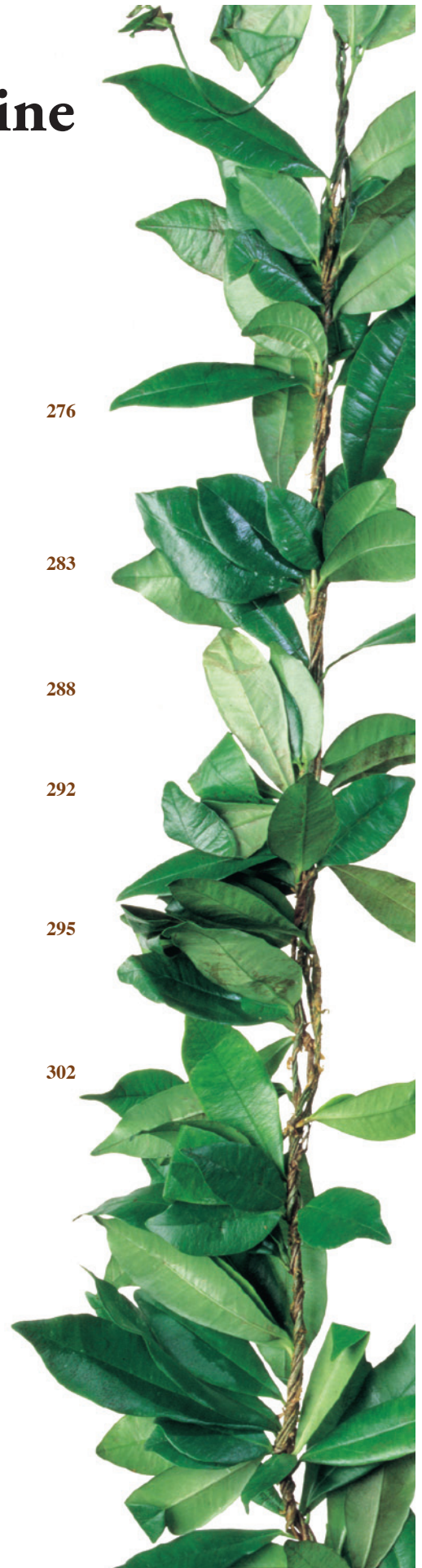
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# Hawai'i Journal of Medicine & Public Health

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# Hospital Visits Due to Domestic Violence from 1994 to 2011 in the Solomon Islands: A Descriptive Case Series

Penny C. Farrell MPH; Joel Negin PhD; Patrick Houasia MBBS, FICS, Orth;  
Alex B. Munamua MBBS; David P. Leon MBBS; Mia Rimon MPP;  
and Alexandra L.C. Martiniuk PhD

## Abstract

*The Solomon Islands has one of the highest rates of domestic violence in the world. This paper is a descriptive case series of all cases of domestic violence presenting to the Solomon Islands National Referral Hospital (NRH) over 18 years. Data were routinely collected from a database of all patients who were treated by NRH general surgery and orthopedic clinicians between 1994 and 2011, inclusive. The total number of cases in the injury database as a result of domestic violence was 387. The average number of cases in the database per year from 1994 to 2011 was 20. There were 6% more female patients (205 of 387; 53%) than male (182 of 387; 47%). Of the cases in which the perpetrator of the violence against a female patient was specified (111 of 205 female cases), 74% (82 of 111) were the patient's husband. Only 5% (5 of 111) of cases in females were inflicted by another female. This analysis provides the best available information on domestic violence cases requiring a visit to a tertiary hospital in a Pacific Island in the specified time period and is undoubtedly an under-estimate of the total cases of domestic violence. Preventing and treating domestic violence in the Solomon Islands and in the Pacific is an important challenge and there is a significant role for secondary and tertiary health services in screening for and preventing domestic violence.*

## Keywords

*domestic violence, Pacific, Solomon Islands, hospital, screening*

## Introduction

Domestic violence is a complex, often hidden, social and medical problem. Global definitions of domestic violence acknowledge that the perpetrator of domestic violence can be male or female, family, or household member of the victim.<sup>1</sup> A gender-based definition where the victim is female is also widely referred to in the global discourse on domestic violence.<sup>2</sup> The United Nations defines violence against women as any act of gender-based violence that results in, or is likely to result in, physical, sexual, or psychological harm or suffering to women, including threats of such acts, coercion, or arbitrary deprivation of liberty, whether occurring in public or in private life.<sup>3</sup> According to the World Health Organization, intimate partner violence (IPV) is a type of gender-based domestic violence which refers to behavior in an intimate relationship that causes physical, sexual, or psychological harm.<sup>1</sup> This paper discusses both male and female cases of domestic violence, with more in-depth analysis of gender-based domestic violence cases in females, since that was the dominant cause of domestic violence in this study. For clarity, this paper will use the term domestic violence when referring to violence in both men and women, and gender-based domestic violence when referring to violence inflicted by men where women are the victims.

People who have experienced domestic violence are at increased risk of medical conditions including acute musculoskeletal injuries, chronic pain, reproductive and gastrointestinal problems, and depression.<sup>4-7</sup> The link between domestic violence and suicide is well established.<sup>8,9</sup> According to World Bank estimates, domestic violence and rape cause an annual loss of 9 million disability adjusted life years (DALYs) — higher than the number of DALYs lost to cancer.<sup>10</sup> The financial burden of domestic violence on health systems is significant, with research in the United States estimating IPV alone to be responsible for \$19.3 million per year in healthcare costs.<sup>11</sup>

The prevalence of gender-based domestic violence against women varies between countries, with lifetime prevalence of physical or sexual violence estimated from 15% to 71%.<sup>12</sup> The varying figures depended on the country and area studied, for example, 15 % of women in urban Japan, 51% in urban Peru, and 71 % in rural Ethiopia, have experienced physical or sexual violence in their lifetime. A global study found that IPV was the most consistent risk factor for suicide attempts.<sup>13</sup> Such violence has also been associated with unwanted pregnancies and postnatal depression.<sup>14-16</sup> Women who have experienced gender-based domestic violence during pregnancy have children who are more likely to have diarrhea and respiratory infections.<sup>17</sup> IPV has also been shown to compromise children's growth,<sup>18</sup> and unwanted pregnancies often result in a suboptimal family environment for child development.<sup>19</sup>

The Solomon Islands was classified as a country with low human development in the 2011 United Nations Development Programme (UNDP) report, ranking 142 of 187 countries. UNDP's Human Development Index (HDI) classifies countries as low human development if their HDI score is between 0.0 and 0.5 based on a composite score including gross domestic product, education, and health. Life expectancy at birth is 67.9 years and the total population is 552,300.<sup>20</sup> The Solomon Islands has one of the highest rates of gender-based domestic violence in the world. The Solomon Islands Family Health Safety Study (SIFHSS), a 2009 study using the WHO multi-country study methods,<sup>12</sup> was implemented by the Secretariat for the Pacific Community with the Ministry of Women, Youth and Children and Family Affairs and the National Statistics Office. This study reported 46% of women had experienced physical violence by an intimate partner and 64% of women between the ages of 15 and 49 reported that they had experienced either physical or sexual intimate partner violence or both.<sup>8</sup>

Despite the success of the SIFHSS in recording and publishing information on the extent of domestic violence in the Solomon Islands, the topic remains a highly sensitive issue and victims and perpetrators are often reluctant to discuss the issue for fear of the social and private repercussions.<sup>8</sup> Domestic violence has not been treated consistently by police and court systems,<sup>21</sup> thus any current domestic violence data is highly likely to be only the tip of the iceberg. Despite these challenges, health facilities which treat patients with physical injuries as a result of domestic violence provide a valuable window of opportunity to facilitate ongoing support and referral to appropriate services for these patients. Although a crucial first step, simply reporting the prevalence of domestic violence has been shown to be insufficient in developed countries such as the United States.<sup>22</sup>

One of the recommendations of the SIFHSS was to establish detailed and accurate recording systems in the health sector to contribute to the body of data on violence against women, to inform future policies and programmes. Noting that there are no records of how many cases of violence against women pass through the health sector, such statistics are important for informing policy and programme development.<sup>8</sup> This paper aims to address this recommendation by presenting data on hospital attendance by women and men reporting domestic violence and then to use these data as evidence for the need to strengthen the advice and referral to support services provided by medical clinics.

## Methods

This paper is a descriptive case series and contextual analysis of all cases of domestic violence admitted for treatment for physical injuries over an 18 year period. The Solomon Islands National Referral Hospital (NRH) in Honiara is the nation's only tertiary treatment facility. Data were routinely collected in a database for all patients who were admitted to the NRH general surgery and orthopedic departments from 1994 through 2011. The subset of data on domestic violence was extracted from a larger dataset on all injuries collected by the NRH over this time period. At the NRH, these data are collected by the attending clinician using a Trauma Epidemiology form. By completing the form, the attending clinician records the injury according to location, presence, and type. Patient data are then entered into confidential Microsoft Access files by clinic staff. Permission to conduct this research on anonymized routinely collected data was provided by the NRH. Ethics approval to conduct the research study was granted by the Solomon Islands Ministry of Health Ethics Committee.

There were 7,651 cases of injury in the NRH database. These cases were classified into locally defined external cause codes for the mechanism of injury, namely: animal, burns, domestic violence blunt, domestic violence sharp, domestic, gardening, homicide, industrial, logging, marine injury, other, road traffic injuries, sport other, sport soccer, suicide, tree, violence blunt, violence sharp, and war injury. A total of 3110 cases that had originally been categorized by the attending NRH clinician as domestic violence blunt (n=304), domestic violence sharp

(n=89), domestic (n=1798), violence blunt (n=336), violence sharp (n=142) and other (441) were included in the initial review. Duplicate entries were identified and removed so that patients were not counted twice. The case notes were then examined to verify true cases of domestic violence.

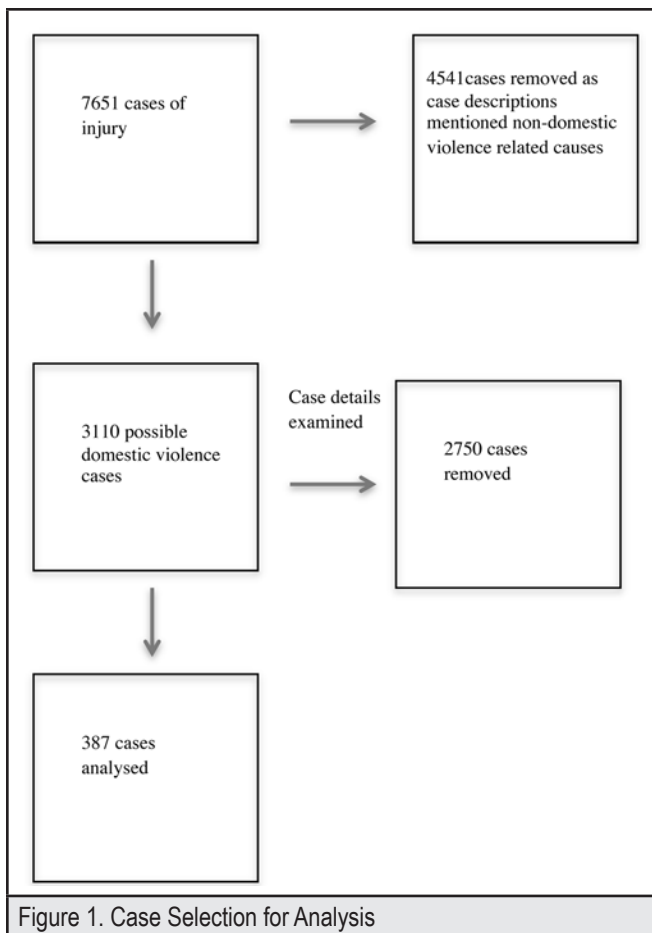
Cases were included for further analysis if the injury occurred at home and had been inflicted by another person or if it occurred outside the home and had been inflicted by a family member or intimate partner of the injured person. If a case was classified as domestic violence blunt or domestic violence sharp but the case notes did not demonstrate that domestic violence had occurred, for example "cut thumb while cutting coconut," the case was not included as these were seen to be injuries which occurred domestically but which did not fall within the global definitions of domestic violence. If a case was classified as domestic violence blunt or domestic violence sharp but no other case notes were available, it was included.

Instances where the case notes stated the inflictor of violence was the patient themselves were included if the case notes clearly indicated the injury was inflicted as a direct result of a domestic violence incident, for example, "hit wall of the house, had argument with wife." Using these criteria, 281 domestic violence blunt and 79 domestic violence sharp cases remained. If a case was classified as violence blunt, violence sharp, domestic, or other, and no other case notes were included, it was not included. If the notes specified the injury occurred at home and had been inflicted by another person or if it occurred outside the home and had been inflicted by a family member or intimate partner of the injured person, it was included. In total, 9 violence blunt, 4 violence sharp, 14 domestic, and 0 other, cases remained.

More in-depth analysis of female cases was conducted because gender-based domestic violence is an urgent problem in the Solomon Islands and this analysis provides an opportunity to understand and strengthen the role of health services in identifying and preventing these cases. Because this case series only includes those domestic violence cases requiring care at the NRH, it is important to note that this study likely represents only the most serious of the domestic violence cases and those where the patient correctly reported the cause of their injury. As such, these data are likely to severely underestimate the true total number of individuals affected by domestic violence. Nonetheless, these data remain valuable as the only medical records on all domestic violence cases presenting to the only tertiary care center in the country for nearly two decades.

## Results

The total number of cases in the injury database as a result of domestic violence was 387, representing 5% of all injuries recorded in the NRH dataset over the same period of time. Data were available on the injury incident description, home province of patient (for all cases), year or imputed year of patient visit (data available for 360 of the 387 cases), perpetrator of injury (for 111 of the 205 female cases and 61 of the 182 male cases), age of patient (for all cases), and patient gender (for all cases). In order to increase understanding of the problem



of gender-based domestic violence and IPV in female patients in the Solomon Islands, deeper analysis of patient age, type of injury, perpetrator of injury, and length of stay at NRH was conducted on the 205 female cases in the dataset.

The following extractions from case notes gives a snapshot of the diversity of injury incident descriptions categorized as domestic violence: Wife stabbed him with kitchen knife; stick, *wantok* (defined as another member of the same tribe or language group); was hit by her partner with a stick; plank, brother; kicked in the face by the husband; paddle, auntie; stabbed with a fishing spear over L chest-Axilla.

The province with the majority of cases was Guadalcanal, the island on which the NRH is located, with 287 cases (74%). More remote provinces such as Malaita had 33 (9%) cases, Makira had 11 (3%) cases, and Choiseul had five (1%). Using 2010 population estimates from the Solomon Islands National Statistics Office<sup>23</sup> the ratio of cases to population was 37 per 10,000 adults in Guadalcanal (population 78,290), 2 per 10,000 in Malaita (population 159,923), 3 per 10,000 in Makira (population 40,386) and 2 per 10,000 in Choiseul (population 25,870).

Year or imputed year of injury was available for 360 (93%) cases. Data was missing for admission or discharge dates in approximately half of the cases; however, it was possible to estimate the year of the cases that were placed in chronological order in the dataset where the date was missing in a group of cases for the same year. Where it was not possible to reasonably estimate the year based on this pattern (n=27), the year was left blank. There was considerable variation in the number of domestic violence cases per year with the most cases recorded in 2010 (n=45). The imputed average number of cases in the database per year from 1994 to 2011 was 20.

More than half, or 111 of 205 female cases (54%), had data on the perpetrator of the injury available. Of these, 82 (74%) were the patient's husband. Cases where the boyfriend or partner of the victim was responsible totaled 6 (5%) (Figure 2). For the 88 female patients affected by violence caused by an intimate partner, 82 of 88 (93%) had suffered injuries inflicted by their husbands. When we examined male cases, 61 of 182 (34%) specified the relationship of the patient to the perpetrator(s) of their injury. Of these, 17 (28%) involved a brother; 12 (20%) self; 6 (10%) uncle; 4 (7%) wife; 4 (7%) father; 3 (5%) nephew; 3 (5%) cousin; 2 (3%) brother in law; 2 (3%) friend; 1 (2%) *wantok*; 1 (2%) mother.

Age of patient was available for all cases. The age distribution in female patients was 18% under 20; 67% between 20 and 39; and 15% 40 and over. The age distribution was similar in males, although male patients were slightly older; 17% of male patients were aged under 20, 58% between the age of 20 and 39, and 25% aged 40 and over.

There were slightly more female patients (n=205; 53%) than male (n=182; 47%). A more detailed analysis of female cases follows in order to increase understanding of the problem of gender-based domestic violence and IPV in female patients. Of the female cases, 141 (69%) involved a fractured bone. Two female cases died in hospital, representing 1% of cases. Approximately a third (66 of 205; 32%) of female cases reported alcohol consumption was involved in the event that resulted in their injury. The mean number of weeks in hospital for female cases was 2.2 weeks and median 1.3 weeks.

To analyze method of injury in female patients, case notes were classified into the category "blunt object" if the method of injury included an object such as a paddle, stone, iron bar, or baseball bat (Figure 4). The classifications "hit" and "kick" were used when the case notes referred to direct person-to-person contact. Sharp objects included knives, spears, and broken bottles. For the 109 cases for which data were available, 32 (29%) of injuries were inflicted with blunt objects, 28 (26%) were classified as hits, 25 (23%) were due to kicks and 24 (22%) were inflicted by a sharp object.

Figure 5 demonstrates the location of injury according to region of the body for female cases, the data for which was available on all cases (n=205). The majority of domestic violence injuries affected the upper limbs (54%), with the next most common being the head or neck (18%) followed by the lower limbs (15%).

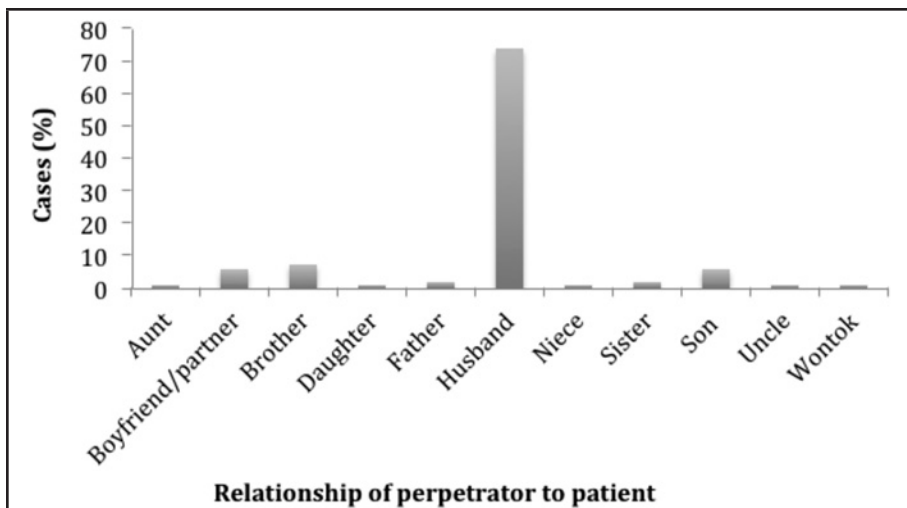


Figure 2. Relationship of Perpetrator of Violence to Female Patients

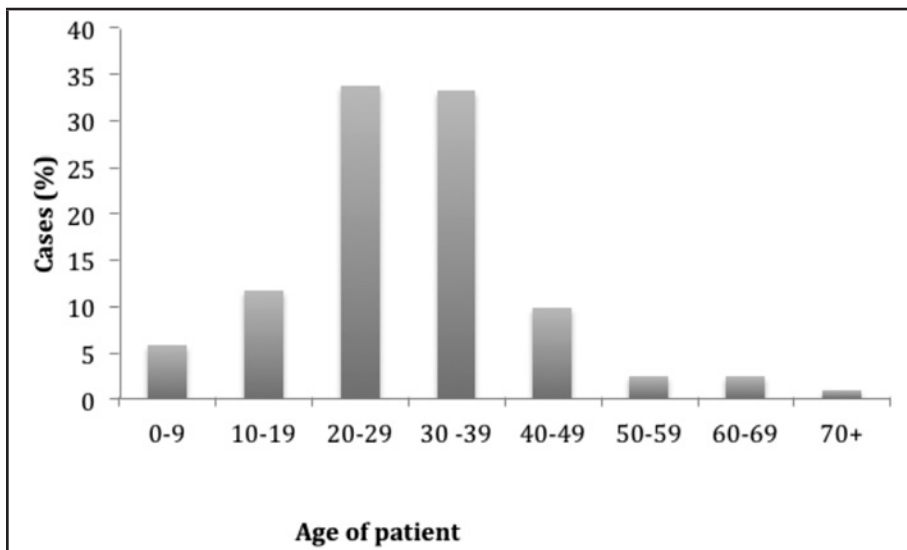


Figure 3. Number of Domestic Violence Cases by Age Groups for Female Patients

## Discussion

### Summary of Findings

Males presented at nearly the same rate as females for injuries requiring medical treatment due to interpersonal violence in their homes. The finding that men are often injured as a result of domestic violence in the Solomon Islands is consistent with other studies, which have also described domestic violence as a cause of injuries to males.<sup>24,25</sup> Domestic violence injuries in male patients were usually inflicted by another family member, but not an intimate partner – in fact only 7% of injuries to males involved an intimate partner. It is possible that in some of these cases, the injuries inflicted were the result of self-defense on the part of the other person with whom they were in conflict. The age distribution of male victims was similar to that in females, although female patients were slightly younger.

It is likely that Guadalcanal as the place of patient origin was overrepresented in this dataset due to more convenient access to the NRH; in addition, the costs of travel and inefficiencies of the referral system from other islands to the NRH may have further limited access.<sup>26</sup> Depending on the island of origin, ticketed boat trips may only be available once a week or less frequently, and flights, if available, are often cost prohibitive for members of the Solomon Islands population. According to UNICEF, women living in isolated communities are especially at risk for domestic violence,<sup>9</sup> which is often the situation in the remote island communities of the Solomon Islands.

### Gender-based Violence

The majority of female cases were the result of male to female violence. Although data were only available on the perpetrator for about half of the cases in the dataset, 88% of those cases were perpetrated by the intimate partner of the patient. Among DV cases where the victims were female, more than two thirds of cases were in patients of reproductive age (ie, 20 to 39 years old). These trends in the data suggest that IPV is a dominant cause of domestic violence toward women in the Solomon Islands. This finding is consistent with previous studies in the region, which is why these cases are the focus of this paper.<sup>21</sup>

The majority (93%) of female patients affected by IPV had their injuries inflicted by their husband. The 2009 SIFHSS reported that 73% men in the Solomon Islands believe it is acceptable to physically attack their wife. The damage resulting from this belief extends beyond the affected households because it is also a potential barrier to accessing support services such as the police force, if the belief is also held by the people who work for those services. The SIFHSS found that 70% of women who had experienced physical or sexual violence had not told anyone.<sup>8</sup> ‘Bride price’ [a cultural practice where

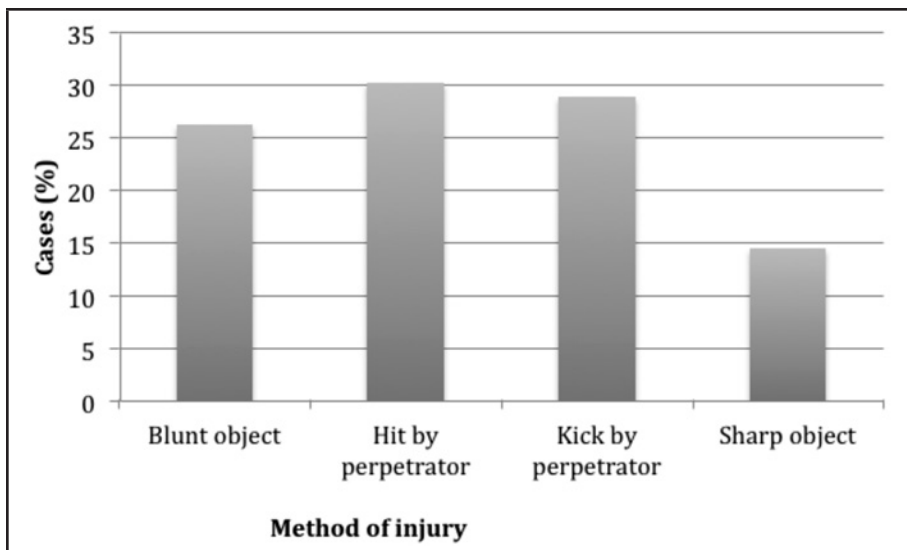


Figure 4. Method of Injury for Female Patients

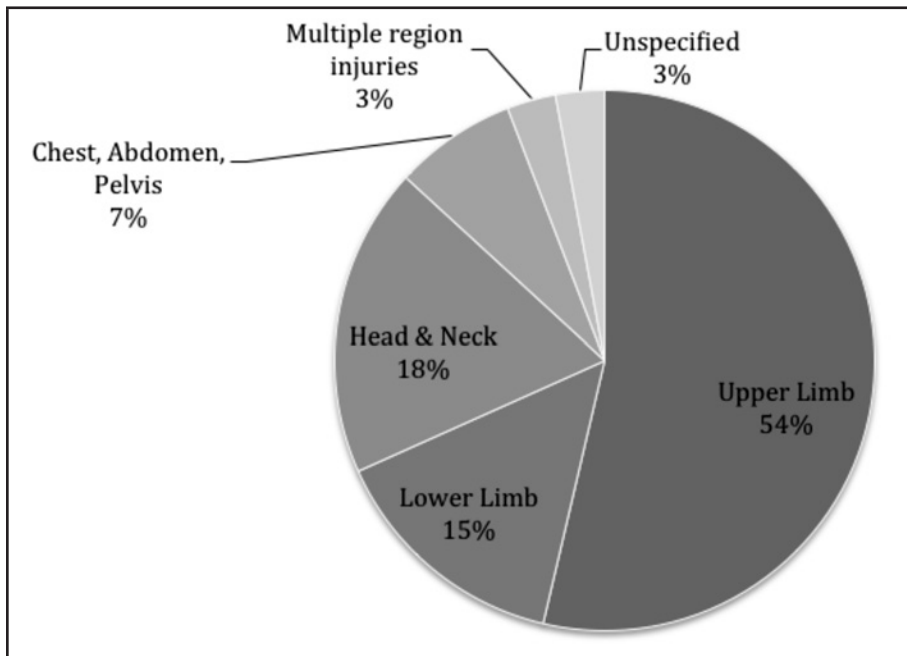


Figure 5. Location of Domestic Violence Injury According to Anatomical Body Part in Female Patients (N=205)

men pay money to their prospective wife's family in order to marry her] and perceived ownership of wives,<sup>21</sup> and the fact that marital rape only became illegal in November 2012, are also contributing factors.

Based on clinical history data, 32% of incidents where the female was the victim involved alcohol. Patients do not receive clinical alcohol testing at NRH; rather, they are asked about alcohol consumption during patient history taking. The data did not specify whether the perpetrator, the victim or both had consumed alcohol prior to the violent incident. The finding that alcohol consumption was involved in a notable number of cases is in line with the global literature on domestic violence, which states alcohol is a risk factor.<sup>9</sup> Despite the relatively poor epidemiological strength of patient-reported data compared to clinical pathological testing, the occurrence of alcohol use with domestic violence in this dataset seems to be an important finding.

#### Current Support Services

Use of formal support services is very low in the Solomon Islands and this is thought to be at least in part due to shame and fear on the part of the person who has experienced the violence.<sup>21</sup> At the hospital level, there are a few trained clinical staff, and a "quiet room" at the NRH for victims to enable confidential reporting and privacy during recovery. However, more work in this area is needed — training of health workers at all health facilities in the Solomon Islands is at a low level, compromising their ability to screen for domestic violence cases. At present at the NRH, each case is only managed for their presenting problem, and formal support is not routinely provided for concurrent domestic issues.

At the time of writing, there was only one shelter for women in the Solomon Islands.<sup>21</sup> There has been some promising work in recent times, such as that of the organization *Vois Blong Mere* (Voice of Women)



Solomon Islands, who share women's stories and disseminate information about women's rights through radio media.<sup>21</sup> In 2013, in response to the findings of the SIFHHS study, the SAFENET program commenced.<sup>27</sup> This is a new Memorandum of Understanding, which aims to provide systematic collaboration and standardized access to support services between the Ministry of Health and Medical Services, the health services, the police, the Public Solicitor's Office, the Family Support Centre, and the Christian Care Centre.

### Limitations

There were a number of limitations to the analysis of the NRH dataset. The dataset is likely to have underreported cases of domestic violence where the victim was too fearful or ashamed to state the cause of their injury; previous research has documented that domestic violence victims in the Solomon Islands very seldom speak about it.<sup>8</sup> Underreporting may also occur where the systems in place at NRH failed to adequately capture and classify cases. The categorization of injuries as domestic violence was largely reliant on the discretion of the clinician and it is possible that different clinicians categorized injuries differently. The data do not include information on those victims who visited other healthcare facilities, or those who were not able to travel to facilities, which we acknowledge might be a considerable number. Some of the violence blunt, violence sharp, domestic, or other cases in the original dataset that were not included for analysis may have been domestic violence cases but were excluded because the attending clinician's notes were not detailed enough to make a determination.

Despite these limitations, the analysis was conducted on a routinely-collected programmatic database and thus provides the best available information on domestic violence cases requiring a visit to a tertiary hospital in a Pacific Island. These data show that there is true potential in the Solomon Islands for health facilities to collect data on domestic violence and elucidate some of the contributing factors, thus providing useful input to prevention policies and pathways to care.

### Future Directions

The data suggest the need for a number of programmatic changes that would provide more detailed information on domestic violence injuries. More consistent data on the perpetrator would be beneficial to understanding domestic violence and to possible police action. Data on how many times each patient had presented to the NRH (or other facilities) for treatment for domestic violence related injuries could assist in identifying high risk cases and providing them with appropriate follow up care, as well as help in evaluating prevention programs.

Given the high rates of gender-based domestic violence found in the SIFHSS, we acknowledge that these data do not begin to represent the full picture of gender-based domestic violence injuries in the country. The underreporting of domestic violence is not unique to the Pacific but is a worldwide phenomenon,<sup>2</sup> and a review by Plichta asserted that injuries requiring treatment were not the most common outcome of domestic violence.<sup>28</sup>

The role of healthcare facilities in other countries in identifying patients who have experienced violence is a growing area of study.<sup>22,29-31</sup> Multi-modal screening for domestic violence in both female and male patients is recommended in order to deal with this sensitive issue. Approaches that have been most successful in similar settings include patient-administered self screening tools, on-site counseling, 24-hour telephone services,<sup>31</sup> and case-based screening by trained health professionals.<sup>30</sup> One study in an orthopedic clinic in India found a higher rate of reporting of domestic violence in patients who were administered a self-reported questionnaire than patients who were interviewed by health workers.<sup>29</sup> A study in Uganda which analyzed healthcare workers' ability to effectively discuss IPV with patients concluded that comprehensive training of health workers, increasing community awareness, and strengthening networks between different levels of support would improve the ability of health facilities to provide support to patients who had experienced IPV.<sup>32</sup>

### Conclusion

The findings presented in this study are an important first step in understanding the ability of health facilities in the Solomon Islands to contribute to an understanding of DV resulting in physical injuries, and most importantly, in providing locally appropriate support to patients affected by domestic violence. Multidisciplinary training of medical care providers to counsel, assess, screen, and confidentially assist patients who may have been affected by domestic violence may help in identifying more cases and therefore, in collecting higher quality data. More rigorous reporting systems are required so that cases are consistently classified and underreporting is avoided.

Preventing and treating domestic violence in the Solomon Islands and in the Pacific is an important challenge and there is a significant role for secondary and tertiary health services in this effort.<sup>33</sup> Health service providers have a role in asking victims about abuse; greater clarity is needed on who should ask questions, in what setting and after what training. Providing a safe space for affected patients to disclose is essential; without sufficient privacy and confidentiality, women can be put at increased risk.<sup>34</sup> Specialized training of NRH staff in identifying possible domestic violence cases and deciding how to approach victims with offers of clinical, psychosocial, and legal support, based on models from other developing country settings,<sup>35,36</sup> would be an appropriate next step to addressing the issue in the health care setting.

### Conflict of Interest

None of the authors identify a conflict of interest.

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# Marijuana Use and Maternal Experiences of Severe Nausea During Pregnancy in Hawai'i

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## Abstract

Recreational use of marijuana is relatively common in the United States, and medicinal use is gaining popular and legal support. Marijuana has been proposed as a potential treatment for hyperemesis gravidarum. Research into this topic is complicated by associations between marijuana use and poor birth outcomes. Cannabinoid hyperemesis syndrome, which can cause severe nausea and vomiting in marijuana users, is another complicating factor. Hawai'i Pregnancy Risk Assessment Monitoring System data from 4,735 respondents were used to estimate prevalence of self-reported marijuana use during and in the month before pregnancy, as well as severe nausea during pregnancy. Data were weighted to be representative of all pregnancies resulting in live births in Hawai'i between 2009 and 2011. Prevalence ratios (PR) and 95% confidence intervals (CI) were computed to estimate associations. Of recently-pregnant women in Hawai'i, 6.0% reported using marijuana in the month before pregnancy, and 2.6% reported using marijuana during pregnancy. Approximately 21.2% reported severe nausea during pregnancy. Women who reported severe nausea during pregnancy were significantly more likely to report marijuana use during pregnancy (3.7% vs 2.3%; PR=1.63, 95% CI: 1.08-2.44). More research is needed to investigate the relationship between marijuana use and severe nausea during pregnancy, and to quantify associated risks to mother and fetus.

## Keywords

Marijuana, Pregnancy

## Introduction

Recreational use of marijuana is relatively common in the United States,<sup>1</sup> and medicinal use is increasingly gaining popular and legal support.<sup>2,3</sup> In 2012, approximately 38.1% of American women aged 12 and over reported ever using marijuana and 9.2% reported using it in the past year, making it the most common illicit drug used by women in the United States.<sup>4</sup> One of the primary medicinal uses of marijuana is as an anti-emetic,<sup>5,6</sup> and marijuana has been used in some cultures as treatment for nausea during pregnancy.<sup>7,8</sup> Research is currently underway examining potential use of the drug as treatment for hyperemesis gravidarum, a severe form of nausea and vomiting during pregnancy that often requires hospitalization.<sup>8</sup> However, there are significant concerns regarding use of marijuana during pregnancy. Results of recent studies examining perinatal marijuana use and birth outcomes have been mixed. Some show an association between marijuana use during pregnancy and poor birth outcomes,<sup>9,10</sup> while others do not.<sup>11-14</sup> Potential investigation of marijuana as treatment for severe nausea or hyperemesis gravidarum is complicated not only by associations with poor birth outcomes, but also by the existence of cannabinoid hyperemesis syndrome (CHS), which can cause cyclic nausea and vomiting in some long-term marijuana users.<sup>6,15,16</sup> This study sought to (1) determine the prevalence of marijuana use during and immediately before pregnancy in Hawai'i and

(2) describe differences in marijuana use during and immediately before pregnancy in Hawai'i by maternal report of severe nausea during pregnancy.

## Methods

### Data Source

A secondary analysis of Hawai'i Pregnancy Risk Assessment Monitoring System (PRAMS) data from 2009 to 2011 was conducted. PRAMS is a self-reported survey of recent mothers designed to collect information on maternal behaviors, attitudes, and experiences before, during, and immediately following pregnancy. It is a partnership project between the Centers for Disease Control and Prevention (CDC) and selected state and city health departments. PRAMS programs follow a standardized data collection protocol centering on self-administered mailed questionnaires with telephone follow-up for non-responders. Women are selected for participation in the Hawai'i PRAMS survey as part of a stratified sample drawn from the certificates of live births in Hawai'i. Participants complete the survey 3-8 months postpartum, with the majority responding 3-4 months postpartum. The Hawai'i PRAMS analytic dataset includes information collected from survey questions as well as from selected linked birth certificate variables. Data are annually weighted for nonresponse and other demographic factors by the CDC to create an analytic dataset which is representative of all pregnancies resulting in live births in Hawai'i in a given year. All PRAMS program sites must achieve a minimum weighted response rate of 65% in order for survey results to be considered generalizable to all live births in a given year. Hawai'i PRAMS annual response rates have not fallen below 65% since data collection began in 2000, and the response rates for the years presented in this analysis ranged from 71-73%. Detailed information on PRAMS methodology can be found at: <http://www.cdc.gov/prams/methodology.htm>.

Data were available for 4,735 respondents, weighted to be representative of all pregnancies resulting in live births in Hawai'i between 2009 and 2011 (approximately 55,690 live births). Survey responses related to the three main outcomes of interest were missing in less than 3% of weighted cases. Secondary analysis of Hawai'i PRAMS data is covered under pre-existing approvals granted by the Institutional Review Board of the Human Research Protection Office of the CDC, as well as by the Hawai'i State Department of Health Institutional Review Board.

### Measures

The following questions pertaining to severe nausea during

pregnancy and marijuana use in the month before and during pregnancy were used for this analysis:

**Did you have any of the following problems during your most recent pregnancy?** For each item, circle **Y** (Yes) if you had the problem or circle **N** (No) if you did not.

c. Severe nausea, vomiting, or dehydration N Y

**Did you use any of these drugs in the month before you got pregnant?** For each item, circle **Y** (Yes) if you used it or circle **N** (No) if you did not.

b. Marijuana (pot, bud) or hashish (hash) N Y

**Did you use any of these drugs when you were pregnant?** For each item, circle **Y** (Yes) if you used it or circle **N** (No) if you did not.

b. Marijuana (pot, bud) or hashish (hash) N Y

Prevalence estimates, confidence intervals, and *P*-values were generated using SAS 9.2 (SAS Institute Inc., Cary, NC) and SAS-callable SUDAAN 10.0 (RTI International, Research Triangle Park, NC) to account for complex sampling. Chi-square tests were calculated to determine statistical significance.

Maternal age, race/ethnicity, nativity, education, and parity were determined based on linked birth certificate variables included in the Hawai'i PRAMS dataset. Although approximately 23% of the population of Hawai'i identifies as mixed race,<sup>17</sup> the maternal race/ethnicity variables included in the Hawai'i PRAMS dataset have been sorted into single race groups based on a standard algorithm used by the Hawai'i State Department of Health Office of Health Status and Monitoring.<sup>18</sup> Federal Poverty Level (FPL) was based on maternal report of household annual income and number of dependents in the year before delivery and was calculated according to Hawai'i-specific threshold guidelines.<sup>19-22</sup>

## Results

Of women with recent live births in Hawai'i, 6.0% (95% CI: 5.2-6.8) reported using marijuana in the month before their most recent pregnancy, and 2.6% (95% CI: 2.2-3.2) reported using marijuana during their most recent pregnancy. The demographic groups reporting the highest estimates of pre-pregnancy marijuana use were women of other or unknown race/ethnicity (12.1%; 95% CI: 7.8-18.1), women below age 20 (10.3%; 95% CI: 7.2-14.5), primiparous women (9.1%; 95% CI: 7.6-10.8), and women with less than a high school education (8.9%; 95% CI: 5.8-13.2). The demographic groups reporting the highest estimates of marijuana use during pregnancy were women of other or unknown race/ethnicity (4.6%; 95% CI: 2.7-7.7), women at or below 100% of the Federal Poverty Level (4.1%; 95% CI: 3.1-5.5), white women (3.8%; 95% CI: 2.8-5.3), and women with 1-3 years of college education (3.8%; 95% CI: 2.6-5.5). A complete breakdown of these prevalence estimates by maternal characteristics can be seen in Table 1.

Approximately 21.2% (95% CI: 19.8-22.8) of women with live births in Hawai'i reported severe nausea during their most recent pregnancy. Compared to those who did not report severe

nausea during pregnancy, women who reported severe nausea during pregnancy were more likely to report marijuana use during pregnancy (3.7% vs 2.3%; PR = 1.63, 95% CI: 1.08-2.44) (Table 1). This association was statistically significant (*P* = .034). Women who reported severe nausea during pregnancy also had a higher prevalence of marijuana use before pregnancy compared to women who did not report severe nausea during pregnancy (7.0% vs 5.5%; PR = 1.27, 95% CI: 0.94-1.72), however the association between marijuana use before pregnancy and severe nausea during pregnancy was not statistically significant (*P* = .134).

## Discussion

Hawai'i women who reported severe nausea during pregnancy were significantly more likely to report use of marijuana during pregnancy than those who did not report severe nausea during pregnancy. As medical marijuana use has been legal in the state of Hawai'i since the year 2000,<sup>23,24</sup> this finding could indicate use of marijuana as an anti-emetic (either with or without a prescription from a licensed health care provider) among those experiencing severe morning sickness. However, marijuana use before pregnancy was also associated with an increased likelihood of severe nausea during pregnancy, although the difference was not statistically significant. These preliminary findings warrant further research into the subject, with special attention paid to the relatively rare, but increasingly documented cannabinoid hyperemesis syndrome (CHS). While CHS is still being fully described as a medical condition, current reports describe it as being characterized by cyclic nausea and vomiting in long-term marijuana users.<sup>6,15,16</sup> In light of this, the relationship between marijuana use, CHS, and severe nausea during pregnancy is a bit more complicated. Are regular marijuana users who become pregnant more likely to report severe nausea during pregnancy due to undiagnosed CHS? Are women with severe nausea during pregnancy opting to use marijuana (legally or illegally) in order to relieve their symptoms, with CHS playing a role only as a minor complicating factor? The body of literature available does not appear sufficient to make a clear determination at this time.

As current information on CHS relies mainly on case reports from the past decade,<sup>6,16,25-27</sup> population prevalence estimates are not yet available. However, CHS has been observed and described in Hawai'i.<sup>28</sup> There has also been at least one published case report of CHS during pregnancy to date,<sup>29</sup> and the first documented report of CHS in the literature (in 2004) stated that two female CHS patients reported a history of severe hyperemesis gravidarum which had required hospital admission and administration of intravenous fluids.<sup>16</sup> An important point from the 2011 case report of CHS during pregnancy regarded misdiagnosis of CHS as hyperemesis gravidarum.<sup>29</sup> The researchers in that study suggested that pregnant patients with tentative diagnoses of hyperemesis gravidarum who do not respond to treatment might benefit from investigation of CHS as a possible cause, along with potentially adjusting treatment accordingly.<sup>29</sup> Currently, the principle treatments for CHS include utilizing hot

Table 1. Marijuana Use By Maternal Characteristics, Hawai'i PRAMS, 2009-2011					
	Percent of total birth population* (95% CI)	Percent reporting marijuana use before pregnancy* (95% CI)	P-Value	Percent reporting marijuana use during pregnancy* (95% CI)	P-Value
<b>Total</b>	100	6.0 (5.2 – 6.8)		2.6 (2.2 – 3.2)	
<b>Age (years)</b>					
< 20	7.3 (6.4 – 8.3)	10.3 (7.2 – 14.5)	P < .001	3.2 (1.7 – 5.7)	P = .196
20-24	23.6 (22.1 – 25.3)	8.6 (6.8 – 10.9)		3.6 (2.6 – 5.2)	
25-29	27.3 (25.7 – 29.0)	5.3 (4.0 – 6.9)		1.9 (1.3 – 2.8)	
30-34	24.4 (22.9 – 26.0)	4.5 (3.3 – 6.2)		2.6 (1.7 – 3.9)	
35 +	17.4 (16.1 – 18.8)	3.6 (2.3 – 5.5)		2.1 (1.2 – 3.8)	
<b>Race</b>					
Hawaiian or other Pacific Islander <sup>a</sup>	37.4 (35.7 – 39.2)	6.2 (5.0 – 7.6)	P < .001	2.8 (2.1 – 3.8)	P = .001
Asian <sup>b</sup>	34.4 (32.7 – 36.2)	2.9 (2.0 – 4.2)		1.4 (0.8 – 2.4)	
White	23.0 (21.5 – 24.6)	8.8 (7.1 – 11.0)		3.8 (2.8 – 5.3)	
Other or unknown <sup>c</sup>	5.2 (4.4 – 6.1)	12.1 (7.8 – 18.1)		4.6 (2.7 – 7.7)	
<b>Nativity</b>					
Born in US	74.8 (73.1 – 76.4)	7.3 (6.4 – 8.4)	P < .001	3.3 (2.7 – 4.0)	P < .001
Born outside US	25.2 (23.7 – 26.9)	1.8 (1.1 – 3.1)		0.7 (0.4 – 1.3)	
<b>Education Level</b>					
Less than high school	7.5 (6.6 – 8.5)	8.9 (5.8 – 13.2)	P = .011	3.0 (1.6 – 5.5)	P = .045
High school graduate	39.7 (37.9 – 41.5)	6.5 (5.3 – 8.0)		2.4 (1.8 – 3.3)	
1-3 years of college	23.5 (22.0 – 25.1)	6.0 (4.5 – 7.9)		3.8 (2.6 – 5.5)	
4 or more years of college	29.3 (27.7 – 31.0)	4.1 (3.0 – 5.5)		1.7 (1.1 – 2.5)	
<b>Federal Poverty Level (%)</b>					
≤ 100%	29.3 (27.6 – 31.0)	8.7 (7.1 – 10.7)	P < .001	4.1 (3.1 – 5.5)	P = .007
101-200%	26.0 (24.4 – 27.7)	6.2 (4.6 – 8.2)		2.2 (1.5 – 3.3)	
201% +	44.7 (42.8 – 46.6)	4.1 (3.2 – 5.3)		2.0 (1.4 – 2.9)	
<b>Parity</b>					
First live birth	40.6 (38.8 – 42.4)	9.1 (7.6 – 10.8)	P < .001	3.7 (2.9 – 4.8)	P = .001
Not first live birth	59.4 (57.6 – 61.2)	3.8 (3.1 – 4.7)		1.9 (1.4 – 2.5)	
<b>Severe Nausea During Ppregnancy</b>					
No	78.8 (77.2 – 80.2)	5.5 (4.7 – 6.5)	P = .134	2.3 (1.8 – 2.9)	P = .034
Yes	21.2 (19.8 – 22.8)	7.0 (5.4 – 9.0)		3.7 (2.7 – 5.1)	

\*Weighted estimates; <sup>a</sup>Hawaiian or other Pacific Islander includes Hawaiian, Part Hawaiian, Samoan, Guamanian, and other Pacific Islander; <sup>b</sup>Asian includes: Chinese, Japanese, Korean, Filipino, Vietnamese, Asian Indian, and other Asian; <sup>c</sup>Other or unknown includes: African American, American Indian, Puerto Rican, Cuban, Mexican, and all others.

baths or showers for immediate symptom relief, with abstinence from marijuana typically providing long-term resolution of symptoms.<sup>6,25</sup> Supportive treatment for dehydration may also be needed.<sup>6,25</sup>

This study is the first examining the relationship between marijuana use and severe nausea during pregnancy using maternally reported data from the Hawai'i PRAMS survey. This data source has advantages over smaller studies in that it provides population-based estimates representing all pregnancies resulting in live births in Hawai'i in a given time period. Another advantage of using Hawai'i PRAMS as a data source for this study relates to the uniqueness of the state itself. The multiethnic nature of the population of Hawai'i means that generalizability

of research findings from studies conducted outside the state is unclear with regards to many different topics, marijuana use included. The research presented here includes racial and ethnic groups less frequently reported in the scientific literature.

This study does have limitations. Limitations related to the Hawai'i PRAMS survey itself include that the data are self-reported, and consequently subject to bias due to recall or reporting factors. Due to the sensitive nature of the subject, some bias in reporting due to perceived social desirability of behaviors would be expected.<sup>30</sup> However, past research has shown that population prevalence estimates calculated based on maternal self-report of marijuana use during pregnancy tend to be higher than those calculated based on positive urine

tests, suggesting that self-reported survey data is a good starting point for research into this topic.<sup>31</sup> The Hawai'i PRAMS survey questions related to marijuana use did not have information on amount or frequency of use, pregnancy trimester of usage, or if the marijuana was recreational or prescribed by a physician. The survey question related to severe morning sickness during pregnancy was self-reported and non-validated, so variation may have existed with respect to maternal interpretation of nausea severity.

There may also be some effects due to mode bias (mail versus telephone), as mail respondents were more likely to report all three outcomes of interest than were phone respondents (data not shown). However, phone respondents tend to differ from mail respondents in multiple ways, some of which are thought to be at least partially addressed by PRAMS weighting for demographic characteristics.<sup>32</sup> Previous investigation into mode bias effects on PRAMS survey responses found that most differences by mode were minimal or nonexistent, and attempts to control for mode bias resulted in very small absolute differences in estimates.<sup>33</sup> In the years examined for this study, 81.0% of survey respondents completed the Hawai'i PRAMS questionnaire by mail.

Although medical use of marijuana has been legal in Hawai'i for some time,<sup>23,24</sup> the issue is still accompanied by significant controversy within the state, as it is in the rest of the country.<sup>24,34,35</sup> More research is needed to investigate the exact nature of the relationship between marijuana use and severe nausea during pregnancy, as well as to quantify other risks to mother and fetus associated with marijuana use during pregnancy.

## Disclaimer

The findings and conclusions described in this article are those of the authors and do not necessarily represent the official position of the Hawai'i State Department of Health, the Centers for Disease Control and Prevention, or any other organization.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# Atypical Antipsychotic Usage Among Asian Americans and Pacific Islanders

Junji Takeshita MD; Deborah Goebert DrPH; Iwalani Else PhD; Barry Carlton MD; Courtenay Matsu MD; and Anthony Guerrero MD

## Abstract

*Previous studies have shown significant ethnic differences in prescribing patterns of two or more antipsychotics. This study examined changes in atypical and typical antipsychotic prescriptions among Asian Americans and Pacific Islanders. Five hundred consecutive charts were reviewed for antipsychotics at the time of admission and discharge from each of two inpatient psychiatric facilities in Hawai'i. Multiple antipsychotic prescription rates were 9% at intake and 6% at discharge. For the ethnic groups studied, there were no statistically significant differences by patient ethnicity regarding antipsychotics at intake ( $\chi^2=29.2$ ,  $df=21$ ,  $P=.110$ ) or discharge ( $\chi^2=20.5$ ,  $df=24$ ,  $P=.667$ ). There were no significant differences in prescription and polypharmacy patterns among Asian Americans and Pacific Islanders ethnic groups in this study.*

## Keywords

*ethnicity, atypical antipsychotics, polypharmacy*

## Introduction

Antipsychotics have been prescribed for schizophrenia for over fifty years. Typical or first generation antipsychotics refer to older antipsychotics such as chlorpromazine and haloperidol which primarily affect the dopamine system. Newer atypical antipsychotic medications (also called second generation antipsychotics) include medications such as risperidone and olanzapine which affect both the dopamine and serotonin system. The effectiveness of atypical and typical antipsychotics appears to be similar.<sup>1</sup> While tardive dyskinesia occurs less frequently with atypical antipsychotics, the cost of those agents, compared to typical antipsychotics, is considerable as many are still under patent. Additionally, recent concerns of metabolic syndrome have been raised, which may be a greater problem with atypical antipsychotics.<sup>2</sup> However, pharmacoeconomics may justify the use of atypical antipsychotics over older medications.<sup>3</sup>

While some studies have shown ethnic differences in use of atypical antipsychotics with lower prescription rates for African Americans and Hispanic Americans,<sup>4,5,6</sup> others note no differences.<sup>7</sup> Recent articles from the United Kingdom do not show any differences.<sup>8,9</sup> Among children with schizophrenia, African Americans, received comparable rates of antipsychotic prescriptions as Caucasians, but were less likely to be adherent.<sup>10</sup> In New Zealand, Asian patients were less likely to be prescribed clozapine.<sup>11</sup> A Canadian study from 2011 showed lower usage of antipsychotics among Chinese and higher among mixed ethnicity compared with Caucasian patients.<sup>12</sup>

Antipsychotic polypharmacy (hereafter referred to as "polypharmacy") is the concurrent use of two or more antipsychotics and this has increased in frequency. In the United States polypharmacy ranged from 4.1%-41%.<sup>13,14</sup> Studies comparing African Americans with Caucasians did not show clear differences in

polypharmacy.<sup>15,16</sup> However, none included Asian Americans or Pacific Islanders. Polypharmacy across East Asia ranged from 12.0% to 78.6%<sup>17</sup> consistent with the rate of 46% reported by Chong, et al.<sup>18</sup> Unlike the US mainland, Asian Americans and Pacific Islanders (including Hawaiians) are the predominant ethnic groups in Hawai'i.<sup>19</sup> Our team considered whether the race and ethnicity of patients are associated with patterns of polypharmacy with atypical antipsychotics. We sought to study these patterns among patients receiving treatment in Hawai'i, both at intake and discharge from an inpatient psychiatric facility. We assumed that intake patterns reflected community practice, whereas discharge patterns reflected inpatient treatment practices. We hypothesized that antipsychotic prescriptions and polypharmacy among Asian Americans and Pacific Islanders in Hawai'i would be higher than the US Mainland but lower than in Asia.

## Methods

An arbitrary date was chosen (April 30, 2002 at one facility and December 5, 2003 at the other facility). Five hundred consecutive charts were reviewed at two inpatient psychiatric facilities in Hawai'i with catchment areas of similar socioeconomic status. Records from January 14, 1997 to December 5, 2003 were included to reach the sample size. Information included demographics, medications on intake and discharge, discharge information, legal status, marital status, educational achievement, and the patient's diagnoses on intake and discharge based upon the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) which is used for classifying psychiatric disorders. Missing data was recorded as such. Only patients with psychotic disorders, listed either among primary or secondary diagnostic codes, were included (schizophrenia [295.xx], schizoaffective [295.70], and psychosis not otherwise specified {psychosis not otherwise specified (NOS) [298.9]}). The resulting sample size for this study was 485.

Ethnicity was collected from multiple sources including the history and physical, admission form, and discharge summary. Ethnicity chosen at admission was based on dropdown list with greater than 20 choices. Ethnicity was coded individually with up to ten ethnicities available to be chosen by each person. Ethnicities or combinations of ethnicities were then classified into more inclusive categories. For the purpose of this study, the final and most inclusive categories were Caucasian (European American), Pacific Islander (primarily, but not exclusively, indigenous Hawaiian), Asian American, and other. If the patient indicated a primary ethnicity then it was coded into one of the



four groups. However, if the patient did not indicate a primary ethnicity, this field was coded as mixed and categorized as “Other.”

Only antipsychotic medications were included for coding in this study. Intake medications were based on nursing documentation and the unit medication administration log. Discharge medications were listed on the discharge summary. Previous outpatient medications not on the discharge summary were excluded.

Intake and discharge medications were classified into mutually exclusive categories—single atypical oral, no other antipsychotic; single typical oral, no other antipsychotic; single intramuscular (IM) injection of an antipsychotic, no other antipsychotic (most injections administered were of typical antipsychotics, since IM injections of atypical antipsychotics were introduced in 2001, just prior to study commencement in 2002); clozapine, no other antipsychotic; clozapine plus other (one atypical only or one typical); other polypharmacy among antipsychotics; antipsychotics with *pro re nata* (prn) medications; and no antipsychotics. Other polypharmacy included using more than one atypical or typical antipsychotic with or without clozapine; IM injection plus atypical, typical, or clozapine; and more than one IM injection. Although classified as an atypical antipsychotic, clozapine was categorized separately due to usage primarily for refractory psychosis. Two categories were included at discharge regarding tapering—tapering antipsychotics, and tapering multiple antipsychotics. Tapering

antipsychotics, defined here as the transient use of multiple antipsychotics when switching a single antipsychotic, was not considered polypharmacy. The university and hospital institutional review boards (IRB) approved the study. SAS, version 9.2 (Cary, NC) was used to examine frequency distribution and comparative statistics including  $\chi^2$  and ANOVA. Multivariate methods were not needed, as most potential confounders were insignificantly associated with the outcome.

## Results

Table 1 displays sample characteristics. Missing or discrepant data for sample characteristic was less than 2% for age, gender, and marital status, and 8% for educational level. The ethnically diverse sample was 33% Asian American, 30% Caucasian, 21% Pacific Islander and 16% other. Sixty-nine percent of patients were male. Twenty-three percent had less than a high school education, 44% received a high school diploma or general educational development (GED), and 33% had some college. Sixty-nine percent of patients were single and 10% were married. The mean age was 40.1 years. Forty-nine percent were diagnosed with schizophrenia, 36% with schizoaffective disorder, and 15% with psychosis not otherwise specified. There were no statistically significant differences in gender, marital status, and psychotic diagnoses by ethnicity. Pacific Islanders were significantly younger and less educated than Caucasians and Asian Americans.

Table 1. Sample Characteristics of Inpatients with Psychotic Disorders (N=485)						
	Asian American	Caucasian	Pacific Islander	Other	Total	Significance
<b>Total (row %)</b>	159 (33%)	148 (30 %)	101 (21%)	77 (16%)	485	Ethnicity $\chi^2 = 37.2$ , $df = 3$ , $P = .001$
<b>Gender</b>						
Male	100 (64%)	107 (73%)	71 (72%)	53 (71%)	331 (69%)	Gender* Ethnicity $\chi^2 = 3.5$ , $df = 3$ , $P = .326$
Female	57 (36%)	40 (27%)	28 (28%)	22 (29%)	147 (31%)	
<b>Education</b>						
Less than High School	27 (19%)	26 (19%)	30 (31%)	20 (30%)	103 (23%)	Education* Ethnicity $\chi^2 = 25.2$ , $df = 9$ , $P = .003$
Completed High School /GED	62 (43%)	57 (41%)	51 (53%)	24 (36%)	194 (44%)	
Some College/2-year College	45 (31%)	45 (33%)	15 (15%)	16 (24%)	121 (27%)	
4-year College Degree or Higher	10 (7%)	10 (7%)	0	7 (10%)	27 (6%)	
<b>Marital Status</b>						
Single	99 (63%)	109 (75%)	70 (69%)	50 (68%)	328 (69%)	Marital Status* Ethnicity $\chi^2 = 11.6$ , $df = 12$ , $P = .476$
Married	18 (11%)	11 (8%)	13 (13%)	6 (8%)	48 (10%)	
Separated	10 (6%)	7 (5%)	5 (5%)	4 (5%)	26 (5%)	
Divorced	25 (16%)	17 (12%)	13 (13%)	11 (15%)	66 (14%)	
Widowed	5 (3%)	1 (<1%)	0	3 (4%)	9 (2%)	
<b>Age</b>						
Mean (sd)	41.7 (10.8)	40.8 (11.8)	37.1 (10.5)	39.7 (10.7)	40.1 (11.1)	Age* Ethnicity $F = 3.85$ , $df = 3, 477$ , $P = .010$
<b>Psychotic Diagnosis</b>						
Schizophrenia	83 (52%)	71 (48%)	38 (49%)	45 (46%)	237 (49%)	Diagnosis* Ethnicity $\chi^2 = 4.6$ , $df = 6$ , $P = .595$
Schizoaffective	57 (36%)	49 (35%)	27 (33%)	42 (42%)	175 (36%)	
Psychosis NOS	19 (12%)	28 (19%)	12 (16%)	14 (14%)	73 (15%)	

Note: Totals may not equal 100% due to missing or discrepant data in some of the demographic characteristics. \* = interaction effect.

The frequency of antipsychotic medications at intake by ethnicity is provided in Table 2. There was no statistically significant difference in the category of antipsychotic medications at intake by ethnicity ( $\chi^2=29.2$ ,  $df=21$ ,  $P=.110$ ). Fifty two percent of patients were prescribed a single antipsychotic at intake which included 36% atypical antipsychotic, 14% typical antipsychotic, 1% single intramuscular injection of antipsychotic, and 1% clozapine. Nine percent of patients were prescribed multiple antipsychotics. On admission, one percent of the patients received both a standing dose and prn dosing of antipsychotic, and 0.8% received clozapine with another antipsychotic. Thirty-seven percent of patients did not receive any antipsychotic medications.

Table 3 displays the frequencies of prescribed antipsychotic medications by ethnicity at discharge. There was no statistically significant difference in antipsychotic medications at discharge by ethnicity ( $\chi^2 = 20.5$ ,  $df=24$ ,  $P=0.667$ ). Patients receiving a single antipsychotic increased from 52% to 74% of whom 58% received an atypical antipsychotic, 6% received a typical antipsychotic, 4% received a single intramuscular injection of antipsychotic and 6% received clozapine; 0.2% were prescribed both a standing dose and prn dose of antipsychotics, and 1% received clozapine with another antipsychotic. At discharge, 4% were tapering to a single antipsychotic. Multiple antipsychotic usage was reduced to 6% from 9%. Thirteen percent of patients did not receive antipsychotics at discharge.

Antipsychotic Medications	Asian American	Caucasian	Pacific Islander	Other	Total
Single Oral Atypical, no other antipsychotic	45 (28%)	54 (36%)	36 (35%)	39 (51%)	174 (36%)
Single Oral Typical, no other antipsychotic	26 (16%)	19 (13%)	15 (15%)	6 (8%)	66 (14%)
Single IM Injection, no other antipsychotic	0	2 (1%)	3 (3%)	0	5 (1%)
Clozapine, no other antipsychotic	3 (2%)	1 (.7%)	3 (3%)	0	7 (1%)
Clozapine plus Other Antipsychotics	3 (2%)	1 (.7%)	0	0	4 (.8%)
Other Polypharmacy (or multiple antipsychotics)	14 (9%)	12 (8%)	12 (12%)	5 (6%)	43 (9%)
Antipsychotics with prn	3 (2%)	2 (1%)	2 (2%)	0	7 (1%)
No Antipsychotics	65 (41%)	57 (39%)	30 (30%)	27 (35%)	179 (37%)

Antipsychotic Medications	Asian American	Caucasian	Pacific Islander	Other	Total
Single Oral Atypical, no other antipsychotic	95 (60%)	89 (60%)	58 (58%)	41 (54%)	283 (58%)
Single Typical, no other antipsychotic	13 (8%)	7 (5%)	5 (5%)	5 (6%)	30 (6%)
Single IM injection, no other antipsychotic	4 (3%)	5 (3%)	6 (6%)	2 (3%)	17 (4%)
Clozapine, no other antipsychotic	10 (6%)	7 (5%)	10 (10%)	4 (5%)	31 (6%)
Clozapine plus Other Antipsychotic	2 (1%)	0	1 (1%)	0	3 (1%)
Other Polypharmacy (or multiple antipsychotics)	11 (7%)	11(7%)	5 (5%)	4 (5%)	31 (6%)
Antipsychotics with prn	0	0	1 (1%)	0	1 (0.2%)
Tapering Antipsychotics	7 (4%)	5 (3%)	5 (5%)	3 (4%)	20 (4%)
Tapering Multiple Antipsychotics	3 (2%)	2 (1%)	1 (1%)	1 (1%)	7 (1%)
No Antipsychotics	14 (9%)	22 (15%)	9 (9%)	17 (22%)	62 (13%)

## Discussion

This is the first study to examine atypical antipsychotic use and prescription changes in an inpatient setting among Asian Americans and Pacific Islanders. We did not find ethnic differences in atypical prescription practices at intake or discharge. In our study, atypical antipsychotics were widely prescribed to all groups with higher rates at time of discharge. Overall, the percentage receiving antipsychotics increased from 63% at admission to 87% by discharge. Furthermore, multiple antipsychotics (excluding the use of clozapine) was uncommon,

decreasing from 9% at admission to 6% at discharge. The low clozapine usage is concerning given the indication for refractory illness but consistent with other studies.<sup>20</sup> Discharges without any antipsychotics likely reflect refusal of medications. The rate of prn antipsychotic, a common practice to manage acute agitation or insomnia without a strong evidence base, was reassuringly low.<sup>21</sup>

There are a number of possible explanations for our findings. First, atypical antipsychotics have been widely accessible in Hawai'i without restriction since 1997.<sup>22</sup> Second, Hawai'i has

few uninsured individuals and a comprehensive Medicaid program. Most patients have access to antipsychotic medications.<sup>19</sup> Copeland and colleagues noted only slightly less use of atypical antipsychotics in African American and Hispanic American veterans where access is equal.<sup>3</sup> Third, Hawai'i lacks a majority ethnic group which may minimize racial disparities. At the time of this study, there was less emphasis on metabolic syndrome and diabetes which is now a significant concern for atypical antipsychotics. Selection of the antipsychotics was likely not based on body size, typically larger for a Pacific Islander compared with an Asian American.<sup>23</sup>

The main limitation of this study is the sample size. Ethnicity was based on self-report so participants with multiple ethnicities may have arbitrarily made only a single choice as evidenced by only 16% of patients being categorized as Other. Ethnically mixed individuals comprise 44% of individuals in Hawai'i.<sup>19</sup> For example, indigenous Hawaiians are virtually all of mixed ethnicity. It is not clear whether such patients would be coded differently if blood quantum were analyzed (ie, patient ethnicity based on highest percentage). Additionally, states or counties with formulary restrictions will likely have different utilization patterns. The use of two inpatient institutions is another limitation as community outpatients are not represented, and hospitalized patients may not be representative of all patients prescribed antipsychotic medications.

Polypharmacy and antipsychotic treatment are complex issues involving health care systems, nonpharmacological treatment, differing reasons for admission, and variations in prescriptions. While this study was not designed to address all of those issues, it is the first study to document antipsychotic prescription use among Asian Americans and Pacific Islanders with psychotic disorders in Hawai'i.

## Conclusion

Our data shows no racial differences in antipsychotic prescriptions for Asian Americans and Pacific Islanders that may reflect equality in antipsychotic treatment of public sector patients in Hawai'i. A multi-site study comparing Hawai'i with other states with large Asian American and Pacific Islander populations is needed to determine whether the findings are replicated in other health systems.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# MEDICAL SCHOOL HOTLINE

## **Educating Current and Future Seniors: The Mini-Medical School on Healthy Aging; University of Hawai'i at Manoa, John A. Burns School of Medicine**

Virginia S. Hinshaw PhD and Nancy S. Partika MPH

*The Medical School Hotline is a monthly column from the John A. Burns School of Medicine and is edited by Satoru Izutsu PhD; HJMPH Contributing Editor. Dr. Izutsu is the vice-dean of the University of Hawai'i John A. Burns School of Medicine and has been the Medical School Hotline editor since 1993.*

### **Aging in Hawai'i**

We age from the day we are born and, in Hawai'i, our life spans are definitely increasing. "Healthy aging" is a goal we all share. Since 1980, the rapid increase in the aging population in Hawai'i has been unprecedented, as in other parts of the United States. Hawai'i is projected to have 33% of its population over age 65 by the end of 2020, the highest percentage in the United States.

By 2035, the 60 year and older adult Hawai'i population is projected at 474,586 individuals and represent 29.7% of the total population, a greater than 300% increase during the 55-year period, 1980 -2035, whereas the total Hawai'i population is projected to increase 65.1% during this same 55-year period. The 85+ year old group of elders is projected to increase over 1000% during this 55-year period. According to the most recent population data, there are more than 263,000 adults over the age of 60 living in Hawai'i today, with over 183,000 residing in the City and County of Honolulu. (*source: Hawai'i State Plan on Aging, 2011-2015*)

### **Establishing a Mini-Medical School (MMS)**

While there are currently many health and special services targeted to meet the expanding needs of our elderly, Hawai'i seems to need a central and constant source of evidence-based geriatric health information and education. Over 80 schools of medicine in the United States have mini-medical schools (MMS) for community-based initiatives, but only 3-4 in the United States are focusing on healthy aging. One of the oldest, University of California (UC) Davis' MMS, was initiated over ten years ago by Dr. Michael McCloud, a geriatrician on the faculty in the UC Davis Medical School. This program continues to draw large audiences. His efforts inspired University of Hawai'i (UH) Manoa Chancellor Emeritus Virginia Hinshaw while she was serving as provost at UC Davis. His advice was pivotal in helping Dr. Hinshaw establish a program at the John A. Burns School of Medicine (JABSOM) at UH Manoa, designed to fit the culture of Hawai'i.

The central mission of the MMS is to provide Hawai'i's citizens with current evidence-based information on the best ways to maintain health and well-being as they age, similar to

what JABSOM medical students learn, but tailored for public audiences. The topics focused on four keys to aging: (1) being physically active, mentally engaged, nutritionally balanced, and socially connected with the goals of enabling our citizens to remain as healthy as possible and maintain their independence; (2) prepare them for the realities of aging; (3) provide resources to help them deal with those realities; (4) and encourage them to call on multidisciplinary teams to address their health issues effectively. There are also many positive effects of aging which are seldom mentioned, so the theme for the MMS was "Seniors Rock!" to emphasize that message.

### **Organizing a Mini-Medical School**

Hawai'i's MMS was conceived in 2012 by Dr. Hinshaw with the strong support of JABSOM and the UH Foundation, in collaboration with JABSOM's cadre of knowledgeable faculty and students in the Department of Geriatric Medicine.

Since a MMS on healthy aging was a new and relatively unfamiliar concept in Hawai'i, numerous focus groups of community members, UH donors, local aging experts, UH faculty and students, and other community stakeholders were convened to gain their input on topics in healthy aging the MMS should present and how best to meet the needs of our aging population in Hawai'i. A website for the program, <http://www.jabsom.hawaii.edu/minimedicalschool/>, was developed and speakers were invited and worked on presentation materials. Preparation for the inaugural course involved many people, including JABSOM and UH Foundation, but also many community groups and the UH Cancer Center in hosting the program in the Sullivan Conference Center.

The inaugural program was piloted in Spring 2014 with a class of UH donors who were offered a chance to learn, evaluate and guide the development of this new program based on their input. There was no charge since their responsibility was to evaluate the curriculum and the overall program. The enrollment goal of 160 people filled quickly, in less than two weeks. The age distribution of the class was 1/3 age 50-65 and 2/3 over 65. The program was conducted on six Saturday mornings in Spring 2014 and was presented by a volunteer team of Hawai'i's



respected experts on the topics. Healthy aging topics presented in two 50-minute segments included:

Week 1:

- “Overview of Geriatrics and Normal Changes of Aging”  
— Dr. Kamal Masaki (Geriatrician)
- “When Your Mind Works and When It Doesn’t”  
— Dr. Pat Blanchette (Geriatrician)

Week 2:

- “Vaccines We Should Get and Why”  
— Dr. Virginia Hinshaw
- “Knowing More about the Drugs We Take!”  
— Dr. Shari Kogan

Week 3:

- “Caregiving and Palliative Care in our Health System”  
— Dr. Ritabelle Fernandez
- “Health Promoting Interventions”  
— Dr. Keawe Kaholokula

Week 4:

- “Seeing Into the Future”  
— Dr. Brandon Lee
- “Being Legally Prepared for Health-related Decisions”  
— James Pietsch JD

Week 5:

- “Exercise for Health & Balance”  
— Micheal Tengan CPT
- “Healthy Hearts – A Clinical Approach to Complex Problems”  
— Dr. Robert Hong

Week 6:

- “Eating and Living to be 100?”  
— Dr. Brad Willcox and Dr. Craig Willcox

“Wisdom Sharing Panel”

- Dr. Satoru Izutsu, Dr. Noreen Mokuau,  
Dr. Cullen Hayashida and Valisa Saunders,
- Special Celebration/Graduation with a talk by Alan Wong  
“The Happiest Man in America” and  
music by Ian O’Sullivan, UH Manoa Department of Music

Additional one-hour optional interactive sessions after weekly classes were offered on related topics such as: “Using The Web For Gathering Evidence-based Healthy Aging Information” by JABSOM Head Librarian Ginny Tanji; “Individual Brown Bag Medication Reviews” by UH Hilo School of Pharmacy faculty and students, “Hula from the Heart” by the JABSOM Department of Native Hawaiian Health and “Blood Pressure Checks” by current JABSOM medical students.

Each week, the speakers and topics were evaluated; in addition, an overall evaluation at the end of the class and another one three months later were conducted to determine what actions the participants had taken and maintained. The participants were responsible in meeting their role as evaluators and their input has been invaluable in shaping our current efforts. The responses regarding the speakers, topics and outcomes of this first MMS course were extremely favorable, with 99% of the participants reporting that they would definitely recommend the course to others. This first MMS cohort was very enthusiastic about the opportunity to learn and indicated a strong interest in returning for more healthy aging courses.

### Future Plans for the MMS

Plans for the future of the JABSOM MMS include: a repeat offering of the Spring 2014 course in Fall 2014 with all new participants, an educational event for the Spring 2014 inaugural class and a spring 2015 MMS course with new healthy aging topics, such as dermatology, hearing, psychological well-being, nutrition, and more. Course evaluations from the spring 2014 inaugural course and subsequent courses will guide the development of future MMS offerings.

The class size remains limited because of the space available, but a goal of this program is to reach the broader population. A grant was submitted and funded by the HMSA Foundation to prepare mini-talks on several topics, particularly those that might be most useful to community groups interested in aging issues. These talks are currently being completed and will be posted on the website <http://www.jabsom.hawaii.edu/minimedschool/> to enable the information to reach a larger audience. In addition, most presentations in the Fall 2014 course will be videotaped and included on the website. These innovations will make the information available to anyone in Hawai'i or beyond. All of us age, so we hope this information will help educate younger people, as well as seniors, about healthy aging. Learning together is truly a joy!

### **Examples of Testimonials from the Spring 2014 Inaugural Class**

"Will there be a part II to the MMS on Healthy Aging? Some of the sessions were so interesting; I wish I could have heard more. The sessions involving audience participation beyond Q&A were outstanding."

"This was such a wonderful experience! All the knowledge dispensed was invaluable to all in attendance. We all were beneficiaries of the hard work involved to get this class organized. Thank you!"

"Each session generated interest & left me wanting more—good length of time nevertheless. Excellent planning and time management."

"I enjoyed this course & will work to use the info. I have already recommended the course to others. I sense a very strong interest & it will likely be even stronger next time & afterward."

"Course affirmed that I'm headed in right direction—diet, exercise, education on healthy aging, care, enhanced and provided additional building blocks."

"I became more aware of the responsibility to educate myself to take better care of my body, physically and mentally and to keep abreast of the available resources which aid towards an aging healthy body."

"Trying to be more conscientious about watching my diet and knowing that it all has an effect on "aging." I've also tried to increase my exercise routine. So many things were reminders of what we all should be doing!"

"There were many actions already in place, but not being practiced regularly. The mini-course inspired me to activate these plans regularly."

"I'm already trying to do all the recommendations of the course. This is deepening understanding and strengthening resolve."

"I really appreciated the additional optional hour sessions/opportunities to pick up something new if I chose to stay and learn."

"Needs to be presented to all ages-younger adults can use knowledge to live better & healthier. Caregivers need to be aware of their choices as their charges grow older and require additional or extended care."

"Loved the MMS-outstanding relevant topics, great speakers! Important info-need to start eating right, exercising, etc, throughout life."

"Speakers were very articulate, speaking at levels easy for the "lay" person to understand."

"The entire curriculum has been enriching & stimulating!"

"Information should be made available to 50+ year-olds to be better prepared in retirement/for retirement"

"Great job in planning a broad, well-thought out curriculum that was meaningful, enjoyable & entertaining- Mahalo!"

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# INSIGHTS IN PUBLIC HEALTH

## The Special Supplemental Nutrition Program for Women, Infants and Children: Strengthening Families for 40 Years

Linda R. Chock MPH, RD; Donald K. Hayes MD, MPH; and Danette Wong Tomiyasu MBA

*Insights in Public Health is a monthly solicited column from the public health community and is coordinated by HJMPH Associate Editors Jay Maddock PhD from the Office of Public Health Studies at John A Burns School of Medicine and Donald Hayes MD, MPH from the Hawai'i Department of Health in collaboration with HJMPH Manuscript Editors Tonya Lowery St. John MPH and Ranjani Starr MPH from the Hawai'i Department of Health.*

### Abstract

*The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) is a proven, cost-effective investment in strengthening families. As part of the United States Department of Agriculture's (USDA) 15 federal nutrition assistance programs for the past 40 years, WIC has grown to be the nation's leading public health nutrition program. WIC serves as an important first access point to health care and social service systems for many limited resource families, serving approximately half the births in the nation as well as locally. By providing nutrition education, breastfeeding promotion and foods in addition to referrals, WIC plays a crucial role in promoting lifetime health for women, infants and children. WIC helps achieve national public health goals such as reducing premature births and infant mortality, increasing breastfeeding, and reducing maternal and childhood overweight. Though individuals and families can self-refer into WIC, physicians and allied health professionals have the opportunity and are encouraged to promote awareness of WIC and refer families in their care.*

### Introduction

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) is a proven, cost-effective investment in strengthening families.<sup>1-4</sup> The program is a short-term intervention program designed for low to moderate-income pregnant and postpartum women, infants, and children. Its mission is to safeguard the health of income-eligible, nutritionally at-risk women, infants, and children up to age five. WIC celebrates 40 years of strengthening families in 2014. WIC works to combat food insecurity with sister United States Department of Agriculture (USDA) programs in the state such as Supplemental Nutritional Assistance Programs (SNAP), Child Nutrition Programs including School Breakfast and School Lunch, the Senior Farmers' Market Nutrition Program, and the Emergency Food Assistance Program.

Designed to influence lifetime nutrition and lifestyle behaviors, WIC provides nutrition education, nutritious foods, breastfeeding support, and referrals. The nutrition education and specific healthy foods provided enable young families to make lifelong healthy eating and lifestyle choices. WIC clients are generally 25% women, 25% infants up to age one, and 50% children age two to five. Approximately half of births in the state and

nationally are enrolled in WIC. In Federal Fiscal Year (FFY) 2013, Hawai'i WIC served an average of 36,370 women, infants and children monthly, each receiving an average monthly food benefit of \$70.07. Last year, WIC check redemptions totaled approximately \$30.6 million.

WIC has evolved from the initial infant formula give-away pilot project to decrease infant mortality to the largest public health breastfeeding promotion program in the nation. WIC promotes breastfeeding as the optimal infant feeding choice and supports national efforts to improve breastfeeding initiation, duration, and exclusivity. WIC supports two major Healthy People 2020 goals to (1) promote health and reduce chronic disease risk through the consumption of healthful diets, and achievement and maintenance of healthy body weights, and (2) improve the health and well-being of women, infants, children, and families. Numerous Healthy People 2020 objectives related to WIC are summarized in Table 1. WIC provides anticipatory guidance to families, connects them to community resources, and promotes medical and dental homes. Findings demonstrate that WIC improves birth outcomes,<sup>5-7</sup> diets and diet-related outcomes,<sup>8,9</sup> infant feeding practices,<sup>10</sup> and immunization rates.<sup>11</sup>

### WIC Funding

WIC is a domestic discretionary program funded annually through Congressional appropriations. WIC was established by Congress as part of the Child Nutrition Act of 1966, and is currently reauthorized through 2015. Grants are provided to the states, which in turn provide funding at local levels. The Hawai'i State Department of Health (DOH) is the designated State Agency which administers funds from the USDA, Food and Nutrition Services (FNS). WIC Services Branch within the Hawai'i DOH is responsible for administering the 100% federally funded Program. Seventy-five percent (75%) of funds are generally spent on food benefits, with 25% spent on nutrition education, breastfeeding promotion, other client services and administration.

Table 1. Healthy People 2020 Objectives Related to WIC			
Topic Area	Objective		
Early & Middle Childhood (EMC)	EMC-1	Increase the proportion of children who are ready for school in all five domains of healthy development, physical development, social-emotional development, approaches to learning, language and cognitive development	
	<b>Maternal, Infant &amp; Child Health (MICH)</b>		
Maternal, Infant & Child Health (MICH)	<b>Morbidity &amp; Mortality</b>		
	MICH-1	Reduce the rate of fetal and infant deaths	
	MICH-3	Reduce the rate of child deaths	
	MICH-5	Reduce the rate of maternal mortality	
	MICH-6	Reduce maternal illness and complications due to pregnancy	
	MICH-8	Reduce low birth weight (LBW) and very low birth weight (VLBW)	
	MICH-9	Reduce preterm births	
	<b>Pregnancy Health &amp; Behaviors</b>		
	MICH-10	Increase the proportion of pregnant women who receive early and adequate prenatal care	
	MICH-11	Increase abstinence from alcohol, cigarettes and illicit drugs among pregnant women	
	MICH-13	Increase the proportion of mothers who achieve recommended weight gain during pregnancies	
	<b>Preconception Health &amp; Behaviors</b>		
	MICH-14	Increase the proportion of women of childbearing potential with intake of at least 400 micrograms of folic acid from fortified foods or dietary supplements	
	MICH-15	Reduce the proportion of women of childbearing potential who have low red blood cell folate concentrations	
	MICH-16	Increase the proportion of women delivering a live birth who received preconception care services and practiced key recommended preconception health behaviors	
	<b>Infant Care</b>		
	MICH-21	Increase the proportion of infants who are breastfed	
	<b>Health Services</b>		
	MICH-30	Increase the proportion of children, including those with special health care needs, who have access to a medical home	
	Nutrition & Weight Status (NWS)	<b>Weight Status</b>	
		NWS-8	Increase the proportion of adults who are at a healthy weight
NWS-9		Reduce the proportion of adults who are obese	
NWS-10		Reduce the proportion of children and adolescents who are considered obese	
NWS-11		Prevent inappropriate weight gain in youth and adults	
<b>Food Security</b>			
NWS-12		Eliminate very low food security among children	
NWS-13		Reduce household food insecurity and in doing so reduce hunger	
<b>Food &amp; Nutrient Consumption</b>			
NWS-14		Increase the contribution of fruits to the diets of the population aged two years and older	
NWS-15		Increase the variety and contribution of vegetables to the diets of the population aged two years and older	
NWS-16		Increase the contribution of whole grains to the diets of the population aged two years and older	
NWS-17		Reduce consumption of calories from solid fats and added sugars in the population aged two years and older	
NWS-18		Reduce consumption of saturated fats in the population aged two years and older	
NWS-19		Reduce consumption of sodium population aged two years and older	
NWS-20		Increase consumption of calcium population aged two years and older	
<b>Iron Deficiency</b>			
NWS-21		Reduce iron deficiency anemia among young children and females of childbearing age	
NWS-22		Reduce iron deficiency anemia among pregnant females	
Oral Health (OH)		<b>Oral Health of Children &amp; Adolescents</b>	
		OH-1	Reduce the proportion of children and adolescents who have dental caries experience in their primary or permanent teeth
		<b>Access to Preventive Services</b>	
OH-8	Increase the proportion of low-income children and adolescents who received any preventive dental services during the past year		



## WIC Eligibility Requirements

WIC recipients must have income at or below 185 percent of the poverty income guidelines or be adjunctively income-eligible through enrollment in SNAP, Temporary Assistance to Needy Families (TANF) or MedQUEST. In addition to meeting income eligibility, the WIC applicant must be a pregnant woman, a breastfeeding woman up until one year postpartum, a non-breastfeeding woman up until six months postpartum, or an infant or child up to age five living in Hawai'i. Postpartum women include those who miscarry. Finally, applicants must also be at risk medically or nutritionally (eg, anemia, underweight, overweight).

## WIC Availability in Hawai'i

WIC services are available on all major islands statewide. A family is free to access WIC services at the agency of their choice and does not depend on where they live (except for Kookaa Kalihi Valley Comprehensive Family Services, which only serves those residing in Kalihi Valley). In addition to their main clinic site, several of the agencies provide satellite clinic services to ensure accessibility. Contracted services are available at seven community health centers (CHCs), one social service agency and one hospital. State employees provide services at an additional seven local agencies. This variation is related to funding and women, infants and children receive the same services regardless of type of agency or location. Table 2 lists the agency, type of agency, caseload achieved for the period October 1, 2012 through September 30, 2013 (FFY 2013), and the general service area. The caseload across the state was nearly half a million in 2013.

## WIC Benefits

Once enrolled, WIC provides monthly support for specific supplemental foods to ensure health and development along with nutrition education, breastfeeding promotion/support, and referrals. The families then redeem checks at authorized retail grocery stores (and one approved pharmacy for specialty formulas).

WIC provides four major benefits discussed in more detail: (1) nutrition education; (2) specific healthy supplemental foods; (3) breastfeeding promotion/support; and (4) referrals to health and social services.

## Nutrition Education

Core nutrition messages based on national recommendations endorsed by the USDA are promoted by WIC to encourage participants to eat more fruits, vegetables, whole grains, and fiber; consume less fat, cholesterol, juice, and sweetened beverages; and to breastfeed. Nutrition education may be provided one-on-one with a nutritionist, registered dietitian or trained staff, or in a group setting. Participant-centered services, theoretically based on stages of change, and drawing techniques from motivational interviewing and rapport building, are offered by direct service staff. Families are able to choose topics that they want to learn, such as what to eat for a healthy pregnancy, cooking on a budget, reading food labels, how and when to introduce solids to a baby, and how and when to wean a baby from a bottle to a cup.

Table 2. Hawai'i WIC Agencies by Name, Type, 2013 Caseload and Service Area			
Agency Name	Type	Caseload	Service Area
Kalihi Palama Health Center (Hale Ho'ola Hou)	CHC*	42,543	O'ahu
Kapiolani Medical Center for Women and Children	Hospital	21,149	O'ahu
Kookaa Kalihi Valley (Comprehensive Family Services)	CHC	18,859	Kalihi Valley
Waimanalo Health Center	CHC	10,927	O'ahu
Waianae Coast Comprehensive Health Center	CHC	56,390	O'ahu
Leeward Unit	State	45,027	O'ahu
Pearl City Unit	State	20,084	O'ahu
Wahiawa Unit	State	43,868	O'ahu
Windward Unit	State	34,799	O'ahu
Bay Clinic	CHC	20,141	Hawai'i Island
Hilo Unit	State	45,225	Hawai'i Island
Kona Unit	State	18,737	Hawai'i Island
Community Clinic of Maui (Malama I Ke Ola Health Center)	CHC	23,450	Maui
Maui Unit	State	19,942	Maui
Moloka'i Community Health Center	CHC	5,241	Moloka'i
Maui Family Support Services	Social Service	1,271	Lana'i
Kaua'i Unit	State	18,380	Kaua'i
<b>TOTAL</b>		<b>446,033</b>	

\*Denotes a Community Health Center Location

## Healthy Supplemental Foods

The WIC food packages (ie, foods covered by WIC dollars) are designed for nutritional value to supplement the needs of women, infants, and children to ensure good health, growth and development. The package was changed in 2009 based on an Institute of Medicine study to align with the Dietary Guidelines for Americans, including cash value vouchers (CVVs) for fruits and vegetables for the first time.<sup>12</sup> The food package currently includes fruits, vegetables, low-fat dairy, soy products, and whole grains. Table 3 lists the key nutrients provided by categories of WIC allowed foods.

While WIC's prescribed food packages and allowed foods are limited and specific, SNAP benefits are more liberal. For example, WIC allowed cereals must contain a minimum of 28 mg of iron and a maximum of 21.2 g of sucrose and other sugars per 100 g of dry cereal but any cereal can be purchased with SNAP benefits. As another example, WIC allowed juices must contain at least 30 mg of vitamin C per 100 mL of juice whereas any drink can be purchased with SNAP benefits. Another difference is that WIC benefits expire in 30 days, but unused SNAP benefits carry over into the next month. SNAP allows families to buy fruits and vegetables at participating farmers' markets in Hawai'i, but currently WIC CVVs are redeemable only at authorized grocery stores. WIC encourages families to apply for all eligible USDA programs, and use SNAP benefits to complement the WIC food package.

## Breastfeeding Support

WIC strengthened breastfeeding policies and activities in the 1990s which included the introduction of an enhanced food package for exclusively breastfeeding mothers in 1992, followed by a breastfeeding campaign implemented in 1997. WIC promotes breastfeeding as the optimal infant feeding choice. Breastfeeding provides numerous health benefits to both mother and infant, and reduces healthcare costs. Breastfeeding lowers the risk of obesity, type 2 diabetes and asthma.<sup>13</sup> WIC educates pregnant women on the benefits of breastfeeding and continues to provide support after they give birth. Support includes the provision of personal pumps, which may be manual pumps or hospital-grade breast pumps on loan, breastfeeding supports (eg, breastfeeding drapes), and providing a breastfeeding-friendly clinic environment.

The breastfeeding peer counselor (BFPC) project is an adjunct to basic core WIC breastfeeding support. In 2004, the national BFPC initiative started hiring peer counselors to support WIC women learning to breastfeed. BFPC trained paraprofessional peer counselors provide breastfeeding support in venues other than WIC clinics, and during hours when WIC clinics are closed. Studies among WIC participants in Texas and Maryland have shown that interaction with WIC BFPCs prenatally is associated with increased rates of breastfeeding initiation.<sup>10,14</sup> In Hawai'i WIC, the BFPCs concentrate on pregnant women enrolled in their first trimester, but also support breastfeeding among all those that are interested regardless of entry into WIC.

## Referrals

WIC also assists families to access social services (eg, Head Start, domestic violence resources, voter registration, and financial assistance) and healthcare services (eg, substance abuse treatment, immunizations, oral care, or prenatal care). Medical and dental homes are encouraged. Some WIC agencies also coordinate activities such as car seat safety inspections and fluoride varnish applications.

## Improved Birth Outcomes

Preterm births are costly. Prenatal WIC participation is associated with lower infant mortality rates.<sup>6</sup> USDA studies based on linked WIC and Medicaid data in five states found that prenatal WIC participation resulted in longer pregnancies; fewer premature births; lower incidence of moderately low birth weight (LBW, less than 2,500 grams) and very low birth weight (VLBW, less than 1,500 grams) infants; fewer infant deaths; a greater likelihood of receiving prenatal care; and, within the first 60 days after birth, a savings of \$1.77 to \$3.13 for every dollar spent.<sup>11,16</sup> Another study conducted in Virginia found a savings of up to \$4.21 in Medicaid for every dollar spent on a WIC pregnancy.<sup>17</sup> Prenatal WIC participation is associated with a positive impact of 6.6 ounces of birth weight in WIC babies compared to babies born to mothers who did not participate in WIC prenatally,<sup>7</sup> and prenatal WIC participation reduced the rate of LBW babies by 25% and VLBW babies by 44%.<sup>5</sup> To promote healthy birth outcomes, WIC women are monitored throughout their pregnancy for appropriate weight gain as well as health behaviors and advised to receive early prenatal care.

WIC Foods & Alternatives	Key Nutrients Provided
Fruits & Vegetables	Vitamins A,C,E, Folate, Potassium, Fiber
Baby Food Fruits & Vegetables and Meats	Vitamins A,C,E, Folate, Potassium, Fiber (Iron & Zinc in baby food meat)
Milk, Soy Beverage, Tofu	Protein, Calcium, Vitamins A,D; Folate, Riboflavin
Whole Grain Cereals, Bread, Brown Rice, Soft Corn Tortillas	Iron, B Vitamins, Folate, Fiber, Zinc, Magnesium
Canned Fish (Tuna, Salmon, Sardines, Mackerel)	Protein, Folate
Dry Beans, Peanut Butter	Protein, Calcium, Vitamins A,D, Riboflavin
Cheese	Protein, Calcium, Vitamins A,D, Riboflavin
Eggs	Protein, Vitamins A&D

WIC infants are also routinely monitored. A recent analysis of Hawai'i WIC data on gestational weight gain (GWG) and birth weights for mother-infant pairs from 2003 to 2005 indicated 62% had excessive weight gain and 15% had inadequate weight gain.<sup>18</sup> Those with excessive weight gain during pregnancy were more likely to have a high birth weight (HBW) infant. Those with inadequate weight gain during pregnancy were more likely to have a LBW infant if they were underweight or normal weight prior to pregnancy. Women gaining appropriate weight had better birth outcomes. These analyses demonstrate the impact of WIC and help guide the provision of services.

### **Improved Diet and Diet-Related Outcomes**

WIC participation is associated with higher mean intakes of iron, vitamin C, thiamin, niacin, and vitamin B6 without an increase in food energy intake, indicating an increase in nutrient density.<sup>19</sup> Studies have shown positive effects on nutrient intake without an increase in fat or cholesterol intake;<sup>20</sup> and that WIC is more effective than other cash or SNAP benefits in improving intake of key nutrients for preschoolers.<sup>20</sup> The CDC has attributed a national decline in the iron deficiency anemia rate from 7.8 percent in 1975 to 2.9 percent in 1985 partially to WIC.<sup>4</sup> Low-income children enrolled in WIC have a lower prevalence rate of anemia than those who are not enrolled in WIC.<sup>9</sup> Moreover, WIC enrollment is associated with improved growth rates among children.<sup>21</sup> Infants on WIC are less likely to be underweight, but are not at greater risk of being overweight.<sup>22</sup> Four and five-year olds whose mothers participated in WIC during pregnancy have better vocabulary test scores than children whose mothers did not receive WIC.<sup>18</sup>

### **Improved Infant Feeding Practices Including Breastfeeding Rates**

Women who reported having received breastfeeding advice at WIC are more likely to breastfeed than other WIC women or women not in WIC.<sup>30</sup> BFPC participants have an increased rate of initiation.<sup>10</sup> For infants on formula, 90 percent received iron-fortified formula.<sup>25</sup> Data from Hawai'i has shown an impact on breastfeeding initiation in WIC with closing the gap between those on WIC prenatally and those not on WIC. For example in 2000, an estimated 14.1% of WIC moms who were enrolled prenatally did not attempt to breastfeed compared to 7.8% of non-WIC moms; by 2011 5.9% of WIC moms did not attempt to breastfeed compared to 3.3% of non-WIC moms. Similarly, there has been a narrowing of this gap in breastfeeding at 8 weeks with an estimated 60.7% of WIC moms who were enrolled prenatally were breastfeeding compared to 74.7% of non-WIC moms in 2000, but by 2011 this increased to 73.4% of WIC Moms who were enrolled prenatally compared to 82.3% of non-WIC Moms.<sup>26</sup> Additionally, a recent analysis of Hawai'i WIC mother-child pairs of two-year olds born between 2005 and 2009 showed children breastfed for at least six months had a lower childhood obesity risk compared to those who were never breastfed.<sup>27</sup> As a result of information such as this,

WIC provides breastfeeding training to all staff, uses BFPCs, and incentivizes with a more robust food packages for nursing mothers and breastfed infants.

### **Improved Oral Health**

Early childhood caries (ECC) is the most prevalent infectious and transmittable disease among children in America.<sup>28</sup> An estimated 80 percent of ECC in low-income children aged two to five remain untreated.<sup>29</sup> Children whose mothers participated in WIC for a full year were approximately 1.7 times more likely to have two or more dental visits per year than children who never participated in WIC.<sup>30</sup> WIC does not have trained staff to meet oral health care needs, but feeding practice recommendations and referrals can prevent ECC. WIC promotes dental homes for families, and encourages caregivers to plan a child's first dental visit by age one. Kona WIC and the West Hawai'i Community Health Center have collaborated to provide "Keiki Dental Days" where the parent (with child in lap) and provider sit knee-to-knee to administer a child oral health assessment, fluoride varnish application, toothbrush prophylaxis, anticipatory guidance, and necessary referral to care and case management; services are provided on-site at WIC by the CHC dental staff. Many other CHCs with WIC services also offer co-located dental services.

### **Improved Immunization Rates & Regular Source of Medical Care**

WIC participation is associated with improved rates of childhood immunization as well as having a regular source of medical care.<sup>31</sup> Children in WIC are more likely to be immunized than those who drop out of WIC.<sup>11</sup> Many CHCs which offer WIC also offer co-located immunization and medical services. National studies show WIC infants are in better health than eligible infants not participating in WIC.<sup>22</sup>

### **Collaborative efforts**

In addition to providing direct support of clients, WIC staff also participates in collaborative efforts that promote health in the State. For example, WIC staff are participants in the Governor's Early Childhood Action Strategies to assure a comprehensive early childhood system.<sup>32</sup> In this collaborative, specific focus areas of WIC interest include healthy and welcomed births, safe and nurturing families, on-track health and development, and equitable access to programs and services. Another example, would be supporting the work of the Family Health Services Division in State Priorities through participation in workgroups such as promoting healthy weight among children, improving access to children oral health care, promoting developmental screening, as well as participating in efforts such as reducing prenatal smoking and alcohol use. WIC staff also collaborates across divisions in the Hawai'i DOH. For example, WIC staff support efforts of the Healthy Hawai'i Initiative to reduce child obesity and improve breastfeeding education and initiations in birthing hospitals.

## Conclusion

For the last 40 years, WIC has been improving the health of nutritionally at-risk women, infants and children by providing healthful supplemental foods accompanied by nutrition education, breastfeeding support and referrals, and through collaborative efforts with partners. WIC is cost effective in safeguarding the health status of the target population, with recent studies showing \$4.21 in Medicaid savings for every dollar spent on a WIC pregnant woman. Interdepartmental and interagency cooperation help alleviate childhood hunger and food insecurity. Physicians and allied health care professionals can help promote WIC, by reaching out to potentially eligible families and encouraging them to apply.

## Disclaimer

The opinions, findings, and conclusions in this article are those of the author and do not represent the official position of the Hawai'i Department of Health.

## Conflict of Interest

None of the authors identify a conflict of interest.

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## Biostatistical Guideline for HJM&PH

The following guidelines are developed based on many common errors we see in manuscripts submitted to HJM&PH. They are not meant to be all encompassing, or be restrictive to authors who feel that their data must be presented differently for legitimate reasons. We hope they are helpful to you; in turn, following these guidelines will reduce or eliminate the common errors we address with authors later in the publication process.

**Percentages:** Report percentages to one decimal place (eg, 26.7%) when sample size is  $\geq 200$ . For smaller samples ( $< 200$ ), do not use decimal places (eg, 26%, not 26.7%), to avoid the appearance of a level of precision that is not present.

**Standard deviations (SD)/standard errors (SE):** Please specify the measures used: using “mean (SD)” for data summary and description; to show sampling variability, consider reporting confidence intervals, rather than standard errors, when possible to avoid confusion.

**Population parameters versus sample statistics:** Using Greek letters to represent population parameters and Roman letters to represent estimates of those parameters in tables and text. For example, when reporting regression analysis results, Greek symbol ( $\beta$ ), or Beta (b) should only be used in the text when describing the equations or parameters being estimated, never in reference to the results based on sample data. Instead, one can use “b” or  $\beta$  for unstandardized regression parameter estimates, and “B” or  $\beta$  for standardized regression parameter estimates.

**P values:** Using  $P$  values to present statistical significance, the actual observed  $P$  value should be presented. For  $P$  values between .001 and .20, please report the value to the nearest thousandth (eg,  $P = .123$ ). For  $P$  values greater than .20, please report the value to the nearest hundredth (eg,  $P = .34$ ). If the observed  $P$  value is great than .999, it should be expressed as “ $P > .99$ ”. For a  $P$  value less than .001, report as “ $P < .001$ ”. Under no circumstance should the symbol “NS” or “ns” (for not significant) be used in place of actual  $P$  values.

**“Trend”:** Use the word trend when describing a test for trend or dose-response. Avoid using it to refer to  $P$  values near but not below .05. In such instances, simply report a difference and the confidence interval of the difference (if appropriate), with or without the  $P$  value.

**One-sided tests:** There are very rare circumstances where a “one-sided” significance test is appropriate, eg, non-inferiority trials. Therefore, “two-sided” significance tests are the rule, not the exception. Do not report one-sided significance test unless it can be justified and presented in the experimental design section.

**Statistical software:** Specify in the statistical analysis section the statistical software used for analysis (version, manufacturer, and manufacturer’s location), eg, SAS software, version 9.2 (SAS Institute Inc., Cary, NC).

**Comparisons of interventions:** Focus on between-group differences, with 95% confidence intervals of the differences, and not on within-group differences.

**Post-hoc pairwise comparisons:** It is important to first test the overall hypothesis. One should conduct *post-hoc* analysis if and only if the overall hypothesis is rejected.

**Clinically meaningful estimates:** Report results using meaningful metrics rather than reporting raw results. For example, instead of the log odds ratio from a logistic regression, authors should transform coefficients into the appropriate measure of effect size, eg, odds ratio. Avoid using an estimate, such as an odds ratio or relative risk, for a one unit change in the factor of interest when a 1-unit change lacks clinical meaning (age, mm Hg of blood pressure, or any other continuous or interval measurement with small units). Instead, reporting effort for a clinically meaningful change (eg, for every 10 years of increase of age, for an increase of one standard deviation (or interquartile range) of blood pressure), along with 95% confidence intervals.

**Risk ratios:** Describe the risk ratio accurately. For instance, an odds ratio of 3.94 indicates that the outcome is almost 4 times as likely to occur, compared with the reference group, and indicates a nearly 3-fold increase in risk, not a nearly 4-fold increase in risk.

**Longitudinal data:** Consider appropriate longitudinal data analyses if the outcome variables were measured at multiple time points, such as mixed-effects models or generalized estimating equation approaches, which can address the within-subject variability.

**Sample size, response rate, attrition rate:** Please clearly indicate in the methods section: the total number of participants, the time period of the study, response rate (if any), and attrition rate (if any).

**Tables (general):** Avoid the presentation of raw parameter estimates, if such parameters have no clear interpretation. For instance, the results from Cox proportional hazard models should be presented as the exponentiated parameter estimates, (ie, the hazard ratios) and their corresponding 95% confidence intervals, rather than the raw estimates. The inclusion of  $P$ -values in tables is unnecessary in the presence of 95% confidence intervals.

**Descriptive tables:** In tables that simply describe characteristics of 2 or more groups (eg, Table 1 of a clinical trial), report averages with standard deviations, not standard errors, when data are normally distributed. Report median (minimum, maximum) or median (25th, 75th percentile [interquartile range, or IQR]) when data are not normally distributed.

**Figures (general):** Avoid using pie charts; avoid using simple bar plots or histograms without measures of variability; provide raw data (numerators and denominators) in the margins of meta-analysis forest plots; provide numbers of subjects at risk at different times in survival plots.

**Missing values:** Always report the frequency of missing variables and how missing data was handled in the analysis. Consider adding a column to tables or a footnote that makes clear the amount of missing data.

**Removal of data points:** Unless fully justifiable, all subjects included in the study should be analyzed. Any exclusion of values or subjects should be reported and justified. When influential observations exist, it is suggested that the data is analyzed both with and without such influential observations, and the difference in results discussed.



## IT WOULD BE A NO BRAINER - \$50 vs \$2000 - WERE IT NOT FOR GREED.

Medicare released information about individual physician payments for 2012. Ophthalmologists accounted for a substantial number of physicians who received payments exceeding \$1 million. A large factor in those high payments for some physicians was reimbursement for intra-vitreous injections for age-related macular degeneration (AMD). Lucentis the anti-vascular endothelial growth factor (VEGF) goes at \$2000 per injection. The National Institutes of Health conducted a two-year study published in the journal Ophthalmology that verified that Avastin, an anti-cancer drug, is just as effective as a VEGF medication as Lucentis. Lucentis costs \$2000 per injection, Avastin \$50. Both drugs are made by Genentech. Still, doctors injected Lucentis, over half a million times in 2013 with greater profit for Genentech. The company has built hurdles to using the \$50 Avastin by packaging it in large containers requiring more handling and possible contamination. Moreover, doctors who use large amounts of Lucentis are rewarded, and Medicare must contribute a larger per dose portion for injecting it. The added cost to Medicare is over one billion annually. Is this legal? Answer is yes. Is it ethical? Genentech should provide similar dose systems for Avastin and cease with financial incentives for surgeons. Don't hold your breath.

## THAT METAL TEASTE IN MY MOUTH IS MY HIP?

Cobaltism is a spectrum of illnesses that can potentially follow a metal-on-metal (MoM) hip replacement surgery. Cases describe extreme wear of MoM acetabular cup and ball rubbing against one another during times of physical activity. Metal ions can shear away and enter the surrounding tissues or blood stream. In severe cases these micro-emboli have caused psychologic, constitutional, neurologic, and cardiovascular manifestations. Reporting in the Journal of the American Academy of Orthopedic Surgeons, lead investigator Stephen Tower MD, found that cobaltism as described is common. In his study, 42% of patients that had undergone MoM hip revision surgery had toxic cobalt levels. Many patients are asymptomatic. Dr. Tower recommends mandating annual systematic screening of patients with MoM implants.

## RARELY DOES NOT MEAN NEVER. WHAT GOES AROUND COMES AROUND.

A 46-year-old woman tried to sell plasma to supplement her income, but was refused when she tested positive for HIV. She had no history of heterosexual intercourse for 10 years. In the previous 5 years she had 3 female sex partners, but was currently in a monogamous relationship of the last 6 months. She had not gotten a tattoo, acupuncture, transfusions or transplants. She denied engaging in any other HIV risk behavior. Investigators reported that the likely source of her new infection was her 43-year-old partner, who tested positive for HIV in 2008. The partner took anti-retroviral therapy starting in 2009, but discontinued in late 2010. The couple admitted routinely indulging in unprotected oral and vaginal contact, sometimes rough to the point of bleeding. Lab tests confirmed the virus was identical to that of her partner. However, team members reported HIV transmission woman to woman is extremely rare.

## SOON YOU'LL BE ABLE TO QUIT TOBACCO, IT SAYS HERE.

The manufacturers of electric cigarettes claim not only are they safer than tobacco, but also can serve as a first step toward quitting. E-cigarettes deliver nicotine in vapor form without tars and other cancer-causing materials of lit cigarettes. A research team at the University of California San Francisco surveyed 949 smokers of e-cigarettes. After one year they could find no difference in quit rates when compared with regular tobacco users. Quit rates of the two groups fell within the

margin of error. Authors of the study suggest regulators should ban ads claiming e-cigarettes help people quit smoking unless scientific evidence emerges to prove it.

## HEART DEFECTS ARE EQUAL OPPORTUNITY KILLERS.

A 15-year-old athletic young man had a heart attack and died. His mother, a veteran nurse, never suspected that her son might bear a possibly fatal heart defect. She teamed up with cardiologists at John Roberts Hospital in San Diego and started a program to offer free electrocardiogram screenings for teenagers. So far, 12,000 have been scanned with 121 found to bear potentially fatal heart defects. Across the U.S., parents of young athletes who unexpectedly died from hidden heart conditions are launching scanning programs to keep such tragedies from befalling others. Teaming up with local cardiologists, they offer free or low-cost EKGs. At times they include an echocardiogram to study heart structure. Whether to screen young athletes, as is done in Israel and Italy, is a topic of hot debate in the United States. Opponents point out published research showing a rate of one in 164,000 sudden cardiac deaths in young athletes. An NCAA study published in 2011, found a rate of one in every 43,000. But consider, if it's your young apparently healthy athlete and a free or low-cost EKG is available who cares about the numbers.

## ANY PORT IN A STORM—PREFERABLY AN EXPENSIVE PORT

At California State Polytechnic San Luis Obispo the class on viticulture and enology is loaded with 350 students. Vital to the state's economy and with European cachet, the class is hampered by rigid state laws that prohibit students from sampling their wares. To allow the students to even taste would place the faculty and administrators at grave risk. The law states "serving alcohol to a minor" is a felony. Some students must take a fifth year to reach age 21 before they can taste as well as smell. The current California legislative session is considering a change that would allow underage students to sniff, sip and spit.

## AFFLUENZA? IN TEXAS, THE RICH REALLY ARE DIFFERENT FROM THE REST OF US.

Ethan Couch, 17, was convicted of DUI manslaughter last year after killing four people. At sentencing a counselor stated that Ethan was a victim of "affluenza." This condition occurs in children of wealthy families who hopelessly feel "entitlement" and lack responsibility for their actions. Sentenced to rehabilitation at a hospital in Vernon, Texas, Ethan's parents were informed that they would be billed for only 6% of the \$21,000 monthly cost of his "affluenza" therapy. The balance will be paid by Texas taxpayers.

## MAN DIES, SUV ROLLS ON.

In New York City a 58 year-old-man was killed by his own SUV. He double-parked, then reached across to open the passenger door, but forgot his car was still in reverse. When it began to roll backward he tried to put on the brake, but instead hit the gas pedal. The SUV lurched backward, he was ejected and pinned against a van parked alongside. He had a heart attack and died while his vehicle rolled across Madison Avenue and 49th Street.

## ADDENDA

- The CDC blamed booze for 1 in 10 deaths (88,000) between 2006 and 2010. 70% were working adults ages 20 to 64.
- Elizabeth Taylor had a record 65 costume changes in one film for her role as Cleopatra in 1963.
- Startling new evidence reveals the Girl from Ipanema was actually short, pale, old and homely, perhaps influenced by the futbol team.
- You never see a serial killer with a light-up bow tie.
- In my house I'm the boss; my wife is just the decision-maker.
- If your parents never had children chances are you won't either.

## ALOHA AND KEEP THE FAITH *rts*

*(Editorial comment is strictly that of the writer.)*

## Guidelines for Publication of HJM&PH Supplements

The following are general guidelines for publication of supplements:

1. Organizations, university divisions, and other research units considering publication of a sponsored supplement should consult with the editorial staff of HJMPH to make certain the educational objectives and value of the supplement are optimized during the planning process. It is important that the sponsoring editor is aware of all steps to its publication. Please contact Drs. Kalani Brady or Michael Meagher for further information.

2. Supplements must have educational value, be useful to HJMPH readership, and contain data not previously published to be considered for publication.

3. Supplements must have a sponsoring editor who will be involved in every step of the development, editing, and marketing of the publication since HJMPH staff will only be reviewing final proofs.

4. Supplements should treat broad topics in an impartial, unbiased manner. Please prefer specific classes of drugs, rather than products, unless there are compelling reasons or unique properties of the drug (product) that justifies its treatment.

5. The authors are solely responsible for the content of their manuscripts and the opinions expressed. They are also responsible for the replicability, precision, and integrity of the data and may be asked to sign a statement to that effect prior to publication. All authors are required to disclose any primary financial relationship with a company that has a direct fiscal or financial interest in the subject matter of products discussed in submitted manuscripts, or with a company that produces a competing product. The sponsoring editor must ensure that each article submitted incorporates a disclosure statement from the authors within the body of the text. For more information, please refer to the Disclosure Statement within "Instructions to Authors" on the journal website.

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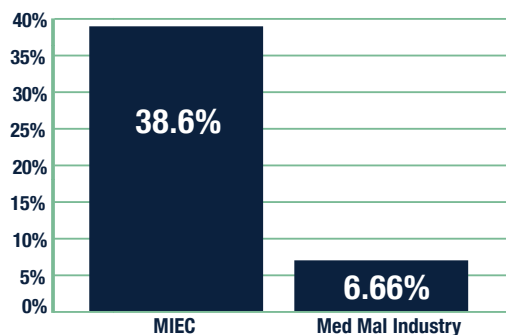
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