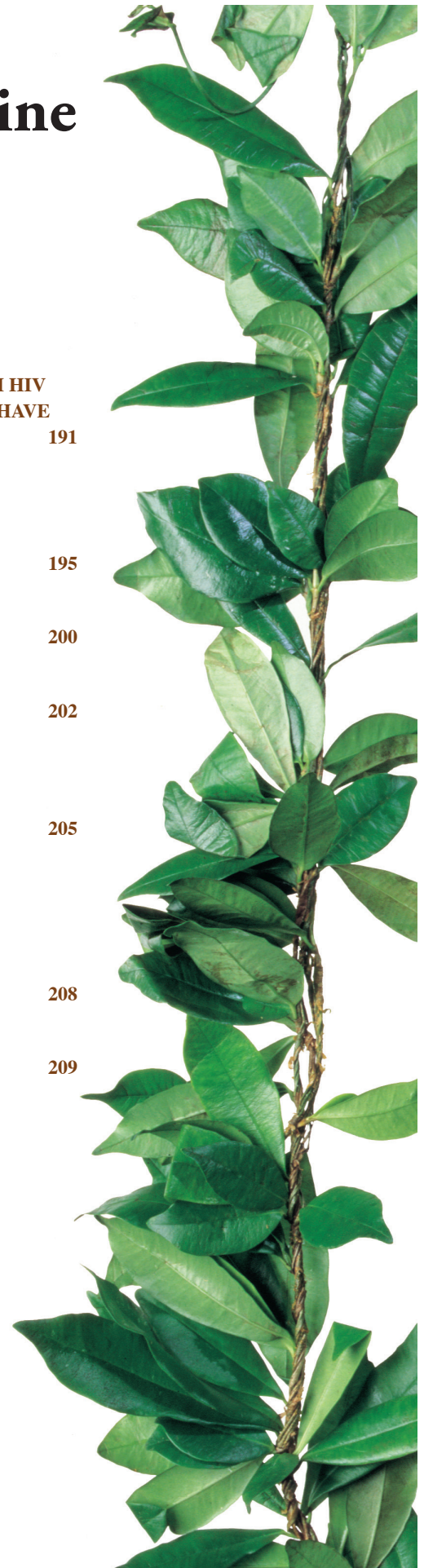


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Prevalence of Risk and Protective Factors Associated with HIV and HCV Infections Among Male High School Students Who Have Sex with Males—Hawai‘i, 2013, 2015, and 2017

Joshua R. Holmes MPH; Heather B. Clayton PhD, MPH; Thaddeus Pham; Alice K. Asher PhD, RN; and Ranjani R. Starr PhD, MPH

Abstract

Human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infections are increasing among young adults, and males who have sex with males (MSM) are at high risk for both infections. Limited Hawai‘i data exists on the extent to which populations, such as MSM, are engaging in behaviors that place them at increased risk for either infection. This analysis quantified the proportion of Hawai‘i public high school students who are MSM and are at risk for HCV and HIV infections. Data from the 2013, 2015, and 2017 Hawai‘i Youth Risk Behavior Surveys (YRBS) were combined (n=16,751) to investigate the prevalence of risk factors associated with HIV and HCV infections (eg, sexual risk behaviors, substance use) and protective factors among MSM public high school students. Among sexually experienced male students (n=3,391), 13.1% were classified as MSM and among these, 40.3% identified as heterosexual despite reporting same-sex sexual contact. Multivariate modeling demonstrated that MSM students are significantly more likely than non-MSM students to engage in behaviors that increase their risk for HIV and HCV infections (composite risk variable; adjusted Prevalence Ratio: 1.40, 95% CI 1.15 – 1.70) and are significantly less likely to have protective factors. Evidence-based prevention strategies for reducing HIV and HCV risk behaviors while improving protective factors among sexual minority youth in Hawai‘i are necessary and must address sexual behavior along with other dimensions of sexual orientation.

Keywords

HIV/AIDS; Hawai‘i; YRBS; Hepatitis C virus; MSM

Abbreviations and Acronyms

HCV: Hepatitis C Virus

HIV: Human Immunodeficiency Virus

MSM: Males who have sex with males

YRBS: Youth Risk Behavior Survey

Introduction

Hepatitis C virus (HCV) infection is increasing among young adults (<30 years) in the United States due to rising injection drug use linked to the opioid epidemic.¹ Young males who have sex with males (MSM) are at a heightened risk for Human immunodeficiency virus (HIV) infection,² and concomitant HCV co-infection.³ Sexual transmission of HCV, even without self-reported exchange of blood between partners during sex, has been noted among MSM co-infected with HIV.⁴ Substance use is associated with HCV and HIV transmission, and sexual minority high school students have a greater prevalence of self-reported substance use behaviors compared to their heterosexual peers.⁵

Between 2011 and 2013 in Hawai‘i, acute HCV diagnoses for young adults under 30 years who inject drugs more than doubled,⁶ and nearly half of new HIV diagnoses between 2010–2015 were among males under 34 years.⁷ This study examines data from

the Hawai‘i Youth Risk Behavior Survey (YRBS) to understand the extent to which young MSM in Hawai‘i engage in behaviors that increase their risk for HCV and HIV infections. This is the first analysis of its kind to look exclusively at male students in Hawai‘i and will provide insight into the demographic profile of MSM students. This study will also compare this population’s reported prevalence of the risk behaviors associated with HIV and HCV infections to that of non-MSM students. Understanding the risk and protective factors of young MSM may inform targeted interventions to decrease risk in this population.

Methods

Youth Risk Behavior Survey

The Hawai‘i YRBS is a biennial cross-sectional school-based survey of 9th–12th grade students who attend public schools. In Hawai‘i, YRBS uses a two-stage cluster sample design to generate representative data on the prevalence of risk behaviors and protective factors among students. In 2015, survey administration in Hawai‘i changed from an active (opt-in) to a passive (opt-out) consent process for students. This analysis combined data from the 2013, 2015, and 2017 Hawai‘i surveys, with overall response rates ranging from 60.0% to 78.0%. Detailed methodology of the YRBS has previously been published.⁸

Statistical Analyses

In this analysis, students were considered to be MSM based on their answers to two questions – one assessing the student’s sex, and the other assessing the sex of the student’s sexual contacts. Students who identified as male and reported sexual contact with only males or both females and males were classified as MSM. Male students who reported sexual contact exclusively with females were classified as males who have sex with only females (ie, non-MSM). The Hawai‘i YRBS questionnaire measures several behaviors associated with increased risk for HCV and HIV infections and some protective factors that may reduce risk.^{1,4,6} These risk factors include drinking alcohol or using drugs before last sexual intercourse among currently sexually active students (those who had sexual intercourse during the three months before the survey); not using a condom during last sexual intercourse among currently sexually active students; currently using alcohol, cigarettes, or marijuana (on at least 1 day during the 30 days before the survey); ever injecting any illegal drug; ever using other illicit drugs (includes methamphetamine, cocaine, ecstasy, heroin, or hallucinogenic drugs); ever using

prescription pain medicine without a doctor's prescription or differently than prescribed (2017 YRBS only); and seriously considering suicide during the 12 months before the survey. The protective factors include having an adult outside of school they could talk to about important things; and having an adult in their school they could talk to about a problem. A composite variable limited to currently sexually active students was created by combining responses to the questions on condom use and ever injection of any illegal drug (ie, HCV/HIV composite risk). Students were considered to be at risk if they had not used a condom during their last sexual intercourse or ever injected any illegal drugs, while students were considered not at risk if they had used a condom during last sexual intercourse and had never injected any illegal drugs.

The three survey cycles included a total of 16,751 high school students. Analyses were restricted to male students with prior sexual contact, resulting in a final analytic sample of 3,391 students. Bivariate analyses compared demographic characteristics (eg, race/ethnicity, sexual identity, and grade) of the sample by MSM status, with significant differences determined by the chi-square test. Students were classified into race/ethnic categories based on criteria established by Hawai'i.⁹

Weighted prevalence estimates and 95% confidence intervals (CI) of risk behaviors and protective factors were calculated by MSM status. Adjusted prevalence ratios (aPR) and corresponding 95% CIs were calculated in separate logistic regression models for each of the risk and protective factors, with the MSM classification (Yes vs No) serving as the independent variable. Model covariates included race/ethnicity and grade. All statistical analyses were conducted using SAS-callable SUDAAN 11.0.1 (RTI International, Research Triangle Park, North Carolina). *P*-values <.05 were considered statistically significant. The Hawai'i State Departments of Health and Education approved this study. Additionally, it received an exempt status from the Hawai'i State Department of Health Institutional Review Board.

Results

Among male students in Hawai'i who reported previous sexual contact, 13.1% were classified as MSM. MSM students were similar to non-MSM in race/ethnicity and grade distribution (Table 1). Of note, 40.3% of MSM students reported their sexual identity as heterosexual.

Table 1. Demographic Characteristics among Male High School Students by MSM ^a Status — Hawai'i, Youth Risk Behavior Surveys, 2013, 2015, and 2017					
Population	MSM ^a high school students		Non-MSM ^b high school students		P-value
	No (%)	CI ^c	No (%)	CI ^c	
Total	464 (13.1%)	(11.5,14.9)	2,927 (86.9%)	(85.1,88.5)	
Grade	% ^d		% ^d		
9th	18.1%	(13.0,24.6)	18.9%	(15.8,22.3)	P = .9442
10th	22.6%	(17.2,29.2)	24.0%	(20.0,28.5)	
11th	27.4%	(19.5,37.0)	26.3%	(22.3,30.7)	
12th	31.9%	(24.7,40.1)	30.8%	(27.1,34.8)	
Race/Ethnicity					
White ^e	12.5%	(8.4,18.0)	16.2%	(13.0,20.0)	P = .0833
Asian ^f	37.4%	(30.0,45.4)	32.8%	(29.4,36.4)	
Native Hawaiian and other Pacific Islander ^g	27.2%	(22.1,33.0)	31.5%	(27.8,35.6)	
Other ^h	22.9%	(18.4,28.2)	19.4%	(18.1,20.9)	
Sexual Identity					
Heterosexual (straight)	40.3%	(33.3,47.7)	95.1%	(93.9,96.0)	P < .0001
Gay or lesbian	20.6%	(16.2,25.9)	1.3%	(0.9,2.0)	
Bisexual	29.1%	(21.7,37.8)	2.1%	(1.4,3.1)	
Not Sure	10.0%	(6.3,15.6)	1.6%	(1.1,2.3)	

^aMale high school students who had sexual contact with males or with both males and females.

^bMale high school students who had sexual contact with only females.

^c95% confidence intervals.

^dDue to rounding, column totals might not round up to 100%.

^eNon-Hispanic White.

^fAsian consists of non-Hispanic Filipino, non-Hispanic Japanese, and non-Hispanic Other Asian.

^gNative Hawaiian and Other Pacific Islander consists of non-Hispanic Native Hawaiian/Part Native Hawaiian, and non-Hispanic Other Pacific Islander.

^hOther consists of non-Hispanic American Indian/Alaska Native, non-Hispanic Black, Hispanic/Latino, and Multiple non-Hispanic.

Table 2. Unadjusted Weighted Prevalence Estimates and Adjusted Prevalence Ratios for Risk Factors Associated with Human Immunodeficiency Virus (HIV) and Hepatitis C Virus (HCV) Infections among Male High School Students by MSM Status^a — Hawai'i, Youth Risk Behavior Surveys, 2013, 2015, and 2017

Behavior	MSM ^a high school students		Non-MSM ^b high school students		Adjusted ^c Prevalence Ratios	CI
	%	CI ^d	%	CI		
Drank alcohol or used drugs before last sexual intercourse ^e	42 (28.4%)	(18.4,41.1)	287 (24.4%)	(20.2,29.1)	1.20	(0.74,1.94)
Did not use a condom during last sexual intercourse ^e	71 (58.9%)	(44.3,72.1)	515 (47.2%)	(42.3,52.2)	1.28	(1.00,1.64)
Currently drank alcohol ^f	215 (52.8%)	(43.2,62.2)	1075 (40.7%)	(37.7,43.7)	1.24	(1.02,1.50)
Currently smoked cigarettes ^g	127 (26.9%)	(21.6,33.0)	469 (16.3%)	(14.2,18.5)	1.61	(1.20,2.16)
Currently used marijuana ^h	185 (38.6%)	(30.1,47.9)	1027 (34.1%)	(31.7,36.7)	1.10	(0.88,1.38)
Ever used prescription pain medicine ⁱ	76 (40.0%)	(31.5,49.1)	181 (18.4%)	(13.9,24.0)	2.23	(1.54, 3.23)
Ever injected any illegal drug ^j	86 (19.5%)	(13.9,26.7)	117 (3.5%)	(2.7,4.5)	4.77	(2.98,7.65)
Ever used other illicit drugs ^k	203 (42.8%)	(34.7,51.2)	590 (20.2%)	(17.8,22.9)	1.99	(1.64,2.42)
Seriously considered attempting suicide ^l	126 (28.2%)	(22.0,35.4)	389 (14.2%)	(12.3,16.3)	2.00	(1.58,2.52)
Hepatitis C virus (HCV)/Human Immunodeficiency Virus (HIV) risk composite ^m	86 (68.2%)	(55.5,78.7)	533 (49.3%)	(44.7,53.9)	1.40	(1.15,1.70)
Had an adult outside of school they could talk to about important things	225 (58.7%)	(50.9,66.1)	1915 (73.6%)	(71.0,76.0)	0.80	(0.69,0.92)
Had an adult in their school they could talk to about a problem	205 (53.2%)	(46.1,60.1)	1677 (66%)	(62.7,69.2)	0.80	(0.69,0.92)

^aMale high school students who had sexual contact with males or with both males and females.

^bMale high school students who had sexual contact with only females.

^cAdjusted by grade (ie, 9th, 10th, 11th, or 12th) and race/ethnicity.

^d95% confidence interval.

^eAmong students who had sexual intercourse during the three months before the survey.

^fAt least one drink of alcohol on at least 1 day during the 30 days before the survey.

^gOn at least one day during the 30 days before the survey.

^hOne or more times during the 30 days before the survey.

ⁱSuch as codeine, Vicodin, OxyContin, Hydrocodone, and Percocet without a doctor's prescription or differently than prescribed one or more times during their life. 2017 YRBS only.

^jUsed a needle to inject any illegal drug into their body one or more times during their life.

^kMethamphetamine, cocaine, ecstasy, heroin, or hallucinogenic drugs use one or more times during their life.

^lDuring the 12 months before the survey.

^mUsed a needle to inject any illegal drug into their body one or more times during their life and/or did not use a condom during last sexual intercourse, among students who had sexual intercourse during the three months before the survey.

Compared to non-MSM students, MSM students had a significantly higher prevalence of engaging in several risk behaviors for HCV/HIV infections: current alcohol use (aPR=1.24, 95% CI: 1.02-1.50); current cigarette smoking (1.61, 1.20-2.16); ever injecting any illegal drug (4.77, 2.98-7.65); ever using other illicit drugs (1.99, 1.64-2.42); and seriously considering suicide (2.00, 1.58-2.52) (Table 2). The HCV/HIV composite risk variable was significantly higher among MSM students compared to non-MSM students (1.40, 1.15-1.70). Although limited to the 2017 YRBS, ever misuse of prescription pain medicine was also significantly higher among MSM students compared to non-MSM students (2.23, 1.54-3.23). In terms of protective factors, MSM students were significantly less likely than non-MSM students to have an adult outside of school they could talk to about important things (0.80, 0.69-0.92) and to have an adult in their school they could talk to about a problem (0.80, 0.69-0.92).

Discussion

More than 40% of the MSM students surveyed identified as heterosexual, which emphasizes the need to target other dimensions of sexual orientation, such as sexual behavior and attraction, to successfully identify all students at elevated risk for HCV and HIV infections. Compared to non-MSM students, more MSM students engaged in behaviors that increased their risk for HCV and HIV infections. Of concern, one in five (19.5%) MSM students in Hawai'i reported injecting any illegal drug at least once, nearly six times the prevalence of their non-MSM peers. MSM students also reported higher misuse of prescription pain medicine (40.0%), which may increase their likelihood of future injection drug use.¹⁰ Moreover, MSM students reported higher rates of suicidal ideation and substance use, and lower rates of important protective factors, such as having an adult they could talk to inside or outside of school, than non-MSM students. Additionally, although minority stress experiences

such as discrimination and prejudice were not explored in this analysis, they have been associated with substance use, suicide ideation, and a lack of protective factors in sexual minority youth.¹¹ Much work is needed to address the risks experienced by this group of adolescents and improve the resources available to provide a protective safety net for this population.

Limitations

There are some limitations to this analysis. The YRBS is administered only to youth who attend school, thus is not representative of all persons in this age group. In 2012, Hawai'i had a 4.7% dropout rate in public high schools, which may bias our results.¹² Furthermore, this data is only representative of public high school students, and a significant proportion (15.6%) of students in Hawai'i attended private schools in 2013.^{13,14} Because no definition was provided for sexual contact, it is likely that students considered a range of sexual activities when responding to the sex of sexual contact question,⁵ and students' infection risk will differ depending on the type of sexual contact they experience.¹⁵ Lastly, data are based on self-report, and although YRBS questions have demonstrated good test-retest reliability,⁸ the extent to which behaviors were over- or under- reported is not known.

Conclusions

This study demonstrates that MSM public high school students in Hawai'i are at increased risk for risk behaviors associated with new HIV and HCV infections. Interventions are needed to directly address substance use, suicide ideation, inadequate social supports, and sexual risk behaviors in this population. However, key opportunities and vulnerable populations may be missed if screenings and interventions only target youth by sexual identity, due to substantial discordance between sexual identity and sex of sexual contacts. The expansion of preventive health and harm reduction services to all youth may benefit this population.

Conflict of Interest

None of the authors identify any conflict of interest.

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Rising Incidence of Colorectal Cancer in Patients Younger than Age 50 in Hawai'i

Ankur Jain MD, FACG and Shilpa Jain MD, FACG

Abstract

Colorectal cancer is the third most common cancer in the United States in both men and women, and the second leading cause of cancer-related deaths. Whereas the overall incidence of colon and rectal cancer has been decreasing over the past two decades, due in large part to improved colorectal screening and surveillance of patients who are at risk, incidence rates of colorectal cancer in young adults ages 20 to 50 have actually been increasing. Recently, the American Cancer Society updated their guidelines with recommendations that everyone, not just African Americans or those with a strong family history of colon cancer, should begin colorectal screening at age 45 rather than age 50. However, the United States Multi-Society Task Force on Colorectal Cancer, which is comprised of the American College of Gastroenterology, the American Gastroenterological Association, and the American Society for Gastrointestinal Endoscopy, felt that there is still insufficient evidence to support early screening in the absence of known risk factors. Previous authors have examined the epidemiology and natural history of early onset colorectal cancer but none of these studies are specific to the state of Hawai'i, which has a unique ethnic profile. The purpose of this article is to review the most recently reported incidence rate and demographics of early onset colorectal cancer in Hawai'i and to discuss our own experience with colon cancer in patients younger than age 50. If we can determine specific characteristics of young patients with early onset colorectal cancer in Hawai'i, we can better identify those patients who would benefit most from earlier screening.

Keywords

Early onset colorectal cancer, colorectal screening, American Cancer Society, United States Multi-Society Task Force on Colorectal Cancer

Abbreviations and Acronyms

ACS - American Cancer Society
BMI - body mass index
CDC - Centers for Disease Control and Prevention
CEA - carcinoembryonic antigen
CRC - colorectal cancer
EOCRC - early onset colorectal cancer
GI - gastrointestinal
IBD - inflammatory bowel disease
MSI - microsatellite instability
MSTF - United States Multi-Society Task Force on Colorectal Cancer
NIH - National Institutes of Health
NPCR - National Program of Cancer Registries
SEER - Surveillance, Epidemiology, and End Results Program
US - United States

Introduction

Colorectal cancer is the third most common cancer in both men and women, and the second leading cause of cancer-related deaths.¹ The Centers for Disease Control and Prevention (CDC) reports that in 2015, the incidence rate for the state of Hawai'i was 41.3 per 100,000 people, slightly higher than that of the entire United States (US), which was 38. The mortality rates for Hawai'i and the US were 10.5 and 14 respectively.¹ Colorectal

cancer incidence in Hawai'i is highest for Japanese males and females, but the majority of late stage colorectal cancers are diagnosed in Native Hawaiian and other Pacific Islanders, who also have the highest mortality from this disease.²

The United States Multi-Society Task Force on Colorectal Cancer (MSTF) recommends colorectal screening for all average risk individuals after the age of 50.³ Patients at increased risk before age 50 include African Americans, individuals with first-degree relatives diagnosed with colorectal cancer or advanced adenoma before the age of 60, patients with polyposis syndromes such as Lynch Syndrome, and those with a long history of inflammatory bowel disease.³ These patients are advised by the MSTF to undergo screening at an earlier age.³ Modifiable risk factors for the development of colorectal cancer include smoking, alcohol, obesity, and a diet low in fiber, and high in red meats, processed meats, and greasy foods.³

Screening can be done with fecal immunochemical or DNA testing, flexible sigmoidoscopy, as well as virtual/CT colonography, but the gold standard is colonoscopy. Colonoscopy is the only method available to identify and remove pre-cancerous polyps throughout the colon. The Affordable Care Act requires both private insurers and Medicare to cover the costs of all colorectal screening tests recommended by the United States Preventive Services Task Force. Despite this, the colorectal cancer screening rate in 2016 for patients 50 years of age and older in the state of Hawai'i was only 71.9% according to the American Cancer Society (ACS), which is a little above the national average of 68.9%.⁴ The goal of the National Colorectal Cancer Roundtable remains a rate of 80% by the end of 2018, which would prevent 277,000 new cases of colorectal cancer by 2030.⁵

Whereas the overall incidence of colon and rectal cancer in the United States has been decreasing by 1% each year over the past decade, due in large part to improved colorectal screening and surveillance of patients at risk, studies have shown that incidence of colorectal cancer has actually been increasing in young adults age 20 to 50.⁶ This increase of early onset colorectal cancer (EOCRC) is largely of tumors in the distal colon and rectum.⁷

Recently, the ACS updated their guidelines with recommendations that colorectal screening for everyone, not just those at increased risk for colon cancer, should begin at age 45 rather than age 50. They based their recommendation on a decision-analysis which demonstrated an increase in life-years gained when beginning screening at an earlier age.⁸ Most Gastrointestinal (GI) societies including the American College of Gastroenterology, the American Gastroenterological Associa-

tion, and the American Society for Gastrointestinal Endoscopy, have not changed their recommendations however, citing insufficient evidence to support early screening in the absence of family history or other risk factors such as Lynch syndrome.⁹ Furthermore, health insurance companies have yet to approve of early screening for average risk individuals.

We have encountered several cases of EOCRC in our own practice in Honolulu, Hawai'i over the past 5 years. We will review here the previously reported incidence rate and demographics of colorectal cancer in patients younger than age 50 in Hawai'i. We will also present a case series of our patients with EOCRC, examining their demographics, family history and other potential risk factors, clinical presentation, and clinical course, and comparing our current findings with those of prior studies on EOCRC.

Results

Incidence rate of EOCRC in Hawai'i

Data from the National Cancer Institute and the CDC indicates that across all of Hawai'i, as with the rest of the US, the incidence rate of colorectal cancer in patients younger than age 50 went up from 2011 to 2015, though the overall rate still remains low (Table 1). There were 9.1 cases per 100,000 people in 2015 compared with 6.4 in 2011.¹⁰ More recent data from the Hawai'i Department of Health is not yet available.

Demographics of EOCRC in Hawai'i

Between 2009 and 2013, Filipino and Japanese patients had the highest incidence rates of colon cancer before the age of 50, at

10.6 and 10.5 per 100,000 people respectively, according to data from the Hawai'i Tumor Registry of the University of Hawai'i Cancer Center (Table 2). These incidence rates correlate in part with the overall ethnic makeup of Hawai'i. The US Census Bureau reports that between 2009 and 2013, Filipinos and Japanese made up two of the largest racial groups in Hawai'i.¹¹ Males had a higher incidence of colon cancer than females. Data from 2013 to 2015 is still being updated to the Registry.

Case Series

Between 2013 and 2018, we diagnosed nine patients under the age of 50 with colon cancer (Table 3). The median age of our patients was 41, with a range between 27 and 47. Filipinos made up the largest ethnic group. Approximately half were males.

One patient reported a family history of colon cancer and another patient was diagnosed with Lynch syndrome after microsatellite instability (MSI) testing was done on her tumor. Two patients were active smokers. Only one patient had a body mass index (BMI) greater than 40 on presentation and none of the patients were diabetic.

The majority of our patients presented with rectal bleeding and were found to have obstructing tumors of the sigmoid colon or rectum. Only two patients had tumors proximal to the splenic flexure and both presented with iron deficiency anemia. Seven of the nine patients already had stage III or IV colorectal cancer on presentation. Interestingly, carcinoembryonic (CEA) levels were elevated at baseline in only four patients, two of whom were smokers.

Geography	Average Annual Count	Age-Adjusted Incidence Rate per 100,000 (95% Confidence Interval)	Recent 5-Year Trend in Incidence Rates (95% Confidence Interval)	Recent Trend
Hawai'i	78	9.1 (8.2, 10.0)	+ 2.7 (1.6, 3.7)	Rising ↑
US (NPCR + SEER)	14,970	7.6 (7.5, 7.6)	+ 3.7 (2.0, 5.5)	Rising ↑

Source: CDC's National Program of Cancer Registries (NPCR) November 2017 data submission, National Institutes of Health (NIH)'s Surveillance, Epidemiology, and End Results Program (SEER) November 2017 data submission, State Cancer Registries.

Age	Sex	Race	Total Population from 2009-2013	Total New Cases from 2009-2013	Age-Adjusted Incidence Rate per 100,000 (95% Confidence Interval)
<50	Male and Female	All Races	4,503,859	375	8.7 (7.8, 9.6)
		Chinese	278,321	15	5.1 (2.8, 8.4)
		Filipino	806,705	86	10.6 (8.5, 13.1)
		Hawaiian	1,167,932	70	8.2 (6.3, 10.3)
		Japanese	495,125	67	10.5 (8.1, 13.5)
		White	901,432	78	7.8 (6.2, 9.8)
		Other Races	854,344	50	6.9 (5.1, 9.1)
	Male	All Races	2,333,045	215	9.8 (8.6, 11.2)
	Female	All Races	2,170,814	160	7.5 (6.3, 8.7)

Source: Hawai'i Tumor Registry, University of Hawai'i Cancer Center

Table 3. Patients Younger than Age 50 Diagnosed with Colorectal Cancer in our Gastroenterology Clinic in Honolulu, Hawai'i from 2013-2018

Age	Family history of colon cancer?	BMI		Location of tumor	Baseline CEA level (Normal up to 4.7)	Type of surgery	Last known outcome
Race	Lynch Syndrome present?	Smoker?	Presentation	Stage of tumor on presentation		Chemotherapy received?	
Sex		Diabetic?					
47	No	24	Right lower quadrant pain, Rectal bleeding, Abnormal imaging	Rectum (obstructing)	50.8 H	Low anterior resection	Diagnosed in 2014 Expired 2015
Filipino	No	No		IV		Yes	
Male		No					
42	No	21	Left lower quadrant pain, Diarrhea, Rectal bleeding	Sigmoid colon (obstructing)	1.7	Sigmoid colectomy	Diagnosed in 2015 Currently doing well
Filipina	No	No		IIIB (pT3, N1a, M0)		Yes	
Female		No					
41	No	41	Iron deficiency anemia, No symptoms	Transverse colon (obstructing)	0.9	Right hemicolectomy	Diagnosed in 2015 Current status unknown
Latino	No	No		IV		Yes	
Male		No					
47	No	24	Abdominal pain, Change in bowel habits, Rectal bleeding, Weight loss	Rectum (obstructing)	15.5 H	Low anterior resection	Diagnosed in 2015 Currently doing well
Japanese	No	Yes		IIIB (pT3, N1a, M0)		Yes	
Male		No					
41	No	21	Epigastric pain, Iron deficiency anemia	Ascending colon	<3	Right hemicolectomy	Diagnosed in 2015 Currently doing well
Caucasian	Yes	No		IIIB (pT3, N1a, M0)		Yes	
Female		No					
41	No	20	Rectal bleeding	Rectum	<3	Local (wide) excision	Diagnosed in 2016 Currently doing well
Chinese	No	No		I (pT1, N0, M0)		No	
Female		No					
39	Yes (mother age 48)	28	Abdominal pain, Bloating, Rectal bleeding	Sigmoid colon	3.5 H	Sigmoid colectomy	Diagnosed in 2016 Currently doing well
Filipino	No	Yes		I (pT1, N0, M0)		No	
Male		No					
37	No	27	Left lower quadrant pain, Change in bowel habits	Sigmoid colon (obstructing)	166.4 H	Low anterior resection	Diagnosed in 2018 Currently doing well
Filipina	No	No		IV		Yes	
Female		No					
27	No	26	Constipation, Rectal bleeding	Sigmoid colon (obstructing)	1.0	Low anterior resection Pending	Diagnosed in 2018 Currently doing well
Japanese	No	No		IIIC-IV (pT3, N2b, Mx)			
Female		No					

DEFINITIONS

Presentation: Iron deficiency anemia - low iron and blood counts

Colon Cancer Staging Systems			
SEER summary stage	Description	AJCC Stage	TNM stage
Localized	Invasive tumor is confined to colon, including tumors extending through muscularis propria and subserosal tissue, but not serosal surface.	I and IIA	T1-3,N0,M0
Regional	Tumor extends outside colon and/or invades regional lymph nodes, including local tumors extending into serosal surface, pericolic, or mesenteric fat.	IIB IIIA-C	T4,N0,M0 Any T,N1-2,M0
Distant	Tumor has spread to distant organs or lymph nodes.	IV	Any T,Any N,M1

SEER = Surveillance, Epidemiology, and End Results Program. **AJCC** = American Joint Committee on Cancer. **TNM** – Tumor (T) extent, Nodes (N) present, Metastasis (M) present
Types of surgery: Local excision - removal of tumor without cutting through abdominal wall; Low anterior resection - removal of rectum; Sigmoid colectomy - removal of sigmoid colon; Right hemicolectomy - removal of cecum, ascending colon, and part of transverse colon.

All of the patients received segmental resection, and patients with stage III or IV disease also received postoperative adjuvant chemotherapy. One patient with stage IV transverse colon cancer moved to the mainland and his current status is unknown. To our knowledge, at the time of this publication, all of the remaining patients are currently doing well up to four years after their initial diagnosis except for one patient with stage IV disease who unfortunately expired soon after being placed on hospice.

Discussion

Demographics

The median age of our patients was 41 on presentation, which correlates with the median age range of 42–44 noted on previous studies on EOCRC.¹² The majority of our patients were Filipino. EOCRC appears to be more prevalent in Black and Hispanic patients across the US, while in Hawai'i, Filipino and Japanese patients have the highest incidence of colon cancer before the age of 50.^{2,13–14} In Hawai'i, the overall incidence rate of EOCRC is higher in males than females, 9.8 versus 7.5, and 11% of all new cases of colorectal cancer in men and 10% in females occur in patients younger than age 50.²⁴ In our series, there were approximately equal numbers of males and females, though this was a very small sample size.

Family History and Genetics

One of our patients reported a family history of colon cancer and one patient with a proximal tumor was diagnosed with Lynch Syndrome. One expert pointed out that the majority of EOCRC, up to 75% of patients, are in fact sporadic with no known family history while Lynch syndrome accounts for 17%.^{15–16} Studies suggest that for a subset of EOCRC, there may be a distinct molecular signature very different from late onset colorectal cancer. This includes progression through the microsatellite and chromosomal stable (MACS) pathway as well as LINE-1 hypomethylation, which appears to be correlated with chromosomal instability and poor prognosis.^{12,17–18} In one study however, no change in tumor gene expression was noted among 22,052 patients across various ages upon interpretation of their Oncotype DX.¹⁹ The underlying genetics is still being evaluated.

Other Risk Factors

Environmental factors thought to be contributing to EOCRC in patients without a family history include increased prevalence of excess body weight, as well as changes in lifestyle patterns including unhealthy dietary patterns and a sedentary lifestyle.⁶ Diabetes appear to be another risk factor. In fact, large increases in the incidence rates of obesity and diabetes in young adults during the past three decades parallel the increasing incidence of colorectal cancer (CRC) in this age group.²⁰ Only one of our patients had a BMI greater than 40 and none were diabetic however, suggesting that there are likely also other factors in play. An increase in the consumption of sugar sweetened beverages and a decrease in the consumption of milk, which contains CRC-protective calcium, also parallels increases in CRC incidence rate.²⁰ Current research is exploring other po-

tential associations with CRC including variations in the gut microbiome, exposure to environmental toxins, and changing patterns in the use of statins and antibiotics during the past several decades.⁶

Clinical Presentation

Almost all of our patients had either sigmoid or rectal tumors. Nonhereditary early-onset cancers largely comprise tumors on the left side of the colon and rectum whereas Lynch syndrome is predominantly characterized by tumors on the right side of the colon.^{15,21} In one study, 83% of tumors in patients younger than age 50 were in the left colon.²² The authors suggested screening of the left colon by flexible sigmoidoscopy beginning at age 40, however this strategy would have missed proximal tumors in two of our patients.

Compared with older patients with colon cancer, younger patients tend to present with more advanced disease. These patients are more likely to have lymphovascular invasion, T3/T4 tumors, and LN positive disease at diagnosis.²³ CEA levels, however, are relatively normal.²⁴ These results correlate with our own patients, the majority of which had stage III or IV disease on presentation but normal CEA levels. It is still unclear whether these patients present at a later stage because their disease is more aggressive or because their symptoms are dismissed until they develop advanced disease and they are then diagnosed at a later stage. In one study, patients with young-onset CRC had a significantly longer median time to diagnosis, up to 1.4 times longer than for older patients, with longer symptom duration and longer time of evaluation.²⁵

Clinical Course

All of our patients underwent segmental resection rather than extended colonic resection (subtotal, total, or proctocolectomy). According to the National Comprehensive Cancer Network (NCCN), extensive colectomy should be considered in patients with colon cancer younger than 50 due to the risk of metachronous lesions, particularly in patients with inflammatory bowel disease (IBD) and polyposis syndromes. Studies have shown that extended colectomy for sporadic CRC in patients younger than 50 does not improve disease-free or overall survival however, and thus segmental resection appears to be sufficient. In a study examining resection extent in sporadic CRC patients, 3.3% of patients undergoing segmental resection developed metachronous CRC vs 0% undergoing extended resection, which was not statistically significant.²⁶

The majority of our stage III or IV patients have already received or are currently receiving chemotherapy and are doing well at the time of submission. Patients with advanced stage EOCRC tend to do better with chemotherapy than older patients, possibly due to a better ability to tolerate chemotherapy or because their disease is more responsive, and thus they have improved outcomes compared with older patients.²³ The 5-year survival rate for stage IV cancer in early onset versus late onset colon cancer was 18.1% versus 6.2% in one study, and 25.5% versus 14.8% in another study.¹⁸

Conclusion

There has been a definite rise in incidence of EOCRC in Hawai'i over the past decade and this trend will likely continue through to at least the next decade. Hawai'i is unique in the variety of its ethnic groups, and the demographics of EOCRC here is very different from the rest of the US. The majority of these patients have no family history of colon cancer or other high risk conditions, as evidenced in our own practice, and there may be a distinct molecular profile. Poor dietary habits and the increasing incidence of obesity in Hawai'i parallel the increase of EOCRC but other factors are also likely playing a role.

Previous data on EOCRC and our own experience in Hawai'i support previous findings that most patients with early onset colon cancer tend to have left-sided tumors and are symptomatic on presentation. They also often have advanced disease, requiring postoperative adjuvant chemotherapy after surgical resection, but tend to do better per stage than patients with late onset CRC.

Some experts have recommended colorectal screening of all patients as early as age 40 rather than age 50. Further long-term studies are needed to help identify potential risk factors and target specific populations in Hawai'i who will benefit most from earlier screening. Endoscopic evaluation must be considered even in the absence of family history or other risk factors for CRC for all young individuals with rectal bleeding or other worrisome features.

Conflict of Interest

None of the authors identify any conflict of interest.

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Fishhook Injury of the Anterior Chamber Angle of the Eye

Austin S. Nakatsuka MD; Hossein Nazari Khanamiri MD; and Kevin H. Merkley MD

Abstract

A 36-year-old man presented with a corneal penetrating fishhook injury with the tip embedded in the inferior anterior chamber angle of the eye. Complete removal was achieved with extension of the wound at the limbus using the “cut-out” technique. Intraocular fishhook injuries are common in fishing communities and effective surgical removal may involve modified techniques previously described for skin or mucosal tissue.

Introduction

Fishhook injuries of the eye are common occurrences in fishing communities like Hawai‘i.¹⁻⁹ In a retrospective study, 143 (19.5%) of 732 cases of sport-related ocular trauma were related to fishing.¹⁰ Fishhook removal from the eye presents a unique challenge due to the barbed tip of the hooks. Techniques of fishhook removal from the skin, eyelids, and periocular tissues should be modified for fishhook injuries involving the eye globe.¹¹⁻¹² Here, we describe the step-by-step surgical approach to remove a fishhook barb embedded in the anterior chamber angle of the eye.

Case Report

A 36-year-old man was fishing at night in Galveston, Texas, one hour prior to presentation and experienced acute onset of pain and vision loss after a projectile fishhook penetrated his right eye. The patient stated that the hook and line were stuck on a rock, leading him to pull on the line until the hook disengaged, recoiled back, and embedded itself in his eye. The patient was not wearing eye protection at the time. Best corrected visual acuity on presentation was 20/200. Ophthalmic examination

revealed a full-thickness corneal penetration at the limbus with a large fishhook (Figure 1). The tip and barb were embedded in the inferior anterior chamber angle of the eye. The patient was brought to the operating room where the fishhook was removed with the “cut-out” technique by extending the limbal wound with a small sideport blade followed by careful removal through the larger incision (Figure 2). The wound was closed

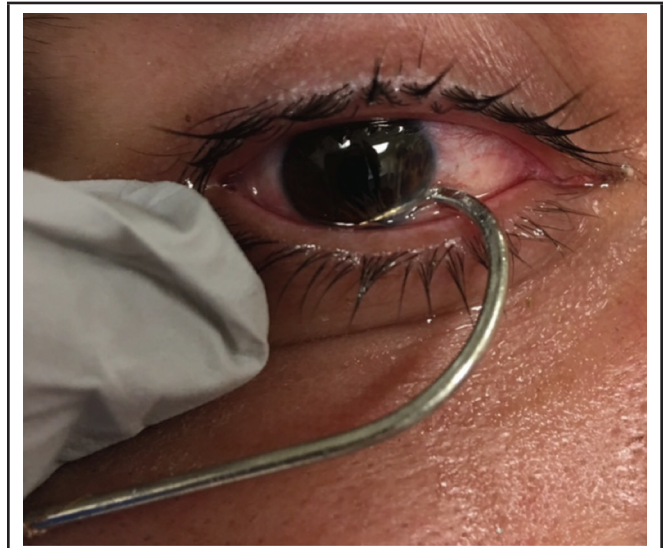


Figure 1. External Color Photograph: A large fishhook with full thickness corneal penetration at the nasal limbus embedded in the inferior chamber angle of the eye.

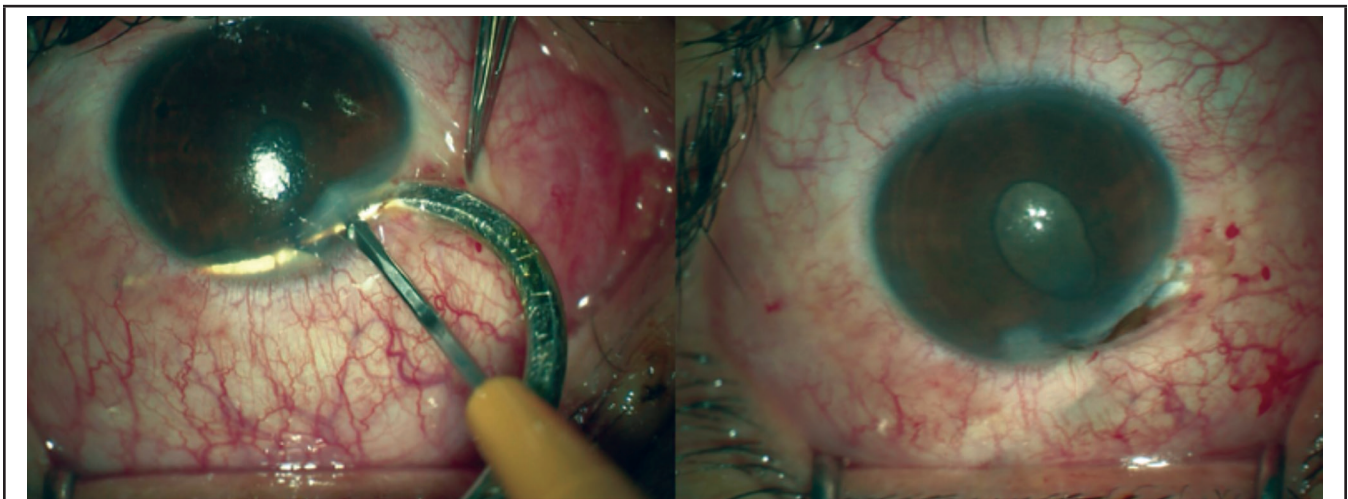


Figure 2. Magnified External Color Photograph of the “Cut-Out Technique”: Extension of the penetration site with a 1.0 mm blade facilitates complete removal.

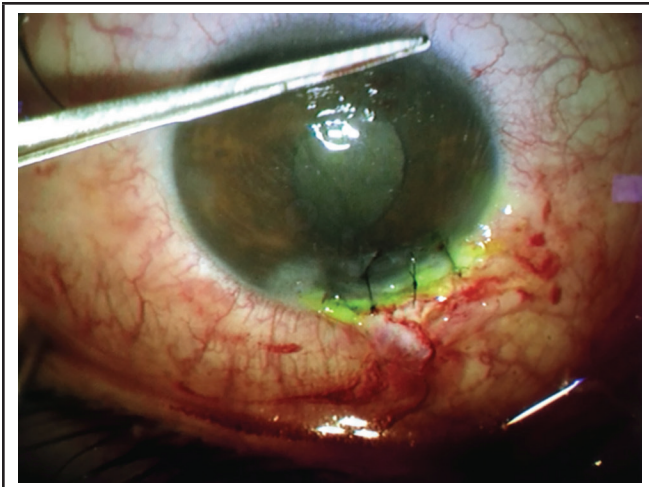


Figure 3. External Color Photograph: The incision is well sealed and the anterior chamber is formed after 3 interrupted 10-0 nylon corneal sutures are placed.

with interrupted 10-0 nylon sutures (Figure 3). The next day, best corrected visual acuity had improved to 20/100, the incision was well sealed, and the patient was safely discharged home. Unfortunately, the patient was lost to follow-up.

Discussion

Most fishhooks are composed of a barb which is used to “snag” and secure the oral tissue of a fish so that it can be retrieved without coming loose. This same barb can have the same effect on human tissue, providing a unique challenge when it comes to foreign body removal without significant damage to the surrounding tissue. Five techniques are described for removing a fishhook from skin and mucosal tissue.¹¹ We will summarize these five techniques and present the reasoning for the chosen technique in our patient.

The “advance and cut” approach involves advancing the tip of the fishhook through the tissue until both the tip and barb are externalized. The shaft of the hook is then cut and the fishhook is removed in two pieces.¹¹ In our patient, the tip and barb of the fishhook were embedded in the anterior chamber angle, so advancing the hook further would have only caused more damage to iris and angle structures.

The “back-out” approach involves carefully retracting the hook through the same entrance site.¹¹ The problem with this method is that the barb can catch or drag along the tissues before being removed, an option that may have posed significant damage to the angle structures in our patient.

The “snatch” technique is similar to “back out” technique but involves applying external pressure to the entrance site to enlarge the opening before pulling the hook out. We did not employ this technique to avoid further damage to the iris base and anterior chamber angle.

The “needle-cover” approach involves advancing a large-bore needle through the entrance site to cover up the barb before

retracting the hook through the original entry site.¹¹ This technique has the advantage of reducing damage caused by the barb during removal, as the needle neutralizes the barb’s sharp edge and should prevent it from dragging or catching on adjacent tissue. The “needle-cover” technique has been reported with success in penetrating injuries of the posterior segment.¹³ This may potentially have been an option in our patient if the barb was facing away from the angle and there was potential space to fit the needle over the barb. We decided that the barb was embedded deep in the angle and advancing another needle into the area would have only caused more damage to the surrounding tissues.

We decided to use the “cut-out” technique, which involves enlarging the entry site to allow space for the hook and barb to be safely removed while causing minimal collateral tissue damage. The hook was successfully removed and the incision was closed with standard anterior segment suturing techniques.

Fishhook injuries of the eye are not uncommon, and practitioners need to be equipped with the techniques to address unique challenges facing such intraocular foreign bodies. Late complications include corneal scar and endothelial cell loss, acute and delayed hyphema, peripheral anterior synechiae, recession of anterior chamber angle with subsequent glaucoma, cataract, and posterior segment trauma. General practitioners should be able to distinguish ocular fishhook injuries from periocular injuries in order to expedite appropriate consultation to avoid further ocular complications.

Conflict of Interest

None of the authors identify any conflict of interest.

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SOCIAL WORK IN ACTION

Community Demand, Academic Partnership, and the Birth of the Bachelor of Social Work Program Distance Education Option

Michael C. DeMattos MSW

Social Work in Action is a solicited column from the social work community in Hawai'i. It is edited by HJMPH Contributing Editor Sophia Kim PhD, of the Myron B. Thompson School of Social Work at the University of Hawai'i at Manoa.

The Bachelor of Social Work (BSW) program at the University of Hawai'i at Manoa (UHM) Myron B. Thompson School of Social Work (MBTSSW) extended its academic reach in Fall 2019 by offering a distance education (DE) option in addition to its campus-based option. The Master of Social Work (MSW) Program at the school has had an acclaimed DE option for over a decade. When conducting site visits, providing academic advising, or actively recruiting for graduate school, adding a distance option at the baccalaureate level was a common request. In the summer of 2018, students attending the MSW DE option new student orientation were asked if they would have pursued a BSW degree had the opportunity been available. The response was a near unanimous "yes". This response resonated with informal feedback we had been receiving over the years from administrators, instructors, and students from neighbor island four-year colleges and community colleges, as well as representatives from the social service sector from geographically distant regions of the state, including rural areas of O'ahu and the less populated neighbor islands of Kaua'i, Maui, Hawai'i Island, Lana'i and Moloka'i.

The MBTSSW initiated the new BSW DE option through a partnership with Outreach College (OC), which was designed to extend the resources of the state's flagship campus, the University of Hawai'i at Mānoa, to the community and world by presenting year-round, lifelong learning opportunities for both traditional and nontraditional students. This column articulates the process and birth of the BSW Program Distance Education option.

Benefits of Expanded Educational Options in Social Work

Pursuing higher education in social work satisfies multiple needs. First, it provides a legitimate professional endeavor with reasonable wages. While social workers are unlikely to strike it rich, those who earn their degree in social work are unlikely to experience unemployment. According to Bureau of Labor Statistics (BLS), the number of practicing social workers grew by 15.5% between 2004-2005 and 2014-2015. Healthcare social workers were the fastest growing group, with an increase of 45%.¹ Second, those earning a degree in social work can make

a near immediate impact in their community. People from small communities know best the unique strengths and concerns that permeate their particular community and are best suited to access those community strengths to address systemic problems.

Finally, earning a degree in social work, especially through a DE option, directly addresses concerns around *brain drain*. Community representatives from the neighbor islands have shared their frustrations over higher education options that leave students feeling forced to leave their homes for O'ahu or the continental US to earn their degree. Many of these students then stay away, pursuing work opportunities in their new communities. Distance education for social work assures that students have the opportunity to learn while remaining in their community, where they can stay to practice if they choose. This is not to say that students should shun opportunities in other, often larger communities, but many want to learn and work in their home community and, being forced to move away jeopardizes many of their hopes and dreams even as some are met.

Barriers to a Baccalaureate Degree in Social Work

Earning a BSW from UH Mānoa requires the satisfactory completion of 120 credit hours, including general education requirements, 38 credit hours that are taken directly from the BSW program, and 21 credit hours earned by taking specific upper-division electives outside of the program, for example from American studies, political science, public health, psychology, women's studies, and disability studies.

Although the community expressed a desire for social work education, there were three main barriers to extending the BSW program through distance or online offerings to neighbor islands:

- Technological capacity
- Human resources, including faculty who could teach in a distance/online format
- Access for students to courses outside of the required social work courses, including general education courses and upper division electives

Early on, two of these challenges were met. The MBTSSW houses three academic social work programs including bac-

calaureate, master's, and doctoral programs, and the master's program has offered a DE option for more than 10 years. The program has been recognized as one of the top DE options in the country. Thus, the school had in place the necessary technological capacity to meet the needs of those living far from Mānoa as well as the human resources necessary to administer a DE option at the baccalaureate level. In fact, in trying to keep an eye to the future, recent faculty recruitment efforts have included the expectation for capacity to teach in the online setting, assuring workforce and curriculum flexibility. This left the final challenge, ensuring non-social work course availability, as the remaining major barrier to launching a DE option of the BSW Program.

Working with Outreach College

In the spring of 2017, the deans of the MBTSSW and the OC attended a DE conference on the continental US and began exploring the possibility of an online BSW degree. With conversations happening at the highest reaches of the university and a groundswell of support from the community, a mutually beneficial partnership was formed. The OC became the answer for issues outside of the BSW program's control, most importantly, the need to offer the courses outside of the social work curriculum. Course offerings from OC number in the hundreds, and many are offered online in both synchronous and asynchronous formats. What the OC had not offered to date was a pathway to a baccalaureate-level degree. With our existing BSW curriculum, the demand for social workers in the community, and the extensive number of offerings through OC, the stage was set to launch the BSW DE option.

Program Design

One key to the successful launch of the new program was the ability to tap into the existing in-house expertise. The MSW program has gone to great lengths to assure that the quality of education in the DE option is identical to that of our campus-based option. The leaders of the BSW program were clear that we would demand nothing less than the best and would do the same as our graduate program to assure a quality education. We did not want to create a two-tier system or an unequal status for those who would pursue an online education.

Still, we knew there needed to be some differences. Although the campus based BSW program has typically enjoyed a greater percentage of non-traditional students than other programs here at UH Manoa, it was expected that adding distance learning option would include still more students of non-traditional backgrounds. Many of those who would pursue a BSW are first generation college students, often working in the field in an auxiliary or paraprofessional capacity. Additionally, many are raising *keiki* (children) and taking care of their *kupuna* (elders). Moreover, we appreciate that the cost of tuition at UH Mānoa is an economic challenge for many who would apply for our program. These variables, taken together, mandated innovation.

Condensed Courses

We have learned that students who struggle in school do so because life can get bigger than the individual. Economic, familial, vocational, spiritual, cultural and educational demands can become overwhelming, and it is not unusual for school to be the first life activity to be let go. Unfortunately, when students are simultaneously enrolled in four classes, each running for 16 weeks, it is common for students to struggle in all four. In fact, "lost semesters" occur all too frequently for far too many. For this reason, instead of running the traditional 16-week courses, the leadership of the BSW DE option decided to create 5-week accelerated courses. Condensed or accelerated courses, similar to those offered across the country in summer session are often appreciated by students who need to gain ground on their educational goals. Most prospective students we talked to across the state seemed to both desire and appreciate accelerated courses, but in order for 5-week courses to be successful, additional changes were needed.

A Sequential Curriculum

To maintain continuity, accelerated courses must be taken in succession. This represents the second major change to the curriculum. Instead of running several 16-week courses concurrently, we run three 5-week courses serially. Students take one course at a time, committing all of their academic time and attention to a single effort. Students consistently praised this model for the singular focus outlined above, but also because when life gets too big, pushing through a single course seems much more tenable than trying to succeed in four courses taken concurrently. Interestingly, there is research showing improved knowledge retention by students enrolled in accelerated courses as opposed to longer 16-week courses taken concurrently over a semester. The authors postulate that some of the improved retention may be the result of immersion in course content as opposed to distributed learning over an extended time when courses are taken concurrently.²

The Asynchronous Classroom

The final change to the curriculum involved a shift from the synchronous to an asynchronous classroom. Many of our students have more than one job, or have varied schedules for other reasons. Hawai'i has huge wealth disparities, with a high cost of living and rampant underemployment. Any attempt to increase educational accessibility must include offerings that fit our prospective students' varied schedules. Asking a student to change their employment status (get a different job, rearrange their work schedule, or reduce their total hours) may not be a reasonable request. If we truly want to extend educational opportunities, then we had to account for the diversity of experiences relative to the work, family, school triangle. The asynchronous classroom provides an opportunity for students to access an education within the students' often hectic schedule.

While the asynchronous model is widely applauded, some faculty and staff had concerns about applying the model to social work. They were concerned about: 1) delivering content for a discipline/profession that is fundamentally a person-to-person endeavor; 2) assessing student performance, particularly critical thinking and empathic listening; 3) navigating a digital divide for those with either limited resources or lower technological acumen; and 4) monitoring student engagement.

We addressed these concerns through several fundamental interventions. These include, 1) an annual in-person orientation to the program that helps students develop a sense of community with faculty, staff, and their fellow students and importantly creates an investment in the program, as well as their education; 2) frequent synchronous connections or contact points within the virtual classroom to facilitate communication skill acquisition and skill assessment; 3) regular academic and professional advising that is held both online through programs like Zoom and Skype, as well as in-person during field site visits; and 4) opportunities to fully participate in the extracurricular activities like student government through the use of technologies like Zoom, Skype and Google Hangouts.

New Learning

With just 1 year of experience running an asynchronous, accelerated, sequential curriculum we are acutely aware that we have much to learn. Still, some of the most pressing questions have been answered, and we already have ideas for improving the option. We now know that 5-week accelerated courses can be every bit as rigorous and demanding as 16-week courses. We did well in preparing our students for the intensity of condensed and accelerated courses, but less well preparing our faculty. We received consistent reports from our instructors that running an online condensed course was an around-the-clock ordeal. When students fall behind, there is little time to catch up, and

the same is true for faculty. Building in small breaks of 2-4 days between courses provides a window for students to make up late work and catch their breath.

We knew that we wanted to build a sense of community in the cohort and utilized several synchronous “points of contact” to ensure this happened. Students, however, seemed to struggle navigating the synchronous components of the curriculum in light of its largely asynchronous nature, which in turn negatively impacted attendance at required program activities like the field integration seminar. Here, communication seems to be key. As our Distance Education Option Director Dr. Rebecca Stotzer noted, communication is critical and messaging across multiple channels a necessity in online settings. Finally, teaching in an asynchronous condensed setting fundamentally impacts pedagogy. Instructors had to radically alter the delivery of course content using a variety of resources to support a larger educational narrative. Rather than worrying exclusively about what is being covered, instructors had to pay special attention to how material was being covered. Asynchronous online students need things to do, and faculty cannot depend on didactic methods and classroom dialogue. Interestingly, as instructors learned to create “experiences” for online students, they found them useful for their brick-and-mortar classes, thus enriching both the campus-based and online curricula.

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A Unique Partnership Between the University of Hawai‘i Cancer Center and the University of Guam: Fifteen Years of Addressing Cancer Health Disparities in Pacific Islanders in Hawai‘i and Guam

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The Cancer Center Connection is a standing column from the University of Hawai‘i Cancer Center and is edited by HJM&PH Contributing Editor Shane Y. Morita MD, PhD.

Abstract

This manuscript describes the efforts in research, education, and outreach of a unique partnership between the University of Hawai‘i Cancer Center and the University of Guam in addressing cancer health disparities faced by Pacific Islanders in Hawai‘i, Guam, and other parts of Micronesia. Significant accomplishments of this 15-year collaboration in research, training Micronesian students, and impact on the local communities are highlighted.

Keywords

Cancer health disparities, Pacific Islanders, Guam, Hawai‘i, Betel nut

Abbreviations

ESI = Early Stage Investigators

GCR = Guam Cancer Registry

PACHE = Partnerships to Advance Cancer Healthy Equity

UHCC = University of Hawai‘i Cancer Center

UOG = University of Guam

USAPI = United States Associated Pacific Islands (Guam, Northern Mariana Islands, American Samoa, Republic of Palau, Federated States of Micronesia (which consists of the Kosrae, Pohnpei, Chuuk, and Yap States), Republic of the Marshall Islands)

Introduction: Cancer Health Disparities in Pacific Islanders

Despite tremendous advancements in cancer research as well as scientific discovery, not all populations have benefited equally, as disparities continue to persist among specific populations and for numerous types of malignancies. Moreover, educational and research opportunities are not equally available to all; population groups that experience the greatest health disparities are also significantly underrepresented in the US biomedical research and health care workforce, further exacerbating cancer and other health disparities.

In the Hawai‘i-Pacific region, Americans of Pacific Islander ancestry continue to experience significant disparities in cancer risk due to lifestyle, genetic, and environmental factors, along with limited cancer awareness and education, poor access to cancer screening, late-stage diagnosis, and limited cancer treat-

ment options. Thus, this group is burdened by poor treatment outcomes. For example, geographic, educational, and resource barriers contribute to the highest rates of cervical cancer in Micronesia where incidence in Micronesian women is 8-fold higher than the US national average (79.7/100,000 vs 9.9/100,000). Cervical cancer incidence in Guam was nearly double the rate in Hawai‘i for the period of 2009-2013.^{1,2} Compared to men in Hawai‘i, men in Guam, particularly Chamorros (Guam’s indigenous population), are disproportionately affected by poor outcomes for a number of major cancers including those involving the lung and bronchus, nasopharynx, liver, and intrahepatic bile duct. Rates of liver and intrahepatic bile duct cancer among men in Guam were nearly double, and nasopharyngeal cancers were more than quadruple higher than those of men in Hawai‘i.^{1,2}

The University of Guam/University of Hawai‘i Cancer Center Partnership

In 2018, the University of Guam (UOG) and University of Hawai‘i Cancer Center (UHCC) marked 15 years of continuous funding awarded by the National Cancer Institute (NCI) to support collaborative research, training, and outreach to address cancer health disparities in Americans of Pacific Island ancestry. The UOG/UHCC Partnership is one of only 14 partnerships within NCI’s Partnerships to Advance Cancer Health Equity (PACHE) program. Since 2001, the PACHE program has supported partnerships between NCI-designated cancer centers and minority-serving institutions that aim to investigate cancer health disparities and their impact on racial/ethnic minorities, medically underserved, and socio-economically disadvantaged populations. The UOG/UHCC Partnership is the only partnership within the PACHE program that addresses cancer health disparities in Pacific Islanders. The program focuses especially on Micronesians in Hawai‘i and Guam, but also in other USAPI jurisdictions.

Through the UOG/UHCC Partnership, the PACHE program has provided long-term infrastructure support for cancer research in the Hawai'i-Pacific region, graduate training in cancer health disparities, mentoring and career development for early stage investigators (ESI) at the partnering institutions, outreach education for communities in Guam, Hawai'i, and the USAPI, and funding for new and innovative cancer research projects of particular relevance to Hawai'i, Guam, and the USAPI.

Research

In the current funding cycle (2015-2020), the UOG/UHCC Partnership has focused on two regionally relevant areas of research: betel nut use and cervical cancer. Betel nut is the fourth most commonly used psychoactive substance in the world. The nuts are chewed for cultural and religious reasons, as well as for their stimulant effects, by more than 600 million people concentrated in South and Southeast Asia as well as in Papua New Guinea and the USAPI, notably on Yap and Chuuk. The practice is spreading eastward in the Pacific as Micronesians migrate to neighboring jurisdictions, including Guam, Pohnpei, the Marshall Islands, and Hawai'i where betel nut is locally harvested from the Areca palm tree and sold by neighborhood vendors catering to the Pacific Islander communities. Betel nut is classified by the International Agency for Research on Cancer (IARC) as a Group 1 carcinogen, and is associated with oral, oropharyngeal, and esophageal cancer, as well as oral lesions, gum disease, and oral submucosal fibrosis. When chewed in combination with tobacco, which is common, betel nut is also linked to cancers of the pharynx. Other additives that are used include the Piper betel leaf, calcium hydroxide, alcohol, and spices.

To date, 12 betel nut studies have been supported by the UOG/UHCC Partnership, including 3 molecular studies, 3 population studies, 3 mechanistic studies, and 2 prevention studies, including an intervention trial. In the current funding cycle (2015-2020), our partnership is funding an adult betel nut cessation trial in Guam. This is the first known randomized intervention trial, modeled after group tobacco cessation interventions. We are also conducting a pilot study exploring betel nut biomarkers in urine and saliva for use in validating betel nut use in human research; an oral microbiome study evaluating the influence of betel nut chewing on oral bacterial composition plus bacterial composition of the Areca (betel) nut and Piper betel leaf; and a study to identify molecular components of Areca nut responsible for promoting chronic inflammation, an important process in carcinogenesis. The partnership's investment in betel nut research is of global and regional importance, as study findings will inform future public health interventions and clinical recommendations for betel nut users in the Pacific region and worldwide.³

Our research on cervical cancer includes a screening study tailored for Pacific Islander women in Guam and Hawai'i. Researchers are testing the effectiveness of sending text messages in participants' native languages that are designed to increase

cervical cancer screening rates among Marshallese migrants in Hawai'i and Chuukese migrants in Guam.

As our investigators pursue more sources of external funding, we expect that our research portfolio on cancer health disparities in Pacific Islanders will continue to grow.

Research Education

Cancer health equity in Pacific Islanders will require research that is designed and conducted by, for, and with Pacific Islanders. As such, the UOG/UHCC Partnership provides support through its Research Education Core for underrepresented graduate students and early stage investigators (ESI), such as postdoctoral fellows and junior faculty, in the form of graduate assistantships, training in cancer health disparities research, and mentoring and career development at the partnering institutions. At UOG, up to 4 master's students per year are awarded 2 years of support from the partnership to pursue degrees in programs related to cancer health disparities. A research thesis is required of all master's students supported by the partnership, and as a requirement for graduation. These students are also exposed to all projects currently funded by the partnership. At UHCC, the partnership supports up to 2 doctoral students each academic year, including 1 supported by NCI funds and another supported by UHCC institutional funds dedicated to the partnership. Together with their mentors, all master's and doctoral students are required to develop a career development plan and to present their research thesis to the partnership team before completing their program. All students who work on research projects of the partnership, including those awarded graduate fellowships as well as others hired by partnership investigators, are encouraged to participate in additional courses and activities to strengthen their ability to conduct research related to cancer and health disparities in preparation for health and research careers in the Pacific region. Seven online training modules have been developed by UHCC and UOG faculty to support the training aims of the partnership.

In addition to supporting minority students in cancer health disparities research, the partnership aims to support and develop underrepresented ESI at UOG and UHCC. ESIs are mentored by partnership faculty to strengthen their research skills, such as those in research design, grant writing, navigating the institutional review board (IRB) process, working with community advisory boards, and other areas related to conducting, analyzing, and disseminating cancer health disparities research. ESIs are informed about and encouraged to participate in research training and career development opportunities made available through the partnership, the partnering institutions, the National Institutes of Health (NIH), and other sponsors, including the NCI-funded Geographical Management of Cancer Health Disparities Program (GMaP, Region 5), which sponsors an annual career development workshop.⁴ The partnership also provides learning and career development opportunities through travel support available for students and ESIs to present at national conferences and meetings as well as summer travel and salary

support for faculty, doctoral students and ESIs to conduct research, prepare manuscripts, develop research proposals, and engage in other professional activities in collaboration with faculty members at the partnering institutions.

These activities address the partnership's overarching goal to develop scientists underrepresented in basic, clinical, translational, behavioral, and population research, while increasing the number of Pacific Islanders leading successful careers as health professionals and scientists committed to addressing cancer prevention and control priorities of island communities in the Pacific region.

Community Outreach

In addition to advancing the cancer health equity aims of the partnership, we conduct outreach activities which have been selected in response to the recommendations of community advisory groups at both UOG and UHCC. In Guam, outreach efforts have focused on increasing uptake of human papilloma virus (HPV) vaccination through provider education and community awareness initiatives. In addition, following the recent purchase of an inflatable colon, UOG's outreach team is leading efforts to promote colorectal screening in Guam. In Hawai'i, UHCC's outreach team is working with members of Oahu's Kosraean community and healthcare providers at Kapiolani Medical Center for Women and Children in Honolulu to identify and implement strategies to facilitate mutually trusting relationships and the delivery of culturally competent care.

Outcomes and Impact

Outcomes during the previous funding period (which began in September 2009) included significant scientific discoveries published in more than 70 peer-reviewed publications, a complete list of which is provided on our website: <http://www.guamcrc.org>. Other accomplishments include 16 grants awarded to partnership investigators, 8 faculty exchange visits, and support for 22 master's students and 8 doctoral students. There are 4 PhD graduates of our programs at UHCC from Guam and other parts of Micronesia, including two who are now faculty at UOG and contributing as partnership investigators. Importantly, these graduates are already mentoring future scientists from Guam and other parts of Micronesia. In addition, a master's level program in cancer health disparities was developed at UOG, and is now a part of the institution's Micronesian Studies Program.

Community outreach activities resulted in landmark tobacco control legislation adopted in Guam, most importantly a significant increase in the tobacco tax. Modeled after a similar increase in Hawai'i tobacco tax, tobacco tax revenues in Guam are earmarked for cancer programs, including approximately \$1 million in annual revenues to support cancer screening and direct patient services on Guam. In September 2016, through the work of partnership betel nut investigators, legislation prohibiting the sale of betel nuts to minors was adopted in the US Commonwealth of the Northern Mariana Islands.

The Guam Cancer Registry (GCR), once an unfunded legislative mandate, was developed into a fully operational cancer registry with help from the Hawai'i Tumor Registry and NCI partnership funding. This registry is now an important resource for research and public health in Guam. Long-term sustainability of the GCR is now ensured by an earmarked portion of Guam's tobacco tax.⁵

Conclusion

Infrastructure and resources for cancer research and surveillance were nonexistent in Guam prior to the establishment of the UOG/UHCC partnership in 2003. The partnership has significantly increased research capacity at UOG and cultivated interest and engagement in cancer research among underrepresented investigators as well as minority students alike. Scientists from a variety of disciplines and departments at both institutions are collaborating to address cancer health disparities in Guam, Hawai'i and the neighboring USAPI. Pacific Islander populations, particularly Micronesians in Guam and Hawai'i, are more aware of the risks associated with cancer, and providers are becoming more sensitive to the needs of these patients. While the partnership has made progress in its 15-year history, there is much more to be done to overcome the unequal burden of cancer in Pacific Islanders.

Conflict of Interest

None of the authors declare any conflict of interest.

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HAWAI'I JOURNAL WATCH

KAREN ROWAN MS

Highlights of recent research from the University of Hawai'i and the Hawai'i State Department of Health

HOSPITAL READMISSION RATES IN HAWAI'I

For hospitals, potentially preventable readmissions (PPRs) are costly, and high rates of PPRs can signal opportunities to improve quality of care. New findings show that among adults over age 65, Native Hawaiian men, Filipino men, and Other Pacific Islander men and women have higher rates of PPRs than whites, in a fully-adjusted analysis. However, other groups' PPR rates were not significantly different from those of whites, and Chinese women over 65 had lower rates. The researchers, including senior author Deborah A. Taira, ScD, of The Daniel K. Inouye College of Pharmacy, looked at data from the Hawai'i Health Information Corporation on nearly 500,000 hospitalizations in Hawai'i from 2007 to 2012. The use of data from subpopulations is important in detecting policy-relevant differences between subgroups of Asians and Pacific Islanders, the researchers concluded. The report, [Thirty-Day Inpatient Readmissions for Asian American and Pacific Islander Sub-Groups Compared with Whites](#), is published in *Medical Care Research and Review*.

ODDS OF CHRONIC DISEASE ARE RELATED TO FOOD AND HOUSING INSECURITY IN HAWAI'I

Food insecurity and housing insecurity may affect racial/ethnic groups in Hawai'i differently. A new analysis of the likelihood of diabetes, cardiovascular disease (CVD), and asthma shows that housing-insecure Native Hawaiian/Other Pacific Islanders (NHOPIs) face nearly double the odds of having diabetes, as well as nearly double the odds of having CVD, compared with housing-secure NHOPIs. Moreover, food-insecure NHOPIs have more than double the odds of diabetes, compared with food-secure NHOPIs. In addition, whites and Asians with either housing insecurity or food insecurity have higher odds of having asthma compared with their secure counterparts. The analysis, conducted by David A. Stuppelbeen, PhD, MPH, of UH Public Health, pooled data from the 2009 and 2012 Behavioral Risk Factor Surveillance System and concluded that housing and food insecurity are associated with higher rates of chronic diseases in Hawai'i. The report, [Housing and Food Insecurity and Chronic Disease Among Three Racial Groups in Hawai'i](#), is published in *Preventing Chronic Disease*.

IMPROVING MAGNETIC RESONANCE IMAGING OF BONES

Conventional magnetic resonance imaging (MRI) methods measure signals from water molecules that are located in relatively large compartments such as cells or extracellular spaces. Collagenated tissues, such as tendons, cartilage, and the outer layers of bones, are characterized by their dense structural features which have a strong effect on the physical properties

of the water molecules within them. Signals from these water molecules quickly decay (within a few milliseconds), making it difficult to detect and, consequently, to use for imaging. The advancement of specialized MRI methods called ultrashort echo time (UTE) methods capable of imaging these types of tissues is an active field of research. Now, researchers Christoph Rettenmeier, PhD and V. Andrew Stenger, PhD, of the John A. Burns School of Medicine, have developed a method that enables the combination of a fast imaging technique called "parallel imaging" with UTE imaging to reduce the scan time for cortical bone images. Results from scans of healthy volunteers showed that a 3-minute scan using this combination of techniques produced images of the skull bones that were comparable in quality to those from a 20-minute scan using previous UTE methods. The paper, [Radiofrequency Phase Encoded Half-Pulses in Simultaneous Multislice Ultrashort Echo Time Imaging](#), is published in *Magnetic Resonance in Medicine*.

WHY HAWAI'I DOES NOT HAVE PAID FAMILY LEAVE

A bill that was introduced in the Hawai'i State Legislature in 2016 would have provided paid family leave for many workers, but it did not pass. Researchers led by Jing Guo, PhD, of the Myron B. Thompson School of Social Work, and Hua Zan, PhD, of the College of Tropical Agriculture and Human Resources, analyzed the bill and the 155 testimonials submitted about it. The analysis showed that businesses opposed the bill mainly for cost reasons, and that local unions did not support the bill because it required employees, but not employers, to pay into the fund to support workers taking leave. The researchers concluded that there is a need to build a unified, broad coalition of support for a paid family leave bill prior to introduction. They also identified gaps in empirical research on paid family leave. The paper, [Policy Development and Advocacy: The Analysis of a Paid Family Leave Bill in the Hawai'i State Legislature](#), is published in *Social Work & Society*.

HEPATITIS B PREVALANCE AMONG ASIANS AND PACIFIC ISLANDERS IN HAWAI'I

People with chronic hepatitis B infection face increased risk of liver cancer, but most people are not aware they carry the infection. A new study looked at nearly 1300 foreign-born Asians and Pacific Islanders who sought medical care at Kalihi-Palama Health Center and found that 5.6% tested positive for chronic hepatitis B infection, a rate 14 times higher than the estimated 0.4% prevalence in the general US population. Moreover, the prevalence was 26.5% among those in the study who reported having household contact with a person infected with hepatitis B. The team of researchers, including several researchers from UH Public Health and Thaddeus Pham, of the Hawai'i State Department of Health, concluded that there is a need for increased hepatitis B screening and appropriate follow-up care, as well as vaccination and culturally-appropriate education, for at-risk communities in Hawai'i. The paper, [Hepatitis B Prevalence and Risk Factors in a Foreign-Born Asian and Pacific Islander Population at a Community Health Center in Hawai'i](#), is published in *Asia Pacific Journal of Public Health*.

CORRIGENDUM

Provider Status for Pharmacists: Why It Matters for Other Healthcare Providers

This corrects the article “Provider Status for Pharmacists: Why It Matters for Other Healthcare Providers,” which was published in September 2015, in volume 74 issue 9, on pages 319-321. In the original article, there was a mistake in authorship. The authors originally listed on the article were: Christina L. Mnatzaganian PharmD, BCACP; Victoria Rupp PharmD, BCACP; and Carolyn Ma PharmD, BCOP. The correct author information is: Christina L. Mnatzaganian PharmD, BCACP, and Victoria Rupp PharmD, BCACP.

The authors apologize for this error and state that this does not change the conclusions of the article in any way.

Reference

1. Mnatzaganian C, Rupp V. The Daniel K. Inouye College of Pharmacy Scripts: Provider status for pharmacists: why it matters for other healthcare providers. *Hawaii J Med Public Health*. 2015;74(9):319-21.

Hawai‘i Journal of Medicine & Public Health Instructions to Authors

The Hawai‘i Journal of Medicine & Public Health (HJMPH) publishes original contributions, reviews, balanced viewpoints (ie, point/counterpoint articles), editorials, and other categories of articles. Topics of interest include scientific articles related to the practice of medicine and public health, with a focus on the unique, multicultural and environmental aspects of the Hawaiian Islands and Pacific Rim region. Some frequently published types of articles are described herein. Authors interested in published other types of articles may contact the journal.

Original articles are usually research-related, quantitative or qualitative papers.

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Keep manuscript to 3,000 words maximum (title page, abstract, keyword, abbreviations, references, tables/figures not included).

- Use Times font in 10 point size.
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II. Tables and Figures:

Tables and figures may be submitted as part of your manuscript. Each table or figure should be carefully selected or designed to add value to the manuscript by showing a relationship of ideas, data, or objects that would be difficult to describe precisely or completely using words alone. Authors must be judicious in their use of tables and figures.

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- Use the salt or ester of a drug at first mention.
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- Avoid the use of trademarks or manufacturers' names unless they are essential to the study.
- Include major terms in the abstract, since the abstract can be text searched in many data retrieval systems.
- Include Keywords

Include Keywords

Include Abbreviations: for example, Abbreviations and Acronyms

BP = blood pressure
CI = Confidence Interval

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1. The title of the submission
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A few specific guidelines to consider in preparing an abstract follow:

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We recommend that articles be divided into sections with headings. The traditional layout described below may not apply to all submission types (eg, editorials or case reports). Nevertheless, the journal recommends that authors create 3-5 sections with appropriate headings to optimize the organization and flow of their write-ups. In addition, a background/review piece, and a summary/discussion piece is recommended for all types of articles submitted to the journal. *Note:* If your manuscript includes more than five abbreviations, please include a list of abbreviations, along with their definitions in a table.

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Acknowledgments—Acknowledge only persons who have made substantial contributions to the study. Authors are responsible for obtaining written permission from everyone acknowledged by name; readers might believe those acknowledged are endorsing the study and conclusions.

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- List the citations in their order of appearance within your paper.
 - Examples of reference style:
1. Garbutt JM, Banister C, Spitznagel E, Piccirillo JF. Amoxicillin for acute rhinosinusitis: a randomized controlled trial. *JAMA*. 2012;307(7):685-692.
 2. Steinbrook R, Ross JS. “Transparency reports” on industry payments to physicians and teaching hospitals [published online ahead of print February 14, 2012]. *JAMA*. doi:10.1001/jama.2012.211.
 3. Centers for Medicare & Medicaid Services. CMS proposals to implement certain disclosure provisions of the Affordable Care Act. <http://www.cms.gov/apps/media/press/factsheet.asp?Counter=4221>. Accessed January 30, 2012.
 4. McPhee SJ, Winker MA, Rabow MW, Pantilat SZ, Markowitz AJ, eds. *Care at the Close of Life: Evidence and Experience*. New York, NY: McGraw Hill Medical; 2011.

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- Statistical Probability P (upper case, italics)
- Standard Error SE
- Standard Deviation SD
- Relative Risk RR
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