

# Hawai'i Journal of Health & Social Welfare

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## HAWAI'I JOURNAL WATCH

Karen Rowan MS

67

## EMERGING TRENDS IN ANTIBIOTIC RESISTANT

### *NEISSERIA GONORRHOEAE*: A NATIONAL AND HAWAI'I PERSPECTIVE

Alan R. Katz MD, MPH; Alan Y. Komeya MPH; Jo M. Dewater MPH;  
Juval E. Tomas MSN, RN; Lance Chinna MT (ASCP); and Glenn M. Wasserman MD, MPH

68

## SAFETY OF SINGLE-STAGE BILATERAL DIRECT ANTERIOR APPROACH TOTAL HIP ARTHROPLASTY PERFORMED IN ALL ELIGIBLE PATIENTS AT A HONOLULU HOSPITAL

Gregory J. Harbison MS; Samantha N. Andrews PhD, ATC; and Cass K. Nakasone MD

71

## IDENTIFYING SOURCES OF STRESS ACROSS YEARS OF GENERAL SURGERY RESIDENCY

Gavin Q. Ha BS; Joseph T. Go BA; Kenric M. Murayama MD, FACS;  
and Susan Steinemann MD, FACS

75

## MEDICAL SCHOOL HOTLINE

### Hawai'i Pacific Neuroscience Summer Internship Program

Maiya Smith BS; Alyssa Wicknick BS; and Kore Kai Liow MD

82

## INSIGHTS IN PUBLIC HEALTH

### Development, Implementation, and Evaluation of the Prevent Diabetes, Hawai'i Campaign

Bronwyn Sinclair-White MPH; Blythe Nett MPH; Lindsey Ilagan MS;  
Stephanie L. Cacal BA; Uyen Vu MEd; Lance K. Ching PhD MPH;  
Catherine M. Pirkle PhD; and L. Brooke Keliikoa DrPH

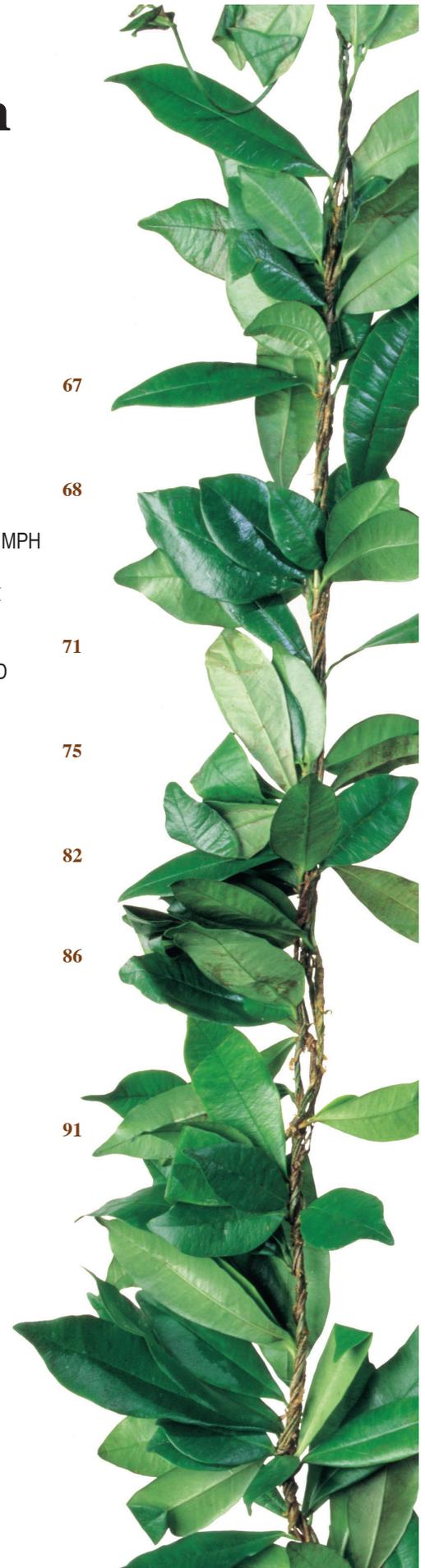
86

## INSIGHTS IN PUBLIC HEALTH

### Outpatient Care Gaps for Patients Hospitalized with Ambulatory Care Sensitive Conditions in Hawai'i: Beyond Access and Continuity of Care

Tetine L. Sentell PhD; Todd B. Seto MD, MPH; Michelle L. Quensell MPH;  
Jhon Michael Malabed BS; Mary Guo MPH; May D. Vawer RN;  
Kathryn L. Braun DrPH; and Deborah A. Taira ScD

91



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The aim of the Hawai'i Journal of Health & Social Welfare is to advance knowledge about health and social welfare, with a focus on the diverse peoples and unique environments of Hawai'i and the Pacific region.

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# HAWAI'I JOURNAL WATCH

KAREN ROWAN MS

**Highlights of recent research from the University of Hawai'i (UH) and the Hawai'i State Department of Health (HDOH)**

## NATIVE HAWAIIAN MEN BENEFIT FROM CULTURALLY-APPROPRIATE CANCER EDUCATION

Culturally-grounded colon cancer educational sessions are beneficial to Native Hawaiian *kāne* (men). Researchers led by Kevin D. Cassel DrPH, of the University of Hawai'i Cancer Center, recruited *kāne* and offered educational sessions based on the traditional Native Hawaiian practice of *hale mua* (men's house). Results showed that 232 *kāne* attended a session, including 149 who were over age 50. Of these 149, 31% had never discussed colon health or cancer screening with a doctor. After the sessions, 92% reported they learned something new about colon health, and 91% reported they liked discussing colon health with other *kāne*. Moreover, 76% agreed to undergo colon cancer screening via fecal immunochemical testing. The paper (PubMed ID: [32008466](#)) is published in *Racial and Ethnic Diversity and Disparity Issues*.

## EVERGREEN SHRUB COMPOUND SHOWS PROMISE AS DIFFERENTIATING AGENT

The small evergreen shrub *Rhazya stricta* is commonly used in herbal drugs in South Asia and the Middle East. Researchers including Leng Chee Chang PhD, of the Daniel K. Inouye College of Pharmacy, extracted, purified, and isolated 7 compounds from the plant. They then screened the compounds and tested their effects on mouse embryonic stem cells (mESCs). One compound, called RS7, inhibited mESC proliferation and induced differentiation. Further analysis showed the compound was ursolic acid. The findings suggest ursolic acid may be effective as a differentiating agent in treatment of cancer, the researchers concluded. The paper (PubMed ID: [31680088](#)) was published in the *Pakistan Journal of Pharmaceutical Sciences*.

## STATE POLICIES TOWARDS ADDRESSING THE OPIOID EPIDEMIC SHOW PARTISAN DIFFERENCES

Democrat- and Republican-led states differ in their policy responses to the opioid crisis, including the leveraging of Medicaid expansion. Researchers including Clifford Bersamira PhD, of the Myron B. Thompson School of Social Work, conducted surveys and examined legislation across the United States, and completed in-depth case studies in 5 states to understand how states are addressing the epidemic. Between 2014 and 2018, there were 1804 pieces of opioid-related legislation introduced in the United States, and 497 were enacted. Results showed differences in states' reactions to the Medicaid expansion: Republican-led states were more likely to pursue targeted reforms, such as improving addiction treatment coverage for traditional Medicaid populations, while Democrat-led states committed more resources to addressing the epidemic, including through Medicaid expansion. In some states with mixed-party leadership, the urgent need to address the epidemic was given as

the reason why policymakers adopted Medicaid expansion. The paper (PubMed ID: [31808787](#)) is published in the *Journal of Health Politics, Policy and Law*.

## PUBLIC HEALTH ISSUES AND POLICY MAKERS IN HAWAI'I

The attitudes of Hawai'i policy makers towards public health issues may improve or decline over time, but these ups and downs are not tied to the severity of public health problems. Researchers including Meghan McGurk MPH, of the UH Office of Public Health Studies, surveyed elected and appointed officials in Hawai'i about 23 issues in 2007 and 2013. Results showed 5 public health issues decreased in their importance to policy makers, including drug abuse, access to health care, and pedestrian safety. Only obesity and access to healthy groceries increased in importance. There was little concordance between public health data and the policy makers' ratings of the importance of issues. The paper (PubMed ID: [26075196](#)) is published in *Frontiers in Public Health*.

## THE IMPACT OF TOBACCO 21

Hawai'i's Tobacco 21 law, which raised the legal age of sales to 21, may have helped reduce the sales in the state of cigarette and cigar products. Researchers at the Centers for Disease Control and Prevention gathered Universal Product Code level data on cigarette and cigar sales in large food stores from 2012 to 2017. Results showed average monthly cigarette unit sales dropped 4.4%, and the market share belonging to menthol cigarettes, which are favored by adolescents and young adults, also declined. In addition, average monthly sales of cigars decreased by 12.1% after the law took effect. Lila Johnson MPH, of the Hawai'i State Department of Health, contributed to the discussion regarding the intense preparation activity by the Tobacco Prevention and Education Program staff and the statewide coalition prior to the first year of the law's implementation. The paper (PubMed ID: [31932332](#)) is published in *Tobacco Control*.

## RATES OF CHRONIC ABSENTEEISM IN SCHOOL CHILDREN

Chronic absenteeism from school has been linked to poor health and low socioeconomic status, and racial/ethnic differences in rates have also been found. However, studies of chronic absenteeism that disaggregate subgroups of Asian children have been lacking. Researchers led by Eunjung Lim PhD, of the John A. Burns School of Medicine, used a nationally representative dataset, the Medical Expenditure Panel Survey, to study chronic absenteeism. Results showed chronic absenteeism rates were higher in children older than 14, those from lower-income families, and those with asthma or behavioral problems. The chronic absenteeism rate for Filipino children, and the rate for American Indian/Alaska Native/Native Hawaiian/Other Pacific Islander children were not significantly different than the rate for white children. Children in the Other Asian group had a significantly lower chronic absenteeism rate than white children. The researchers concluded that further studies should investigate how cultural differences and other factors affect missing school. The study (PubMed ID: [30843228](#)) is published in the *Journal of School Health*.

# Emerging Trends in Antibiotic Resistant *Neisseria gonorrhoeae*: A National and Hawai'i Perspective

Alan R. Katz MD, MPH; Alan Y. Komeya MPH; Jo M. Dewater MPH; Juval E. Tomas MSN, RN; Lance Chinna MT (ASCP); and Glenn M. Wasserman MD, MPH

## Abstract

*Gonorrhea is the second most common nationally notifiable infectious disease in the United States. Rates have been increasing nationally as have antibiotic-resistant isolates. Both the Centers for Disease Control and Prevention and the World Health Organization have recognized antibiotic-resistant Neisseria gonorrhoeae as a major public health threat and have warned of the emerging threat of "untreatable" gonorrhea. Hawai'i has been on the front lines nationally for gonococcal antimicrobial susceptibility surveillance due to its long-standing, statewide gonococcal isolate surveillance program coupled with antibiotic susceptibility testing of all isolates, and Hawai'i's geographic location between Asia where drug-resistant strains originate, and the continental United States. This article highlights emerging trends in and current status of antibiotic resistant Neisseria gonorrhoeae from a national and Hawai'i perspective.*

## Keywords

drug resistance, microbial; *Neisseria gonorrhoeae*

## Abbreviations

AST = antibiotic susceptibility testing  
CDC = Centers for Disease Control and Prevention  
GISP = Gonococcal Isolate Surveillance Project  
HDOH = Hawai'i Department of Health  
NAAT = nucleic acid amplification test  
STD = sexually transmitted disease  
SURRG = Strengthening the US Response to Resistant Gonorrhea  
WHO = World Health Organization

## Introduction

Among reportable nationally notifiable infectious diseases in the United States (US), gonorrhea ranks second (surpassed only by chlamydia) and rates of gonorrhea have increased 75.2% since a historic low in 2009.<sup>1</sup> In addition, the emergence and spread of antimicrobial-resistant *Neisseria gonorrhoeae* has been recognized as a major public health threat by both the Centers for Disease Control and Prevention (CDC)<sup>2</sup> and the World Health Organization (WHO).<sup>3</sup> Hawai'i has been at the forefront in recognition and early identification of resistant *N. gonorrhoeae* strains because of its long-standing, culture-based screening activities and the fact that Hawai'i is located between the continental US and Asia where these strains originate.<sup>4</sup>

Hawai'i is a national sentinel site for monitoring *N. gonorrhoeae* antibiotic susceptibility and has participated in the CDC's

Gonococcal Isolate Surveillance Project (GISP) since 1987.<sup>5,6</sup> At each of 25-30 GISP sites, gonococcal isolates are collected each month from the first 25 men with gonococcal urethritis. The isolates are then transported to a regional laboratory for antibiotic susceptibility testing (AST) using the agar dilution method. The Hawai'i Department of Health (HDOH) Sexually Transmitted Disease (STD) Clinic was one of the original GISP sites; Tripler Army Medical Center became a GISP site in 2001.<sup>7</sup> The regional laboratory for Hawai'i is at the University of Washington, Seattle.

While the vast majority of gonorrhea cases nationally are diagnosed using nucleic acid amplification tests (NAATs), The HDOH State Laboratory has maintained a state-wide gonococcal isolate surveillance program since the early 1970s and has provided culture-based diagnostic support to community health centers, family planning providers, college health clinics, and correctional facilities in addition to the public STD clinic.<sup>8</sup> Culture isolates are obtained from approximately 25% of all gonorrhea cases diagnosed in Hawai'i,<sup>9</sup> and all culture isolates undergo AST using Etest (bioMérieux, Marcy-l'Etoile, France) at the HDOH State Laboratory. Hawai'i's proportion of diagnosed gonorrhea cases from which isolates are obtained and tested for antibiotic susceptibility is much higher than any other state and substantially higher than the approximately 1% of gonorrhea patients sampled nationally through GISP.<sup>10</sup>

## Historical Trends in Emerging Antibiotic Resistance

Sulfonamide antibiotics introduced in the 1930s were the first curative therapy for gonorrhea. However, by the 1940s, sulfonamide-resistant gonococcal strains were common, and the newly discovered medication, penicillin, became the drug of choice for gonorrhea.<sup>11</sup> Tetracycline and spectinomycin were alternative therapies for individuals with penicillin allergies. However, spectinomycin is ineffective against oropharyngeal infections and has not been available in the US since 2006.<sup>12</sup> By the 1970s, high-level resistance to penicillin was identified, and widespread resistance to both tetracycline and penicillin occurred by the 1980s. Of note, Hawai'i was one of the first states to identify gonococcal isolates demonstrating high-level resistance to penicillin.<sup>13</sup> In the 1980s, the CDC recommended extended spectrum cephalosporins as the primary treatment for gonorrhea and listed fluoroquinolones as an alternate therapy for individuals unable to take cephalosporins.<sup>14</sup> In 1991, GISP

identified the first fluoroquinolone-resistant gonococcal strains in Honolulu, Hawai‘i.<sup>14</sup> Fluoroquinolone resistance subsequently became widespread and the CDC updated their STD treatment guidelines in 2007 to no longer recommend fluoroquinolones to treat gonococcal infections.<sup>15</sup>

Since 2010, the CDC has recommended dual therapy for gonorrhea. The initial recommended dual therapy was an extended spectrum cephalosporin **plus** azithromycin (preferred) or doxycycline to both optimize treatment success and slow the emergence of resistance. The recommended ceftriaxone dose was also doubled from the earlier, 2006 recommendations.<sup>16,17</sup>

The first three cases of multidrug-resistant gonorrhea with decreased susceptibility to cefixime (an oral third generation cephalosporin) were identified through GISP from Hawai‘i in 2001.<sup>18</sup> Again, the subsequent widespread development of strains with decreased susceptibility to cefixime led the CDC to remove oral cephalosporins as a recommended treatment modality for gonorrhea in 2012. Of note, the largest increases of cefixime-resistant *N. gonorrhoeae* in the US were observed in Hawai‘i: from 0% in 2006 to 17% in 2009.<sup>19</sup>

Azithromycin monotherapy (2 g orally) had been listed as an alternative therapy for persons unable to take cephalosporins. However, due to emerging macrolide resistance and documented treatment failures, the 2015 CDC Treatment Guidelines no longer recommended azithromycin monotherapy as an option.<sup>12</sup> Of note, the first gonococcal isolate in the US with high-level azithromycin resistance was identified in Honolulu, Hawai‘i through HDOH’s culture-based surveillance program in 2011.<sup>20</sup>

## Current Status

Clinicians are currently left with a single, first-line treatment recommendation from the CDC for gonorrhea: 250 mg ceftriaxone administered intramuscularly **plus** 1 g oral azithromycin.<sup>12</sup> Dual therapy with ceftriaxone plus doxycycline is no longer listed by the CDC as a “recommended” or “alternative” regimen due to the high prevalence of tetracycline resistant strains. The use of doxycycline as a second antibiotic in the dual therapy regimen is only for patients with azithromycin allergies.<sup>12</sup>

Due to the alarming intersection of continued emerging resistance and dwindling treatment options, both the CDC and WHO have openly expressed concerns about a not-so-distant future with untreatable gonorrhea.<sup>21,22</sup>

To date, there have been no treatment failures in the US with the dual treatment regimen recommended by the CDC. However, treatment failures have been documented from the United Kingdom and Australia.<sup>23-26</sup> Intravenous ertapenem (a carbapenem class antibiotic) was ultimately administered as a last resort treatment for at least two cases.

The first gonococcal isolates in the US demonstrating both decreased susceptibility to ceftriaxone and high-level resistance to azithromycin were identified in Hawai‘i between April and May 2016 through the HDOH culture-based gonococcal surveillance program.<sup>9</sup> These isolates were also resistant to penicillin, tetracycline, and fluoroquinolones, and whole genome sequencing revealed genetic relatedness.<sup>27</sup> All seven patients were successfully treated with the recommended dual therapeutic regimen, but the isolates’ antibiotic susceptibility profile is the most worrisome to date in the US.<sup>9</sup>

The HDOH’s Diamond Head STD Clinic was one of nine funded sites selected by the CDC for their Strengthening the US Response to Resistant Gonorrhea (SURRG) initiative in 2016. Three goals of this ambitious program are to enhance domestic gonorrhea surveillance and infrastructure; build capacity for rapid detection and response to antibiotic-resistant gonorrhea through increasing culturing and local antibiotic susceptibility testing; and enhance rapid field investigation to stop the spread of resistant infections.<sup>28</sup>

The CDC also recommends several additional steps clinicians can take to mitigate the emergence and spread of antibiotic-resistant gonococcal strains. These include eliciting sexual histories from their patients and at least annually screening persons at increased risk for gonorrhea at all exposed anatomical sites (genital, oropharyngeal, and rectal). Explicitly targeted are sexually active men who have sex with men, females less than 25 years of age, and females 25 years of age and older who are at increased risk for gonorrhea. Patients should be counseled on consistent condom usage, and clinicians should follow CDC dual therapy treatment recommendations.<sup>11</sup> Partner notification is an imperative component of STD control programs. Any sexual partners within the past 60 days of persons diagnosed with gonorrhea should be referred for evaluation, testing, and presumptive dual treatment.<sup>12</sup> Optimally, testing would entail collecting cultures with simultaneous NAATs from all exposed sites.

In addition to the HDOH’s activities, Hawai‘i healthcare providers can assist in early identification of antibiotic-resistant *N. gonorrhoeae* by culturing patients with symptomatic urethritis and cervicitis, and obtaining cultures from any patient who tests positive for gonorrhea by NAAT prior to initiating treatment. Cultures should also be collected from any person who has been sexually exposed to gonorrhea, at all exposed anatomical sites (genital, oropharyngeal, and rectal), prior to administering treatment.

Appropriate culture media for *N. gonorrhoeae* is Modified Thayer Martin or Martin Lewis, and growth is optimized if cultures are placed in a 5% CO<sub>2</sub> atmosphere. This can be accomplished with a CO<sub>2</sub> tablet or a candle jar. Cultures should also be incubated at 35<sup>0</sup>-36.5<sup>0</sup> C.<sup>29</sup>

Persistent symptoms after receipt of the CDC's recommended dual treatment regimen are much more likely due to reinfection than treatment failure as there have been no treatment failures to date in the US; hence, it is imperative to always obtain an adequate sexual history from all patients, especially symptomatic patients. If there is any question of treatment failure, please contact the HDOH STD Clinic as soon as possible and obtain cultures to allow for antibiotic susceptibility testing.

The staff at Diamond Head STD Clinic can assist in culture collection and they welcome your referrals. Please direct any questions related to specimen collection or patient referral for culture and treatment to the STD clinic disease intervention specialists. The website for the Harm Reduction Services Branch, Hawai'i Department of Health which administers the Diamond Head STD Clinic can be accessed at URL: <https://health.hawaii.gov/harmreduction>, and the clinic's main phone line is 808-733-9281.

### Conflict of Interest

None of the authors identify any conflict of interest.

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# Safety of Single-Stage Bilateral Direct Anterior Approach Total Hip Arthroplasty Performed in All Eligible Patients at a Honolulu Hospital

Gregory J. Harbison MS; Samantha N. Andrews PhD, ATC; and Cass K. Nakasone MD

## Abstract

*Total hip arthroplasty (THA) is a commonly performed surgery, with candidates often requiring bilateral replacement. Simultaneous, single-stage bilateral THA offers several advantages and the direct anterior approach (DAA) for THA is well-suited for this procedure. In Hawai'i, single-stage bilateral DAA THA has yet to be adopted as a primary practice, and currently, there is limited research on patient outcomes following single-stage bilateral DAA THA in heterogeneous patient populations. In this study, we present our experience regarding intraoperative and 90-day complication rates encountered in a consecutive, all-inclusive cohort of single-stage bilateral DAA THA performed at the Straub Medical Center in Honolulu, Hawai'i, from January 2016 to May 2018.*

*A total of 99 patients were included with a mean age of  $64.7 \pm 10.1$  (mean  $\pm$  standard deviation) years. The sample consisted of 43 (43.4%) males. Mean BMI was  $27.0 \pm 5.3$  kg/m<sup>2</sup>. The racial composition consisted of 50 (50.5%) Asian, 37 (37.4%) Caucasian, 8 (8.1%) Hawaiian/Pacific Islander, 1 (1.0%) African-American, 3 (3.0%) undisclosed. Mean operating time was  $180 \pm 23$  minutes. Mean intraoperative blood loss was  $386 \pm 75$  mL, and 11 (11.1%) patients received a postoperative allogenic blood transfusion. There were no major intraoperative complications. The only major local complication observed was one patient who developed high-grade heterotopic ossification requiring surgery. No major systemic complications occurred. The overall complication rate was 0.5%. In conclusion, we demonstrate that single-stage bilateral DAA THA is a safe option for the treatment of bilateral hip pathology in a wide spectrum of patients.*

## Keywords

*total hip arthroplasty; direct anterior approach; bilateral*

## Abbreviations

ASA = American Society of Anesthesiologists' Classification System

DAA = Direct Anterior Approach

HO = Heterotopic Ossification

THA = Total Hip arthroplasty

## Introduction

Total hip arthroplasty (THA) is one of the most common orthopedic procedures performed in the United States, and the demand for THA is projected to steadily increase in the future due to the aging population.<sup>1,2</sup> A substantial portion of THA candidates present with disease involvement in both joints and thus require bilateral replacement.<sup>3,4</sup> Simultaneous, single-stage bilateral THA has been demonstrated to have several advantages over sequential, two-stage bilateral THA including only one anesthesia event, a shorter overall hospital length of stay, and

lower associated healthcare costs.<sup>5-8</sup> The majority of studies have also found that single-stage bilateral THA has similar or lower rates of major postoperative complications compared to staged bilateral THA yet controversy still exists over which method is safer.<sup>6,9-16</sup>

The direct anterior approach (DAA) for THA is a muscle-sparing procedure that is well-suited for single-stage bilateral operations as the supine position of the patient precludes the need for intraoperative repositioning.<sup>3,17</sup> Additionally, there is evidence to suggest that the DAA for unilateral THA is associated with less blood loss and lower rates of transfusion.<sup>18,19</sup> Multiple studies have demonstrated that the DAA is a feasible option for single-stage bilateral THA with low rates of short-term postoperative complications.<sup>3,17,20-23</sup> However, DAA THA alone is known to have a steep learning curve, therefore, the added complexity of a single-stage bilateral is concerning and may not be appropriate for an inexperienced surgeon.<sup>24,25</sup>

Although single-stage bilateral DAA THA has been performed by the senior author since 2005, this procedure has yet to be adopted as a primary practice in other high volume arthroplasty institutions in Hawai'i, perhaps due to the surgical complexity and perceived risk of systemic adverse events. Additionally, there is very limited research for patient outcomes following a single-stage bilateral DAA THA in a heterogeneous patient population, as seen in Hawai'i. Therefore, the purpose of this study was to evaluate intraoperative and 90-day perioperative complication rates in a consecutive, all-inclusive cohort of single-stage bilateral total hip arthroplasties performed at Straub Medical Center in Honolulu, Hawai'i.

## Methods

### Study Design and Patient Population

A retrospective, Internal Review Board approved analysis was conducted for 99 consecutive patients (198 hips) having undergone elective single-stage bilateral DAA THA between January 2016 to May 2018 at the Straub Medical Center in Honolulu, Hawai'i. All cases were performed by a single, fellowship-trained arthroplasty surgeon. Inclusion criteria for this study included: (1) diagnosed with bilateral hip osteoarthritis, rheumatoid arthritis, or avascular necrosis, (2) no history of prior hip replacement, and (3) had undergone a single-stage bilateral THA via the DAA. The standard of care during the

study period was inclusive of all patients meeting radiographic and clinical evidence for hip arthroplasty. Therefore, no patient was excluded from surgical consideration based on physical or comorbidity status.

### **Surgical Procedure**

Bilateral, single-incision DAA THA was used for all patients, and the surgical procedure for all cases was uniform.<sup>17</sup> The consecutive hip arthroplasty procedures were all performed with the patient in supine position on a specialized fracture table (Hana®, Mizuho OSI, Union City, CA, USA). Patients received general anesthesia, and an ultrasound guided paravertebral block was performed on both sides prior to or shortly after entering the operating room by an experienced anesthesiologist. All patients received an intraarticular pericapsular injection of local anesthetic (ropivacaine or bupivacaine), ketorolac, and epinephrine in the amount calculated for their body mass by the anesthesiologist, and half the maximum dose was used for each hip. Patients with allergies or contraindications to any of the above were excluded from receiving those interventions. All patients received one dose of an appropriate antibiotic prior to incision. All patients received 1 gram of tranexamic acid before incision and before starting closure of the second surgical site. A broach only technique was performed for femoral canal preparation. All patients received a cementless femoral stem (Ovation® Tribute or Alpine®, Ortho Development, Draper, UT) and acetabular implants with a ceramic femoral head and a neutral-faced highly cross-linked polyethylene insert.

Intraoperative fluoroscopy was used to assist with femoral stem and acetabular cup positioning as well as hip offset and leg length assessment. After completion of the initial surgery and wound closure of the first hip, the contralateral hip was sterilely prepped and draped, and a new set of surgical instruments was opened. Approximately 30 minutes elapsed to allow for set up and re-arrangement of the room prior to incision of the second hip. Neither intraoperative red blood cell salvage nor autologous blood donation prior to surgery was performed.

### **Postoperative Protocol**

Patients started physical therapy on the day of surgery as soon as physically able to participate. No weight bearing restrictions or hip dislocation precautions were applied. Patient disposition was assessed based on medical stability and repeated post-operative functional evaluations by experienced physical therapists. Patients were discharged either directly home or transferred to an acute inpatient rehabilitation facility or skilled nursing facility as indicated by repeated functional assessments of safe independent function. All patients participated in six weeks of outpatient physical therapy. Follow up appointments were scheduled at 2 weeks, 6 weeks, 6 months, and 1 year following surgery. Postoperative adverse events which occurred within 90 days following surgery were recorded.

### **Outcomes**

Patient demographics, preoperative comorbidities, including the American Society of Anesthesiologists' Classification System (ASA) class,<sup>26</sup> surgical indication, and perioperative variables, such as hospital length of stay, estimated blood loss, required allogenic blood transfusion, and preoperative and pre-discharge hemoglobin levels, were collected. Surgical and systemic complications occurring within the first 90 days post-operative were collected from routine clinic visits, readmission and emergency room records and any unexpected medical evaluation. A surgical complication was defined as an intraoperative fracture, superficial or deep infection requiring additional surgery, periprosthetic fracture, hip dislocation, heterotopic ossification (HO) requiring additional surgery or early failure of the implant. A systemic complication was defined as a cardiac or vascular event requiring readmission, including but not limited to: myocardial infarction, stroke, deep vein thrombosis, and pulmonary embolism.

### **Results**

A total of 99 patients underwent single-stage bilateral DAATHA. The mean age at time of surgery was  $64.7 \pm 10.1$  (mean  $\pm$  SD) years, and the sample consisted of 43 (43.4%) males. The mean body mass index was  $27.0 \pm 5.3$  kg/m<sup>2</sup>. The racial composition of the sample consisted of 50 (50.5%) Asian, 37 (37.4%) Caucasian, 8 (8.1%) Hawaiian/Pacific Islander, 1 (1.0%) African-American and 3 (3.0%) undisclosed. Four (4.0%) patients were classified as ASA class 1, 59 (59.5%) as class 2, 35 (35.4%) as class 3, and 1 (1.0%) as class 4.

The mean operating time (defined as time of incision of first hip to dressing application of the second hip) was  $180 \pm 23$  minutes. The mean intraoperative blood loss was  $386 \pm 75$  mL, and 11 (11.1%) patients required a postoperative allogenic blood transfusion based on clinical symptoms. The mean preoperative and postoperative hemoglobin levels prior to discharge were  $13.2 \pm 1.9$  g/dL and  $10.9 \pm 1.9$  g/dL, respectively. There were no intraoperative femoral fractures noted before wound closure.

The average hospital length of stay was  $46 \pm 27$  hours. Eleven (11%) of 99 patients were discharged within 24 hours, and 55 (55%) patients were discharged within 48 hours. A total of 50 (50.5%) patients required transfer to an acute inpatient rehabilitation facility from the hospital, and 48 (48.5%) patients were discharged directly to a home environment. Only one (1.0%) was discharged to a skilled nursing facility. No readmissions occurred within the 90-day postoperative period.

At 90-day postoperative follow-up, the only major local complication observed was one patient who developed high-grade HO requiring surgery. No other major local complications occurred, thus the overall major complication rate was 0.5%. No patients developed a periprosthetic infection, periprosthetic

fracture, wound complications requiring surgery or hip dislocation. Additionally, no patient suffered a systemic complication, such as a deep vein thrombosis or pulmonary embolism. One patient presented to the emergency room due to epigastric discomfort, and another patient made a postoperative phone call concerned about a possible adverse medication reaction which was unrelated.

## Discussion

The single-stage bilateral THA, when compared to the two-stage bilateral THA, has been reported to have lower anesthetic risk, shorter overall hospital stay, and lower healthcare costs.<sup>5-11</sup> Despite the potential advantages, the incidence of perioperative complications have previously been reported as high as 7.3%,<sup>3,20-23,27-31</sup> leading to safety concerns when performing the single-stage bilateral THA.<sup>10-16</sup> In the current study, only one perioperative complication occurred (0.5%), diagnosed as a high-grade HO and required surgery to excise ectopic bone. Previous research has reported the incidence of HO following DAA THA from 3.4% to 9.4%,<sup>32-35</sup> therefore, this is most likely not due to the bilateral protocol. Additionally, there were no major systemic complications in the current study, and major complications have been rare in previous other studies. Following single-stage bilateral DAA THA, studies have reported a 2.3% rate of myocardial infarction and congestive heart failure but in patients over the age of 75, as well as pulmonary embolism.<sup>23,36</sup> In the current study, although the average age of 64.7 years old and average body mass index of 27 suggest a low risk THA sample, 36.4% of patients had an ASA category of either 3 or 4. The absence of significant perioperative and systemic complications, therefore, could indicate that a single-stage bilateral DAA THA may be appropriate even for less healthy patients presenting with bilateral joint disease.

An additional concern for the single-stage bilateral THA is the perceived risk of increased intraoperative blood loss and a higher transfusion requirement associated with a longer surgical event.<sup>10,13,14,16</sup> In general, the muscle sparing technique of the DAA THA has been shown to have lower blood loss and lower incidence of required blood transfusions than the lateral and posterior approaches.<sup>17-19</sup> Previous research evaluating the single-stage bilateral DAA THA have reported intraoperative blood loss between 401.6 ml to 738.8 mL,<sup>3,20,22,23,27,28,31,37</sup> all above the average blood loss in the current study of 386 mL. The lower blood loss volume observed in the current study is likely a result of multiple factors, including the use of tranexamic acid, the length of the surgery, and the experience of the surgeon. In a study of 22 bilateral DAA THA using tranexamic acid, Parcels, et al.<sup>27</sup> reported an average blood loss of 473 mL and transfusion rate of 23%. The low blood loss and transfusion rate (11%) in the current study, therefore, cannot be fully explained by use of tranexamic acid. Further explanation may be provided by surgical time, however, differences in reporting and

methodologies make direct comparison difficult. Surgical time was reported as an average of 180 minutes in both the current study and by Parcels, et al, however, the time reported in the current study included the preparation of the second hip following the completion of the first hip as opposed to preparation of both hips prior to beginning. Therefore, the lower blood loss and transfusion rate in the current study is likely contributable to the surgeon's experience in these procedures and ability to perform the procedure efficiently.

There are a few limitations that warrant acknowledgment. First, the study is limited by its retrospective design; however, the surgical procedure did not change over the study period. Secondly, a lack of a comparison group with a staged cohort or a cohort using another surgical approach was not available. Therefore, it is not possible to comment on the effect of the surgical experience or technique. Third, only complications occurring during short-term follow-up within 90 days were reviewed, leaving the long-term clinical and patient reported outcomes of single-stage bilateral DAA THA unknown. Finally, all surgeries in the current study were performed by a single surgeon, with over ten years of experience. Although this may remove the effect of varied surgical techniques, the single surgeon design may limit the generalizability to other surgical approaches or levels of surgical experience.

## Conclusion

In an unselected cohort of 99 patients having undergone single-stage bilateral DAA THA, one patient underwent an additional surgery for HO and no other patients sustained serious perioperative or systemic complications. Compared to previous research, the low transfusion rate and low complication rates in the current study may reflect surgical experience and efficiency regarding the performance of DAA THA but do demonstrate that single-stage bilateral DAA THA is a safe option for the treatment of bilateral hip pathology in a wide spectrum of patients.

## Conflict of Interest

None of the authors identify a conflict of interest.

## Disclosures

Dr. Cass Nakasone reports being a consultant and receives royalties from Ortho Development Corporation.

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# Identifying Sources of Stress Across Years of General Surgery Residency

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and Susan Steinemann MD, FACS

## Abstract

*Stressors during surgical residency training are common and can contribute to impaired technical performance, medical errors, health problems, physician burnout, and career turnover. This survey of general surgery recent graduates and chief residents examined threats to resident health and well-being. An electronic survey composed of multiple-choice, checkbox, dropdown, and open-ended questions was developed to determine the most stressful general surgery residency year, sources of the stress, and potential interventions to manage resident well-being. The survey was sent to five program directors across the United States to be forwarded to chief residents and recent graduates less than five years from graduation. Twenty-three residents and recent graduates responded to the survey. Seventy percent reported they “never” got enough sleep, and 39% reported they did not have a healthy lifestyle. Financial concerns were the most frequently cited source of stress. During post-graduate-years (PGY) 1 and 2, residents were most likely to fear hurting a patient or being “in over their head.” In PGY-3, residents were most likely to consider leaving the residency program. The current findings suggest that each year of general surgery residency is linked with certain stressors, and no year is particularly stressful relative to the other years. There can be more research and efforts to focus on additional PGY-specific training and supervision, as well as added general measures to promote resident health and financial stability throughout all years. Regarding stress mitigation, residents may benefit from faculty, peer, and community interaction rather than from formal professional counseling.*

## Keywords

stress, general surgery, residency, survey, Hawaii

## Abbreviations

ACS = American College of Surgeons  
PGY = post-graduate-year

## Introduction

General surgery is ranked in the top 5 in specialty shortages in O‘ahu. Colorectal surgery represents 1 of the largest subspecialty shortages statewide.<sup>1</sup> An area that could be addressed to improve the shortage of general surgery physicians in the state is addressing burnout. Burnout is prevalent in the surgical specialty and characterized by the combination of emotional exhaustion, depersonalization, and low personal achievement.<sup>2</sup> The perceived overwhelming stress during general surgery residency that causes burnout can manifest as decreased job performance and attrition.<sup>3</sup> The attrition rate for

general surgery residents ranges from 14% to 32%, which is higher than other surgical or non-surgical fields of medicine.<sup>4</sup> Identifying sources of stress during general surgery residency can help guide interventions and retention of general surgery residents. Stressors during surgical training are common and can contribute to impaired technical performance, medical errors, physical and mental health problems, physician burnout and career turnover.<sup>5</sup> These stressors can arise from several sources: personal finances, work hours, quality or length of education, and personal relationships.<sup>6</sup> Persistent stress is associated with a 20% resignation risk as well as depression and suicidal ideation.<sup>4,5</sup> While residents with certain personality types may be more inherently resilient, there are also mechanisms and interventions from the program’s perspective which may be applied to prevent distress and subsequent burnout. Dispositional mindfulness has been useful in building resilience in surgical residents.<sup>5</sup> Unfortunately, training and anticipation do not completely immunize trainees against the deleterious effects of stress associated with residency.

Recently, there has been interest regarding resident preparation for transitions in training, notably from medical school to residency and residency to practice. Due to the varying experiences during medical school training, first-year surgical residents may be unprepared for technical challenges occurring during the course of surgical operations. Implementing a “boot camp” training curriculum — which involves a combination of didactic sessions, actor-based clinical skills assessment, technical skill and clinical scenario-based simulations, as well as self-directed web-based learning modules. These activities may help increase proficiency at the beginning of residency.<sup>7</sup> Studies have shown a lack of preparedness of residents graduating from their programs.<sup>8</sup> To correct this, the American College of Surgeons (ACS) implemented a Transition to Practice program that paired recently graduated residents with a senior general surgeon mentor to increase their confidence, autonomy, decision-making, and operative skills.<sup>8</sup> However, there may be transitions within residency training years that may be stressful, as residents assume increased responsibilities and autonomy in patient care. In the current report, the prevalence and timing of perceived stressors and stress responses during general surgery residency were explored. It was hypothesized that the most stressful period during residency is at the midlevel — Postgraduate Year (PGY) 3.

## Methods

To address this hypothesis, the authors created a survey using a sample from a pool of current chief residents and recent graduates of general surgery. Survey questions were designed to address sources of stress, prevalence and incidence of stress during residency, coping mechanisms, and query about potential interventions. Five expert surgical educators (program and clerkship directors) participated in creating this survey. The survey was constructed by incorporating identified concerns by surgical fellows and surgeons (eg, finances). Demographic questions were adapted from published literature of PubMed.<sup>4,6</sup> Creation of a survey was preferred due to copyright considerations, and a desire to incorporate findings from informal surveys of Hawai'i residents. Select coping mechanisms were identified after consultation with practicing general surgeons. The survey included 6 demographic questions (eg, gender, residency program location and type, marital status, family planning, and non-clinical years), 20 multiple-choice prompts (see table 2) for respondents to identify a specific year (PGY) of residency when they most frequently experienced situations or feelings, or if they "always" or "never" had the described experience throughout residency (eg, "I got enough sleep"), 1 dropdown question identified the most stressful aspect of surgical training with an option to specify other, 1 check box question identified coping mechanisms ("sleeping"), and 2 short-answer questions described the most stressful work experience and thoughts on potential stress-relieving faculty/program interventions. Content analysis of narrative responses were based upon categories derived from literature review and the personal experience of the senior authors. Stressors were coded and grouped into broad categories as follows: (a) work environment, including, patient workload, supervision and support, relationships with supervisors, colleagues and others, (b) ancillary to work environment, including finances, relationships with friends and family, personal well-being. Stress relieving mechanisms were coded as (a) personal (b) professional and (c) programmatic. Respondents were required to answer all questions and subsequent branching questions if they provided a particular answer except for the short-answer, dropdown, and checkbox questions.

Five program directors were contacted by the senior investigators (KM and SS). They represented a convenience sample of those who met the following qualifications: (1) Active membership in the Association of Program Directors in Surgery (APDS) (2) Prior participation in multi-institutional educational research projects (3) established academic surgeons with prior participation in multi-institutional research projects and (4) geographic diversity. All 5 program directors agreed to enter their residents in the study, but the decision to participate rested with the residents. Risks and benefits were outlined in the introduction to the survey, with implied consent indicated by the resident's decision to participate in the study. Participation of the entire

APDS membership (ie, all residency programs) was precluded by the research policy of the APDS, which regulates the number of surveys that can be conducted, favoring large, grant-supported research projects. Program directors forwarded the web-based survey (SurveyMonkey) to recent graduates (less than 5 years post-graduation) and current chief residents. No additional contacts was made to respondents. Anonymous responses were collected over a 5-month period (9/24/17 – 2/23/18); \$5 Amazon gift cards were provided as incentives. University of Hawai'i Investigational Review Board approval was obtained, protocol number 2017-00674.

## Results

The survey was completed by 23 respondents out of 107 survey recipients (response rate 21%) from residency programs located in the West (30%), Midwest (26%), South (35%), and Northeast (9%); 79% were male. Fifty-seven percent trained at a university medical center, the rest at a university-affiliated medical center. Twenty-two percent of respondents had non-clinical years during residency, all occurred during PGY-2 and PGY-3. Activities during the non-clinical years included research (60%), research plus part-time clinical opportunities (20%), or other activities (medical director of facility, research, military, and other jobs) (20%) (Table 1).

Residents were able to grade different aspects of their personal and professional lives during residency (Table 2). Seventy percent of respondents indicated that they "never" felt they had adequate sleep, 30% never had enough time and energy to maintain relationships, and 39% never felt that they were eating and exercising. Residents were least likely to have adequate time, sleep, and a healthy lifestyle during PGY-3 to PGY-4.

Forty-three percent considered leaving their residency program; 60% of those considered it most strongly during PGY3. Thirty percent considered leaving the specialty of general surgery, 43% of those in PGY3. Seventy percent did not feel that their responsibilities matched their skills and training during PGY-5. Approximately one-third of residents directed anger towards friends, family, and staff.

Twenty-seven percent of respondents cited PGY-1 as the year when they frequently felt "in over their head during a case or procedure" and "unprepared during a non-procedural patient encounter." This perception decreased in later years, with zero reporting this during PGY-4 or PGY-5. In PGY-2, 24% said they were the most "fearful of hurting a patient," with PGY-1 following thereafter (19%). Thirty percent of respondents cited PGY-4 as the year of "tremendous growth in knowledge and skills." Although 59% said they "never" felt that they wanted more help/supervision, PGY-1 was cited by 23% of participants as the year they wanted the most help/supervision.

There were diverse sources of stress, many extrinsic to the training environment (Figure 1). The 2 most common stressors were finances (19%) and interpersonal relationships (14%). Work-related responsibilities and the training environment were identified as stressors for half of the respondents: possibility of hurting a patient (14%), learning technical skills (5%), standardized tests (5%), managerial or administrative tasks (10%), dealing with difficult people (5%), and ethical concerns (5%). Ten percent were concerned about their future or job prospects. Surgeons described a variety of stress-coping mechanisms (Table 3). The majority would be considered “healthy” responses including “talking with family/friends,” “talking with faculty, other residents, and work staff,” and exercising. Seventeen percent reported using alcohol to combat stress.

In the narrative responses, stressful work experiences were described as “[perceived] lack of consistency among colleagues and curriculum, getting yelled at by an attending, being repeatedly told that [resident] lack sufficient surgical skill, [perceived hypercriticism from attendings], caring for

more than 50 patients at one time with 4 residents, residency administration not listening/caring about concerns, and during the surgical intensive care unit rotation” (data not shown). Some suggested interventions were “stop targeting certain residents and aim to uplift as opposed to tearing down, reduce hours and increase length of residency, minimize the amount of non-clinical/educational responsibilities of the residents, take time to teach [residents], more time for preparation and study, encourage social interaction, mentorship/advisory models solely for the purpose of discussing stressful situations and emotional issues (in contrast to professional development and research), educate and remind residents on purposefulness, motivation, and mindfulness as it applies to everything they do, have enough coverage and listen to resident concerns, standardize teaching methods and expectations [amongst attendings] within an institution, and demonstrate appreciation for residents and display sensitivity to the demands placed on current general surgery residents and stop comparing to the ways things were in [attending’s] generation.”

Table 1. Demographics of Study Sample. “n” is the Total Number of Responses per Demographic Question. Percentage is Calculated from Taking the Reported Response Divided from the Total Responses Per Question.	
<b>Gender</b> n = 23	
Male	18 (78.6%)
Female	5 (21.74%)
<b>Location of Residency Program</b> n = 23	
West	7 (30.43%)
Midwest	6 (26.09%)
South	8 (34.78%)
Northeast	2 (8.7%)
<b>Type of Residency Program</b> n = 23	
University medical center	13 (56.52%)
University-affiliated medical center	10 (43.48%)
Non-university affiliated medical center	0
<b>Change in Marital/Partner Status During Residency</b> n = 23	
Yes	7 (30.43%)
No change	16 (69.57%)
<b>When Did Marital/Partner Status Changes Occur?</b> n = 16	
PGY-1	1 (14.29%)
PGY-2	2 (28.57%)
PGY-3	2 (28.57%)
PGY-4	1 (14.29%)
PGY-5	1 (14.29%)
<b>What was the Marital/Partner Change?</b> n = 7	
Married	5 (71.43%)
Engaged	1 (14.29%)
Started relationship	1 (14.29%)

<b>Did You Have Children During Residency?</b> n = 23	
Yes	8 (34.78%)
No	15 (65.22%)
<b>Which PGY Did You Have children?</b> n = 8	
PGY-1	0
PGY-2	2 (25%)
PGY-3	0
PGY-4	1 (12.5%)
PGY-5	2 (25%)
More than one year	3 (37.5%)
<b>Non-Clinical Years Between PGY1-5</b> n = 23	
Yes	5 (21.74%)
No	18 (78.26%)
<b>Which PGY Did You Have Non-Clinical Years?</b> n = 5	
PGY1 – PGY2	0
PGY2 – PGY3	5 (100%)
PGY3 – PGY4	0
PGY4 – PGY5	0
More than one year	0
<b>What Did You Do During the Non-Clinical Years?</b> n = 5	
Research	3 (60%)
Research and part-time clinical	1 (20%)
Personal/medical leave	0
Other	1 (20%)

Table 2. Summary of Resident Responses Most Strongly Felt Per Each Survey Prompt During Residency. Percentages were Calculated from Taking the Number of Responses Divided from the Total Responses. Parentheses are the Number of Responses Per Respective PGY.

	PGY-1	PGY-2	PGY-3	PGY-4	PGY-5	Always Felt this Way	Never Felt this Way	Total Responses
I had enough time and energy to develop and maintain relationships outside of residency	13% (3)	26% (6)	9% (2)	0%	13% (3)	9% (2)	30% (7)	23
I maintained a healthy lifestyle (eating well and exercising).	17% (4)	13% (3)	4% (1)	4% (1)	13% (3)	9% (2)	39% (9)	23
My responsibilities matched my skills and training.	9% (2)	9% (2)	4% (1)	9% (2)	30% (7)	30% (7)	9% (2)	23
I got enough sleep.	13% (3)	4% (1)	4% (1)	4% (1)	4% (1)	0%	70% (16)	23
I had the skills and time to teach others.	9% (2)	13% (3)	13% (3)	17% (4)	35% (8)	4% (1)	9% (2)	23
I experienced tremendous growth in my surgical knowledge and skills.	17% (4)	9% (2)	13% (3)	30% (7)	13% (3)	9% (2)	9% (2)	23
I thought about leaving my residency program.	0%	4% (1)	26% (6)	13% (3)	0%	0%	57% (13)	23
I thought about leaving surgery for another specialty.	4% (1)	4% (1)	13% (3)	9% (2)	0%	0%	70% (16)	23
I was inappropriately angry with my friends or family.	9% (2)	5% (1)	0%	9% (2)	5% (1)	5% (1)	68% (15)	22
I was inappropriately angry with co-workers or staff.	0%	9% (2)	5% (1)	18% (4)	5% (1)	0%	64% (14)	22
I wanted more help/supervision.	23% (5)	9% (2)	5% (1)	0%	0%	5% (1)	59% (13)	22
I wanted more autonomy.	0%	5% (1)	14% (3)	18% (4)	14% (3)	28% (6)	23% (5)	22
I had feelings of being "in over my head" during a case or procedure.	27% (6)	14% (3)	9% (2)	9% (2)	0%	0%	41% (9)	22
I felt unprepared during a non-procedural patient encounter.	27% (6)	14% (3)	9% (2)	0%	0%	0%	50% (11)	22
I used alcohol and/or drugs in order to reduce my stress.	0%	0%	5% (1)	5% (1)	0%	0%	91% (20)	22
I lacked empathy for patients.	9% (2)	5% (1)	0%	14% (3)	0%	0%	73%	22
I felt that my peers were more prepared and/or capable than me.	10% (2)	0%	14% (3)	5% (1)	0%	10% (2)	62% (13)	21
I was fearful of hurting a patient.	19% (4)	24% (5)	0%	5% (1)	0%	19% (4)	33% (7)	21
I dreaded going into work.	14% (3)	10% (2)	5% (1)	0%	10% (2)	10% (2)	52% (11)	21
I had significant, unintentional weight changes.	14% (3)	14% (3)	10% (2)	0%	0%	0%	62% (13)	21

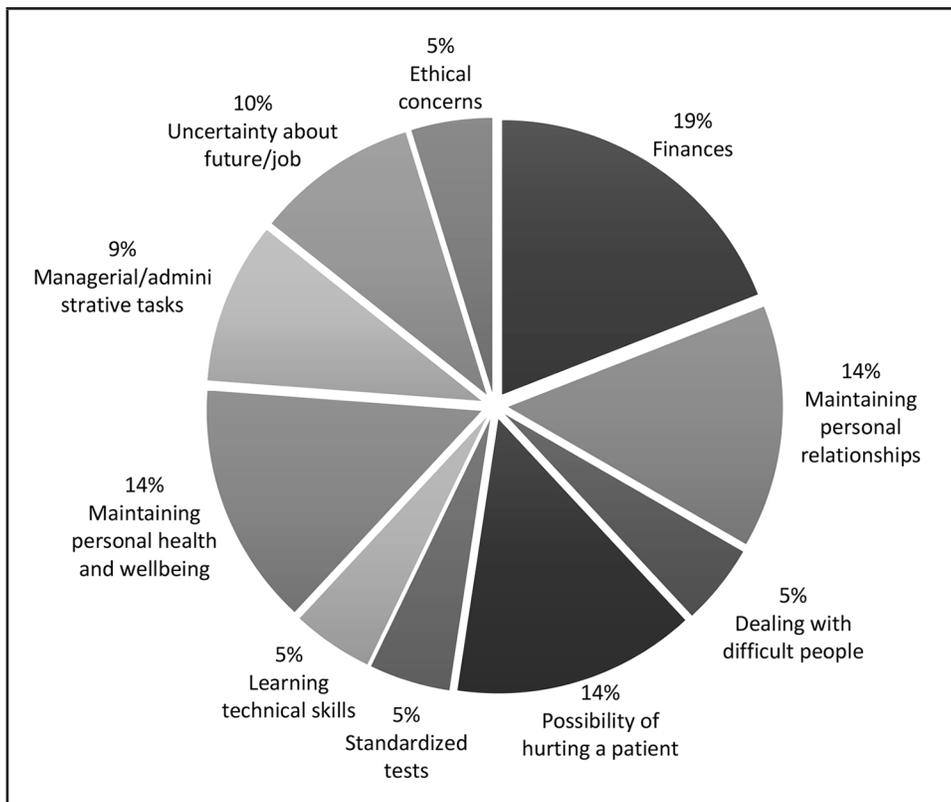


Figure 1. Sources of Stress During General Surgery Residency. Percentages were Calculated from Reported Stress by the Total Number of Respondents, 21.

Activity	Number of Responses Out of 21
Talking with friends and family	19
Talking with faculty, other	12
Talking with a professional	2
Using social media	0
Shopping	0
Watching TV or movies	13
Playing video games	4
Exercising and playing sports	11
Engaging in personal hobbies	10
Drinking alcohol	4
Going out to parties or clubs	3
Sleeping	10
Risk sexual behavior	0
Sexual intimacy	4

## Discussion

This study is a semi-qualitative evaluation, where the authors analyzed response percentages and narrative responses of the sources of stress of general surgery residency, and presented suggestions for improving wellness in such programs. The results suggest that each year, residents experience unique stressful challenges. The first year is when residents felt the most unprepared and in over their heads. However, it was PGY-2 in which residents most frequently felt fearful about hurting a patient. PGY-3 and 4 were reported as years in which residents felt they had the least amount of time, sleep, and ability to have a healthy lifestyle. PGY-3 was also the most frequently cited time when the residents thought about leaving their program or specialty. A large percentage of respondents did not feel that their skills and training matched their PGY-5 responsibilities.

There might be a discrepancy in expectations of the general surgery field by medical students before they become interns and thus contribute to feeling overwhelmed.<sup>4</sup> The findings suggest the first 2 years should focus on standardized training and building residents' confidence in their skills. Effective mentoring by faculty can help prepare residents to become successful, independent practitioners.<sup>9</sup> Establishing deeper mentorships during these first two years can help alleviate some of the stresses mentioned, as well as lay a strong foundation for later years of residency, when some other stresses may become more prominent. A previous study reports that research years can lead to isolation or allow "escape" from the harsh environment of clinical duties, thus causing residents to reconsider their career.<sup>4,10</sup> Program directors should ensure resident well-being and satisfaction in PGY-3 to 4. The sense of inadequacy in PGY-5 can be extrapolated into fellowship training and is supported by current literature where at least 30% of supervising program directors indicate that there are traits of clinical and operative unpreparedness.<sup>11</sup> The ACS transition to practice program or active mentorship during residency might be fitting solutions in resolving this potential dilemma.<sup>8</sup>

Finances, interpersonal relationship issues, fear of hurting a patient, and personal health and wellbeing were all top causes of stress (Figure 1). Financial stress may be particularly severe for general surgery residents in Hawai'i, due to the high cost of living, layered upon the substantial debt incurred from medical school – median debt of \$134,000 for JABSOM students in 2014.<sup>12,13</sup> For comparison, the national median debt for graduating medical students in 2018 was \$192,000 according to the AAMC.<sup>14</sup> This informs the need for geographically appropriate salary calibration for residents and early financial advising.

In regards to coping mechanisms, residents reported talking with family, friends, and colleagues as the preferred ways of managing stress (Table 3). Perhaps, program directors may consider selecting general surgery applicants with stronger ties to the location of the program, eg. family since it may improve

resilience. Interestingly, talking with a professional was not cited as frequently. Physicians, particularly surgeons, have been described as competitive individuals and may have a false belief that seeking help is a sign of weakness.<sup>9</sup> This suggests that if program directors are looking to improve resident well-being and relieve stress, having informal one-on-one meetings to check in with a mentor or having social events would be preferable to more formal and professional interventions. However, this study did not evaluate the strength of supportive resources at the training locations. Current residency programs often emphasize that professional help is often available if the residents need it, but if the most effective way to help relieve these stresses is through more informal relationships and events, then these resources could be allocated better. Additionally, having more cohesive relationships with mentors can build comfort and trust in residents in seeking help.<sup>3</sup> Despite needing more investigations, recent literature also supports the practice of mindfulness training to improve resident stress resilience and improve well-being and clinical performance.<sup>15</sup> According to this study, mindfulness training can obviously benefit residency programs drastically since well-being was reported to be one of the most common causes of stress.

From the narrative responses, the most frequently cited suggestions to improve residency programs were to (1) standardize training, (2) have direct advisory or mentorship roles, and (3) improve coverage to ensure adequate relief. Having direct and personalized mentorship roles could improve stress relief through talking with colleagues and give budding surgeons a sense of encouragement.<sup>2,9</sup> Excessive work hours from duty obligation or inadequate coverage and multiple night calls per week would hinder the occurrence of mentorships.<sup>2</sup> Lastly, identification of early signs of burnout can assist programs mediate therapy in an appropriate time. Investment into improving resident well-being is potentially cost-effective compared to the financial loss from decreased work commitment or replacing a burned out surgeon. The benefit of burnout prevention and intervention can be as significant as "less turn-over, less illness, fewer days off, improved patient care and better patient satisfaction."<sup>22</sup>

Limitations of the study include the possibility of several biases. Recall bias may arise in that respondents who were nearing completion of their program may have recalled their experiences in a better light than those who were still going through the stresses of the early years. Sampling bias can occur because there were only a few representatives from different parts of the nation. However, these programs were a mix of academic and community programs. Although anonymous, social desirability bias can occur because respondents may have been reluctant to report unprofessional behavior such as alcohol or drug use and anger toward patients or colleagues. Non-response bias is possible if "burned out" residents did not want to participate in the survey and we did not address it, thus potentially losing responses from a significant population. The response rate was below the desired target of 60% and was thus not significant to

perform a statistical analysis and obtain meaningful quantitative results. Additionally, three of the programs that were contacted to distribute the survey did not reliably report the number of recipients of the survey and further prevent accurate measuring of response rate. Theoretically, residents who had a stressful experience might have a higher tendency to respond to the survey. However, the data on the prevalence of stressful events is similar to other national surveys of burnout among residents. Lastly, the participants were not blinded and responses may be affected from having insight in taking a stress survey.

The current findings suggest a need for continued emphasis on resident well-being throughout residency. Specifically, new strategies and schedules are needed to promote healthy lifestyles. Adequate sleep would be ideal. These findings demonstrate that each PGY is correlated with its own unique work-related stressors, with mid-level residents at highest risk for leaving their residency program. Effective program interventions may need to be tailored for each PGY-level.

### Conflict of Interest

None of the authors identify any conflict of interest.

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# MEDICAL SCHOOL HOTLINE

## Hawai'i Pacific Neuroscience Summer Internship Program

Maiya Smith BS; Alyssa Wicknick BS; and Kore Kai Liow MD

*In 1993, the Medical School Hotline was founded by Satoru Izutsu PhD (former vice-dean UH JABSOM), it is a monthly column from the University of Hawai'i John A. Burns School of Medicine and is edited by Kathleen Kihmm Connolly PhD; HJH&SW Contributing Editor.*

### Introduction

Hawai'i Pacific Neuroscience (HPN), a multi-disciplinary neuroscience center, is the largest neuroscience teaching facility in the state of Hawai'i. Each year, more than 40 fellows, residents, medical students, post doctorate, and graduate-practicum students complete educational rotations through HPN, ranging from one month to the entire year. Students have come from the University of Hawai'i, Tripler Army Medical Center, Hawai'i Pacific University, Hawai'i School of Professional Psychology, and Chaminade University, as well as mainland universities such as Yale University, Stanford University, University of California-Los Angeles, Johns Hopkins University, and Columbia University. In addition, HPN has been a community partner of the John A. Burns School of Medicine (JABSOM) since 2011 and frequently mentors JABSOM students throughout the academic year. Since 2017, through a summer internship program, HPN has provided both undergraduate and graduate students with experience in the healthcare field.

### Neuroscience Summer Internship Program

The Neuroscience Summer Internship Program (HPN-SIP) exposes undergraduate and graduate students residing in Hawai'i to neurological care by providing opportunities to work in clinic settings and exposure to clinical research. Prior to 2017, pre-medical students traveled to the mainland to find similar opportunities and internships. As a response to this gap in opportunities, the program was created for pre-medical students wanting to experience professional neurological research in Hawai'i. Students with a desire to go into the field of clinical research or medicine and enrolled at an accredited college or university at any level are welcome to apply. Since the program's inception in 2017, over 230 students have participated in the eight-week intensive research program. By interacting with a multidisciplinary team of neurologists, students learn to navigate the benefits and pitfalls of clinical research. Additionally, team leaders, many of them JABSOM students, have the opportunity to mentor students and to be exposed to clinical research.



The HPN-SIP 2019 students and physicians

In 2019, approximately 60 students, including international applicants, applied for the competitive research program, and 30 students were accepted. Students came from schools including Chaminade University, Stanford University, and University of Caen (France). Students worked in small groups and were assigned team leaders, typically medical students who guided pre-medical students in their academic journey. Many of the team leaders were JABSOM students who dedicated their summer to mentoring the HPN-SIP students, some of whom may be their future classmates. Working in their groups, alongside HPN physicians, the students conducted retrospective data analyses on their chosen therapeutic topic. At the conclusion of the program, the students presented posters of their work in the annual summer symposium. The top poster was selected by a panel of community physicians.

In addition to conducting research, students attended seminars led by HPN physicians and community members. A range of topic titles included “MD, PhD, or Both” to “Autism Spectrum Disorders as Revealed by Epigenetics.” Students were encouraged to participate in community events, such as the Epilepsy Foundation’s 4th of July Freedom walk, in efforts to learn the “why” behind research.

## 2019 Abstracts

Therapeutic areas presented by the HPN-SIP students included: Multiple Sclerosis, Alzheimer’s Disease, Parkinson’s Disease, migraines, seizures, and stroke. In choosing topics, HPN took into consideration the community’s interests. For example, both the Parkinson’s and Epilepsy Societies of Hawai‘i expressed an interest in having student research areas pertinent to their organizations. Keeping the community in mind, HPN chose the six topics for the 2019 cohort. Students had the opportunity to rank their top choice projects to which they were assigned.

Below are this year’s HPN-SIP abstracts. Winners of the 2019 final symposium poster presentation were JABSOM team leaders, Julie Crocker (MS3) and Maiya Smith (MS2) with the poster: *Association Between Smoking, Atopic Disease, and Multiple Sclerosis Severity in Hawai‘i Patients*.

### Project 1: Association Between Smoking, Atopic Disease, and Multiple Sclerosis Severity in Hawai‘i Patients

**Students:** Nicholas Van, Lauren Pak, Kylee-Ann Tawara, Lauren Takasato

**Team Leaders:** Julie Crocker, Maiya Smith

**Advisors:** Pat Borman MD, Jason Viereck MD, PhD, Kore Kai Liow MD, FACP, FAAN

Multiple Sclerosis (MS) is a demyelinating disease of the central nervous system. While the cause of MS remains unclear, there are numerous genetic and environmental factors that may

contribute to an increased severity of MS. One established risk factor is smoking and another potential risk factor that is being explored is atopic disease. This study sought to evaluate whether smoking and the presence of atopic disease is correlated with severity of MS. Results showed that smokers had statistically significant increased averages of symptom severity than nonsmokers (smokers =  $3.08 \pm 3.26$  versus nonsmokers =  $1.15 \pm 1.43$ ). No significant difference was found by atopic disease status. This data supports current research found on the continental US concerning symptom severity in regards to smoking and shows that this evidence still holds true amongst Hawai‘i’s diverse population.

### Project 2: Botox as a Treatment for Migraines: A Comprehensive Study on Hawai‘i’s Native Hawaiian Population

**Students:** Keahonui Kam, Sierra Burgon, Spencer Ng, Maveric Abella, Gavin Ha

**Team Leaders:** Carol Lu

**Advisors:** Kore Kai Liow MD, FACP, FAAN

Migraines are characterized by recurring debilitating headaches. Botulinum toxin is sometimes used for chronic migraine management, however, literature demonstrates little evidence on their effectiveness. This study sought to investigate the therapeutic effect of botox injections and analyze the difference in migraine presentation amongst Native Hawaiians. Results showed that Native Hawaiians present with migraines similarly to other ethnicities, but overall receive less therapeutic relief from botox treatment. With a migraine diagnosis, Native Hawaiians may be at higher risk of developing hypertension, stroke, and PTSD. Several lifestyle choices and medical conditions can put Native Hawaiians at a higher risk of cardiovascular diseases, including poor diet, physical inactivity, tobacco/alcohol use, and obesity. Native Hawaiians also are more likely to present with symptoms of numbness and coordination issues, which may be related to their increased prevalence in cardiovascular diseases such as stroke, which share similar symptoms.

### Project 3: Correlation Between Alzheimer’s Disease and Education

**Students:** Abigail Majo, Bryce Sakata, Samantha Masca, Gavin Ha

**Team Leaders:** Camille Burgos, Celine Coyle

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Alzheimer’s Disease (AD) is a progressive neurodegenerative disease that causes an irreversible decline in memory and cognitive skills. Obtaining a higher education is shown to have a protective effect on developing AD. Although the relationship between education and AD has been previously studied, the results remain inconclusive. The current study sought to strengthen the relationship between education level and AD by examining the severity of AD based on the Mini-Mental Status Exam or the Montreal Cognitive Assessment. The results

showed that AD patients with higher education (>12 years) had statistically significant higher cognitive function in comparison to AD patients with lower education (< 12 years). This supports the role of education as protective against developing AD. Studies should continue exploring the correlation between AD and education in other states with a range in education quality and examine other activities that may have a protective effect in developing AD.

#### **Project 4: Leading Risk Factors for Ischemic Stroke: A Comparative Ethnographic Study of Patients In Hawai'i**

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**Team Leaders:** Juliette Capitaine

**Advisors:** Pat Borman MD, Jason Viereck MD, PhD, Kore Kai Liow MD, FACP, FAAN

Stroke is a leading cause of death and disability worldwide. Established risk factors include hypertension, diabetes, hyperlipidemia, smoking, and alcohol consumption. Although there have been studies exploring the correlation between ethnicity and certain risk factors, little is known of the stroke risk in Native Hawaiians and other Pacific Islanders (NHOPI). Investigating the relationship between ischemic stroke and NHOPI, results showed that NHOPI patients had significantly more diabetes, higher BMI and were a decade younger at the onset of stroke, than other ethnicities. Asian patients had more hypertension and were mostly males, in comparison to NHOPI patients who were more frequently female. White patients tended to be mostly male, and drink significantly more alcohol than the other ethnicities. Future studies could include underrepresented populations such as African Americans, Hispanics, and Mixed-raced people. The conclusions from this study can better inform medical recommendations for stroke prevention specific to ethnicity.

#### **Project 5: The Relationship Between Cigarette Smoking and Oral Levodopa Equivalent Daily Dose (LEDD) in Parkinson's Disease Patients**

**Students:** Luke Taylor, Ariel Chon, Shu Yi Shi, Maya Ogasawara

**Team Leaders:** Christian Ogasawara

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Studies have found that smoking leads to a later onset of motor symptoms and a reduced risk for developing Parkinson's Disease (PD). However, other studies have produced contradictory findings. Among the many symptomatic treatments for PD, Levodopa remains the treatment standard. Levodopa equivalent daily dose (LEDD) is a useful tool to summarize the total anti-parkinsonian medications a patient is receiving. This study sought to compare the average oral LEDD of current smokers and non-smokers in our PD sample. Results showed that LEDD dosages in current smokers were significantly

lower than non-smokers, with a very low overall prevalence of current smokers relative to the expected for Hawai'i's elderly population. With inconsistent results among studies looking at nicotine as a PD treatment, further research needs to be done with a larger sample size.

#### **Project 6: The Use of Systemic Anti-Inflammatory Medication in Intractable versus Not-Intractable Seizures**

**Students:** Caroline Feng, Jessica Huang, Chirstyn Okuno, Kevin Nguyen

**Team Leaders:** Huanli Hu, Alyssa Wicknick

**Advisors:** Pat Borman MD, Jason Viereck MD, PhD, Kore Kai Liow MD, FACP, FAAN

A seizure is defined as a sudden, uncontrolled electrical disturbance in the brain, which can cause unusual movements, sensations, behavior, and loss of consciousness. Epilepsy is the tendency for seizures to recur. Intractable seizure disorder is defined as continued seizure activity, at least once per month, for 18 months, despite the use of two or more anti-epileptic medications. Overall, 20%-40% of seizures are intractable, which accounts for 80% of the health costs of epilepsy management. Inflammatory processes continue to be one of many areas of interest in the development of new epilepsy treatments, particularly for intractable seizure disorders. The researchers hypothesized that patients with intractable seizures will have a higher rate of anti-inflammatory drug use than those with not-intractable seizures. Results found that there was no statistically significant difference in the percentage of patients taking varying quantities of systemic anti-inflammatory medications between the groups, nor in the amount of specific types of anti-inflammatory medications taken between each group. Our data suggests that the use of known systemic anti-inflammatory medications do not influence seizure control. Further studies could investigate other inflammatory pathways.

#### **Conclusion**

HPN's vision is to increase the number of future healthcare providers in Hawai'i. Exposing pre-medical students to possible future health career paths at home is important to Hawai'i's future, especially given the growing physician shortage in Hawai'i. The HPN summer research program was designed with this shortage in mind by catering to Hawai'i's local talent and providing students with opportunities for both academic pursuit and community outreach.

After completion of the summer 2018 internship program, Carol Lu, an undergraduate student at Johns Hopkins University, stated:

Now, more than ever, I wish to do research in cognitive neuroscience, and I intend to do everything I can to get there. Though my time at HPN has come to an end, for now, I know

even greater things await me ahead at John Hopkins University, where I have committed to studying neuroscience and cognitive science. In ten years' time, I will have obtained my Ph.D and will be conducting and leading research that will make an impact in this world.

A year later, Carol returned to HPN as a 2019 summer student leader. Her abstract was accepted for national presentation at the 2019 American Epilepsy Society meeting in Baltimore. Carol is an example of how HPN's summer internship program can help pave the road for Hawai'i students to grow and develop into healthcare leaders and future innovators.

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# INSIGHTS IN PUBLIC HEALTH

## Development, Implementation, and Evaluation of the Prevent Diabetes, Hawai'i Campaign

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*Insights in Public Health is a monthly solicited column from the public health community and is coordinated by HJH&SW Contributing Editor Tetine L. Sentell PhD from the Office of Public Health Studies at the University of Hawai'i at Mānoa and Contributing Editor Michele N. Nakata JD from the Hawai'i Department of Health.*

### Abstract

The Prevent Diabetes, Hawai'i campaign aimed to increase awareness of prediabetes by encouraging adults to take a Diabetes Risk Test and share the results with their doctors or healthcare providers. The campaign was developed based on social marketing principles, and focus groups were used to inform the marketing mix. Television, radio, digital, and print advertisements featured local actor and comedian Frank De Lima, and a website with an online Diabetes Risk Test and resources for patients and providers were promoted in all advertisements. From March 2017 to November 2019, more than 55,000 Hawai'i residents visited the campaign website. Campaign outcomes were assessed through state-added questions to the 2017 Behavioral Risk Factor Surveillance System. Overall, 35.0% of adults said that they remembered seeing or hearing an advertisement featuring Frank De Lima and/or the Prevent Diabetes, Hawai'i message. Five percent of respondents reported taking an online or paper version of the Diabetes Risk Test in the past 12 months, and an additional 19.7% said that they planned to take it. Among those who reported taking the Diabetes Risk Test, 60.2% said they had already spoken to their doctor or other healthcare provider about the test results or risk for type 2 diabetes. The State Department of Health will continue efforts to increase awareness of type 2 diabetes and prediabetes, reach priority populations most at risk, and expand availability of evidence-based lifestyle change programs.

### Keywords

prediabetes, type 2 diabetes, health communications, social marketing, screening

### Abbreviations

CDC = Centers for Disease Control and Prevention  
DOH = Hawai'i State Department of Health  
DPP = Diabetes Prevention Program  
FQHC = Federally Qualified Health Center

### Highlights

- An estimated 442,000 adults in Hawai'i have prediabetes, but two-thirds are not aware of having this condition.
- The *Prevent Diabetes, Hawai'i* campaign was launched to increase awareness of prediabetes and encourage adults to take the Diabetes Risk Test (available at [www.PreventDiabetesHawaii.com](http://www.PreventDiabetesHawaii.com)).
- From March 2017 to November 2019, more than 55,000 Hawai'i residents visited the campaign website.
- One-third of Hawai'i adults recalled seeing or hearing a *Prevent Diabetes, Hawai'i* advertisement.
- Approximately 5% of Hawai'i adults surveyed (representing an estimated 61,900 adults) reported taking a Diabetes Risk Test online or on paper.
- The Hawai'i State Department of Health will continue efforts to increase awareness of prediabetes and expand availability of evidence-based lifestyle change programs.

### Background and Campaign Rationale

The burden of type 2 diabetes is increasing in Hawai'i and nationally. Over one decade (2000-2010), the prevalence of self-reported diabetes among Hawai'i adults increased 60%, from 5.2% to 8.3%.<sup>1</sup> An additional estimated 442,000 (41.5%) adults in Hawai'i have prediabetes, yet two-thirds of them are unaware of their condition.<sup>1</sup> Prediabetes is a condition in which an individual's blood glucose levels are elevated, indicating an increased risk for developing diabetes.<sup>2</sup>

Hawai'i adults with lower educational status or lower household income are disproportionately affected by diabetes and prediabetes.<sup>3</sup> Filipino and Native Hawaiian adults are more than twice as likely to have diabetes than white adults. Diabetes prevalence increases with age, with 44.4% of Hawai'i residents who are diagnosed being over age 65.<sup>3</sup> Prediabetes prevalence is

9.4% among those 35-44 years, and 18.6% among those 55-64 years. Additionally, within the past 3 years, people with lower educational attainment, those with lower household income, and younger adults have lower rates of having a test for high blood sugar.

Prediabetes awareness, early identification, and interventions can prevent or delay the progression to type 2 diabetes.<sup>4</sup> In 2016, to address the growing national epidemic, the Centers for Disease Control and Prevention (CDC) developed a risk test and promoted it through the Do I Have Prediabetes? national campaign<sup>5-8</sup> with the goal of preventing new cases of type 2 diabetes. The risk test contains questions about age, gender, family history of diabetes, history of hypertension, physical activity, height, and weight.<sup>9</sup> Individuals who score 5 points or higher on the risk test are encouraged to share the results with their healthcare providers and discuss next steps, such as referral to CDC-recognized lifestyle change programs.<sup>10</sup> The National Diabetes Prevention Program (DPP) focuses on losing 5% to 7% of one's body weight through 150 minutes of physical activity each week and healthy eating and offers an entire year of support to prevent or delay the onset of diabetes.<sup>11</sup>

Since the establishment of DPP, the Hawai'i State Department of Health (DOH) has been working with partners across the state and has leveraged state and federal funding to establish and maintain DPPs in Hawai'i. As of November 2019, there were 17 CDC-recognized DPPs throughout Hawai'i.<sup>12</sup> However, prior to the establishment of DPPs in the state, DOH recognized the need to increase awareness of prediabetes and type 2 diabetes prevention, particularly among populations with higher prevalence and lower screening rates.

## Campaign Development

In 2017, DOH developed a media campaign, *Prevent Diabetes, Hawai'i*, with the goal of preventing new cases of type 2 diabetes. The campaign was modeled after CDC's national campaign and included a risk test with identical questions and scoring. The *Prevent Diabetes, Hawai'i* campaign was developed utilizing social marketing principles,<sup>13</sup> focusing on the perceived value (benefits and barriers) to the target audience to influence behavior.

DOH solicited feedback about the campaign from partner organizations working to establish DPP programs in Hawai'i. They emphasized the importance of focusing on prediabetes awareness in the initial campaign and agreed that a follow-up campaign could encourage people to join DPP programs once they were more readily established throughout the state. Consistent with state surveillance data, the target audience for the campaign was low-income Native Hawaiian and Filipino adults ages 35-64 years. This age range was chosen because prediabetes prevalence increases significantly between the 35-44 and 45-54 age brackets.

To determine messaging that would best resonate with the priority population, DOH conducted formative research with Native Hawaiian and Filipino O'ahu residents aged 35-64 years whose household incomes were under 200% of the federal poverty level. Four focus groups were held with 26 participants (2 with women and 2 with men) to: (1) determine awareness of diabetes and prediabetes; (2) explore perceived risk for type 2 diabetes and perceived preventability of type 2 diabetes; (3) identify motivators and barriers for taking the Diabetes Risk Test and for talking to one's doctor about the risk for diabetes; and (4) gain feedback on the national campaign and risk test.

Focus group data were organized by the marketing mix (Product, Price, Place and Promotion) and guided the state campaign. The marketing mix is a framework used by commercial marketers to sell a tangible product.<sup>14</sup> In social marketing, the marketing mix is adapted to promote a social idea, attitude or behavior.<sup>15-17</sup> A brief definition for each "P" of the marketing mix is provided in the following section, along with results from the focus groups.

## Formative Research Results

**Products:** There are three types of Products in social marketing: The Core Product is the desired benefit to the target audience and is based on their wants, needs, and preferences.<sup>13,15</sup> While the Core Product is the perceived benefit, the Actual Product describes actual features or consequences of performing the desired behavior, and the Augmented Product is a tangible good or service that is offered to encourage the desired behavior.<sup>13</sup>

**Core Product:** "*Type 2 diabetes can be prevented.*" Focus group participants shared that the concept that type 2 diabetes is preventable is a motivating factor for them. Almost all had someone in their family or a close friend with diabetes. The ideas that getting diabetes "is inevitable" or that "it runs in my family" were common themes. Most thought the term prediabetes was confusing. Nearly all said they were motivated by the tagline "Do you have prediabetes?" but recommended using "at risk for diabetes" instead.

**Actual Products:** (1) *Knowledge of prediabetes;* (2) *Potential diagnosis of prediabetes by a healthcare professional;* and (3) *Possible prevention of developing type 2 diabetes.* Nearly all focus group participants stated that diabetes is a concern for them, and many said they fear being diagnosed.

**Augmented Product:** *The Diabetes Risk Test.* The risk test was well-accepted by participants. Almost all said they would have taken the test if they knew about it, and some remarked that it was easy to complete.

**Price:** *Fear, Time, Money, and Self-Control.* The audience gives up something of value—the Price—to receive the desired benefit, or Core Product. Price can either be monetary or non-monetary.<sup>13,15</sup> Participants said there were no barriers to taking a risk test but expressed a fear of being diagnosed with

diabetes. There were also perceived barriers to taking actions such as talking to their doctor, exercising, and eating healthier. They stated that their busy lives, family obligations, little time for exercise, and lack of money were barriers for taking action to reduce their diabetes risk. Many participants talked about the difficulty of resisting customary diets and ethnic foods.

**Place: *At Home and in Doctor's Offices.*** Place can mean either the location where the consumer performs the behavior, or where they acquire campaign-related goods or services.<sup>13</sup> Participants asked for both online and paper versions of the risk test, to either take at home or fill out in a doctor's office or clinic, such as in a federally qualified health center (FQHC). About half of participants said they visited an FQHC in the past 12 months.

**Promotion: *Approachable humor.*** Promotion refers to the communications strategies used to promote the behavior including key messages, messengers, and communications channels.<sup>13</sup> Advertisements for the national campaign utilized a funny but sarcastic tone, and focus group participants found this unappealing. They expressed a desire for advertisements that incorporated humor but asked that it utilize a more approachable tone. Participants said they primarily consume media online, followed by on television and on the radio.

### Campaign Implementation

*Prevent Diabetes, Hawai'i* launched in March 2017. As recommended by focus group participants, the campaign's main message was to take the Diabetes Risk Test and share the results with a doctor or other healthcare provider, with the tagline "Are you at risk for type 2 diabetes?" Advertisements highlighted that type 2 diabetes can be prevented, and that taking the online risk test was simple and quick. The campaign initially ran from March to June 2017, with booster campaign periods running through February 2018.

For an approachable humor, DOH engaged local comedian Frank De Lima to serve as the spokesperson for the campaign, and he was featured in all advertisements (Figure 1). DOH also launched a website, [www.PreventDiabetesHawaii.com](http://www.PreventDiabetesHawaii.com), that housed the online Diabetes Risk Test as well as materials available for download for patients and health care providers, such as risk tests and factsheets available in 14 languages (including Hawaiian, Ilocano, and Tagalog), and information on how to incorporate screening, testing, and referral into provider practices. From March 2017 to November 2019, more than 55,000 Hawai'i residents visited the campaign website.

Campaign promotion included television advertisements; radio messages in multiple languages (including Ilocano and Tagalog); posters in shopping malls; and digital advertisements online as well as in more than 500 digital kiosks in retail locations and clinical settings. DOH also distributed more than 1,000 posters, 2,500 educational brochures, and 4,000 paper risk tests and

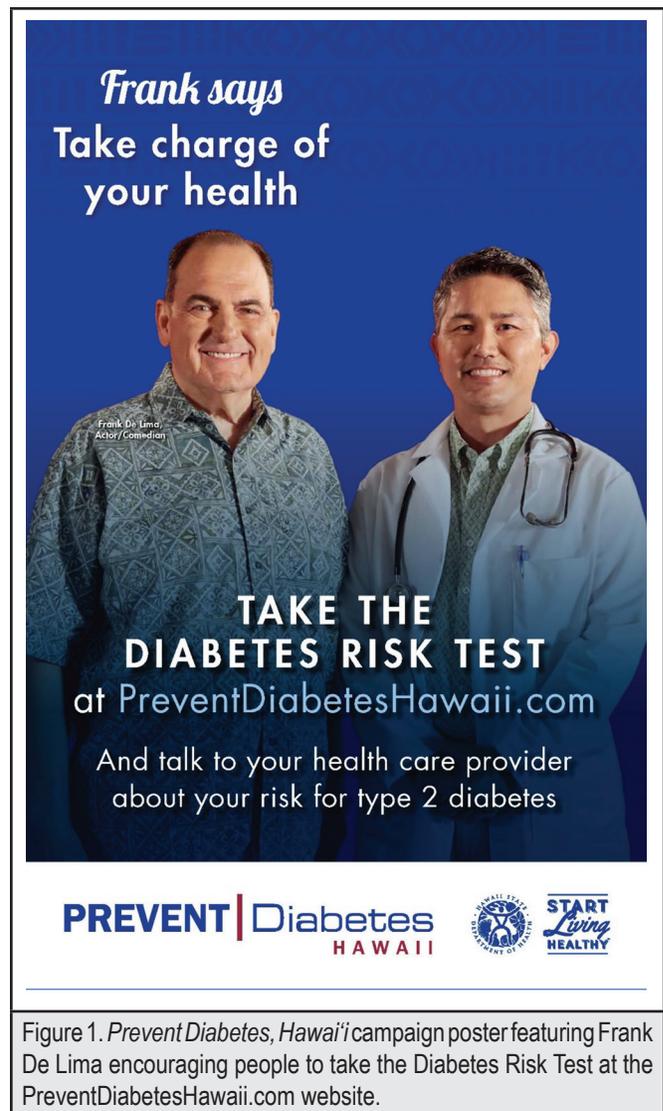


Figure 1. *Prevent Diabetes, Hawai'i* campaign poster featuring Frank De Lima encouraging people to take the Diabetes Risk Test at the [PreventDiabetesHawaii.com](http://PreventDiabetesHawaii.com) website.

campaign-branded pens to partners statewide. Partners include 13 FQHCs, potential and existing DPP providers, diabetes self-management education providers, public health educators, and bilingual health aides.

### Evaluation

To assess awareness of the *Prevent Diabetes, Hawai'i* campaign and its influence on taking the Diabetes Risk Test, 6 questions were added to the Hawai'i Behavioral Risk Factor Surveillance System (BRFSS) survey. Campaign awareness was assessed by asking adults if they remembered hearing or seeing advertisements about preventing diabetes featuring Frank De Lima and/or the *Prevent Diabetes, Hawai'i* tagline (unaided and aided recall). Data were collected from July-December 2017 (n=2,739). Data were analyzed using survey weights to account for the complex survey design and to produce estimates that were more representative of the state population.

In total, 62.6% (789,200 adults) said they had seen or heard an ad about preventing diabetes, and 35.0% reported remembering hearing or seeing a *Prevent Diabetes, Hawai'i* advertisement. This includes 5.0% of adults who reported seeing or hearing ads featuring Frank De Lima or the *Prevent Diabetes, Hawai'i* tagline without prompting (unaided recall). The remaining

adults were able to recall a campaign ad when prompted with the tagline and Frank De Lima (aided recall). Respondents aged 60-69, of Japanese ethnicity, or with a diabetes diagnosis had higher levels of campaign recall, but there were no differences in recall by gender, education level, county of residence, or having a prediabetes diagnosis (Table 1).

Table 1. Percentage of Adults Who Recalled Seeing or Hearing a Prevent Diabetes Hawai'i Campaign Advertisement			
	Recalled Seeing or Hearing a Prevent Diabetes Hawai'i Ad		P-Value <sup>b</sup>
	% <sup>a</sup>	95% CI	
<b>Total</b>	35.0	32.1 – 38.0	
<b>Age (years)</b>			
18 – 29	17.5	12.9 – 23.3	<.001
30 – 39	31.2	24.6 – 38.7	
40 – 49	32.8	26.0 – 40.5	
50 – 59	43.4	36.2 – 50.8	
60 – 69	54.2	47.9 – 60.4	
70+	42.1	35.0 – 38.4	
<b>Gender</b>			
Male	32.8	28.9 – 37.0	.167
Female	37.0	32.8 – 41.4	
<b>Education</b>			
Less than high school	25.7	14.3 – 41.9	.129
High school graduate	33.6	28.2 – 39.5	
Some college	34.1	29.2 – 39.3	
College graduate	41.0	36.8 – 45.3	
<b>Ethnicity</b>			
White	37.5	32.6 – 42.7	<.001
Filipino	24.2	17.9 – 32.0	
Japanese	45.5	38.6 – 52.6	
Native Hawaiian/Other Pacific Islander	40.3	33.8 – 47.2	
Other Asian	28.2	20.4 – 37.5	
Other	26.0	17.7 – 36.5	
<b>County</b>			
Honolulu	36.0	32.3 – 39.9	.760
Hawai'i	32.9	27.7 – 38.7	
Kaua'i	33.4	25.1 – 43.0	
Maui	33.6	26.8 – 41.2	
<b>Diabetes Status</b>			
Diagnosed with diabetes	54.5	44.9 – 63.6	<.001
No diabetes diagnosis	32.6	29.5 – 35.8	
<b>Prediabetes Status</b>			
Diagnosed with prediabetes	38.2	30.9 – 45.9	.105
No prediabetes diagnosis	31.5	28.3 – 34.9	

<sup>a</sup> Data are weighted to the state population

<sup>b</sup> P-value from  $\chi^2$  test

Overall, 5.0% of adults reported taking a Diabetes Risk Test, representing an estimated 61,900 adults. Of those who took it, 3.5% reported taking it online and 1.5% reported taking the paper version. An additional 19.7% of respondents said that they did not take the test but plan to do so. Among adults who reported taking a test, 26.8% indicated that they were at risk for diabetes. Nearly half (43.4%) of those who reported taking the Diabetes Risk Test said they had talked to their doctor or healthcare provider about their test results and/or their risk for Type 2 diabetes. Of those who had not taken a test, 19.7% said they planned to. Finally, campaign recall was higher among those who took a risk test (45.8%) compared to those who did not take a risk test (34.7%), but this was not statistically significant ( $P = .128$ ).

## Discussion and Next Steps

With more DPPs established throughout Hawai'i, DOH is building on the momentum achieved by the *Prevent Diabetes, Hawai'i* campaign and is focusing efforts on generating referrals to and participation in DPP. Currently, DOH has a CDC Cooperative Agreement (1815) that identifies Filipinos as a priority population for additional outreach and engagement efforts around preventing diabetes. Under this funding opportunity, DOH has already disseminated a provider toolkit and conducted educational presentations to health care providers that summarize the need for increased prediabetes screening among this population group. DOH continues to work with health systems serving the priority population to identify patients with prediabetes more effectively and facilitate referrals to DPPs through health information technology activities, such as implementing algorithms, workflows, and clinical decision support tools. In accordance with feedback from partner organizations, DOH is also assessing potential resources for a second media campaign to drive participants to DPPs.

Focus groups would be beneficial for planning a second campaign to understand why the campaign was recalled to a lesser extent by some priority populations, including Filipino adults. Future awareness efforts should engage with Filipino community-based organizations and communication outlets, such as Ilocano and Tagalog radio stations, that serve this population. Although several FQHCs adopted the campaign materials in their clinics, DOH would like to better integrate future campaign efforts with a wider variety of partners who work with the priority population, such as churches and public health nurses. Future advertising efforts should also include digital advertisements in Filipino languages to better reach the population.

As DPP program capacity expands and access is widened through increased insurance coverage, DOH will continue to expand its network of community partners to increase diabetes and prediabetes awareness and screening to align communication efforts better and leverage these organizations' ability to reach the priority populations. DOH will keep the risk test on the

website up to date, maintain resources in different languages, and support DPP providers in creating their own culturally-tailored materials.

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# INSIGHTS IN PUBLIC HEALTH

## Outpatient Care Gaps for Patients Hospitalized with Ambulatory Care Sensitive Conditions in Hawai'i: Beyond Access and Continuity of Care

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### Abstract

*Ambulatory care sensitive conditions (ACSCs) are conditions that can generally be managed in community-based healthcare settings, and, if managed well, should not require hospital admission. A 5-year, mixed methods study was recently concluded that (1) documented disparities in hospitalizations for ACSCs in Hawai'i through quantitative analysis of state-wide hospital discharge data; and (2) identified contributing factors for these hospitalizations through patient interviews. This Public Health Insights article provides deeper context for, and consideration of, a striking study finding: the differences between typical measures of access to care and the quality of patient/provider interactions as reported by study participants. The themes that emerged from the patients' stories of their own potentially preventable hospital admissions shed light on the importance of being heard, trust, communication, and health knowledge in their relationships with their providers. We conclude that improving the quality of the relationship and level of engagement between the patient and community/outpatient providers may help reduce hospitalizations for ACSCs in Hawai'i and beyond. These interpersonal-level goals should be supported by systems-level efforts to improve health care delivery and address health disparities.*

### Ambulatory Care Sensitive Conditions

Hospital admissions for ambulatory care sensitive conditions (ACSCs) are considered avoidable with access to high-quality outpatient care.<sup>1</sup> Admissions due to ACSCs are tracked by health care systems and hospitals as performance measures.<sup>2</sup> Reducing ACSC hospitalizations is an important topic as the cost of ACSC hospitalizations was estimated at over \$30.8 billion nationally<sup>3</sup> and over \$250 million for the state of Hawai'i specifically.<sup>4</sup>

The majority of ACSC research has focused on information available through administrative data (ie, insurance type) from the hospitalization itself and/or area-level data (ie, supply of primary care physicians).<sup>5-7</sup> Qualitative insights regarding patients' experiences before the hospitalization, including those experiences in the outpatient setting, have been limited.<sup>8-10</sup> Patient-centered insights are critical to understanding fun-

damental factors precipitating these potentially preventable hospitalizations.<sup>11-12</sup> Even the terminology of "ambulatory care sensitive conditions" points to the importance of considering the outpatient setting to reduce these hospitalizations. Also, as vulnerable patients rely more heavily on "the physician's competence, skills, and good will" than less vulnerable ones,<sup>13</sup> primary care may be particularly important for reducing ACSC-related hospitalization disparities.

ACSC hospitalization data on heterogeneous Asian and Pacific Islander populations has been limited.<sup>14-16</sup> With grant support from the National Institutes of Health, we recently concluded a 5-year mixed methods study in the state of Hawai'i that (1) documented significant disparities in ACSC hospitalization rates for some disaggregated Asian and Pacific Islander populations compared to whites in heart disease and diabetes through quantitative analysis of state-wide hospital discharge data;<sup>15-20</sup> and (2) identified contributing factors to these hospitalizations using in-person interviews of patients with ACSC hospitalizations at a major medical center.<sup>9,21-22</sup> Compared to whites, quantitative results demonstrated higher rates of ACSC hospitalizations for Native Hawaiians, Filipinos, and some elderly Asian groups and notably high costs for Native Hawaiians for these hospitalizations.<sup>15-20</sup> When asked to share their perspectives about why they were hospitalized with an ACSC, many patients reported psychosocial factors, including homelessness, poverty, mental illness, and substance abuse as critical precipitating factors to these hospitalizations.<sup>9,21-22</sup>

This Public Health Insights article provides deeper context for, and consideration of, a striking study finding: the differences between typical measures of access to care and the quality of patient/physician interactions as reported by study participants during in-person interviews. We conclude that improving the quality of the relationship and the level of engagement between the patient and community/outpatient providers

may help reduce hospitalizations for ACSCs in Hawai‘i and beyond. These interpersonal-level goals should be supported by systems-level efforts to improve health care delivery and address health disparities.

## Study Methods

From June 2013 to February 2016, we interviewed 102 adults hospitalized for diabetes mellitus (DM) or cardiovascular disease (CVD) within The Queen’s Health Systems<sup>23</sup> on the island of O‘ahu. CVD and DM are responsible for approximately 40% of all ACSC hospitalizations.<sup>24</sup> We restricted recruitment to patients who lived in the state of Hawai‘i and self-reported race/ethnicity as Asian, Native Hawaiian, Other Pacific Islander (eg, Samoans, Micronesians), or white, and who were proficient in English. Here we provide brief methodological details to contextualize study findings discussed in this article. More details of the study methods and detailed description of the study population can be found elsewhere.<sup>9,21-22</sup>

Most participants (73%) were working age (21-65 years) and many had socio-demographic vulnerabilities. Ninety-six percent had less than a college degree; 32% had a family income of less than \$20,000/year. Approximately a quarter were experiencing housing challenges and many were experiencing mental health and/or substance abuse issues.<sup>21</sup>

Following consent, an interviewer administered a semi-structured oral questionnaire. This included standard measures of access to care (ie, self-reported insurance coverage; having a personal doctor) and items from the Parent’s Perceptions of Primary Care (P3C) tool modified to pertain to perception of the respondents’ experience of primary care (rather than a child’s).<sup>25</sup> Open-ended questions elicited patient perspectives on their hospitalizations. Additional data were obtained through medical record review. Qualitative analyses of patients’ open-ended responses were guided by the framework approach by two coders.<sup>26</sup>

The focus on outpatient care experiences was not planned, nor previously reported in detail. The interest in these experiences arose organically as the numerous mentions of challenges became notable in contrast to findings of strong access to care from standard questionnaire items, including long-standing relationships with primary care providers. Thus, we returned to the qualitative data to consider this issue in more detail. Individuals who had specifically mentioned an issue related to outpatient care when asked why they felt they were hospitalized were identified. From their responses, two coders considered relevant outpatient care themes. Individuals were classified as dichotomously (yes or no) mentioning outpatient care themes, and then further classified as saying something positive, negative, neutral, or mixed (both positive and negative) for that theme.

## Access and Primary Care Quality

Despite notable social vulnerabilities, most respondents reported having access to care and continuity of care, including having health insurance (89%), a usual source of care (87%), and a personal doctor (83%). On average, individuals had been going to their usual source of care for 10.3 years (SD:9.1) and seeing their personal doctor for 10.5 years (SD:8.5).

Yet many patients experienced limitations in aspects of high-quality primary care. Some respondents felt uncomfortable asking questions to their primary care provider (PCP) (31%), reported the PCP did not explain things to their satisfaction (41%), or reported the PCP did not spend enough time with them (39%). While 64% felt the PCP knew their medical history, only 41% felt they also knew their health values and beliefs.

## Qualitative Analysis Related to Outpatient Care

Eighty-two of the 102 respondents (80%) specifically mentioned at least 1 issue related to outpatient care when asked why they felt they were hospitalized. Six themes emerged: communication, trust, respect/care, coordination, access, and knowledge. Responses are considered below and by the nature, positive or negative, of the way in which each issue was raised by the patient (Table 1).

### Communication

The most common theme in patient interviews was communication, mentioned by 60 respondents who reported an outpatient care issue; 47 (78%) of these descriptions were negative. For instance, a 42-year-old man said his doctors did not read the notes from other providers. A 39-year-old woman said she needed “better communication with patient and doctor, and not only them diagnosing you with their medical terms.” A 23-year-old woman, who was a new immigrant with a preference for her native language, said it is “easier for me to understand in [my language, but] I never ask for an interpreter, [no one] asked if I needed one.” Others mentioned positive examples of communication, including a 58-year-old woman who called her doctors her “partners” and said, “what I love about them is that they hear me.”

### Trust

Trust was identified by 27 respondents; 18 (67%) of these were negative. A 69-year-old woman said her doctor yelled at her, and she had lost trust in this provider. She said her doctor: “just keeps giving me more pills.” She wanted a new provider but also did not want to hurt her physician’s feelings. However, 7 individuals mentioned trust in a positive way. A 74-year-old

man noted specifically that he trusts his providers who come to his house to help him with his diabetes.

### Respect/Care

Forty-two respondents mentioned this theme, including 20 (48%) who said they did not feel respect/care from their doctor. A 39-year-old woman said her provider was rushed: “They got no more the time for talk with you or sit and find out ‘cause they get other patients they got to go make money off of.” As a 62-year-old minority woman said: “If you’re going to get a doctor that looks down at you, or not understand our culture, then eventually it’s going to break up.” However, 12 patients noted respectful relationships with providers.

### Coordination

The coordination of care across doctors was described by 25 respondents; 15 of these (60%) were negative. Patients reported long wait times or not being able to get an appointment soon enough. Sometimes these challenges resulted in emergency room visits. A 62-year-old woman said: “If you can’t see your doctor, you go to the emergency... because you have no choice.”

### Access to/Continuity of Care

Twenty-five respondents mentioned issues around access and/or continuity relevant to outpatient care. These included lacking insurance or being afraid to go to the doctor. Of those, 14 respondents mentioned this access as something negative, while 8 said something positive, including the respondent with the “diabetes doctors” who come to his home.

### Knowledge

Patient stories revealed gaps in knowledge or management of their disease; 46 patients who mentioned outpatient care

experiences mentioned significant knowledge gaps, as did 10 who did not mention an outpatient care experience. Although many individuals had general knowledge of recommendations (eating right, watching their feet for complications of diabetes), they did not understand why they were doing so (ie, how heart disease worked exactly) or which issues warranted going to the emergency department. Significant gaps in understanding (such as not thinking of insulin as a medication) were noted. For instance, a 62-year-old woman who has had diabetes since age 12 did not think her non-healing wound was serious: “I’m not comprehending that I am so close to being amputated.”

### Multiple Aspects

Finally, many patients described multiple aspects of care (trust, respect, care coordination) together. For instance, a 67-year-old man reported a non-mutual doctor-patient relationship: “No one is working with me to develop a plan, just telling me what to do.” He said: “I want a doc who believes in meds, but who also believes in natural foods and health...not just ‘meds, meds’.” This patient was hospitalized because, to be more natural, he stopped taking all medication suddenly without telling his doctor. When he finally sought care for chest pain, he also had a foot infection.

A 60-year-old man mentioned lack of trust between people in his ethnic group and doctors. He also felt doctors did not take him seriously because of his drug use. He wanted better communication with doctors, and for doctors to provide reasons, “Why am I going to listen to you?” He noted a strong relationship with a nurse who called him regularly to check on him.

A 69-year-old woman had 3 doctors who did not seem to communicate with each other, which she blamed on a primary care provider she had seen for many years. She said no one explained her health issues in a way that she could understand. She was hospitalized for an infection, and said: “What does my diabetes have to do with my leg like this?”

Participant Description	Participant Perspective	Time with Personal Doctor	Contextual Notes
<b>Theme: Access to Care/ Continuity of Care (mentioned by 25 respondents: 14 negatively, 8 positively, 3 mixed-positive negative)</b>			
52-year-old man	“The reason I am in hospital because I could not afford health insurance. I didn’t know how serious my condition was. I was shocked to see how much of my toe was removed.”	No usual source of care (USC)	7 years since he last saw a doctor because he had no insurance and it was too expensive
57-year-old man	“Too worried about taking care of myself than trying to see a doc.”	No USC	Homeless, has no money for food, and a substance abuse history
32-year-old woman	“Have better relationship with wound care than my doctor.”	1 year	Was living in Seattle and moved home to Hawai’i a year ago. Doesn’t have a new primary care physician (PCP).
53-year-old man	“Just got to know my PCP within this year. I never had any problems regarding my health. Everything was ok and so I didn’t need to see someone.”	1 year	No regular care, did not go to PCP because did not feel sick

Participant Description	Participant Perspective	Time with Personal Doctor	Contextual Notes
<b>Theme: Trust (mentioned by 27 respondents: 18 negatively, 7 positively, 3 mixed positive-negative)</b>			
76-year-old man	"I can feel if true or just trying to make money...You can feel that concern they have for the individual. They want to help."	30 years	
69-year-old woman	"She just keeps giving me more pills."	7 years	Used to trust her doctor but not getting better so really doesn't trust doctor now and wants a new one, but doesn't want to hurt PCP's feelings.
48-year-old woman	"I don't trust in-house docs. No listen to me. I feel like I'm a guinea pig to them."	6 years	
68-year-old man	He has a lot of doctors, but they "don't know sh** about anything" and they give him the "run around...Don't trust people, after Vietnam came back to no one appreciating me. I'm an angry kind of guy."	10 years	A very heavy drinker, 10-12 drinks a day, 7 days a week and living in a place not suitable for habitation.
<b>Theme: Respect/Care (mentioned by 42 respondents: 20 negatively, 12 positively, 3 neutrally and 7 mixed positive-negative)</b>			
73-year-old man	Doctors sometimes dismiss his problems with "Well, we take care of you tomorrow"	20 years	Mostly has a good relationship with doctors, likes them and jokes around.
57-year-old man	"Don't think PCP takes me seriously"	12 years	Has pain and cannot get pain meds because of history of drug use.
75-year-old man	"My PCP and I don't get along."	10 years	Doctor told him he had to switch doctors because not listening to the doctor.
50-year-old woman	Doctor wanted to amputate her whole foot so she "wouldn't have to come back here anymore"	2 years	She walks a lot so if she lost her toe, she would no longer be self-sufficient.
59-year-old woman	"Sometimes if I don't understand doc, I don't do what I am told. I never think about asking him to repeat. It's part of my culture not to ask or question. B/c he is not from my culture and sometimes does not understand my needs."	10 years	
<b>Theme: Coordination (mentioned by 25 respondents: 15 negatively, 4 positively, 5 neutrally, and 1 mixed positive-negative)</b>			
51-year-old man	"I never like to go to doctors...I no like go doctor"	<1 year	He got his heart disease diagnosis and was seeing many doctors over many weeks to get results, get new tests, learn more, but got worse during this time so cut off medication during this time because he was feeling worse.
56-year-old man	"It became a labored experience. It's very troublesome"	<1 year	Last doctor had seen him for 30 years, but lost insurance and had to get a new doctor. It took him 6 months to get insurance and a new doctor. Has a heart doctor and PCP and needs to schedule three doctors—hard to schedule them.
<b>Theme: Communication (mentioned by 60 respondents; 47 negatively, 6 positively, 3 neutrally, and 4 mixed positive-negative)</b>			
58-year-old woman	"What I love about them is they hear me."	20 years	Works well with doctors and calls them "my partners."
65-year-old man	"I cannot read...I cannot understand the words doc uses."	2 years	
65-year-old man	Doctor didn't teach about disease. He just "talk fast and go"	28 years	
73-year-old woman	"Sometimes I don't understand what the doctor says, but I don't tell him I don't understand...Or I forget and cannot remember...Sometimes I feel it's hard to let the doc know how I'm feeling. I don't know the questions to ask."	12 years	

Participant Description	Participant Perspective	Time with Personal Doctor	Contextual Notes
57-year-old man	"They don't take time to explain things... I don't get the care I think I should get."	27 years	Active substance abuse may complicate communication
61-year-old man	"They didn't ask. I had no reason to tell them. I didn't want to add to their problems because they cannot help me..."	2 years	Cannot read because of diabetes complications and did not go to the eye doctor because of concern about cost. Did not tell doctors about his financial worries.
23-year-old woman	"I'm shy, scared and don't know how to ask or tell them what I need..."Easier for me to understand in [my language, but] I never ask for an interpreter, nor has anyone asked if I needed one."	6 years	Documented as "noncompliant" in records.
39-year-old woman	"They just tell me the normal things. You've got to take your meds, your insulin...but to be in pain and to be at home taking kids and to do all of that ain't so easy."	8 years	
51-year-old man	"Ask plenty questions b/c you know you go on google and you think you have medical degree. It's really just about communicating with doc."	<1 year	
50-year-old man	"Difficult to be physically ill and not able to use the right words to express myself. "	1 year	Notes a good relationship with doctor.
41-year-old man	Did not tell doctor about mental health or substance use because "didn't feel like I should talk to doctor about personal problems."	5 years	Good relationship with doctor in general, notes that he feels comfortable. Yet still not sharing relevant information.
<b>Theme: Knowledge Gaps (mentioned by 56 respondents)</b>			
42-year-old man	Says he has probably gotten patient education before but "wasn't paying attention"	29 years	Has been with the doctor for a long time. Was thinking problem would heal on its own as this has happened before and got better. Knew he had an appointment so was just waiting for that, did not know the problem was so acute that he should have gotten immediate care.
80-year-old woman	"Talking to docs was just fine but didn't follow what doc said"	20 years	Didn't think a little salt would hurt her health.

## Considerations

Quality outpatient, primary care is a public health issue and plays a critical role in reducing ACSC hospitalizations. Most participants in the current study reported good access to primary care and long-term continuity of care, yet their stories revealed limitations in timely access to high-quality outpatient care, the depth of the patient-provider relationship, and patient-provider communication. Despite relationships of many years, some patients reported their providers did not know their beliefs and values. Efforts to address these problems may demand skills such as cultural competency and health communication that may not be sufficiently taught during provider training.<sup>27-28</sup> There is motivation to focus on these issues, including the fact that the acute care for these patients is expensive.

The current study holds lessons for new care models, including accountable care organizations and their providers. For instance, although poor health outcomes are often attributed to lack of access or health insurance, most participants in the current study had insurance and reported good access to care. Other factors are clearly important and need to be addressed. This could occur during a hospitalization for an ACSC, in primary care, and/or in health systems-focused efforts to improve quality and outcomes in health care delivery.

Options to support patient needs during an ACSC hospitalization could be to provide in-hospital case managers, arrange follow-up visits with physicians, and ensure a review of medications for omissions, duplications, dosing errors, and/or interactions. Culturally-relevant patient navigators can bridge acute care with

supports that connect patients to outpatient care and address their psychosocial needs following discharge.<sup>29-30</sup> Providers should strive to build trusting, culturally-sensitive relationships and provide continuity of care from the inpatient to outpatient setting and across outpatient providers.

Communication is critical. Previous research has found that, in people with diabetes, doctor-patient communication is associated with better self-management.<sup>21-34</sup> Studies have found that although patients report that their doctors communicate well in general, this is not always the case around diabetes-specific matters.<sup>21-34</sup> Previous studies have also found that many patients have poor understanding of their chronic condition(s), especially among those with low health literacy and those with limited English proficiency.<sup>35-36</sup>

Such factors are likely relevant to the communication gaps described by patients in this study. Fortunately, effective models exist for improving physician communication.<sup>37</sup> Gaps in patient knowledge around disease-specific topics, in particular, could be a focus for patient education, including culturally-relevant nutrition information.<sup>38-39</sup> However, the responsibility to address these gaps cannot fall only on providers who have many competing demands and time pressures. Health care organizations should integrate strategies to ensure patient and caregiver health literacy in typical workflows.<sup>40-41</sup> Time to deliver patient education, understand patient needs, and build trust should be understood as necessary and adequately compensated. These are important not just for high quality health care, but also to address health disparities.

Native Hawaiians, Asians, and Other Pacific Islanders identified trust as an important issue in this study. Research suggests trust in components of our health care system differs by race, as does the quality of patient-physician interactions.<sup>42-44</sup> Minority individuals report less empathetic responses from physicians, less rapport, and less participation in decision making.<sup>42-44</sup> Although it can be challenging to separate the roles of cultural preferences, health care professional biases, and health care system biases, our study confirms that trust in providers is an important issue to this patient population in Hawai'i.

Collaborative care management (CCM) reduces racial/ethnic disparities.<sup>45-47</sup> Patient-centered medical homes are potential solutions to some of these issues.<sup>48</sup> Patient navigators and community health workers may also provide solutions to these care gaps.<sup>29-30;49-50</sup> They can provide culturally-appropriate education, link patients to help when the doctor is busy, and facilitate rapport and building trust.<sup>29-30;49-50</sup> We also note the background social and psychological factors precipitating these hospitalizations for ACSC are not typically captured in administrative data, but are increasingly included in electronic medical records and health system workflows generally and specifically in the state of Hawai'i.<sup>51-52</sup>

In this project, we considered the patient perspective, but the provider perspective could also identify potential pathways to improved outcomes. We also focused on individuals hospitalized with an ACSC. Further work should prospectively study a population with similar clinical and social vulnerabilities who are not yet hospitalized to determine the factors that predict hospitalization. Only participants who could speak English were included. Because communication and trust may be exacerbated in patients with limited English proficiency, our results may underestimate problems in these areas. Another limitation is that many of our metrics are based on self-report. Finally, we did not ask specifically for thoughts on outpatient care in the open-ended question portion of the interview, so this is not a comprehensive assessment of all participants' perspectives on this topic.

## Conclusions

This article highlights key issues around ACSC hospitalizations in Hawai'i from a public health perspective. We considered provider/patient-focused factors that arose in patients' stories of why they believed they were hospitalized with an ACSC. Despite long-term relationships with providers, patients reported issues related to patient-doctor relationships and poor patient-provider communication. These shed light on the importance of being heard, trust, communication, and health knowledge in relationships with the provider. Improving the quality of the relationship and level of engagement between the patient and community/outpatient providers may help reduce hospitalizations for ACSCs in Hawai'i and beyond. These interpersonal-level goals should be supported by systems-level efforts to improve health care delivery and address health disparities. It is time to reconfigure health care so it supports the critically important relationships between patients and providers.

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# Hawai‘i Journal of Health & Social Welfare (HJH&SW)

## Style Guide for the Use of Native Hawaiian Words and Diacritical Markings

The HJH&SW encourages authors to use the appropriate diacritical markings (the ‘okina and the kahakō) for all Hawaiian words. We recommend verifying words with the Hawaiian Language Dictionary (<http://www.wehewehe.org/>) or with the University of Hawai‘i Hawaiian Language Online (<http://www.hawaii.edu/site/info/diacritics.php>).

Authors should also note that Hawaiian refers to people of Native Hawaiian descent. People who live in Hawai‘i are referred to as Hawai‘i residents.

Hawaiian words that are not proper nouns (such as *keiki* and *kūpuna*) should be written in italics throughout the manuscript, and a definition should be provided in parentheses the first time the word is used in the manuscript.

Examples of Hawaiian words that may appear in the HJH&SW:

*‘āina*  
*ali‘i*  
*Hawai‘i*  
*kūpuna*  
*Kaua‘i*  
*Lāna‘i*

*Mānoa*  
*Māori*  
*Moloka‘i*  
*O‘ahu*  
*‘ohana*  
*Wai‘anae*

## General Recommendations on Data Presentation and Statistical Reporting (Biostatistical Guideline for HJH&SW) [Adapted from Annals of Internal Medicine & American Journal of Public Health]

The following guidelines are developed based on many common errors we see in manuscripts submitted to HJH&SW. 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, 27%, 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 greater 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.

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