Hawai‘i Journal of Medicine & Public Health

A Journal of Pacific Medicine & Public Health
ISSN 2165-8218 (Print), ISSN 2165-8242 (Online)

The Journal’s aim is to provide new scientific information in a scholarly manner, with a focus on the unique, multicultural, and environmental aspects of the Hawaiian Islands and Pacific Rim region.

Published by University Health Partners of Hawai‘i (UHP Hawai‘i) [formerly University Clinical, Education & Research Associates, UCERA]
Hawai‘i Journal of Medicine & Public Health
677 Ala Moana Blvd., Suite 1016B, Honolulu, Hawai‘i 96813
http://www.hjmph.org; Email: info@hjmph.org

The Hawai‘i Journal of Medicine & Public Health was formerly two separate journals: The Hawai‘i Medical Journal and the Hawai‘i Journal of Public Health. The Hawai‘i Medical Journal was founded in 1941 by the Hawai‘i Medical Association (HMA), which was incorporated in 1856 under the Hawaiian monarchy. In 2009 the journal was transferred by HMA to University Health Partners of Hawai‘i (UHP Hawai‘i). The Hawai‘i Journal of Public Health was a collaborative effort between the Hawai‘i State Department of Health and the Office of Public Health Studies at the John A. Burns School of Medicine established in 2008.

Editors:
S. Kalani Brady MD, MPH
Michael J. Meagher MD

Editor Emeritus:
Norman Goldstein MD

Associate Editors:
Lance K. Ching PhD, MPH
Tonya Lowery St. John PhD, MPH
Ranjani R. Starr MPH

Copy Editor:
Alfred D. Morris MD

Senior Editors:
Joel Brown MD
Ben Young MD

Junior Editors:
Joshua Holmes MPH
Tricia Mabellos DrPH
Ghazaleh Moayedi DO

Contributing Editors:
Kathleen Khimm Connolly PhD
Donald Hayes MD, MPH
Satoru Izutsu PhD
Carolyn Ma PharmD
Tetine L. Sentell PhD
Russell T. Stodd MD
Carl-Wilhelm Vogel MD, PhD

Layout Editor & Production Manager:
Drake Chinen

Editorial Board:

Statistical Consulting:
Biostatistics & Data Management Core,
John A. Burns School of Medicine,
University of Hawai‘i (http://biostat.jabsom.hawaii.edu)

Advertising Representative
Roth Communications
2040 Alewa Drive, Honolulu, HI 96817
Phone (808) 595-4124

The Hawai‘i Journal of Medicine & Public Health (ISSN 2165-8218) is a monthly peer-reviewed journal published by University Health Partners of Hawai‘i (UHP Hawai‘i). The Journal cannot be held responsible for opinions expressed in papers, discussion, communications, or advertisements. The right is reserved to reject material submitted for editorial or advertising columns. Print subscriptions are available for an annual fee of $220; single copy $20 includes postage; contact the Hawai‘i Journal of Medicine & Public Health for foreign subscriptions. Full text articles available on PubMed Central. ©Copyright 2017 by University Health Partners of Hawai‘i (UHP Hawai‘i).

Over 50 Years of Dedication to Hawai‘i’s Physicians

The Board of Directors at Physicians Exchange of Honolulu invite you to experience the only service designed by and for Physicians in Hawai‘i.

President:
Vince Yamashiroya, M.D.

Vice President:
Stephen Osli, M.D.

Secretary:
Kimberly Koide Iwao, Esq.

Treasurer:
Richard Philpott, Esq.

Directors:
Cynthia Goto, M.D.
Robert Marvit, M.D.
Myron Shirasu, M.D.
Garret T. Yoshimi
David Young, M.D.

Executive Director:
Rose Hamura

• Professional 24 Hour Live Answering Service
• Relaying of secured messages to cell phones
• Calls Confirmed, Documented and Stored for 7 Years
• HIPAA Compliant
• Affordable Rates
• Paperless Messaging
• Receptionist Services
• Subsidiary of Honolulu County Medical Society
• Discount for Hawai‘i Medical Association members

“Discover the difference of a professional answering service. Call today for more information.”

Physicians Exchange of Honolulu, Inc.
1360 S. Beretania Street, #301
Honolulu, HI 96814

(808) 524-2575
Retrospective Review of Pediatric Blunt Renal Trauma: A Single Institution’s Five Year Experience

Carly R. Richards MD; Margaret E. Clark MD; Ronald S. Sutherland MD; and Russell K. Woo MD

Abstract
Children are at higher risk of renal injury from blunt trauma than adults due to a variety of anatomic factors such as decreased perirenal fat, weaker abdominal muscles, and a less ossified thoracic cage. Non-operative management is gaining in popularity for even major injuries, although there are no universally accepted guidelines. We present a retrospective review of pediatric major blunt renal injuries (grade 3 or higher) at a children’s hospital in Hawai’i over a 5-year period. Medical records were examined between January 2009 and September 2014 from Kapi’olani Medical Center for Women and Children in Honolulu, Hawai’i. Inclusion criteria were a diagnosis of renal trauma, or the diagnosis of blunt abdominal trauma with hematuria. Exclusion criteria were grade I or II renal injury or death due to an additional traumatic injury. Mechanism of injury, clinical characteristics on admission, blood product requirements, surgical interventions performed, and hospital length of stay were retrospectively analyzed. Eleven total patient records were examined, nine of which fit inclusion criteria. Uniquely, 33% of patients sustained their renal injury while surfing. No patients required laparotomy or nephrectomy, though 22% of patients received a blood transfusion and 44% of patients underwent ureteral stent placement. Non-operative management of major renal injuries in children is feasible and allows for preservation of renal tissue. A novel mechanism of surfing as a cause of major renal trauma is seen in the state of Hawai’i.

Keywords
Pediatric renal injury, Surfing injuries, pediatric trauma, renal laceration, hematuria

Introduction
Children, when compared to adults, are at a higher risk of renal injury from blunt trauma due to a variety of anatomic factors including decreased perirenal fat, weaker abdominal muscles, and a less ossified thoracic cage. While there are strong trends toward non-operative management of blunt renal trauma, there are no explicit guidelines for high grade injuries. Organ preservation in children is always a primary goal with solid organ injury due to these patients’ projected lifespan. Nationally, trauma is the leading cause of death and disability in children with an estimated 90% of trauma being due to a blunt mechanism. Exact statistics for renal trauma are difficult to ascertain on a national level. The National Trauma Data Bank (NTDB), the largest trauma database in the country with 805 responding hospitals, recorded 2,213 renal injuries secondary to trauma in children 19 years or younger from 2002 to 2007. Children in Hawai’i age 5-14 years old have the highest utilization rate of the emergency department (ED) for traumatic injuries of all age groups at 244 injuries per 100,000 residents. This is more than three times higher than for other age groups (average 74 injuries per 100,000 residents). While national data on pediatric renal trauma is limited, there is even less statewide data for Hawai’i. To increase statewide knowledge and analyze current practice patterns we retrospectively reviewed all cases of pediatric major blunt renal trauma managed at Kapi’olani Medical Center for Women and Children over a 5-year period. While the dataset is small, it does provide information on practice patterns with comparison to national data from Hawai’i’s only pediatric trauma center.

Methods
All patients under the age of 18 who were admitted to Kapi’olani Medical Center with a diagnosis of renal trauma were retrospectively reviewed after obtaining approval by the Hawai’i Pacific Health Research Institute. The ICD-9 code 866 was used to identify patients with a renal injury. The time period examined was between January 1, 2009 and September 30, 2014. Inclusion criteria were either a diagnosis of renal trauma or a diagnosis of blunt abdominal trauma and hematuria. Exclusion criterion was death due to an additional traumatic injury. Children with minor renal injuries, grade I or II, were also excluded. The medical charts were examined by the authors and data was then de-identified and secured in an excel document. The mechanism of injury (fall, surfing, assault), injury severity score (ISS), injury grade (I-V), the presence of hematuria, and demographic data to include age, weight, and sex, were recorded and reviewed. The ISS grades injury severity from zero to 75. A score of 75 indicates an unsurvivable injury in any body region with lesser scores falling on a gradient for comparison to each other. In addition, amount of blood product required, hematocrit nadir prior to transfusion to assist in ascertaining whether transfusion was necessary, surgical interventions performed, and hospital length of stay were also retrospectively analyzed. For reference, the normal range of hematocrit is 34.5% – 43.5% with less than 34.5% considered anemic. Due to the low sample size we used descriptive as opposed to inferential statistics in our analysis.

Results
Eleven patients were found to fit the initial search criteria. Two patients were excluded as they had minor grade injuries. Patient demographic data and clinical characteristics are detailed in Table 1. Demographics include male to female ratio of 2:1 and the average age of patients was 11.9 ± 4.6 years. Of the nine patients who underwent review, three (33%) children presented with a grade III renal injury, and six (67%) with a grade IV injury. Figure 1 shows a computed tomography (CT) image...
of a grade IV renal injury in one of the study patients. There were no grade V injuries during the studied time period. The average (mean + standard deviation) ISS on presentation was 15 ± 8.5 with a range of 11-36 and interestingly, surfing was the mechanism of injury in one third of the study patients (Figure 2). All patients were initially managed with a non-operative approach and no patients required laparotomy or nephrectomy. The only intervention required in 4 of 9 patients (44%) was a stent placement. Renal preservation was therefore achieved in all of the study patients.

Six patients presented with gross hematuria and 3 with microscopic hematuria. Only two patients (22%) required blood transfusions, with the average hematocrit nadir being 31 ± 5.3% (24.8-37.8). One of the two patients transfused had a concomitant grade IV splenic laceration with a hematocrit nadir of 24.8% and clinical symptoms consistent with shock. The other patient received blood products at an outside hospital prior to transfer for uncertain reasons given a nadir of 30%. Four patients (44%) underwent double J stent placement for grade IV injuries with urinary leak. One patient also required ultrasound guided percutaneous drainage of a right calyceal-retroperitoneal fistula. The average length of hospital stay was 5.1 ± 3.1 days, ranging from 2 to 12 days. The child with the longest length of stay was the child who required drainage of a right calyceal-retroperitoneal fistula. No child developed post-injury hypertension either during their admission or at their follow-up appointments and all patients were seen in follow-up at least once.

Discussion

Children who are involved in blunt trauma are at greater risk for renal injury than adults due to anatomical differences that result in less overall protection to the kidney. Pediatric kidneys are also large proportional to their surrounding organs and are predisposed to parenchymal disruption. Blunt abdominal trauma is reported to involve renal trauma in 10%-20% of cases.10 This continues to be an important topic, as trauma continues to be the most common cause of death in the pediatric population.

Surfing was the mechanism of injury in 33% of the studied patients. All patients that presented with this mechanism were hit in the flank with a surfboard. All patients injured in this manner sought medical attention due to persistent flank pain. Motor vehicle collisions (MVCs) were not the cause of any of the injuries in the study population. This is in contrast to the published literature where MVCs were the cause in up to 33% of renal trauma in the pediatric population.11 Studies looking at surfing-related injuries are not common, but have shown skin lacerations to be the most common injury, with most injuries involving the head and neck.11,1,18 In a large survey-based study of 1,348 patients, surfing related injuries to the trunk were reported in 162 patients, mostly to the back (43%) and chest wall (35%). Chest wall injuries were predominantly rib fractures and rib contusions. There were only 19 abdominal injuries, including 2 splenic ruptures, and no documented renal injuries.12 The average age of these surfers was 28.6 (11-60), which may account for the different injury patterns when compared with our pediatric cohort.

Though there is a growing body of literature supporting non-operative management of blunt renal injury, this approach has not been clearly defined and published guidelines are lacking.3,4,10,13,14 In a recent meta-analysis, non-operative management of nonvascular grade IV trauma was successful in more
than 80% of children. However, there is still variation within the literature. Fitzgerald, et al, from Detroit Medical Center retrospectively reviewed 39 children with blunt renal trauma and found a combined (Grade I to V) non-operative rate of 97%. Henderson, et al, from Children’s National Medical Center retrospectively reviewed 164 children with blunt renal trauma and found a non-operative rate of 70%. For high-grade renal injuries specifically (grades IV and V), the non-operative rate was only 56%. However, these numbers do not exclude patients who underwent non-kidney related surgeries and the authors maintain that if this is taken into account that the non-operative rate overall is mid 90%. Renal salvage often still includes interventions such as percutaneous drainage and/or ureteral stent placement. Reported intervention rates vary from 20%-65%. Our data demonstrated a 100% renal salvage rate. However, there was an intervention rate of 67% for grade IV injuries. None of these interventions were performed emergently and all of them were performed to treat collecting system injuries as opposed to parenchymal or vascular injuries. It is likely that the threshold for urologic interventions is low given that they are minimal risk procedures. The urology literature suggests that mild urinary extravasation can be treated with a Foley catheter and antibiotics whereas significant extravasation requires a double J stent with percutaneous drainage. It should be noted that our study population did not include any grade V injuries. These severe injuries often present with massive hemorrhage and can necessitate operative intervention for clinical instability with published rates of non-operative management from 0% - 60%. Also of note, pediatric patients treated at adult trauma centers were three times as likely to undergo nephrectomy versus those treated at pediatric hospitals.

Further debate over blunt renal trauma involves the utility of bed rest. In one study three children had repeated gross hematuria that lasted approximately one month and attributed this to inadequate bed rest. However, others argue that bed rest is hard to justify given that the kidney is confined to an encapsulated space in Gerota’s fascia, with a low threat of uncontrolled bleeding. Reported mean lengths of bed rest range from 3 to 13 days. Unfortunately, we were not able to accurately determine the length of bed rest in these patients due to the retrospective nature of the study.

New-onset hypertension is an important variable in renal trauma, with rates ranging from 0% to 7.5%. A three-year prospective study is underway, as these children are at risk if they continue to have untreated hypertension. However, it appears that patients who do not present with hypertension during the initial three to four weeks post-trauma, are highly unlikely to develop hypertension after this time period. None of the children reviewed at our institution developed post-injury hypertension with the caveat that while all patients were seen in clinic for follow-up, not all patients had follow-up as far out as one month. Our center is actively seeking to obtain longer term follow up on these patients.

Although there are limitations to this study, it supports the previously published research that encourages non-operative management for blunt renal trauma. The main limitations to this study are small sample size and retrospectively gathered data. Another limitation is that pediatric patients, though predominantly are treated at Kapi‘olani, are also seen at other hospitals. Therefore, this study is not representative of the state demographics for renal trauma. However, this study still importantly shows that surfing is a cause of renal injury in Hawai‘i and may be a topic for future research. In the future, prospective multi-center studies should be pursued.

**Conclusion**

This study shows that over a period of five years at one center, no children with grade III or higher kidney injury required emergent surgical intervention and less than half required transfusion. Of the nine children reviewed, less than half eventually required any procedural intervention. This argues that the trend towards non-operative intervention for even high grade kidney injuries is prudent and likely to persist. Interestingly we also found that surfing in a pediatric population poses a potential risk of significant renal injury. Providers should maintain a high index of suspicion for renal injury in children who present with abdominal or flank pain, or even hematuria, after surfing. Renal salvage after any trauma should be pursued not only in pediatric but adult trauma centers.

**Disclosure Statement**

The views expressed in this manuscript are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the US Government.

**Conflict of Interest**

The authors declare no conflict of interest.

Authors’ Affiliations:
- Tripler Army Medical Center, Honolulu, HI (CRR, MEC)
- Kapi‘olani Medical Center for Women and Children, Honolulu, HI (RSS, RKW)

Correspondence to:
Carly Richards MD; Department of General Surgery, Tripler Army Medical Center, 1 Jarrett White Rd., Tripler AMC, 96859; Ph: (808) 433-3479; Email: carly.r.richards.mil@mail.mil
References
Hearing and Balance Disorders in the State of Hawai‘i: Demographics and Demand for Services

Mohsin Ahmed M. Shaikh PhD; James W. Hall III, PhD; Cindy McManus AuD; and Henry L. Lew MD, PhD

Abstract
Hearing and balance disorders affect people of all ages. Among children, hearing loss affects speech and language development, academic performance, and psychosocial development. Hearing loss in adults negatively impacts work productivity, cognitive function, and psychosocial status. Prevalence of hearing loss in children in Hawai‘i is higher than the national average. Research indicates that hearing loss is a prevalent condition among veterans and advanced age adults. This is of particular concern in Hawai‘i as the state is home to many military training facilities and has a large elderly population. In contrast to the higher than average prevalence of hearing loss in Hawai‘i, there is a relatively small number of practicing audiologists in the state. Audiologists are independent doctoral level professionals responsible for the assessment and non-medical management of hearing impairment, vestibular disorders, auditory processing disorder, auditory neuropathy, tinnitus, and related disorders. Currently, there is no formal audiology training program in Hawai‘i to meet the needs for current or future hearing health professionals. The Department of Communication Sciences and Disorders at the University of Hawai‘i at Mānoa is developing a proposal for a Doctor of Audiology (Au.D.) program to provide a comprehensive doctoral-level audiology curriculum and clinical training in order to graduate audiologists with knowledge and skills needed to serve people with hearing and balance disorders in Hawai‘i. This review article describes the current status of hearing and balance disorders and services in Hawai‘i and stresses the importance of early identification and intervention in remediating their effects in all ages, with a focus on the need for expanding hearing health services in Hawai‘i.

Keywords
Audiology, Doctor of Audiology (Au.D.), Hawai‘i, hearing loss, prevalence, screening

Abbreviations
Au.D. = Doctor of Audiology
NHSP = Newborn Hearing Screening Program
SRP = School Readiness Project
PACT = Parents and Children Together
AAA = American Academy of Audiology
ABA = American Board of Audiology
ASHA = American Speech-Language and Hearing Association
CSD = Communication Sciences and Disorders
UHSHC = University of Hawai‘i Speech and Hearing Clinic
JABSOM = John A. Burns School of Medicine

Introduction
Hearing disorders can affect people across the lifespan from infancy to advanced age. Damage or dysfunction in various parts of the hearing system leads to temporary or permanent hearing loss of varying types and degrees. If hearing loss is not identified and treated early, it can have long-term effects on the cognitive, emotional, social, and educational development of an individual.1

Hearing loss not only affects the individual but also impacts family, and friends, as well as co-workers, and is associated with complex communication consequences such as difficulty in conversations with loved ones, speech understanding problems in educational, work, and social situations, and frustration using the phone and watching television. Because of the difficulties in communication due to their hearing loss, people often withdraw and may become socially isolated.2 Hearing loss can also be associated with physical consequences such as fatigue, headache, tiredness, vertigo, and stress.2 Recent evidence from multiple studies of large numbers of persons ranging from young adults to the geriatric population suggests a link between untreated hearing loss and cognitive impairment.3,4 and diminished quality of life.4

Around 40 million Americans including children and adults, approximately 16% of the population, suffer from hearing loss severe enough to affect communication abilities.5 In the United States, at least 2 children out of 1000 births have hearing-related disorders.6 In the State of Hawai‘i, approximately 3 per 1000 children are born annually with permanent hearing loss.7 Hearing loss can occur at any age from infancy to old age and considering the higher prevalence of hearing loss and the population of Hawai‘i, there are relatively few licensed practicing audiologists. The main purpose of this paper is to review the importance of early identification and intervention for hearing loss in all ages, with a focus on the need for expanding hearing health services in Hawai‘i.

Hearing Loss in Children
Infant Hearing Loss
Even a mild degree of hearing loss in infants can be associated with difficulties in speech and language development, learning, reading, and interpersonal and social skills necessary to augment self-esteem and success in life.8 Children with hearing and listening difficulties are an underserved population across the country.9,10,11 The earlier hearing loss occurs in a child’s life, the more severe the effects on the child’s development.9

In 1990, Hawai‘i became the first state to mandate universal newborn hearing screening for all infants born in the state. Audiologists are primarily responsible for early identification, diagnosis, and management of hearing loss in children, and for minimizing the impact of hearing loss on overall development of children. Unfortunately, a high proportion of children who do not pass hearing screening test may not receive a necessary follow-up diagnostic assessment or adequate early intervention.
services due to an insufficient number of audiologists. The serious shortage of audiologists in the state, parental refusal, lack of accessibility, and other reasons contribute to a breakdown in the provision of necessary diagnostic and intervention services for children with hearing impairment.

**Hearing-Related Programs in Hawai‘i for Newborns**

Programs are available to infants in Hawai‘i for detection, diagnosis, and habilitation or rehabilitation of pediatric hearing loss. The Hawai‘i Department of Health Newborn Hearing Screening Program (NHSP) coordinates hospital screening activities statewide and helps families to set up diagnostic evaluation for babies who fail hearing screening. Newborn hearing screening data from 2007 to 2013 published by the State of Hawai‘i, Department of Health (Table 1) shows that in 2013, 3.3 children in every 1000 births were diagnosed with a hearing loss, and 65.6% received early intervention services. Among children who failed newborn hearing screening, 18.0% were lost to follow up. In Table 2, 63.93% of the infants were diagnosed with permanent sensorineural hearing loss, 32.78% with a mixed (conductive and sensorineural) hearing loss, and 3.27% with a conductive hearing loss.

Sensorineural and mixed hearing losses can be managed by prescribing hearing aids, cochlear implants, assistive devices, and/or other implants. Audiologists play a role in determining candidacy, prescribing hearing devices, programming and fitting hearing devices, and aural rehabilitation. Conductive hearing losses are the result of trauma, ear infection (otitis media), foreign bodies, ear-wax, malformation of ear, etc, and can be treated medically by otolaryngologist and other professionals. Persistent untreated conductive hearing loss can lead to language delay, poor school performance, and auditory processing disorders. According to the American Academy of Audiology’s (AAA) “Audiologic Guidelines for the Diagnosis and Treatment of Otitis Media in Children,” the identification, assessment, and management of hearing loss as a result of otitis media falls within the scope of practice of the audiologist. Children with fluctuating hearing loss due to recurrent otitis media experience developmental deficits in communication, attention, and behavior that are primarily auditory based. These children should be referred for a complete audiology evaluation to include: air and bone threshold testing, speech threshold and discrimination testing, and immittance audiometry. Due to the fluctuating nature of the hearing loss, children should continue to be monitored at least at the beginning of the school year and once during the winter months. Audiology intervention should also include an education component for the caregivers regarding the implications of hearing loss on communication as well as information on how to optimize auditory based communication and the classroom environment. Therefore, the audiologist plays a crucial role in the screening, evaluation, treatment, and monitoring of these children.

**Table 1. Hawai‘i Department of Health Newborn Hearing Screening Data from 2007 to 2013**

<table>
<thead>
<tr>
<th>Year</th>
<th>%Screened</th>
<th>% Not Passed Screening</th>
<th>% Lost to Follow-Up/Lost to Documentation (LTF/LTD)</th>
<th>% Confirmed Hearing Loss*</th>
<th>Hearing Loss Prevalence per 1000 screened</th>
<th>% Enrolled in Early Intervention (EI)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>98.6</td>
<td>1.4</td>
<td>33.6</td>
<td>25.5</td>
<td>3.7</td>
<td>82.6</td>
</tr>
<tr>
<td>2008</td>
<td>99.0</td>
<td>1.2</td>
<td>23.1</td>
<td>31.0</td>
<td>3.7</td>
<td>80.3</td>
</tr>
<tr>
<td>2009</td>
<td>97.6</td>
<td>1.1</td>
<td>11.7</td>
<td>28.2</td>
<td>3.2</td>
<td>75.9</td>
</tr>
<tr>
<td>2010</td>
<td>98.0</td>
<td>1.5</td>
<td>32.2</td>
<td>22.3</td>
<td>3.3</td>
<td>77.0</td>
</tr>
<tr>
<td>2011</td>
<td>98.5</td>
<td>1.1</td>
<td>24.6</td>
<td>26.1</td>
<td>2.8</td>
<td>63.2</td>
</tr>
<tr>
<td>2012</td>
<td>98.5</td>
<td>1.2</td>
<td>15.0</td>
<td>24.4</td>
<td>2.9</td>
<td>72.2</td>
</tr>
<tr>
<td>2013</td>
<td>99.2</td>
<td>1.0</td>
<td>18.0</td>
<td>31.3</td>
<td>3.3</td>
<td>65.6</td>
</tr>
</tbody>
</table>

- Children who failed the hearing screening were referred for the diagnostic hearing test
- Children who failed diagnostic hearing test were referred for early intervention
- % Confirmed Hearing Loss = (Total number of children who failed diagnostic hearing test)/(Total number of children who failed hearing screening) X100
- **% Enrolled in EI = (Total number of children enrolled in early intervention)/(Total number of children who failed diagnostic hearing test) X100

**Table 2. Newborn Hearing Screening Data, Hawai‘i Department of Health (2013)**

<table>
<thead>
<tr>
<th>Data Item</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Births</td>
<td>18,930</td>
</tr>
<tr>
<td>Total Documented as Not Screened</td>
<td>214</td>
</tr>
<tr>
<td>Total Documented as Screened</td>
<td>18,716</td>
</tr>
<tr>
<td>Total Pass Screening</td>
<td>18,521</td>
</tr>
<tr>
<td>Total Not Pass Screening</td>
<td>195</td>
</tr>
<tr>
<td>Total with Permanent Hearing Loss</td>
<td>Out of 61, 39 (63.93%) reported sensorineural hearing loss; 2 (3.27%) reported conductive hearing loss; 20 (32.79%) reported mixed hearing loss.</td>
</tr>
</tbody>
</table>

Out of 195 children who failed the screening, 49 children had no diagnosis and 85 had no hearing loss.
Hearing Loss in Pre-School and School-Aged Children
Middle ear infection is the most common cause of hearing loss in pre-school and school-age children in Hawai’i. Middle ear disorders may be more prevalent in Hawaiian preschoolers than typical preschool populations.\textsuperscript{13} Ear infections can lead to conductive hearing loss and negatively affect communication. Hearing loss not detected and treated early can have a negative impact on educational development as well as the development of speech, language, and interpersonal skills. Until 1995, the Hawai’i Department of Health conducted the School Health Hearing and Vision Program that included hearing screening. The program was discontinued due to budgetary constraints. Data for the 1994-95 school year showed out of 72,896 students screened statewide, 5.8\% failed the hearing screening and 3.1\% showed some type of hearing deficit. Otitis media (ear infection) was the major cause of hearing loss followed by cerumen or foreign body impaction. About 145 children were identified with permanent sensorineural hearing loss.\textsuperscript{14}

The Hawai’i State Department of Education reports that about 1.5\% to 2\% of students receiving special-education services are identified with hearing-related problems. Studies confirm an increased prevalence of permanent hearing loss in school age children, particularly adolescents, presumably secondary to recreational exposure to sound.\textsuperscript{15} Also, auditory processing disorders in children with normal hearing sensitivity can have a markedly adverse impact on communication, reading, and academic performance.\textsuperscript{16} School audiologists are key members of the educational team when it comes to reducing the negative impact of hearing loss and other auditory disorders on children. In Hawai’i, at present there are school screening programs such as School Readiness Project (SRP), Parents and Children Together (PACT), and Hawai’i Lions Hearing Screening. These school screening programs reach few schools in the state and not all school-aged children receive the screening services.

Hearing Loss in Adults

Noise-Induced Hearing Loss
One of the most common causes of hearing loss in adults is exposure to loud levels of sound. Adults are at risk for noise-induced hearing loss in the work environment and also as a result of recreational activities such as hunting, motor sports, and listening to or performing loud music. The Hawai’i Department of Labor and Industrial Relations\textsuperscript{17} reports annual data about the number of individuals with occupation/employment-related hearing loss. The reported cases had a wide range of occupational backgrounds such as construction, manufacturing, mining, and transportation. In Table 3, data from 2010-2014 showed that slightly less than 0.5\% of total reported cases had hearing loss. This number is an under-representation of total adult cases in Hawai’i since all cases are not reported.

Hawai’i is home to one of the largest military bases and naval installations. Soldiers, marines, sailors, and airmen are exposed to loud sounds from blasts, gunfire, and jet engine noise which not only cause hearing loss but can also cause tinnitus, which is ringing in the ear. Hearing loss is the most common service-connected disability in military veterans.\textsuperscript{18} In addition, severe hearing loss for relatively younger veterans who served from 2001 to 2010 is four times higher compared to non-veterans.\textsuperscript{19} There are 112,625 veterans living in the Hawai’i, which is approximately 11\% of Hawai’i’s adult population.\textsuperscript{20} The veteran population in Hawai’i is in need of more accessible audiology services for the management of hearing loss and tinnitus.

Hearing Loss Related to Aging

In the United States, more than 60\% of people above age 70 reported a permanent hearing loss requiring immediate audiology intervention.\textsuperscript{21} Hawai’i witnessed a growth in the elderly population within the last two decades. Roughly 14.5\% of the state’s population is within the age range of 65 years and above. Hearing loss is a common health problem among the aging population, especially if the clients had noise exposure during their military service.

Related Disorders
In addition to assessment, treatment, and management of hearing loss, audiologists provide clinical services to persons with other related disorders. Tinnitus is the perception of ringing or other sounds in the absence of external sound. Approximately one-in-five persons with hearing impairment have persistent tinnitus, which can be debilitating. Bothersome tinnitus has a major effect on sleep, work, and quality of life. Tinnitus is also one of the most common health problems in military personnel and veterans.

Audiologists are also responsible for evaluation and management of vestibular and balance disorders. Impaired balance and fall disorders among the elderly population are a major health problem with serious financial implications.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Reported Cases with Hearing Loss*</th>
<th>Total (%) with Hearing Loss</th>
<th>Reported Cases with Hearing Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>New</td>
</tr>
<tr>
<td>2010</td>
<td>20,654</td>
<td>100 (0.48)</td>
<td>32</td>
</tr>
<tr>
<td>2011</td>
<td>20,515</td>
<td>91 (0.44)</td>
<td>22</td>
</tr>
<tr>
<td>2012</td>
<td>21,052</td>
<td>87 (0.41)</td>
<td>18</td>
</tr>
<tr>
<td>2013</td>
<td>20,721</td>
<td>83 (0.40)</td>
<td>22</td>
</tr>
<tr>
<td>2014</td>
<td>20,693</td>
<td>71 (0.34)</td>
<td>16</td>
</tr>
</tbody>
</table>

*Total reported cases: All injuries and illnesses reported to the disability compensation division. These reported injuries or illnesses may not have occurred during the reported year.
Other causes of hearing loss include head trauma, vestibular schwannoma affecting the auditory system, neural degeneration, ototoxic medications, cardiovascular disease, diabetes, and hypertension. Prompt audiology monitoring and early intervention of hearing loss in adults is important to reduce the impact on the individual’s quality of life.

During the process of assessment and management of various hearing and balance related disorders, audiologists often work closely with other professionals such as otolaryngologists, ear-nose-throat specialists, neurologists, family physicians, psychologists, teachers, social service professionals, and speech-language pathologists.

Need for Audiologists in Hawai‘i
Despite the high prevalence of hearing and balance disorders in Hawai‘i, only 76 audiologists hold a license to practice, some of whom are listed as living on the mainland. The need for audiology services is outpacing the supply of new audiologists. There is a need for a formal doctoral level educational program to produce an adequate number of competent audiologists in the state.

Audiologists are doctoral level licensed professionals who identify, diagnose, and manage hearing and balance disorders in children and adults. Management of hearing loss involves selection and fitting of hearing aids and other assistive devices, programming cochlear implants, instruction on communication strategies, hearing conservation, environmental modifications, and personal and information counseling. Audiologists also perform intra-operative neurophysiology surgical monitoring, newborn hearing screening, school-based services, tinnitus management, and implementation of hearing conservation programs. Assessment and non-medical management of auditory processing disorders, vestibular disorders, and auditory neuropathy falls under the audiologist’s scope of practice.

Doctor of Audiology Degree
In the United States, the Doctor of Audiology degree (AuD) has replaced the Masters-level degree to become the new entry-level academic credential, since 2007. The AuD is a clinical doctorate degree that can lead to state licensure and other professional credentials. Professional organizations such as the American Academy of Audiology (AAA), American Board of Audiology (ABA) and American Speech-Language and Hearing Association (ASHA) offer educational activities and credentialing to assure the high standard of practice, clinical certification, and code of conduct for the profession of audiology.

The Accreditation Commission for Audiology Education provides accreditation to new audiology programs. At present, there are 74 accredited AuD programs in the United States but only 4 programs are on the West Coast. Programs generally accept between 10 and 20 students a year. In comparison to other health professions such as medicine, optometry, and dentistry, audiology programs combined have the lowest number of students and the fewest graduates annually. There is considerable and growing demand for more audiology graduates in the country, but little has been done to increase the number of audiology professionals as compared to other allied health professions.

Tele-Audiology
The term “tele-audiology” was coined to refer to audiology applications of tele-health. Peer-reviewed publications describe validation of the feasibility and quality of diverse audiology services delivered via tele-health technology and techniques in newborn hearing screening, diagnosis of childhood hearing loss, hearing screening of school age children, hearing aid fitting, cochlear implant programming, counseling, and rehabilitation of persons with bothersome tinnitus. The tele-audiology approach to hearing health care is now relied upon in the Veterans Administration Audiology clinics, rural regions of the United States, and also in developing regions of the world. Legislation related to tele-health was recently enacted in the state of Hawai‘i, including 2013 statutes §432D 23.5, §431:10A-116.3, and the 2016 Legislative Session Act 226 mandating Medicaid coverage for tele-health services and removing originating site restrictions. Research confirms that tele-audiology increases access to high quality hearing health care while decreasing patient wait times and costs. The unique geographical features of Hawai‘i present challenges to patients attempting to access hearing health care. Patients with hearing loss and related disorders are scattered among multiple islands yet diagnostic and rehabilitative audiology services are available only in major population centers. Transportation to these centers is often time-consuming and costly. There is a strong rationale for the development of a systematic tele-audiology program for expansion of various hearing health care services in the state of Hawai‘i.

Department of Communication Sciences and Disorders at the University of Hawai‘i at Manoa
The Department of Communications Sciences and Disorders (CSD) at the University of Hawai‘i at Manoa is located in the John A. Burns School of Medicine (JABSOM). The department currently offers a Master of Science degree in CSD with an emphasis in speech-language pathology. The CSD department proposes to eventually establish a Doctor of Audiology program, which will complement the current Master of Science in Communication Sciences and Disorders, as well as provide a much-needed service to the community. The University of Hawai‘i Speech and Hearing Clinic (UHSHC) is a state of the art clinic and has been providing speech, language, and hearing services for more than 30 years. UHSHC is affiliated with United Health Partners which is the faculty practice organization created to support clinical, academic, and research activities of faculty at JABSOM. Services provided by UHSHC include:
There is a shortage of audiologists in Hawai‘i available to provide much needed hearing health care to the community. Although competent audiologists are urgently needed, there is no professional training program available in the state. The prospective Auditory Program at the University of Hawai‘i at Manoa would provide a high-quality educational opportunity for students interested in a career in audiology who wish to remain in their home state. It is also anticipated that an Auditory Program in Hawai‘i would attract students from across the country and throughout the Pacific.

The University of Hawai‘i at Manoa, Department of Communication Sciences and Disorders is aiming to build an audiology graduate program that will prepare professionals to serve a diverse group of individuals who require diagnosis, counseling, and assistance with hearing and speech problems. A new Auditory Program will help to increase the number of highly qualified audiologists in Hawai‘i who will be able to serve the needs of the veteran population, school screening, newborn hearing screening, people with traumatic brain injury, and all children and adults with communication disorders. Hawai‘i has a strategic location to connect the United States, Pacific region and Asian countries, which could be an advantage in bringing students from multicultural backgrounds.

Conflict of Interest
None of the authors identify any conflicts of interest.

Acknowledgment
Many individuals and organizations have extended their support by helping in gathering data for this article. Authors would like to thank: Hawai‘i State Department of Education, Ms. Verna Chinen and Ms. Barbara Ward, faculty at University of Hawai‘i at Manoa, Department of Communication Sciences and Disorders. Also, Hawai‘i State Department of Health, Hawai‘i Department of Labor and Industrial Relations, and Lions Club, Hawai‘i.

Authors’ Affiliations:
- Department of Communication Sciences and Disorders, University of Hawai‘i at Manoa, Honolulu, HI (JWH, CM, HLL)
- Department of Audiology and Speech-Language Pathology, Bloomsburg University of Pennsylvania, Bloomsburg, PA (MAMS)

Correspondence to:
Henry L. Lew MD, PhD; Department of Communication Sciences and Disorders, University of Hawai‘i at Manoa, John A. Burns School of Medicine, 677 Ala Moana Blvd., #625, Honolulu, HI 96813; Ph: (808) 692-1580; Email: henrylew@hawaii.edu

References
Racial-ethnic Disparities in Postpartum Hemorrhage in Native Hawaiians, Pacific Islanders, and Asians

Scott A. Harvey MD, MS; Eunjung Lim PhD; Krupa R. Gandhi MPH; Jill Miyamura PhD; and Kazuma Nakagawa MD

Abstract
The objective of this study was to assess racial-ethnic differences in the prevalence of postpartum hemorrhage (PPH) among Native Hawaiians and other Pacific Islanders (NHOPI), Asians, and Whites. We performed a retrospective study on statewide inpatient data for delivery hospitalizations in Hawai`i between January 1995 and December 2013. A total of 243,693 in-hospital delivery discharges (35.0% NHOPI, 44.0% Asian, and 21.0% White) were studied. Among patients with PPH, there were more NHOPI (37.1%) and Asians (47.6%), compared to Whites (15.3%). Multivariable logistic regression was used to assess the impact of maternal race-ethnicity on the prevalence of PPH after adjusting for delivery type, labor induction, prolonged labor, multiple gestation, gestational hypertension, gestational diabetes, preeclampsia, chorioamnionitis, placental abruption, placenta previa, obesity, and period with different diagnostic criteria for preeclampsia. In the multivariable analyses, NHOPI (adjusted odds ratio [aOR], 1.40; 95% confidence interval [CI], 1.32-1.48) and Asians (aOR, 1.45; 95% CI, 1.37-1.53) were more likely to have PPH compared to Whites. In the secondary analyses of 12,142 discharges with PPH, NHOPI and Asians had higher prevalence of uterine atony than Whites (NHOPI: 77.2%, Asians: 73.9% vs Whites: 65.1%, P < .001 for both comparisons).

Methods

Data Source
We conducted a retrospective study using Hawai`i Health Information Corporation (HHIC) inpatient data from January 1995 to December 2013. HHIC maintains the largest healthcare database in Hawai`i including inpatient administrative, emergency department, and financial data. The HHIC inpatient database has detailed, all visit, discharge data from every non-federal hospital in Hawai`i by all payers, and includes race-ethnicity, sex, age, insurance type, and International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9) primary and secondary diagnoses and procedure codes.17 This study was approved by the Institutional Review Board of the University of Hawai`i at Manoa.

Patients
We received a de-identified dataset from HHIC that included 286,556 discharges (age >16) who had the primary diagnosis of vaginal or cesarean delivery. As this study is specifically evaluating the ethnic population of Hawai`i, non-Hawai`i residents (n=1,571 discharges), and records lacking race-ethnicity data or with race-ethnicity other than NHOPI, Asian, and White (n=41,292 discharges) were excluded (total 42,863 discharges). In the final analyses, a total of 243,693 delivery discharges were included.

Variables
The primary outcome variable was discharge diagnosis of PPH as defined by ICD-9 Codes of 666.x and 641.11. These ICD-9 codes for PPH are well-validated, showing a positive predictive value of 80%.19 The primary independent variable for this study was race-ethnicity, which was obtained from the HHIC race-ethnicity classifications. HHIC includes only one primary race-ethnicity, reported by each hospital from the patient’s self-report at admission. The seven largest groups were Native Hawaiian, Japanese, Filipino, Chinese, other Pacific Islander,
other Asian, and White, accounting for more than 90% of the inpatient database. We classified race-ethnicity into three groups: NHOPI (Native Hawaiian and other Pacific Islander), Asian (Japanese, Filipino, Chinese, and other Asian), and White for this study, and used Whites as the reference group. We considered the following potential pre-specified confounders: age, delivery type (cesarean with labor, cesarean without labor, operative vaginal delivery, and spontaneous vaginal delivery), history of cesarean delivery, smoking, obesity, substance abuse, multiple gestation, multiparity, chronic hypertension, gestational hypertension, pre-gestational diabetes, gestational diabetes, pre-eclampsia, labor induction, polyhydramnios, chorioamnionitis, placental abruption, placenta previa, and prolonged labor.\(^{18-22}\)

We also categorized the period with different diagnostic criteria for pre-eclampsia (before year 2000, between 2000 and 2013 November, after 2013 November). In secondary analyses, we investigated racial-ethnic disparities in uterine atony, transfusion, and hysterectomy among patients who were diagnosed with PPH. All ICD-9 codes for clinical variables are described in the Appendix.

**Statistical Analysis**

Demographic and clinical characteristics are represented by frequency, mean, and standard deviation. Bivariate associations between the variables and PPH were assessed using chi-squared tests for categorical variables and two-sample t-test for maternal age. A multivariable logistic regression using all factors in Table 1 and stepwise selection method was performed with significance level of 0.01 for entry and staying to find the best model to investigate the impact of race-ethnicity on PPH. C-statistic was assessed to measure the accuracy of the final model in predicting PPH. Chi-squared tests were used to assess racial/ethnic differences in the rate of uterine atony, hysterectomy, and transfusion. Due to the large data, \(P < 0.01\) was considered statistically significant. All analyses were performed in SAS 9.4 (SAS institute, Cary NC).

**Results**

A total of 243,693 in-hospital delivery discharges (35.0% NHOPI, 44.0% Asian, and 21.0% White) were analyzed. The average maternal age was 28.5 years (SD=6.3). Overall, there were 12,141 (5.0%) discharge diagnoses of PPH. A bivariate analysis demonstrated risk factors that were significantly associated with PPH (Table 1). Among patients with PPH, there were more NHOPI (37.1%) and Asians (47.6%), compared to Whites (15.3%). A multivariable logistic regression was conducted using all the factors in Table 1 and stepwise selection was used to find the best model to investigate the impact of race-ethnicity on PPH. Table 2 represents the results from the final logistic regression model for PPH, with moderate level of prediction (c-statistic=0.657, 95% confidence interval [CI], 0.652-0.662). After controlling for the confounding variables, race-ethnicity remained significant. Compared to Whites, NHOPI (adjusted odds ratio [aOR], 1.40; 95% CI, 1.32-1.48) and Asians (aOR, 1.45; 95% CI, 1.37-1.53) were more likely to have PPH. Furthermore, labor induction (aOR, 1.45; 95% CI, 1.37-1.52), prolonged labor (aOR, 1.26; 95% CI, 1.12-1.42), multiple gestation (aOR, 2.72; 95% CI, 2.22-3.32), gestational hypertension (aOR, 1.37; 95% CI, 1.27-1.48), gestational diabetes (aOR, 1.15; 95% CI, 1.07-1.23), preeclampsia (aOR, 2.11; 95% CI, 1.95-2.28), chorioamnionitis (aOR, 2.15; 95% CI, 2.01-2.30), placental abruption (aOR, 1.78; 95% CI, 1.54-2.07), placenta previa (aOR, 66.01; 95% CI, 59.30-73.48), and obesity (aOR, 1.56; 95% CI, 1.38-1.77) were associated with PPH (Table 2).

Patients who delivered vaginally were more likely to have PPH than the patients who went through cesarean section delivery with labor (operative vaginal: aOR, 1.74; 95% CI, 1.63-1.87; spontaneous vaginal: aOR, 1.36; 95% CI, 1.04-1.77). Patients who delivered after year 2000 were more likely to be diagnosed with PPH than patients who delivered before year 2000 (between 2000 and 2013 November: aOR, 1.13; 95% CI, 1.08-1.18; after year 2013 November: aOR, 1.09; 95% CI, 1.02-1.17). In addition, to account for correlated multiple deliveries by the same patients, a separate multilevel model was conducted using hospital record identifier or master patient identifier to link patient-level encounter data. The model presents similar results in the magnitude and significance of the estimates (results not shown).

Table 3 represents prevalence of uterine atony, transfusion and hysterectomy by race-ethnicity among patients who had PPH. NHOPI (77.2%) and Asians (73.9%) had a higher proportion of uterine atony and PPH, compared to Whites (65.1%) (\(P < .001\)). Whites (13.1%) were more likely to receive transfusion than NHOPI (9.5%) and Asians (7.9%) after PPH (\(P < .001\)).

**Discussion**

Using Hawai‘i statewide claims data over an 18-year period, we demonstrated that NHOPI and Asians may have higher prevalence of PPH compared to Whites after adjusting for known risk factors. This study also validated prior studies that Asians/Pacific Islanders have higher rates of PPH, independent of the known risk factors for PPH.\(^{11}\) Additionally, this study demonstrated a higher prevalence of uterine atony in NHOPIs and Asians than Whites, among those with PPH.

PPH is a clinical diagnosis yielded by the imprecise visual estimation of blood loss that may be diluted in other fluids (ie, amniotic fluid, urine, saline irrigation, etc) after the completion of the delivery of the fetus and placenta. The majority of blood loss is typically derived from the prior placental attachment site in the uterus, as the placenta avulses from its vascular bed, spiral arteries, and veins.\(^{23}\) These vessels that were used to provide blood flow to the placenta and baby are mechanically compressed with a firm contraction of the uterus after placental delivery, and in conjunction with the coagulation system, these vessels are clotted to prevent further bleeding. Postpartum uterine bleeding may be in conjunction with genital tract lacerations of the cervix and vagina that may significantly contribute to blood loss and hemorrhage. Failure of the uterus to contract postpartum (uterine atony), abnormal vasculature of the genital tract lacerations of the cervix and vagina that may significantly contribute to blood loss and hemorrhage.
Table 1. Clinical Characteristics of Patients with and without Postpartum Hemorrhage

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>Postpartum Hemorrhage, n (%)</th>
<th>No (n=231,551)</th>
<th>Yes (n=12,142)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable</strong></td>
<td><strong>Total</strong></td>
<td><strong>Postpartum Hemorrhage, n (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age (yr.), mean ± SD</strong></td>
<td>28.5 ± 6.3</td>
<td></td>
<td>28.5 ± 6.2</td>
<td>28.7 ± 6.4</td>
</tr>
<tr>
<td><strong>Maternal Race-ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHOPI</td>
<td>85,178 (35.0%)</td>
<td>80,670 (34.8%)</td>
<td>4,508 (37.1%)</td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>107,256 (44.0%)</td>
<td>101,477 (43.8%)</td>
<td>5,779 (47.6%)</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>51,259 (21.0%)</td>
<td>49,404 (21.3%)</td>
<td>1,855 (15.3%)</td>
<td></td>
</tr>
<tr>
<td><strong>Type of Delivery</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spontaneous Vaginal</td>
<td>183,584 (75.3%)</td>
<td>174,192 (75.2%)</td>
<td>9,392 (77.4%)</td>
<td></td>
</tr>
<tr>
<td>Operative Vaginal</td>
<td>1,657 (0.7%)</td>
<td>1,597 (0.7%)</td>
<td>60 (0.5%)</td>
<td></td>
</tr>
<tr>
<td>Cesarean without Labor</td>
<td>31,060 (12.8%)</td>
<td>29,524 (12.8%)</td>
<td>1,536 (12.7%)</td>
<td></td>
</tr>
<tr>
<td>Cesarean with Labor</td>
<td>27,382 (11.2%)</td>
<td>26,238 (11.3%)</td>
<td>1,154 (9.4%)</td>
<td></td>
</tr>
<tr>
<td><strong>Labor Induction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prolonged Labor</strong></td>
<td>5,049 (2.1%)</td>
<td>4,728 (2.0%)</td>
<td>321 (2.6%)</td>
<td></td>
</tr>
<tr>
<td><strong>Previous Cesarean</strong></td>
<td>30,658 (12.6%)</td>
<td>29,458 (12.7%)</td>
<td>1,200 (9.9%)</td>
<td></td>
</tr>
<tr>
<td><strong>Multiple Gestation</strong></td>
<td>1,286 (0.5%)</td>
<td>1,161 (0.5%)</td>
<td>125 (1.0%)</td>
<td></td>
</tr>
<tr>
<td><strong>Multiparity</strong></td>
<td>2,991 (1.2%)</td>
<td>2,810 (1.2%)</td>
<td>181 (1.5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Chronic Hypertension</strong></td>
<td>371 (0.2%)</td>
<td>344 (0.2%)</td>
<td>27 (0.2%)</td>
<td></td>
</tr>
<tr>
<td><strong>Gestational Hypertension</strong></td>
<td>11,427 (4.7%)</td>
<td>10,641 (4.6%)</td>
<td>786 (6.5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Pre-gestational Diabetes</strong></td>
<td>2,061 (0.9%)</td>
<td>1,931 (0.8%)</td>
<td>130 (1.1%)</td>
<td></td>
</tr>
<tr>
<td><strong>Gestational Diabetes</strong></td>
<td>16,985 (7.0%)</td>
<td>15,938 (6.9%)</td>
<td>1,047 (8.7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Preeclampsia</strong></td>
<td>9,217 (3.8%)</td>
<td>8,320 (3.6%)</td>
<td>897 (7.4%)</td>
<td></td>
</tr>
<tr>
<td><strong>Polyhydramnios</strong></td>
<td>1,733 (0.7%)</td>
<td>1,611 (0.7%)</td>
<td>122 (1.0%)</td>
<td></td>
</tr>
<tr>
<td><strong>Chorioamnitis</strong></td>
<td>12,134 (5.0%)</td>
<td>11,030 (4.8%)</td>
<td>1,104 (9.1%)</td>
<td></td>
</tr>
<tr>
<td><strong>Placental Abruption</strong></td>
<td>2,408 (1.0%)</td>
<td>2,175 (0.9%)</td>
<td>233 (1.9%)</td>
<td></td>
</tr>
<tr>
<td><strong>Placenta Previa</strong></td>
<td>1,882 (0.8%)</td>
<td>612 (0.3%)</td>
<td>1,270 (10.5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Smoking</strong></td>
<td>6,101 (2.5%)</td>
<td>5,725 (2.5%)</td>
<td>376 (3.1%)</td>
<td></td>
</tr>
<tr>
<td><strong>Obesity</strong></td>
<td>3,469 (1.4%)</td>
<td>3,176 (1.4%)</td>
<td>293 (2.4%)</td>
<td></td>
</tr>
<tr>
<td><strong>Substance Abuse</strong></td>
<td>5,307 (2.2%)</td>
<td>4,981 (2.2%)</td>
<td>326 (2.7%)</td>
<td></td>
</tr>
<tr>
<td><strong>Period with Different Diagnostic Criteria for Preeclampsia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before year 2000</td>
<td>61,694 (25.3%)</td>
<td>58,845 (25.4%)</td>
<td>2,849 (23.5%)</td>
<td></td>
</tr>
<tr>
<td>Between year 200 and year 2013 November</td>
<td>153,940 (63.2%)</td>
<td>146,023 (63.1%)</td>
<td>7,917 (65.2%)</td>
<td></td>
</tr>
<tr>
<td>After year 2013 November</td>
<td>28,959 (11.5%)</td>
<td>28,683 (11.5%)</td>
<td>1,376 (11.3%)</td>
<td></td>
</tr>
</tbody>
</table>

NHOPI = Native Hawaiian or other Pacific Islander. Column percentage. All were P < .01 except chronic hypertension (P = .042).

or other products of conception, deficits within a patient’s coagulation system, and large lacerations in to the genital tract place postpartum women at risk for PPH.23

There have been several studies linking a familial or genetic predisposition to PPH. A large California database study was able to identify a higher risk of PPH among Asians/Pacific Islanders as a cohort, but did not distinguish rates of PPH among the distinct ethnicities.11 A recent study in the Swedish Database of vaginal births identified families with higher rates of PPH than the general population;24 these studies suggest a familial predisposition to PPH. In an attempt to identify genetic entities that place an individual at risk for PPH, a cohort of 3,219 Italian women was used to study genetic polymorphisms to determine a biochemical rationale for women at risk for PPH.25 Aside from the aforementioned studies, there is a paucity in data identifying genetic and ethnic entities as potential independent risk factors for PPH. Interestingly, in a sub-analysis of our study, we found a statistically higher rate of uterine atony as the cause of PPH among each distinct ethnicity of Asian and Pacific Islander when compared to Whites in Hawai‘i. This may suggest a genetic predisposition for defects of uterine contraction in the postpartum state in these individuals, placing them at higher risk for hemorrhage. Our study also showed an unexpected finding of modestly higher rates of transfusion among Whites compared to NHOPI and Asians. Due to the retrospective nature of the study, the reason for this apparent association is unclear and bears further investigation.

As postpartum hemostasis is multifaceted and relies on the coordination of multiple systemic factors, other genetic predispositions to include defects in coagulation, prostaglandin synthesis, or tissue pliability (degree of laceration) may also contribute to the higher PPH incidence in Asians/Pacific Islander-
Table 2. Final Model by Stepwise Multivariable Logistic Regression for Patients with Postpartum Hemorrhage

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unadjusted OR (95% CI)</th>
<th>Adjusted Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maternal Race-ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NHOPI</td>
<td>1.52 (1.44-1.60)***</td>
<td>1.40 (1.32-1.48)***</td>
</tr>
<tr>
<td>Asian</td>
<td>1.49 (1.41-1.57)***</td>
<td>1.45 (1.37-1.53)***</td>
</tr>
<tr>
<td>White</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Type of Delivery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operative Vaginal</td>
<td>1.23 (1.15-1.31)***</td>
<td>1.74 (1.63-1.87)***</td>
</tr>
<tr>
<td>Spontaneous Vaginal</td>
<td>0.86 (0.66-1.11)</td>
<td>1.36 (1.04-1.77)*</td>
</tr>
<tr>
<td>Cesarean without Labor</td>
<td>1.18 (1.09-1.28)***</td>
<td>0.97 (0.89-1.07)</td>
</tr>
<tr>
<td>Cesarean with Labor</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td><strong>Labor Induction</strong></td>
<td>1.57 (1.50-1.65)***</td>
<td>1.45 (1.37-1.52)***</td>
</tr>
<tr>
<td><strong>Prolonged Labor</strong></td>
<td>1.30 (1.16-1.46)***</td>
<td>1.26 (1.12-1.42)***</td>
</tr>
<tr>
<td><strong>Multiple Gestation</strong></td>
<td>2.07 (1.72-2.49)***</td>
<td>2.72 (2.22-3.32)***</td>
</tr>
<tr>
<td><strong>Gestational Hypertension</strong></td>
<td>1.44 (1.33-1.55)***</td>
<td>1.37 (1.27-1.48)***</td>
</tr>
<tr>
<td><strong>Gestational Diabetes</strong></td>
<td>1.28 (1.20-1.36)***</td>
<td>1.15 (1.07-1.23)***</td>
</tr>
<tr>
<td><strong>Preeclampsia</strong></td>
<td>2.14 (1.99-2.30)***</td>
<td>2.11 (1.95-2.28)***</td>
</tr>
<tr>
<td><strong>Chorioamnionitis</strong></td>
<td>2.00 (1.88-2.13)***</td>
<td>2.15 (2.01-2.30)***</td>
</tr>
<tr>
<td><strong>Placental Abruption</strong></td>
<td>2.06 (1.80-2.37)***</td>
<td>1.78 (1.54-2.07)***</td>
</tr>
<tr>
<td>Placenta Previa</td>
<td>44.07 (39.95-48.63)***</td>
<td>66.01 (59.30-73.48)***</td>
</tr>
<tr>
<td><strong>Obesity</strong></td>
<td>1.78 (1.58-2.01)***</td>
<td>1.56 (1.38-1.77)***</td>
</tr>
<tr>
<td><strong>Period with Different Diagnostic Criteria for Preeclampsia</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before year 2000</td>
<td>Reference</td>
<td>Reference</td>
</tr>
<tr>
<td>Between year 200 and year 2013 November</td>
<td>1.12 (1.07-1.17)***</td>
<td>1.13 (1.08-1.18)***</td>
</tr>
<tr>
<td>After year 2013 November</td>
<td>1.07 (1.00-1.14)</td>
<td>1.09 (1.02-1.17)*</td>
</tr>
</tbody>
</table>

NHOPI = Native Hawaiian or other Pacific Islander. C-statistic was 0.657 (95% CI = 0.652-0.662). *P<.05; **P<.01; ***P<.001

Table 3. Rate of Uterine Atony, Transfusion and Hysterectomy among Patients with Postpartum Hemorrhage by Race-ethnicity, n (%)

<table>
<thead>
<tr>
<th>Race-ethnicity</th>
<th>Uterine Atony (n=8,962; 73.8%)</th>
<th>Transfusion (n=1,591; 8.7%)</th>
<th>Hysterectomy (n=218; 1.8%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHOPI</td>
<td>3,482 (77.2%)***</td>
<td>429 (8.5%)***</td>
<td>72 (1.6%)</td>
</tr>
<tr>
<td>Asian</td>
<td>4,273 (73.9%)***</td>
<td>459 (7.9%)***</td>
<td>109 (1.9%)</td>
</tr>
<tr>
<td>White</td>
<td>1,207 (65.1%)</td>
<td>242 (13.1%)</td>
<td>37 (2.0%)</td>
</tr>
</tbody>
</table>

NHOPI = Native Hawaiian or other Pacific Islander. Chi-square test was conducted to compare White. *P<.05; **P<.01; ***P<.001

ers. Asians have twice the odds of having a 3rd or 4th degree perineal laceration postpartum, which can lead to significant PPH even after controlling for known risk factors such as maternal age, operative vaginal delivery rate (forceps or vacuum), birth weight, and episiotomy rate. 8,26 Further study is needed to better assess which specific biological factor is driving the observed racial-ethnic differences in the prevalence of PPH.

The strengths of our study include a large sample size of over 240,000 deliveries and detailed ethnicity information for a diverse, multiethnic population. The study findings were also consistent with prior studies and support a multitude of risk factors that increase the risk of PPH. There are several limitations to our study. First, estimation of blood loss is most often “qualitative” rather than a “quantitative” assessment, which may introduce bias from the diagnosing clinician. There may also be reporting bias to either over report or underreport PPH in this population. Second, the data on gestational age at delivery and birth weight were not available, and thus their impact could not be assessed. Third, race-ethnicity was based on the patient’s self-report and the algorithm used by HHIC to assign a patient to a single race-ethnicity may underestimate White race. Fourth, since the data was limited to the state of Hawai‘i, our results may not be generalizable to other populations within the mainland United States. Fifth, this data assessed the “in-hospital” deliveries for the specific hospital admission and did not account for outside of institution births or patients who were readmitted to the hospital for a “delayed PPH” possibly impacting our observation. Sixth, our study was limited by what variables were available. Future studies should consider other potential confounders such as BMI, prior history of pre-
Conclusion

PPH prevalence was higher in NHOPI and Asians compared to Whites in the state of Hawai‘i. PPH is a major contributor to morbidity and mortality both worldwide and in the United States and further delineating distinct ethnicity data as independent risk factors may be important for patient counseling, prevention, and treatment. This epidemiological data will also aid in identifying future research studies aimed at genetics/genomics within families and ethnicities at risk for PPH. Currently, as the etiology and pathophysiology for PPH is multifactorial, we are not able to assert a specific rationale for why those of Asian and Pacific Islander ethnicity have higher rates of PPH, even when controlling for known risk factors. With the delineation of race to be an additional risk factor for PPH, further preventative tactics may be employed to effectively reduce morbidity and mortality from this disease.

Conflict of Interest

None of the authors identify any conflict of interest.

Acknowledgments

Dr. Nakagawa was supported in part by the research grant from the National Institute on Minority Health and Health Disparities of the National Institutes of Health (NIH) (2P20MD001173). Dr. Lim and Ms. Gandhi were partially supported by three grants U54MD007584, G12MD007601, and P20GM103466 from the NIH. The content is solely the responsibility of the authors and does not necessarily reflect the official opinion of the NIH.

References

**University of Hawai'i John A. Burns School of Medicine Medical Students Assist in Tuberculosis Control in Micronesia**

Nash A.K. Witten MSIV; Yusuke Kobayashi MSIV; and Seiji Yamada MD, MPH

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

**Background**

The Marshall Islands is located halfway between the Hawaiian archipelago and Australia. It is a group of ancient volcanic seamounts that have sunk into the sea, leaving only fringe reefs peaking above the surface. The Republic of the Marshall Islands (RMI) is one of three nations “Freely Associated” with the United States (US) via the Compact of Free Association, entered into in 1986 and re-negotiated in 2003. As of July 2016, there were an estimated 73,376 people throughout the country; with 74% of those living in the two urban centers of Majuro, the capital, and Ebeye Island, located in Kwajalein Atoll, the largest coral atoll in the world. Ebeye Island is a 0.125 square mile island with a population density of 80,177 people per square mile, one of the highest population densities in the world. The Marshall Islands, with a mean elevation of two meters above sea level, are extremely vulnerable to natural disasters and global climate change. Ebeye Islands’ crowded conditions make its people susceptible to non-communicable and infectious diseases.

Despite the World Health Organization’s (WHO) declaration of TB as a global public health emergency in 1993, tuberculosis (TB), one of the oldest diseases known to affect humans, continues to be a major cause of death worldwide. With an estimated 10.4 million new TB cases worldwide in 2015, and only a 1.5% rate of decline in TB incidence from 2014 to 2015, more work needs to be done. The WHO’s “End TB Strategy” aims to reduce the global tuberculosis epidemic by 90% between the years of 2015 to 2035. For 2015 the RMI had a TB incidence rate of 214/100,000, as compared to a rate of 9.6/100,000 in Hawaii. In 2013, RMI had the highest mortality rate in the Pacific at 40/100,000 people. Additionally, a growing body of research literature suggests a link between TB and type 2 diabetes mellitus. With diabetes-related disease remaining the leading cause of mortality in RMI, TB in RMI represents a public crisis in acute need of action.

**TB-Free Ebeye: Project Objectives and Goals**

In a joint effort among the RMI Ministry of Health, the Centers for Disease Control and Prevention (CDC), the WHO and the Pacific Island Health Officers’ Association (PIHOA), a mass screening and treatment program for TB was conducted on Ebeye Island. Two medical students from the University of Hawai'i (UH) John A. Burns School of Medicine (JABSOM) assisted with phase two of the project. The students had diverse duties ranging from assisting with patient counseling, glucose and cholesterol measurements, training local staff, performing chest X-rays, and assisting with therapy and contact investigations. This program, led by Dr. Richard Brostrom, CDC Regional TB Field Medical Officer, was the first major initiative to curb TB rates in the RMI. His intent was to lower the burden of TB disease by 30% and subsequently focus more on prevention.

Starting in November 2016, the first phase of the initiative involved weight and height measurement, nutrition counseling for mothers with children identified as malnourished, and fingerprint pre-registration of all residents to initiate digitization of medical records. The second phase, from February through April 2017, consisted of non-communicable disease (NCD) and TB screening and treatment. The NCD screening included blood pressure, random blood glucose, and total cholesterol testing, with patients with a glucose greater than a specified cutoff being referred for hemoglobin A1c testing. The TB screening consisted of a symptom and risk factor questionnaire followed by chest X-ray for all participants. For those patients with a suspicious X-ray or symptoms, a sputum sample was retrieved and run on a GeneExpert Mycobacterium tuberculosis/ rifampin resistance (MTB/RIF) assay. The US-RMI Joint Economic Management and Financial Accountability Committee approved $240,000 from unobligated Compact of Free Association funding to support this second phase of screening (personal communication, R. Brostrom).

The goal of phase two was to screen 5,600 patients over 15 years of age over the course of nine weeks. Due to the intensity of the work and volunteer nature of many of the workers, the volunteers were divided into three groups in Ebeye for three and a half weeks at a time. Each team was composed of RMI health workers, regional Pacific TB staff, US volunteers, and representatives from the CDC and the WHO. Each team was divided into two main teams: the screening team, which completed the hypertension, diabetes, cholesterol, and TB screening; and the program team was responsible for capacity building amongst the local TB staff and ensuring that new cases receive appropriate workup, contact investigation, and initiation of directly observed therapy (DOT).
The first external team consisted of four physicians, one TB nurse, two TB program coordinators, an x-ray technician, and two UH JABSOM medical students. The WHO also sent three physicians and two epidemiologists to set up data collection at the start of the project. The participants were from Australia, India, Palau, the RMI, and the US (Hawai‘i, Nevada, Tennessee, Arkansas, and Washington). Physicians’ duties included reading chest X-rays, ordering GeneXpert tests, and counseling patients with diabetes, hypertension, and hypercholesterolemia. The epidemiologists’ duties included data management, and preparation of records and chest X-rays to present at daily morning conferences to plan management for suspicious and confirmed TB cases. The program administrator and nurse managed DOT, contact investigation of active TB cases, and training of Marshallese community health outreach workers (CHOWs).

Role of Medical Students in the Project

Two JABSOM medical students in the first team participated in nearly all aspects of the project. This included assisting with all components of the screening team and shadowing of the program team. For the screening component, the students helped to measure properly blood pressures properly, following the WHO protocol, and learned to operate and troubleshoot the blood glucose and cholesterol machines. Students also waited with the patients for their hemoglobin A1c result to appear on the machine, which determined whether or not they were diabetic. If their hemoglobin A1c was above 6.5%, they were counseled regarding lifestyle interventions and the need for follow-up at the Leroj Kitlang Memorial Health Center on Ebeye Island.

Next, the patients moved to the TB screening portion of the project where the students were taught how to position patients properly for chest X-rays and to direct patients in Marshallese to take a deep breath (bual menono), to hold their breath (jab menono), and then to breathe (menono). Under the careful eye of a physician the X-rays were interpreted for likely signs of TB, including pulmonary infiltrates, calcifications, and pleural thickening. If TB was suspected, the patient was sent for sputum testing. At the sputum testing station students were taught how to collect a sputum sample properly, which involved an elaborate dance with deep breathing to achieve an excellent sample from the patient’s bronchi. Students participated in the daily morning conference during which expert TB clinicians reviewed the case of each patient referred for sputum testing, the result of their GeneXpert testing, and arrived at a case-by-case consensus on appropriate treatment. The program team taught how to investigate patients that have been in close contact with patients with TB and directly observed therapy via active participation in the field as they met with patients and administered medications. Working side-by-side with public health physicians who are committed to global health and learning about their journeys gave insight into students’ potential career paths. Finally, and possibly the most rewarding was being able to participate in the direct delivery of public health services.

Conclusion

Phase two of the program was completed in April 2017. Phase three of the program is to continue treatment of all those patients diagnosed and initially treated during phase two of the project. Since this project is the first to attempt mass screening and treatment of the general population of a geographically (rather than epidemiologically, risk-factor-defined population) - the results will have implications for global TB control. Once the project is completed, it is hoped that a similar project can be next executed in Majuro, the capital of the RMI, in 2018. It is hoped that the 2018 project will also be able to include second year medical students from JABSOM. In March 2017 both the fourth year medical students who participated in this project matched successfully into family medicine residency programs. This opportunity to volunteer in this program was both clinically and emotionally rewarding, a definite capstone in their medical school careers.

Acknowledgments

We thank Dr. Richard Brostrom for his leadership of the efforts described here. The medical students are grateful for the support from the UH JABSOM Department of Family Medicine and Community Health to enable the students to receive academic credit for their participation in this project. Also, the Hawai‘i Pacific Basin Area Health Education Center (AHEC) funded airfare for the medical students. This experience gave all of us unique insights into the reality and culture of the Marshallese, and reinforced the students’ ambitions to pursue careers in global health and to continue to serve underserved populations.

Authors’ Affiliation:
- MSIV, John A. Burns School of Medicine, University of Hawai‘i, Honolulu, HI (NAKW, YK)
- Department of Family and Community Health, John A. Burns School of Medicine, University of Hawai‘i, Honolulu, HI (SY)

References

Effective July 1, 2016, the Office of Public Health Studies (OPHS) at the University of Hawai‘i at Manoa (UHM) joined with the Department of Social Work and the Center on Aging under the Myron B. Thompson School of Social Work (MBT SSW) led by Dean Noreen Mokuau. Each unit (or hale) is strong, but the merger recognizes that it takes a village (or kauhale) to solve some of the intractable health and social problems facing us today. The shared vision of the kauhale, housed within the MBT SSW, is “achieving social justice and health equity for the people of Hawai‘i and citizens in a changing world.” This article presents the rationale for the merger and provides examples of how the three units are working together in this synergistic collaboration.

The Three Units
The OPHS offers the Bachelor of Arts (BA) in Public Health, the Masters of Science (MS) in Epidemiology, the Masters of Public Health (MPH, with specializations in Epidemiology, Health Policy and Management, Native Hawaiian and Indigenous Health, and Social Behavioral Health Sciences), the Doctorate in Public Health (DrPH) in Community-Based and Translational Research and the PhD in Epidemiology. The BA in Public Health, opened in 2014, prepares undergraduate students for a wide array of careers and career paths in health and provides a macroscale perspective on healthcare. The unit currently is directed by Dr. Kathryn L. Braun. The mission of the OPHS is to advance the health of the peoples of Hawai‘i, the nation, and the Asia-Pacific region through knowledge, discovery, innovation, engagement, inclusion, and leadership. http://manoa.hawaii.edu/publichealth/

The Department of Social Work includes a Bachelor of Social Work (BSW) program; a Masters of Social Work (MSW) program, with both Manoa and Distance Education-based options, and with specializations in Behavioral Mental Health, Children and Families, Health, and Gerontology; and a PhD in Social Welfare. Dr. Meripa Godinet serves as Chair. The mission of the DSW is to provide educational excellence that advances social work with its focus on social justice. The principal responsibility is the generation, transmission, and application of knowledge for the global enterprise with special attention to Native Hawaiian, other Pacific Islander, and Asian populations in our state and region. http://www.hawaii.edu/sswork/

The Center on Aging’s mission is to enhance the wellbeing of older adults and those involved in eldercare. The Center on Aging is committed to interdisciplinary and collaborative efforts in research, educational programs, and service to the community, with a focus on the multicultural populations of Hawai‘i and the Pacific Region. It is directed by Dr. Margaret A. Perkinson. The Center’s goals are to better prepare the State and the Pacific Basin for the challenges related to an aging society through teaching, research, and service. http://www.hawaii.edu/aging/

History and Rationale for the Merger
While most professional accreditation bodies accredit degrees (eg, the BSW or MSW), the Council on Education for Public Health (CEPH) accredits structures (ie, schools vs programs). When the former School of Public Health was accredited in 1967, it offered MPHs in the five required specializations and thus was accredited as a school. However, dozens of faculty members retired in the 1990s to take advantage of a state-sponsored early-out scheme, resulting in insufficient faculty in biostatistics and environmental health. Thus, in 2002 the school was downsized and accredited as a program of public health (called the Office of Public Health Studies or OPHS) under the John A. Burns School of Medicine (JABSOM). There was an expectation that OPHS would reemerge as an autonomous school of public health; however, budget shortfalls and competing priorities have not supported this reemergence. Nonetheless, OPHS has been continuously accredited and graduating students since 2002. Our most recent accreditation cycle is 2015 to 2022.

Although JABSOM was initially a good home for OPHS, JABSOM’s move to the Kaka‘ako Campus presented a number of logistical challenges. At the same time, OPHS was collaborating with MBT SSW in an increasing number of areas, including recruitment, teaching, research, and service. Also, Social Work and Public Health offered similar degrees—the baccalaureate, masters, and doctoral degrees—on the same campus. Salary structures, working conditions, and evaluation criteria for faculty members in the two programs were very similar as well.

The inclusion of the Center on Aging within the MBT SSW was logical given the years of collaboration across OPHS, Social Work, and the Center on Aging. The Center on Aging was established in 1988 under Dr. Anthony Lenzer as a free-
standing unit, and was transferred to the School of Public Health in 1993. The next two directors—Dr. Lawrence Koseki and Dr. Kathryn L. Braun—were appointed from the public health faculty to manage the Center on Aging’s gerontology certificates and extramurally funded research. In 2008, the COA was transferred to the Office of the Vice Chancellor for Research (OVCR), under which Dr. Colette Browne from Social Work served as interim director from 2009 to 2012, and Dr. Christy Nishita served as interim director from 2013 through 2016. Drs. Browne and Braun worked with MBT SSW Dean Noreen Mokuau and the OVCR to establish the Barbara Cox Anthony (BCA) Endowed Co-Chairs in Aging (filled in 2015 by Drs. Braun and Mokuau) and a full-time director position (filled in 2017 by Dr. Perkinson).

The merger of these three units was consistent with the University’s strategic goals to increase experiential learning opportunities across the curriculum, to expand and create transdisciplinary opportunities, to increase student success, to promote scholarly work that informs policies and practices that benefit communities, and to increase partnerships and sharing of expertise with community organizations. It also is consistent with the UHM’s financial plans to increase efficiency.

Collaboration and Synergy
Although each unit has demonstrated competence and productivity as a free-standing entity, the merger encourages greater collaboration and synergy that will enable enhanced and more efficient service to students, the professions, and the community. In this section, we detail specific activities that have been facilitated or strengthened by the merger in the areas of recruitment, research, instruction, and community service.

Recruitment
Public Health and Social Work have been collaborating since 2009 on student recruitment and engagement efforts. Initially, both units were members of Ho’ola Malamalama, a group dedicated to recruiting students (especially Native Hawaiian, other Pacific Islander, and Asian students) into the health professions. Other members of Ho’ola represented Medical Technology, Nursing, Food Science, Human Nutrition & Dietetics, Kinesiology & Rehabilitation Sciences, and the UHM Pre-Health/Pre-Law Center (PAC). The Ho’ola group conducted student outreach activities at local high schools, community colleges, and community health events. It also hosted local high school students interested in the health professions on visits to the UHM campus.

Subsequent budget cuts and changes in leadership have limited the amount of formal programing that Ho’ola Malamalama can undertake. However, representatives from Public Health and Social Work continue to conduct joint recruitment and outreach efforts, Congruent with our shared mission—achieving social justice and health equity for the people of Hawai’i and citizens in a changing world—recruitment strategies have been developed to appeal to local students interested in helping their communities within a social justice and health equity framework.

The two primary types of recruitment events are resource fairs and in-class presentations. During resource fairs, representatives request that their display tables be located next to each other. Many students interested in social justice and health equity are not sure of their career options, and having social work and public health representatives close to each other facilitates explanations about the similarities and differences in these professions. For in-class presentations, program representatives share information as a single unit with multiple degree options, rather than in sequence. Students learn that these fields of study take an ecological view, understanding that behavior is influenced by individual, interpersonal, organizational, community, and public policy forces. These fields also require students to work with health, social service, and policy organizations to apply professional knowledge and skills. Social Work emphasizes a strengths perspective in a practice model that includes engagement, assessment, intervention, and evaluation when
working with individuals, families, groups, organizations, and communities. Public Health takes a population approach that focuses more on community assessment, surveillance, health education, program planning and administration, evaluation, research, and advocacy. Representatives also recount stories of former students who earned advanced degrees in both Public Health and Social Work, explaining how these degrees can be complementary.

As an example, Dr. Denise Nelson-Hurwitz (Public Health) and Mari Ono (Social Work) recently participated in the Moanalua High School Career Fair. Together, they presented to groups of high school students about educational and career opportunities within our social justice and health equity framework. Areas stressed were our commitment to community, opportunities for students to help individuals and communities, and our emphasis on practice-based education. Then the specific degrees were described, as well as the career options for graduates from each field. Recruitment efforts are supported by both the DSW Office of Student Services and the OPHS Diversity and Recruitment Committee. Trained, volunteer student ambassadors from the programs, along with paid Manoa Peer Advisors, are important members of the team.

Research
Public Health, Social Work, and the Center on Aging promote collaborative and interdisciplinary research within the university and with other academic and community partners. Their research foci include basic as well as applied, translational, and community-engaged research on local, national, and international levels. For example, Ha Kupuna National Resource Center for Native Hawaiian Elders is a collaborative project that seeks to create and disseminate knowledge on the health of kupuna (elders) to improve kupuna health and the delivery of services to them. The project was established in 2006 with funding from the US Administration on Community Living, and it currently is funded through 2021. Dr. Colette Browne from Social Work leads the program, and several faculty members from Social Work, Public Health, and the Center on Aging participate. A recent publication from Ha Kupuna reports on the 2010 life expectancy estimates for the five largest ethnic groups in Hawai‘i. Findings suggest that life expectancy is increasing for all groups, but life expectancy for Native Hawaiians is 4 years shorter than for Caucasians, 8 years shorter than for Japanese, and 11 years shorter than for Chinese in Hawai‘i.4 This publication received strong media coverage, showing its relevance to the state. Other publications more broadly explore health disparities experienced by Native Hawaiian and Pacific Islander elders,5 advantages and disadvantages of using various research methods when investigating indigenous health,6 dementia among indigenous elders,7 and experiences of Native Hawaiian elders in Hawai‘i and California. http://manoa.hawaii.edu/hakupuna/

Another project that encompasses faculty from the three units is RMATRIX-II (2014-2019), the RCMI Multidisciplinary And Translational Research Infrastructure eXpansion program. The goal of RMATRIX-II is to support early-stage investigators, especially those from underrepresented groups, who are dedicated to improving the health of Native Hawaiians, Pacific Islanders, and Filipinos. Any faculty member can request RMATRIX services for assistance with basic research, clinical research, community-based research, biostatistics, bioinformatics, clinical research services, and regulatory questions. Social Work and Public Health play key leadership roles. Specifically, RMATRIX II is co-led by the Deans of JABSOM and the MBT SSW, and a faculty member from public health co-leads the community-based research core. In their RMATRIX leadership roles, representatives from Social Work and Public Health facilitate recruitment of community-based researchers and advise university researchers on best ways to work in and with Hawai‘i communities experiencing health disparities. RMATRIX II is funded by the National Institute of Minority Health and Health Disparities. http://rmatrix.jabsom.hawaii.edu/index.jsp

On the level of individual grants, faculty members from Public Health, Social Work, and Medicine are working with community collaborators on the Partnerships for Improving Lifestyle Intervention (PILI) Tech project, funded by RMATRIX-II. This project builds on a 12-year community-based participatory research partnership to develop and test the PILI Lifestyle Program, which is a cultural adaptation of the Diabetes Prevention Program Lifestyle Intervention for local Native Hawaiians and other Pacific Islanders communities. This intervention is adapted to Hawai‘i and has been shown to be effective in promoting weight loss.8,9 The goal of the Tech project is to adapt the PILI Lifestyle Program into a self-directed, online program. The PILI Tech project is lead by co-PI’s Dr. Claire Townsend Ing, a faculty member at the JABSOM Department of Native Hawaiian Health who received her doctoral degree from OPHS, and Dr. Seunghye Hong, a faculty member at the DSW, with contributions from Dr. Denise Nelson-Hurwitz of the OPHS.

The Center on Aging is partnering with several units on campus, as well as with a number of community partners, on the Hawai‘i Alzheimer’s Disease Initiative (HADI), which strives to strengthen the dementia-capability of local communities. The project builds on the existing capacity of professionals and organizations to provide support to older adults with memory loss or dementia and their caregivers. It is funded by the federal Administration for Community Living’s Alzheimer’s Disease Initiative-Specialized Supportive Services Program. This project dovetails with the Geriatric Workforce Enhancement Project of JABSOM’s Department of Geriatric Medicine, which engages faculty and students from Social Work, Public Health, Nursing, Medicine, and Pharmacy in inter-professional education opportunities in geriatrics.

Instruction
In the past year, the three MBTSSW units collaborated on the development and piloting of an undergraduate course on aging called Back to the Future: Aging in Today’s Society. The BCA
Endowment provided the funding, and the COA director and faculty members in Public Health and Social Work contributed to ideas for the course. A Public Health faculty member, Dr. Catherine Pirkle, piloted the course in fall 2016, and an application has been submitted to make the course permanent. Cross-listed in Public Health and Social Work, the goal is to attract students majoring in these, as well as other, subjects into gerontology. The course instructor can utilize a number of faculty members from the three units as guest lecturers.

Another potential area of collaboration is between the DrPH program and PhD in Social Welfare. With more attention to economies of scale, units are strongly encouraged to cancel classes with fewer than five enrolled students. However, most doctoral programs are small, admitting only two to four students per year. Thus, it benefits doctoral programs to identify courses in other units that can fulfill their students’ doctoral degree requirements. Already, many PhD in Social Welfare students enroll in Public Health’s graduate course on program evaluation, while many DrPH students have enrolled in Social Work’s qualitative methods course. The two doctoral programs are continuing to identify courses in each other’s units that can serve as substitutes for required courses, as well as for electives.

A third area of collaboration was the “Teach-In / Act Out” event organized by students from Public Health and Social Work in February 2017. More than 125 individuals attended, including students, faculty members, and community members. Attendees had their choice of multiple break-out sessions led by speakers from across campus and the community on such topics as the Affordable Care Act, indigenous rights, sovereignty, climate change, women’s health, LGBTQ health, housing, and immigration. The Teach-In helped showcase the cross-cutting nature of public health and social work, and also demonstrated the need for more interdisciplinary work across the university. The event organizers continue to work with speakers and participants towards creating a broader on-campus movement for community building, policy change, and advocacy.

Community Service

The three units provide service to the community. Many areas of collaboration are with community groups in the field of aging. For example, the COA, in collaboration with the Hawaiian Pacific Gerontological Society and representatives of Social Work and Public Health, sponsors an annual Career and Job Fair in Aging. In 2017, the fair attracted 35 vendors who were looking for employees with an interest in and a passion for eldercare. The vendors included architecture firms, health plans, assisted living facilities, nursing facilities, non-profit service providers, home care providers, and a real estate firm. There even was a display by “de-cluttering” experts. More than 100 students participated in the job fair.

All three units also collaborate to provide continuing education for community-based professionals. Through a grant from the Healthcare Resources and Services Administration, Dr. Valerie Yontz of Public Health organizes 18 or more continuing education sessions each year, and these are accessible by computer to individuals across the state. Trainings cover health topic areas, such as mental health and tobacco use, as well as skill areas, such as program leadership and data analysis. More than 1,000 different community-based professionals attend at least one training a year, and continuing education credits are available for social workers, health educators, certified substance abuse counselors, and dieticians.

Plans for Further Collaboration

We anticipate that demand for degrees in Public Health, Social Work, and Gerontology will grow as the population ages, as new diseases emerge, and as new groups experience health and social disparities. These and other trends will lead to further collaboration across these disciplines. Future areas under discussion are developing a dual MPH-MSW degree program, resurrecting the certificates in aging and public health, expanding inter-professional education opportunities, enhancing our indigenous programs, increasing community education offerings, and joining forces on research projects. We strongly believe that this merger will increase the number of well-trained professionals, researchers, and advocates for health equity and social justice.

Authors' Affiliations:
- Office of Public Health Studies, University of Hawai‘i at Manoa, Honolulu, HI (KLB, DN-H)
- Department of Social Work, University of Hawai‘i at Manoa, Honolulu, HI (MO, MG)
- Center on Aging, University of Hawai‘i at Manoa, Honolulu, HI (MAP)
- Myron B. Thompson School of Social Work, University of Hawai‘i at Manoa, Honolulu, HI (KLB, DN-H, MO, MG, MAP, NM)

References
DOCTORS SHOULD JOIN THE WHISTLEBLOWERS.
Under a new bill that a pair of lawmakers introduced in Congress recently, doctors would be required to report potentially serious problems they note with medical devices they use. Known as the Medical Device Guardian’s Act, the law is intended to raise awareness of certain risks with use of the equipment. Specifically, the issue centers around the use of the laparoscopic power morcellator, a remarkable surgical tool that allows for the removal of tissue through a small incision. Medical studies highlighted the risks associated with the morcellator when it was introduced in the 1990s. It served so well for small incision hysterectomy that the risks were ignored until 2013 when a Boston anesthesiologist fell victim to uterine cancer. Her illness and subsequent death went public and hundreds of other safety reports came to the Food and Drug Administration (FDA). Almost 20 years after initial reports of the risk, the FDA published a “black box warning” in 2014. Johnson & Johnson suspended sales of its morcelorator, withdrew it from the market, and has settled more than 100 legal claims and lawsuits tied to the device. Currently, the FDA requires hospitals and manufacturers to report deaths and serious injuries linked to medical devices to the agency’s data base. Doctors don’t have to report, but they are encouraged to do so and can even do so with a smart phone. Requiring physicians to report such cases would be a major step forward, assuming that the report will get to the proper FDA desk. The FDA suggested in a statement that the bill wouldn’t be a cure-all, but admitted that the present system has “important limitations.”

THE PRESIDENT NAMED A QUALIFIED DOCTOR TO RUN THE FDA.
In an effort to improve action by the FDA, Scott Gottlieb, M.D. has been selected by the president to clear up the stranglehold that discourages drug innovation. Dr. Gottlieb served as a deputy commissioner at the FDA during the George W. Bush administration and he has worked at the Centers for Medicare and Medicaid Services (CMS). He has written about doctor autonomy, drug prices, antibiotic usage, and much more. He states that the fundamental problem at the FDA is cultural. Reviewers believe they are the lone bulwark standing between truth and chaos on prescription medications. Clinical trials have stretched from 460 days in 1999 to 780 days in 2005. Dr. Gottlieb has proposed that such decisions be made by a central committee of senior scientists and not by the same reviewer who collects and analyzes the data. He wants to move generic medications to the market to reduce prices, provide competition, and avoid fiascos such as the EpiPen rip-off. He has also suggested that the FDA should explain the reason for declining a drug. One last credential, he is a cancer survivor and understands the urgency of treatment and cure for the individual.

BIG, STRONG, AND VULNERABLE.
Researchers reporting at the annual scientific sessions of the American Heart Association found that blood pressure and cardiac function worsened for linemen in the National Football League (NFL) over the course of the season. The study adds to evidence that interior linemen (most are 300 lbs and over) suffer more risk of heart disease than any other member of the team. After a controversial study in the 1990s reported that linemen have triple the risk of death from cardiovascular disease compared with other team members, research teams have been studying the risks of playing football. Stanford researchers found that linemen were more likely to have unhealthy enlargement of cardiac muscle, especially the left ventricle with a decrease in its function. The long-term effects of these cardiac findings are still under investigation. Blocking and tackling may not be the biggest risk that linemen face on the gridiron.

SHARING ASSETS WITHOUT LOSING ANYTHING.
Fecal Transplants, the process of exchanging bad bacteria for good ones, is almost a routine for patients suffering with C. difficile. Except in rare cases, the procedure works well. Now researcher Chris Callenwaet at the University of California has found that a similar process works for foul-smelling armpits. Working with identical twins, Dr. Callenwaet found that swabbing the underarms of normal smelling patients and then using that swab on odoriferous pits worked to clear up the bad odor. Doesn’t sound romantic, but hey, whatever works.

SENDING SIGNALS WITH WHAT?
Courtney Marneweck at the University of South Africa Kwalzulu Natal is on a quest to study the sociology of the white rhino. To do so, he studies rhino deposits and especially needs to evaluate the doo-doo before “contamination.” He watches and waits for the rhino to unload, sometimes up to several hours. He has developed an algorithm to allow recognition of 150 rhinos “smell profiles.” His conclusion is that rhinos use feces to send distinct social signals to genetically compatible herds on mating habits and predators. As one critic remarked, really a lot like Facebook.

YOU LOST? WHAT WERE YOU THINKING?
World-class chess players are noted for their intense powers of concentration, so it is not surprising that some top flight women have been disqualified during a game for revealing too much cleavage. Showing too much flesh can be a distraction. Ms. Sava Stoisavjevic, head of the European Union announced that the February championship will be held in Iran and all women must wear a hijab. A top-level American woman announced that she is boycotting.

ADDENDA
- Watches got their name from night watchmen.
- Dr. Seuss’ first book was rejected by 23 publishers.
- Tennessee Williams was born in Mississippi.
- Real life court transcript: Q. “So, you were unconscious, and they pulled from the bucket. What happened then?” A. “Mr. Stewart gave me artificial insemination, you know, mouth-to-mouth.”
- “I had a lazy eye as a child and it gradually spread to my whole body.”
- A guy ran into my car fender. I said, “Go forth and multiply,” but not in those words.
- We made love for an hour and fifteen minutes. It was the night they set the clocks ahead an hour.

ALOHA AND KEEP THE FAITH
(Disclaimer: The editorial comment is strictly that of the writer.)
"For more than 35 years, MIEC has been a valued partner of the HMA and an invaluable resource for our members."

Gary Okamoto
Board of Governors

MIEC has just announced $11 Million in dividends* to be distributed to policyholders in 2017

MIEC continues to support policyholders and their communities!

MIEC has a dividend policy that is vastly superior to our competitors and we’ve never lost sight of the medical associations who back our policyholders. Our mission: provide our policyholders and local medical communities with the exemplary service and support they deserve.

Added value:
- No profit motive and low overhead
- Local Claims office in Honolulu
- Supports organized medicine in Hawaii

For more information or to apply:
- www.miec.com
- Call 800.227.4527
- Email questions to underwriting@miec.com

* On premiums at $1/3 million limits. Future dividends cannot be guaranteed.