

# Hawai‘i Journal of Medicine & Public Health

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# Nodular Sclerosing Hodgkin's Lymphoma Presenting with a Pseudo-Breast Mass Extending from a Necrotizing Granulomatous Mediastinal Tumor

Ekamol Tantisattamo MD; Erlaine F. Bello MD; and Jared D. Acoba MD

## Abstract

*Nodular sclerosing Hodgkin's lymphoma commonly presents with a mediastinal mass, but it rarely compresses or invades mediastinal structures or the anterior chest wall. Histologically, it can cause necrotizing granulomatous inflammation. A woman with a right breast mass extending from an asymptomatic large mediastinal mass selectively compressing the trachea is presented. A computed tomography-guided core needle biopsy from the anterior chest wall mass revealed necrotizing granulomatous inflammation. Finally, the diagnosis of nodular sclerosing Hodgkin's lymphoma was made by incisional biopsy. Clinical suspicion of nodular sclerosing Hodgkin's lymphoma is crucial since an adequate tissue diagnosis is needed when the initial less invasive diagnostic testing is inconclusive.*

## Keywords

*breast mass, mediastinal mass, necrotizing granulomatous inflammation, nodular sclerosing Hodgkin's lymphoma*

## Introduction

Nodular sclerosing Hodgkin's lymphoma commonly presents with a mediastinal mass that typically does not compress mediastinal structures or invade the anterior chest wall. Histological findings are crucial for diagnosis since Hodgkin's lymphoma may mimic other diseases. We report a case of a woman presenting with a right breast mass extending from an asymptomatic large mediastinal tumor selectively compressing the trachea. A computed tomography (CT)-guided core needle biopsy from the anterior chest wall mass revealed necrotizing granulomatous inflammation. However, incisional biopsy revealed nodular sclerosing Hodgkin's lymphoma.

## Case Report

A 42-year-old healthy Thai woman presented with a right breast mass present for 2 months. She discovered a painless mass on her right breast from self-breast examination. The mass was initially small but rapidly enlarged over one month. She denied a history of previous breast mass, nipple discharge, respiratory symptoms, fever, or constitutional symptoms. Her younger sister was recently diagnosed with an early stage breast cancer at age 30. She noted generalized pruritus with no rash. Her last mammogram, performed 10 years ago, was normal. Physical examination revealed a fixed, firm, painless 5 cm mass at the upper inner quadrant of the right breast. There was no warmth, erythema, ecchymosis, skin retraction overlying the mass, nipple retraction, or discharge. There was a movable, rubbery, painless 1 cm right anterior cervical lymph node, but no other adenopathy was found. The lung sounds were clear. She had no signs of upper airway obstruction. Oxygen saturation was 100% on ambient air. Liver and spleen were not palpable. The remainder of the examination was unremarkable.

Mammography showed fibrotic changes without an intrinsic breast mass. A Fine Needle Aspiration (FNA) revealed that not enough cells were obtained because the mass was "too fibrotic." Chest X-ray showed a bulky mediastinal mass encasing the trachea (Figure 1). Chest CT scan demonstrated an infiltrating necrotic soft tissue mass 10 cm by 12.5 cm by 7.2 cm in the mediastinum. It compressed the trachea, narrowed the anteroposterior dimension of the carina to 2 mm, encased the aortic branch vessels, and extended into the anterior mediastinum and through the anterior chest wall. The overlying right breast tissue was unremarkable (Figures 2, 3, and 4). A CT-guided core needle biopsy from the anterior chest wall mass showed necrotizing "granulomatous" inflammation which was negative for acid fast bacilli and fungi. Concern about the possibility of a granulomatous infection prompted referral to an infectious disease clinic. A CBC revealed: hemoglobin of 10.6 g/dL, MCV of 87.1 fL, WBC of 4,500 cells/ $\mu$ L, neutrophils of 82%, lymphocytes of 4%, monocytes of 12%, eosinophils of 2%, and platelets of 425,000 cells/ $\mu$ L. Abnormal tests included elevated serum alkaline phosphatase of 77, lactate dehydrogenase of 267 IU/L, erythrocyte sedimentation rate of 52 mm/hr, and C-reactive protein of 36.8 mg/L. Serum calcium and albumin were 8.2 mg/dL and 2.8 g/dL, respectively. Liver function, serum electrolytes, urinalysis, and angiotensin converting enzyme level were normal. HBsAg, HBsAb, HIV 1 and 2, and PPD skin test were negative.

Because of a potential upper airway obstruction, she was admitted for close observation, and underwent an incisional biopsy which revealed a mediastinal mass invading the chest wall without breast involvement. Pathology examination showed Reed-Sternberg (RS) cells. Immunoperoxidase stains were positive for atypical large cells CD15, CD30, MUM1, and bcl-2 and they were negative for CD3, CD20. Abdominal and pelvic CT scans did not reveal tumor masses. She was diagnosed with early-stage II B nodular sclerosing Hodgkin's lymphoma. She responded well to chemotherapy, and one week after the first cycle of chemotherapy, the right breast mass and the right anterior cervical lymph node disappeared. After the fourth cycle of chemotherapy, positron-emission tomographic (PET) scan was consistent with complete response. Pulmonary function tests showed borderline lung volumes suggesting early restriction, no significant expiratory air flow obstruction, and a volume related reduction in diffusing capacity. She received doxorubicin (Adriamycin), bleomycin, vinblastine, and dacarbazine (ABVD) for 6 cycles, and was treated with mediastinal radiation therapy. At 22 months of follow-up, there is no evidence of disease recurrence.

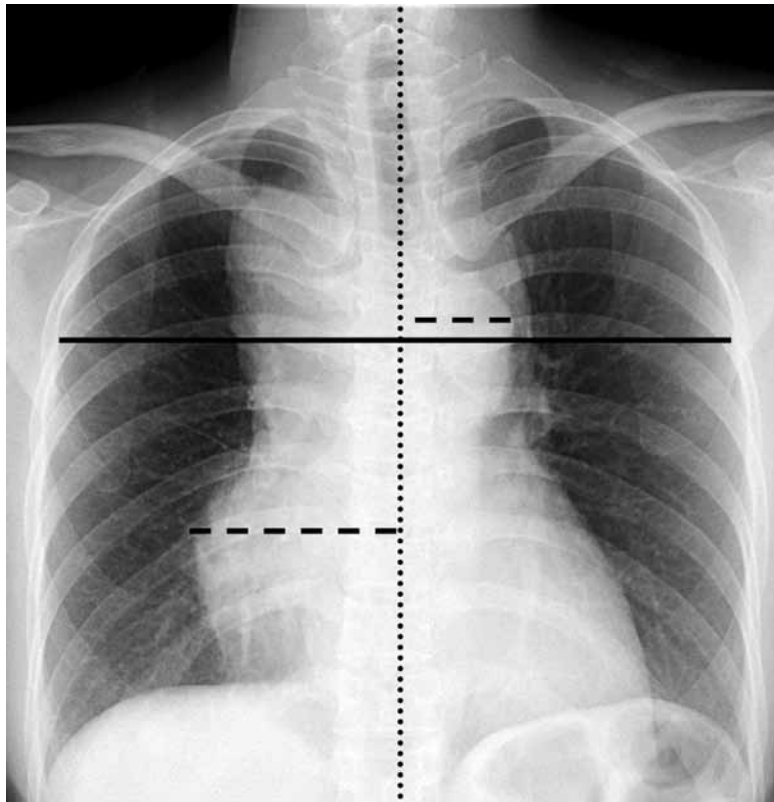


Figure 1. Chest X-ray PA upright shows a bulky mediastinal mass encasing the trachea. The dashed lines show the widest part of each hemi-mediastinum. Summation of both dashed lines is the widest mediastinal diameter (WMD). The solid line shows the internal thoracic diameter (ITD) at T5/6 intervertebral disc space. The ratio between the WMD and ITD is greater than 0.33 in this chest X-ray which indicates a bulky mediastinal mass.

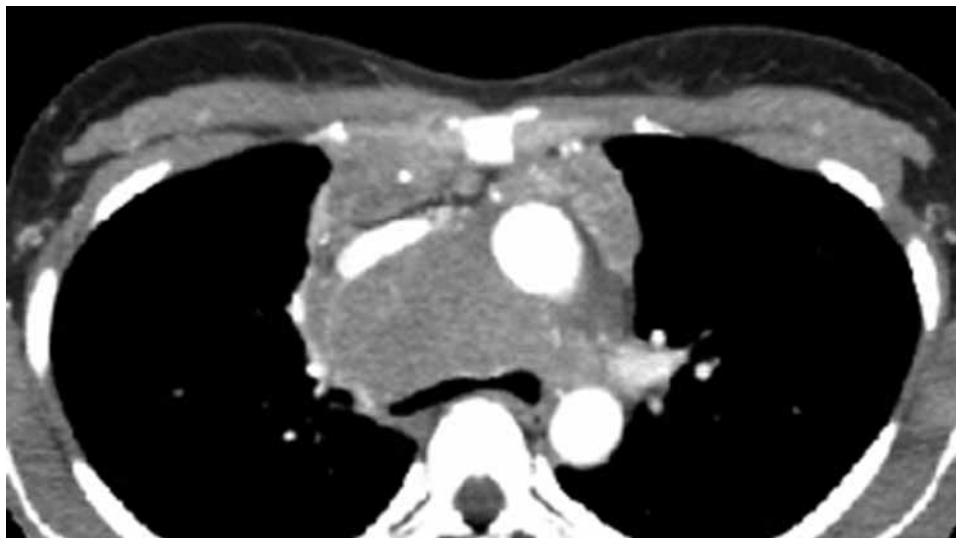


Figure 2. Chest CT scan with IV contrast in transverse section shows a large infiltrative mass 10 cm by 12.5 cm by 7.2 cm in the anterior, middle, and posterior mediastinum invading the right anterior chest wall and causing significant antero-posterior compression of the trachea with a residual tracheal lumen at carinal level of 2 mm. The overlying right breast tissue was grossly unremarkable. The lungs were otherwise clear.

## Discussion

Our patient demonstrated an uncommon manifestation of mediastinal Hodgkin's lymphoma; an initial presentation with an anterior chest wall mass and severe extrinsic compression of the trachea without symptoms of upper airway compression (Figures 2, 3 and 4). The atypical imaging studies along with the granulomatous inflammation on core biopsy created a diagnostic dilemma. Hodgkin's lymphoma is a highly curable disease; however, atypical presentations may mimic other diseases. Often there are no clues from history, physical examination, or imaging studies to differentiate Hodgkin's lymphoma from other diseases causing mediastinal masses. Moreover, histological workup by CT-guided core needle biopsy may be nondiagnostic. Therefore, it is important to be vigilant in pursuing further workup if an initial biopsy of a mediastinal mass only reveals granulomatous changes. We report this case to illustrate a unique presentation of a highly curable disease, and stress the need to pursue a histologic diagnosis.

Given a presentation with a breast mass and a history of early breast cancer in our patient's sister, the initial concern of breast cancer was raised. However, chest CT scan demonstrated a large mediastinal mass extending into the anterior mediastinum, through the anterior chest wall, but not into the right breast tissue. Tumors involving the anterior chest wall are uncommon.<sup>1,2</sup> Most often these lesions are malignant, resulting from metastatic bone tumors, plasma cell dyscrasias, or lymphomas.<sup>3-5</sup> Hodgkin's lymphoma spreads contiguously and has a predisposition to favor the lymph nodes in the anterior and superior mediastinum; presenting as an anterior chest wall mass is extremely rare.<sup>3,6</sup> Our patient noted a rapidly growing breast mass, but further investigation revealed it to be a direct extension of her mediastinal lymphoma.

There are several etiologies of a mediastinal mass (Table 1).<sup>7</sup> In a middle-aged adult, most primary mediastinal tumors are lymphomas; 60% Hodgkin's lymphoma (most commonly nodular sclerosing)<sup>5,8</sup> and 20% Non-Hodgkin's lymphoma.<sup>9</sup> Symptoms and signs of mediastinal lymphoma depend on the size, location, and rate of progression of the tumor as well as the patient's comorbid conditions.<sup>10</sup> Presentations vary from an absence of symptoms to emergent life-threatening upper airway obstruction. However, a compressive effect on mediastinal structures is rare. While cases of Hodgkin's lymphoma compressing the great vessels have been reported,<sup>11,12</sup> airway compression from Hodgkin's lymphoma is very rare.<sup>13-16</sup> The incidence of tracheobronchial abnormalities from Hodgkin's lymphoma is uncertain,<sup>13</sup> but one case series reported that severe airway obstruction is a presenting feature of only 2.4% of mediastinal Hodgkin's lymphomas.<sup>14</sup>

Our patient's lymphoma selectively compressed her trachea but caused no respiratory symptoms. Mandell, et al, showed that the patients with nodular sclerosing Hodgkin's lymphoma presenting with a mediastinal mass compressing greater than 33% of the trachea had respiratory symptoms, difficulty in intubation, or abnormal pulmonary function.<sup>13,17</sup> Thus, our patient

was unique in that despite the significant airway compression she not only denied dyspnea at rest but was able to participate in strenuous exercise without difficulty. Nevertheless upper airway obstruction is unpredictable, and even in the absence of symptoms and signs careful respiratory monitoring is crucial.

Apart from diagnostic CT scans of chest, abdomen, and pelvis, PET scan is recommended for initial staging of patients with lymphoma. It is also used for evaluating residual masses at the end of treatment.<sup>18</sup> However, PET scan cannot be used to diagnose malignancy as sites of infection or inflammation can also display increased uptake of the radioactive tracer.<sup>19</sup> Histological diagnosis is warranted to rule out malignancy in patients presenting with a mediastinal mass invading the anterior chest wall. Our patient did not have a PET scan as part of her initial staging because of lack of insurance.

An additional challenge in this case was the result of the initial core biopsy demonstrating granulomatous inflammation. While histologic diagnosis of Hodgkin's lymphoma can be made by FNA or core needle biopsy, incisional or excisional biopsy is often necessary. Even though RS cells may be found through FNA, they are not pathognomonic for Hodgkin's lymphoma. The presence of RS cells is necessary, but since they are not unique to Hodgkin's lymphoma, RS cells alone are not sufficient for the diagnosis. In addition, FNA is limited in distinguishing subtypes of Hodgkin's lymphoma, especially nodular sclerosing type, because it is important to demonstrate sclerosed bands of tissue around groups of reactive cells interspersed by lacunar-type RS cells.<sup>20</sup> Core biopsy may be the first investigation to diagnose Hodgkin's lymphoma; but the sensitivity of CT-guided percutaneous core-needle biopsy from a large series of biopsies of mediastinal Hodgkin's lymphoma was 78%.<sup>21</sup> However, obtaining an adequate amount of tissue in a core biopsy can be challenging. A CT-guided core needle biopsy in our patient showed "granulomatous inflammation" which led to the differential diagnoses of mediastinal granulomatous inflammation including infections (especially tuberculosis given her origin in Thailand), vasculitis, and immunological aberrations.<sup>22-31</sup> However, granulomatous inflammation is also common in nodular sclerosing Hodgkin's lymphoma (Table 2). Moreover, our patient presented with other characteristics suspicious for Hodgkin's disease including her age, sex, palpable cervical lymphadenopathy, mediastinal mass, and generalized pruritus. As in our patient, adequate tissue via incisional or excisional biopsy should be obtained when there exists a suspicion of Hodgkin's lymphoma but the initial pathologic diagnosis is inconclusive.

## Conclusion

Our case demonstrates an atypical presentation of nodular sclerosing Hodgkin's lymphoma in an asymptomatic woman whose initial complaint was a breast mass. The extension to the chest wall, compression of the trachea, and lack of respiratory symptoms given the degree of compression are extremely rare in Hodgkin's disease. Moreover the initial biopsy revealed only



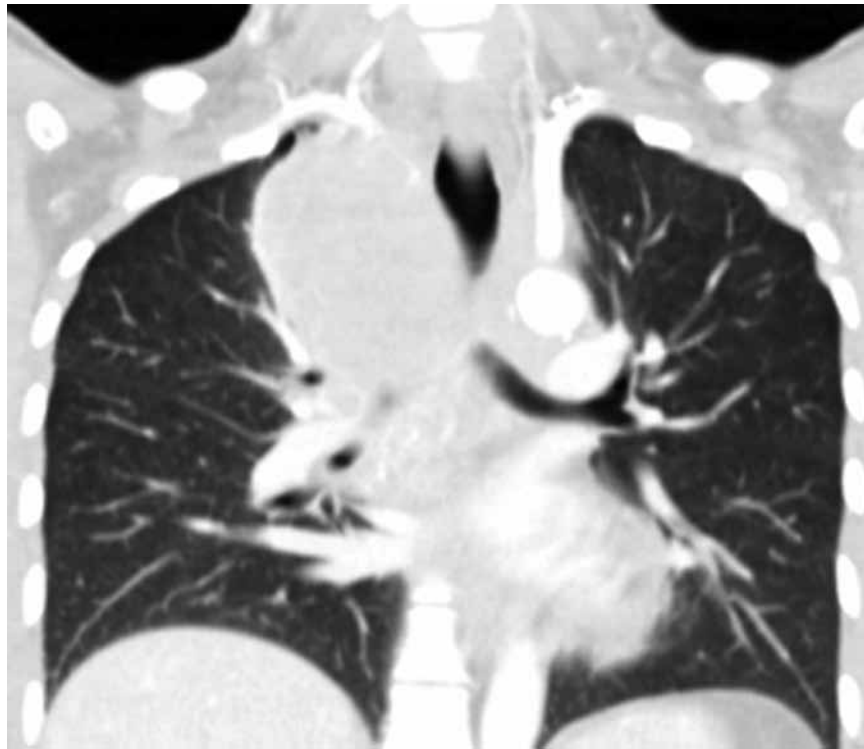


Figure 3.

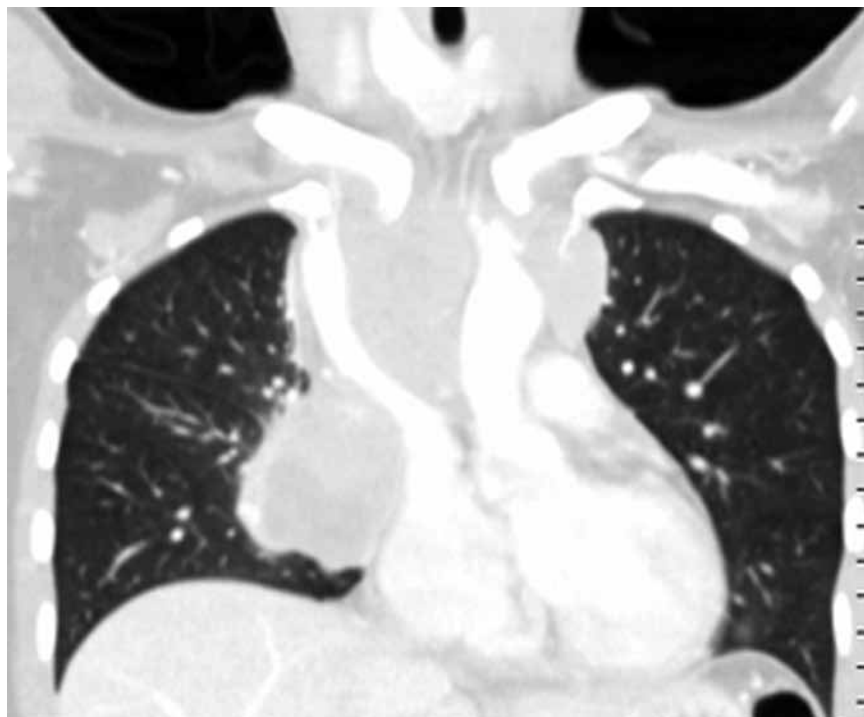


Figure 4.

Figures 3 and 4. Chest CT scan in coronal section shows the bulky mediastinal mass encasing the aortic branch vessels without compression of those vessels.

Table 1. Common etiologies of the anterior mediastinal mass in adult <sup>7</sup>			
	Incidence	Common age groups / Gender	Clinical manifestations
<b>Thymoma</b>	<ul style="list-style-type: none"> <li>The most common primary tumor of the anterior mediastinum.</li> <li>Rare in children and adolescents</li> </ul>	<ul style="list-style-type: none"> <li>&gt;40 years / Male = female</li> </ul>	<ul style="list-style-type: none"> <li>Mostly asymptomatic</li> <li>1/3 chest pain, cough, dyspnea, and/or other symptoms related to compression or invasion of adjacent structures.</li> <li>Up to 1/2 suffer from parathymic syndromes (30-50% myasthenia gravis, 10% hypogammaglobulinemia, and 5% pure red cell aplasia)</li> </ul>
<b>Hodgkin's lymphoma</b>	<ul style="list-style-type: none"> <li>The most common mediastinal lymphoma.</li> <li>Nodular sclerosing Hodgkin's lymphoma is the most common.</li> </ul>	<ul style="list-style-type: none"> <li>Bimodal age distribution / Male = Female (Nodular sclerosing: Female = 2*Male)</li> <li>Mediastinal involvement are younger than without mediastinal disease.</li> </ul>	<ul style="list-style-type: none"> <li>Cervical or supraclavicular lymphadenopathy</li> <li>Most mediastinal lymphomas do not cause symptoms and are discovered incidentally on chest radiographs.</li> <li>Patients may experience chest pain, cough, wheezing, and/or dysphagia due to invasion of or mass effect on mediastinal structures.</li> <li>Superior vena cava (SVC) syndrome and chest wall invasion are uncommon.</li> </ul>
<b>Non-Hodgkin's lymphoma</b>	<ul style="list-style-type: none"> <li>Large B-cell lymphoma and lymphoblastic lymphoma primarily involve the anterior mediastinum.</li> </ul>	<ul style="list-style-type: none"> <li>All age groups with a median age of 55 / Male : Female = 1.4:1</li> </ul>	<ul style="list-style-type: none"> <li>85% presents with advanced disease, constitutional symptoms, generalized lymphadenopathy, and/or extensive extranodal disease at diagnosis.</li> </ul>
<i>Large B-cell lymphoma</i>		<ul style="list-style-type: none"> <li>A median age of 26 years, children / Female</li> </ul>	<ul style="list-style-type: none"> <li>Subacutely, occasionally as oncologic emergencies, with signs and symptoms of a rapidly enlarging mediastinal mass that often directly invades the SVC, airway, chest wall, or adjacent structures.</li> </ul>
<i>Lymphoblastic lymphoma</i>		<ul style="list-style-type: none"> <li>1st – 2nd decades / Male</li> </ul>	<ul style="list-style-type: none"> <li>Rapidly enlarging</li> <li>SVC syndrome</li> </ul>
<b>Mediastinal germ cell tumors</b>	<ul style="list-style-type: none"> <li>10-15% of adult anterior mediastinal tumors.</li> </ul>	<ul style="list-style-type: none"> <li>A mean age of 27 years</li> </ul>	
<i>Teratomas</i>	<ul style="list-style-type: none"> <li>60-70% of mediastinal germ cell tumor</li> </ul>	<ul style="list-style-type: none"> <li>Male = Female</li> <li>&gt;90% of malignant germ cell tumors occur in male.</li> </ul>	<ul style="list-style-type: none"> <li>Mature teratoma usually asymptomatic, but large tumors may cause chest pain, dyspnea, cough, or other symptoms of compression.</li> </ul>
<i>Seminomas</i>	<ul style="list-style-type: none"> <li>40% of malignant germ cell tumor</li> </ul>	<ul style="list-style-type: none"> <li>Third and fourth decades of life / White men</li> </ul>	<ul style="list-style-type: none"> <li>Usually symptomatic.</li> <li>10% may have elevated <math>\beta</math>-HCG</li> </ul>
<i>Nonseminomatous malignant germ cell</i>	<ul style="list-style-type: none"> <li>Includes embryonal cell carcinoma, endodermal sinus tumor, choriocarcinoma, or mixed germ cell tumors</li> </ul>	<ul style="list-style-type: none"> <li>Young adult / Male</li> </ul>	<ul style="list-style-type: none"> <li>Frequently positive LDH, AFP, and <math>\beta</math>-HCG</li> <li>Associated with hematologic malignancy.</li> <li>20% have Klinefelter's syndrome.</li> </ul>
<b>Mediastinal goiter</b>	<ul style="list-style-type: none"> <li>10% of mediastinal masses.</li> <li>20% of cervical goiter descends into thorax.</li> <li>Primary intrathoracic goiters without a cervical part are very rare.</li> </ul>	<ul style="list-style-type: none"> <li>Women</li> </ul>	<ul style="list-style-type: none"> <li>Asymptomatic with a palpable cervical goiter</li> <li>Occasionally causes compressive symptoms or pain.</li> </ul>

granulomatous inflammation further confounding the diagnosis. Despite the unusual presentation, Hodgkin's lymphoma, a highly curable malignancy, was in the list of differential diagnoses. Open biopsy was appropriate and the patient responded well to treatment.

*The findings and conclusions of this study do not necessarily represent the views of The Queen's Medical Center, Honolulu, HI.*

## Disclosure Statement

The authors have no financial disclosures.

## Conflict of Interest

No financial support of any kind was received.

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Table 2. Reported causes of gaunloma mediastinal mass <sup>22-31</sup>				
	Incidence	Presentations	Complications	Diagnosis / Work-up
<b>Fibrosing granulomatous mediastinitis (as a complication of infectious mediastinal masses)</b>	<ul style="list-style-type: none"> <li>• Rare but incidence is not available</li> <li>• Histoplasmosis is the most common cause</li> </ul>	<ul style="list-style-type: none"> <li>• 2nd – 5th decades with cough, dyspnea, hemoptysis, SVC syndrome, dysphagia, and cor pulmonale</li> </ul>	<ul style="list-style-type: none"> <li>• Encasement and obliteration of the tracheobronchial tree, mediastinal vessels and esophagus</li> </ul>	<ul style="list-style-type: none"> <li>• Thoracotomy and histopathology are required</li> </ul>
<b>Hodgkin's Lymphoma; nodular sclerosing</b>	<ul style="list-style-type: none"> <li>• Nodular sclerosing Hodgkin's has a predilection for the anterior mediastinum</li> <li>• A bimodal age distribution</li> <li>• More common in middle-aged women</li> </ul>	<ul style="list-style-type: none"> <li>• Asymptomatic</li> <li>• Cervical or supraclavicular lymphadenopathy, pruritus, alcohol intolerance</li> </ul>	<ul style="list-style-type: none"> <li>• SVC syndrome and chest wall invasion are uncommon</li> <li>• Airway obstruction</li> </ul>	<ul style="list-style-type: none"> <li>• Tissue excision</li> <li>• Elevated LDH, ESR</li> </ul>
<b>Idiopathic (sarcoidosis)</b>	<ul style="list-style-type: none"> <li>• Rare to less than 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Hilar adenopathy</li> </ul>	<ul style="list-style-type: none"> <li>• Pulmonary fibrosis</li> <li>• Increased risk for cancer, in particular lung cancer, malignant lymphomas</li> </ul>	<ul style="list-style-type: none"> <li>• Serum ACE elevation in 60%</li> </ul>
<b>Infectious causes</b>	<p>The following rare infectious causes:</p> <ul style="list-style-type: none"> <li>• Tuberculosis</li> <li>• Syphilis</li> <li>• Histoplasmosis</li> <li>• Nocardiasis</li> <li>• Actinomycosis</li> <li>• Blastomycosis</li> <li>• Coccidioidomycosis</li> <li>• Aspergillosis</li> </ul>	<ul style="list-style-type: none"> <li>• Asymptomatic</li> <li>• Cough, dyspnea, pain in the chest, fever, wheezing, dysphagia, and hemoptysis</li> </ul>	<ul style="list-style-type: none"> <li>• The most common cause of benign obstruction of the SVC</li> <li>• Fibrosing mediastinitis (histoplasmosis is the most common)</li> </ul>	<ul style="list-style-type: none"> <li>• Cultures</li> </ul>
<b>Wegener's granulomatosis</b>	<ul style="list-style-type: none"> <li>• Middle-aged white</li> <li>• 2% among 302 patients in one retrospective study</li> </ul>	<ul style="list-style-type: none"> <li>• Upper airway, lungs, and kidney involvement</li> <li>• Skin, mucous membranes, eyes, ears, and joints</li> </ul>	<ul style="list-style-type: none"> <li>• Sinusitis, tracheal stenosis</li> <li>• Relapses</li> <li>• Long-term complications (86%): chronic kidney disease, hearing loss and deafness.</li> </ul>	<ul style="list-style-type: none"> <li>• Exclude other diagnosis</li> <li>• Granulomatous inflammation, geographic necrosis, and vasculitis</li> <li>• cANCA, serum creatinine, urine sediment</li> </ul>

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# Risk Factors for Community-Associated *Staphylococcus aureus* Skin Infection in Children of Maui

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## Abstract

The prevalence of community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infection, and *Staphylococcus aureus* (*S. aureus*) infection overall, has dramatically increased in the past 10 years. Children and Native Hawaiians and Pacific Islanders (NHPI) are disproportionately affected by CA-MRSA infection. The purpose of this case-control study was to identify risk factors for CA-*S. aureus* skin infections in children of Maui, Hawai'i, as a foundation for reducing the transmission of these infections. Survey data were obtained from patients in pediatric clinician offices over an 8-month period. NHPI participants were well-represented as 58% of cases and 54% of controls. Chi-square analysis and logistic regression were used to identify risk factors. Significant risk factors predictive of infection among all participants were (a) skin abrasions or wounds, (b) household contact, and (c) overweight or obesity. Risk factors predictive of infection among NHPI were (a) skin abrasions or wounds, (b) antibiotic use within 6 months, (c) overweight or obesity, and (d) a history of eczema or other skin disorder. The role of overweight or obesity in *S. aureus* skin infections among NHPI has not been identified in previous research and indicates a focus for additional education. Further research is needed to better understand the role of eczema, antibiotic use, overweight and obesity, and socio-cultural factors in these infections.

## Keywords

*S. aureus*, MRSA, skin infection, Native Hawaiian and Pacific Islander, children, case-control, epidemiology, overweight, obesity

## Introduction

Morbidity from community-associated (CA) *Staphylococcus aureus* has been increasing since the 1990s,<sup>1-3</sup> as has the prevalence of methicillin-resistance among *S. aureus* isolates.<sup>4,5</sup> Both methicillin-resistant *S. aureus* (MRSA) and methicillin-sensitive *S. aureus* (MSSA) may cause severe, invasive illness such as bacteremia, pneumonia, endocarditis, and osteomyelitis; however, invasive MRSA is more likely to be associated with higher mortality rates.<sup>6</sup> Nationwide, CA-MRSA prevalence in clinical specimens is now generally over 30%<sup>7</sup> and is the most common cause of skin and soft tissue infections seen in emergency rooms across the United States.<sup>5,8</sup> CA-MRSA skin infections are difficult to treat and often recur.<sup>4</sup> Children and Pacific Islanders are particularly vulnerable to CA-MRSA infection.<sup>3,9,10</sup> Although the literature indicates that Pacific Islanders are disproportionately affected by CA-MRSA infection,<sup>9</sup> the risk factors for infection in this population have not been established.

Risk factors for MRSA infection have been identified in studies of a number of populations, including: American Indians,<sup>2</sup> Alaska Natives,<sup>11,12</sup> athletic teams,<sup>13,14</sup> prisoners,<sup>13,15</sup> military personnel,<sup>16</sup> the homeless, and medically underserved.<sup>17</sup> The literature indicates risk factors for MRSA infection vary according to the population studied, the reason for investigation, and the research methodology. The potential risk factors, or independent variables, chosen for study in the current research were identified from the findings of prior studies of vulnerable populations.

## *Staphylococcus aureus* Research in Hawai'i

A case-control study conducted in 1989 found contact with seawater to be associated with *S. aureus* infection in children of O'ahu, Hawai'i.<sup>18</sup> Seifried, Tice, and Eischen<sup>19</sup> found the *S. aureus* strain types recovered from recreational seawater in Hawai'i were varied and identical to those isolated from human wounds. The relationship of seawater exposure to *S. aureus* infection on Maui has not been studied prior to the current research.

In a retrospective study of CA-MRSA conducted on the island of O'ahu from 2001 to 2003, 51% of case-patients were Pacific Islanders (178 of 346), yet they represented only 24% of the total population.<sup>9,20</sup> The proportion of pediatric Pacific Islander case-patients with CA-MRSA was even greater at 76% (90 of 118 case-patients), while Pacific Islanders represented 35% of the total pediatric hospital population.<sup>9,20</sup> This disparity reveals a need for further epidemiologic studies of risk factors for CA-MRSA infection targeting Pacific Islanders, to prevent or reduce transmission of infection in this population.

## Methods

The current research utilized a case-control design, and involved children age 6 months to 17 years. IRB approval was obtained from Walden University, number 07-29-08-0296121. Seven clinic sites in multiple geographic areas of the island of Maui participated in the selection of cases and controls (Wailuku, Kahului, Kihei, and Hana). The actual residence of participants had a broader distribution, given that healthcare providers tend to be located centrally (see Table 1 for geographic residence areas of participants). Data were obtained by parental survey over an 8-month period, from September 2008 to April 2009. Written informed consent was obtained from parents of all cases and controls; assent of the children was optional. Chil-

Table 1. Culture Results by Zip Code

CULTURE Zip Code	MSSA	MRSA	None (control)
96708- Haiku	0	1	6
96713- Hana	3	6	20
96732- Kahului	5	9	36
96753-Kihei	11	1	23
96761-Lahaina	1	1	9
96768-Makawao	6	3	12
96779-Paia	1	0	2
96790-Kula	2	3	2
96793-Wailuku	13	4	35
Not specified	1	0	1

dren seeking treatment for skin infection were identified as potential cases upon presentation to the clinician's office and parents were invited to complete a self-administered written survey while in the office. The survey consisted of 22 items addressing the independent variables, or potential risk factors, and demographic information.

The risk factors examined for association with *S. aureus* skin infection in this study were: (a) antibiotic use within 6 months;<sup>12,13,21,22</sup> (b) close contact with a health care worker;<sup>16,23,24</sup> (c) household contact with a person known to have *S. aureus* skin infection;<sup>13,16,25</sup> (d) a history of skin abrasions, eczema, or other rash skin disorder;<sup>13,14,22</sup> (e) personal hygiene practices of bathing frequency and sharing personal items;<sup>14,26</sup> (f) the chronic conditions of diabetes and obesity;<sup>5,25,27,28</sup> and (g) socioeconomic status determined using the number of people in the home and family income.<sup>29,30</sup> In addition, two potential risk factors that have not been examined in other vulnerable populations were included in this study: (h) seawater contact and (i) pneumococcal vaccination. Pneumococcal vaccination (PCV) has not been adequately explored as a potential contributor to *S. aureus* infection. Bogaert, et al,<sup>31</sup> and Regev-Yochay, et al,<sup>32</sup> hypothesized that pneumococcal vaccination may increase the prevalence of *S. aureus* nasal carriage, in particular MRSA, which is known to be associated with active infection.<sup>33</sup> Both of these authors recommended further research to clarify the potential effects of pneumococcal conjugate vaccine.

The survey was developed and content validity determined by consultation with local infectious disease and cultural experts. Survey reliability was confirmed with a test-retest pilot study. Each variable was clearly defined in the survey, for example: sea water exposure was limited to the 2 weeks prior to survey completion. Examples of exposure activities were provided, health care worker titles were listed, and separate questions addressed health care worker contact occurring in the home and outside of the home. The exact height and weight of the child were obtained by clinic staff for calculation of BMI and determination of overweight or obesity by CDC guidelines. Survey questions that assessed a number of events (PCV injections, bathing, and number of people in the home) were given a narrow range of choices, for example, the number of people in the home was queried as two to three, four to five, six to seven, or eight or more. Participants self-identified race/ethnicity in the survey.

The diagnosis of *S. aureus* infection, either MSSA or MRSA, was confirmed by laboratory culture of clinician-obtained sample swabs of the infection site. Following confirmation of *S. aureus* infection, two controls without evidence of skin infection were systematically selected from patient appointment records of the same clinician's office, usually within 2 weeks of the case visit. Cases and controls were age-matched within the following ranges: 6 months to less than 2 years, 2 years to 4 years, 5 years to 8 years, 9 years to 12 years, and 13 years to 17 years. Parents of the controls completed the written survey. In the final count, participants included 71 cases with *S. aureus* infection and 146 controls without infection. Data analysis did

not include surveys obtained from 17 possible cases with skin infection that were determined by culture to have bacteria other than *S. aureus*. Table 1 summarizes the demographic characteristics of participants along with culture results.

Three groups of participants were considered in the analysis: all cases and controls, NHPI (combining the categories of NHPI and Mixed Heritage including NHPI), and the remaining non-NHPI race/ethnicity categories. This allowed for comparison of the data between NHPI and non-NHPI. Data analysis was conducted using Epi Info in a two-step process. In Step One, each independent variable (or potential risk factor) was tested by chi-square with Mantel-Haenszel correction; a two-tailed *P*-value is reported. In Step Two, logistic regression was conducted for the variables found to be significantly associated with infection by the chi-square analysis of Step One. Logistic regression analysis was done for all cases and controls, and NHPI. Logistic regression was not done for the non-NHPI group variables as there were only two significant by chi-square, and participant numbers were low in some cells.

**Table 2. Characteristics of Participants Stratified by Culture Results. Controls were not cultured.**

CULTURE Characteristic	MSSA n=43	MRSA n=28	CONTROL n=146
<b>Age</b>			
6 months to <2 years	5 (12%)	6 (21%)	19 (13%)
2 years to 4 years	7 (16%)	7 (25%)	30 (20%)
5 years to 8 years	14 (33%)	2 (7%)	31 (21%)
9 years to 12 years	7 (16%)	4 (14%)	23 (16%)
13 years to 17 years	10 (23%)	9 (32%)	41 (28%)
Not specified*	0	0	2 (<1%)
<b>Gender</b>			
Male	27 (63%)	12 (43%)	65 (45%)
Female	16 (37%)	16 (57%)	79 (55%)
Not specified*	0	0	2 (<1%)
<b>Race/Ethnicity</b>			
Asian/ Asian American	6 (14%)	2 (7.1%)	33 (23%)
White	6 (14%)	6 (21%)	17 (12%)
Hispanic or Latino	0	4 (14%)	9 (6%)
Mixed Heritage not Pacific Islander	0	4 (14%)	6 (4%)
Native Hawaiian or Pacific Islander	20 (46%)	6 (21%)	48 (33%)
Mixed Heritage with Pacific Islander	10 (23%)	5 (18%)	31 (21%)
Not specified*	1 (2%)	1 (4%)	2 (<1%)
<b>Annual Family Income</b>			
<\$10,000	7 (16%)	8 (29%)	22 (15%)
\$10,001-\$20,000	5 (12%)	4 (14%)	26 (18%)
\$25,001-\$35,000	7 (16%)	5 (18%)	23 (16%)
\$35,001-\$50,000	5 (12%)	7 (25%)	24 (16%)
\$50,001-\$75,000	12 (28%)	2 (7%)	25 (17%)
>\$75,000	7 (16%)	2 (7%)	20 (14%)
Not specified*	0	0	6 (<1%)

\*occasional data missing from self-administered surveys.

## Results

NHPI participants were well represented with 58% of cases and 54% of controls, when the categories of Native Hawaiian Pacific Islander and Mixed Heritage including NHPI were combined. Of the 71 cases, 28 (39.4%) were cultured with MRSA. The majority of cases (60.6%) were cultured with MSSA. Figure 1 displays the number of cases cultured with either MSSA or MRSA, and the number of controls, according to race/ethnicity. The age of participants was fairly evenly distributed from 6 months to 17 years. Fifty-five percent of cases were boys and 45% were girls, while 55% of controls were girls and 45% were boys. The family income of participants was widely distributed from under \$10,000 per year to over \$75,000 per year.

### All Cases and Controls

The results of Step One, the chi-square analysis for each independent variable for all cases and controls, are reported in Table 3. The following risk factors were found to be significantly associated with infection at the 0.05 confidence level: antibiotic use within 6 months; household contact with a person diagnosed with *S. aureus* infection within the past year; skin abrasions or wounds within 2 weeks before presenting to the clinician; the practice of sharing towels; the condition of overweight or

Table 3. Step One: Chi square Analysis Odds Ratios for Independent Variables of Infection in All Participants.

Chi square Analysis	All Participants	
Risk Factor	OR (95% C.I.)	P (2-tailed)
Antibiotic use*	<b>1.94 (1.04, 3.62)</b>	.04
Healthcare worker contact	.93 (.43, 2.03)	.86
Household contact*	<b>4.38 (2.00, 9.60)</b>	<.001
Abrasions or wounds*	<b>4.00 (2.19, 7.29)</b>	<.001
History of eczema or other skin disorder	1.63 (.81, 3.28)	.17
Bathing frequency (<6 per week)	.86 (.37, 1.98)	.72
Sharing of towels*	<b>2.21 (1.24, 3.96)</b>	.01
Sharing of bed linens	1.30 (.74, 2.30)	.36
Overweight or obesity*	<b>2.15 (1.14, 4.05)</b>	.02
Diabetes or other chronic condition	1.41 (.48, 4.11)	.53
Eight or more in home**	<b>3.59 (1.33, 9.71)</b>	.01
Six or more people (vs. 5 or less)	1.41 (.74, 2.68)	.29
SES – poverty level	1.39 (.78, 2.47)	.26
Seawater contact	.92 (.52, 1.62)	.76
Pneumococcal vaccination	.47 (.17, 1.28)	.13

Odds ratios with *P*-values less than .05 are bolded. \*included in logistic regression. \*\*not included in logistic regression due to low cell numbers. Note: OR=Odds Ratio, C.I. = Confidence Interval.

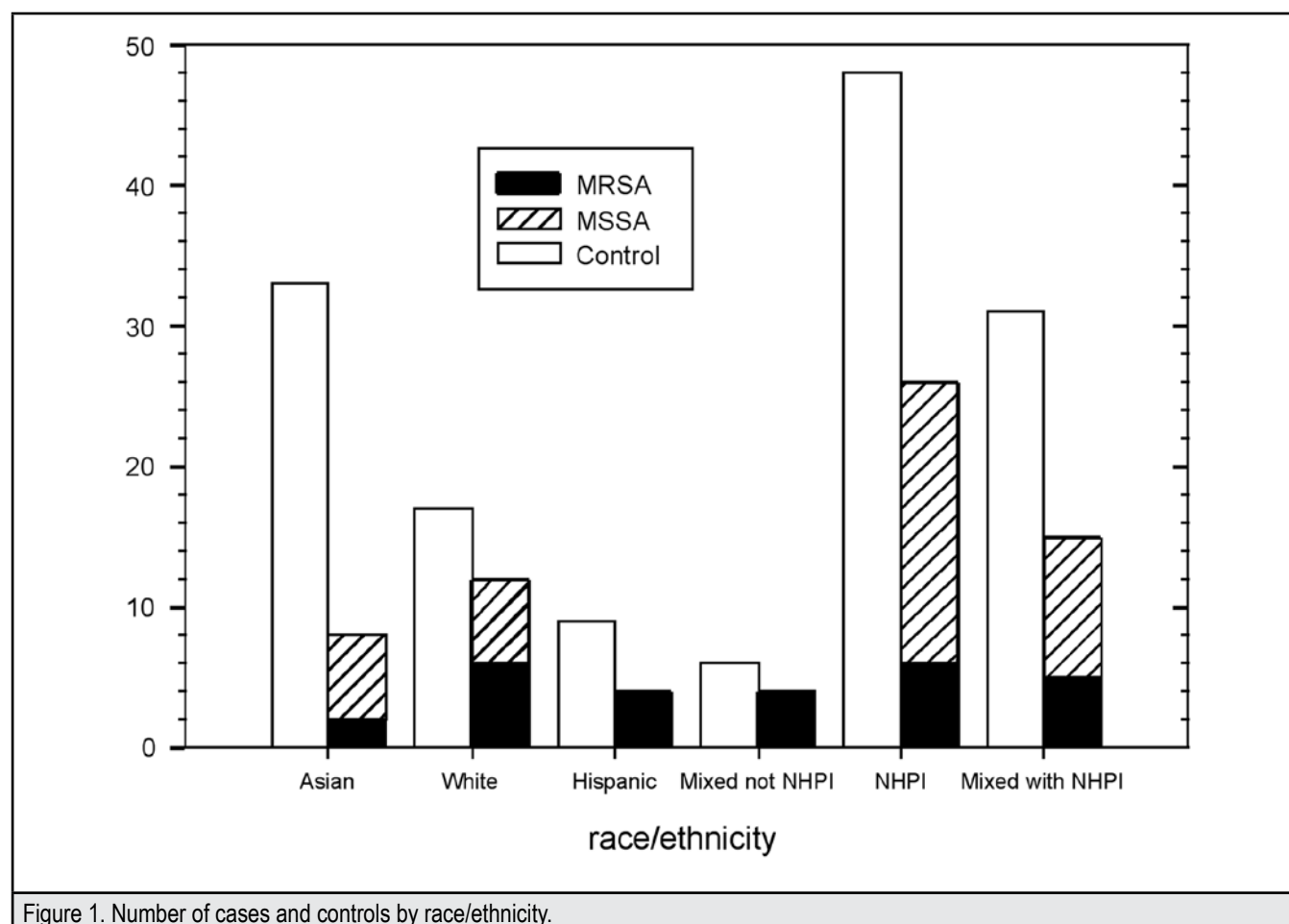


Figure 1. Number of cases and controls by race/ethnicity.



Table 4. Step Two: Summary of Logistic Regression Analyses Odds Ratios, separate regressions for all participants and NHPI participants.				
Logistic Regression Analysis	All Participants		NHPI Participants	
Risk Factor	OR (95% C.I.)	P-value	OR (95% C.I.)	P-value
Antibiotic use	1.93 (.93, 4.01)	.08	<b>3.84 (1.46, 10.1)</b>	<b>.01</b>
Household contact	<b>3.28 (1.38, 7.76)</b>	<b>.01</b>	-	-
Abrasions or wounds	<b>3.42 (1.79, 6.56)</b>	<b>&lt;.001</b>	<b>4.48 (1.75, 11.5)</b>	<b>&lt;.001</b>
History of eczema or other skin disorder	-	-	<b>2.72 (1.00, 7.41)</b>	<b>.05</b>
Overweight or obesity	<b>2.35 (1.16, 4.78)</b>	<b>.02</b>	<b>3.38 (1.33, 8.62)</b>	<b>.01</b>
Sharing bed linens	-	-	1.24 (.48, 3.18)	.66
Sharing towels	1.63 (.84, 3.13)	.15	-	-

Odds ratios with *P*-values less than .05 are bolded. Note: OR=Odds Ratio, C.I. = Confidence Interval.

Table 5. Step One: Chi square Analysis Odds Ratios for Independent Variables of Infection in NHPI and non-NHPI Participants.				
Chi square Analysis	NHPI Participants		non-NHPI Participants <sup>a</sup>	
Risk Factor	OR (95% C.I.)	P-value	OR (95% C.I.)	P-value
Antibiotic use*	<b>2.90 (1.29, 6.61)</b>	<b>.01</b>	.99 (.31, 2.90)	.99
Healthcare worker contact	.58 (.20, 1.58)	.29	2.12 (.55, 7.97)	.24 (F .20)
Household contact	1.93 (.69, 5.32)	.19	<b>19.55 (4.37, 140)</b>	<b>&lt;.001 (F &lt;.001)</b>
Abrasions or wounds*	<b>4.59 (1.06, 10.61)</b>	<b>&lt;.001</b>	<b>3.47 (1.38, 9.09)</b>	<b>0.01</b>
History of eczema or skin disorder*	<b>2.39 (.99, 5.77)</b>	<b>.05</b>	.69 (.14, 2.63)	.59 (F .43)
Bathing frequency (<6 per week)	.60 (.16, 1.93)	.39 (F 0.29)	1.19 (.29, 4.32)	.80 (F .52)
Sharing of towels	2.03 (.94, 4.44)	.07	2.27 (.88, 5.91)	.08
Sharing of bed linens*	<b>2.23 (1.03, 4.94)</b>	<b>.04</b>	.58 (.22, 1.44)	.23
Overweight or obesity*	<b>2.73 (1.22, 6.20)</b>	<b>.01</b>	1.11 (.31, 3.61)	.87 (F .54)
Diabetes or other chronic condition	.96 (.19, 4.08)	.96 (F .63)	2.45 (.40, 15.1)	.28
Eight or more in home	<b>4.00 (1.24, 14.12)</b>	<b>.01</b>	4.00 (1.24, 14.1)	.38 (F .35)
Six or more people (vs. 5 or less)	1.64 (.72, 3.73)	.23	.87 (.25, 2.69)	.81
SES – poverty level	1.24 (.58, 2.70)	.57	1.57 (.61, 4.02)	.34
Seawater contact	.54 (.24, 1.17)	.11	1.75 (.71, 4.39)	.22
Pneumococcal vaccination	1.30 (.24, 10.34)	.76 (F 0.56)	.95 (.37, 2.36)	.91

Odds ratios with *P*-values less than .05 are bolded. The Fisher Exact Test (F) was applied when the expected cell value was less than 5 in the 2x2 table. \*included in logistic regression (NHPI only). <sup>a</sup>logistic regression not performed for non-NHPI as only 2 variables significant by chi square. Note: OR = Odds Ratio, C.I. = Confidence Interval, F = Females.

obesity; and eight or more people living in the home. Multiple analyses for the number of people living in the home indicated the only response of significance was eight or more.

Step Two, logistic regression analysis, was conducted with five of these six preceding risk factors (Table 4). Although significant by chi-square, the variable of eight or more people in the home was not included in the regression due to a low number of yes responses. With logistic regression, the six variables significant by chi-square were reduced to the three risk factors predictive of infection at the .05 level. In order of significance, these were: skin abrasions or wounds, household contact, and overweight or obesity.

The presence of skin abrasions or wounds was significant in both the chi-square and logistic regression analyses. An additional logistic regression was done omitting the risk factor of wounds. Excluding wounds, the regression revealed three significant risk factors, these were: household contact (*P* = .002),

overweight or obesity (*P* = .009), and the practice of sharing towels (*P* = .038). When wounds are excluded, the sharing of towels rises to a level of significance.

#### NHPI Compared to Non-NHPI

Statistically significant differences in risk factors for infection were found in children identified as Native Hawaiian or Pacific Islander when compared with non-NHPI. Table 5 provides the chi-square analysis for each independent variable in NHPI and non-NHPI. The risk factors significant for infection in NHPI and mixed heritage including Pacific Islanders by chi-square at the 0.05 level were: antibiotic use within 6 months, abrasions or wounds, a history of eczema or other skin disorder, sharing of bed linens, overweight or obesity, and eight or more people in the home.

A comparison of odds ratios between NHPI and non-NHPI (Table 5) revealed antibiotic use to be a significant risk factor in NHPI but not in non-NHPI. Household contact was not sig-

nificant in NHPI but was significant in non-NHPI; abrasions or wounds were significant in both groups; eczema or other skin disorder was significant in NHPI but not in non-NHPI; the sharing of bed linens was significant in NHPI but not in non-NHPI; the condition of overweight or obesity was significant in NHPI but not in non-NHPI; and eight or more people in the home was significant in NHPI but not in non-NHPI.

The variable of eight or more people in the home was omitted from the logistic regression analysis for NHPI due to a low number of yes responses (nine cases and five controls). Step Two, logistic regression of the remaining five variables significant by chi-square in NHPI (Table 4) revealed the following four risk factors to be predictive of infection at the 0.05 level, in order of significance: skin abrasions or wounds, antibiotic use within 6 months, overweight or obesity, and eczema or other skin disorder.

Logistic regression analysis of the risk factors significant by chi-square in the non-NHPI group was not performed as there were only two, household contact and abrasions or wounds. Household contact appears to be the single most important risk factor in the non-NHPI group but interpretation of the data is limited by low participant numbers. In this group the yes responses to household contact included 11 cases and 2 controls.

Some variables identified as potential risk factors in earlier studies of other populations, using various methodologies, were not found to be associated with infection for any group in this study. These variables were: healthcare worker contact, bathing frequency, diabetes, family income or poverty level, and seawater contact. The variable of pneumococcal vaccination, not previously identified as a risk factor, was also not associated with infection in this study.

## Discussion

This study comprehensively identifies the risk factors for community-associated *S. aureus* skin infection in children of Maui, in particular for Native Hawaiian and Pacific Islander children. Given that wounds were the most significant risk factor for participants overall, as well as for NHPI, the importance of properly cleaning a wound cannot be overstated. The greatly elevated risk of *S. aureus* infection associated with household contact indicates a need for health care providers to provide education, at the time of diagnosis, to prevent transmission to other family members. Based on the risk from sharing of towels, this education should include the cessation of sharing personal items. These measures have been described by the Hawai'i State Department of Health<sup>34</sup> in relation to MRSA, but should also be addressed for MSSA as all *S. aureus* infections have the potential for serious sequelae.

The problem of overweight and obesity in children has not been previously observed to contribute to *S. aureus* infections in this population. Overweight and obesity in children in general is currently of great concern, as is obesity in adult NHPI. This study provides another reason to focus on measures to reduce obesity in children. Children that are overweight or obese

may benefit from extra attention to skin care in warm, humid climates. The risk factors of eczema or other skin disorders and antibiotic use also need attention to reduce *S. aureus* infections in NHPI. While not conclusive from this study, the risk factors of eight or more people in the home and sharing of bed linens may need consideration in the treatment of NHPI children with *S. aureus* skin infections. Further research is needed to better understand the role of eczema, antibiotic use, overweight and obesity, and NHPI culture in these infections.

The ethnic distribution of participants in this study does not reflect the ethnic distribution of residents of Maui County. According to the State of Hawai'i Data Book, approximately 24.6% of Maui County residents identified as Native Hawaiian or part Hawaiian in 2009,<sup>35</sup> therefore NHPI or mixed heritage with NHPI are over-represented in this study. Compared with their respective percent of the county population, Whites (31.8%), Hispanics (10.1%), and Asians (28.8%)<sup>36</sup> were under-represented. In this study, Whites were 16.9% of cases and 11.6% of controls, Asians were 11.3% of cases and 22.6% of controls, and Hispanics were 5.6% of cases and 6.2% of controls. This may reflect an ascertainment bias in the sampling, or an imbalance in ethnicity of those seeking care at the pediatric clinics.

The association of seawater contact with *S. aureus* skin infection in children found by Charoenca & Fujioka<sup>18</sup> in their 1989 research has not been reproduced in this study. The difference in results may be ascribed to research design, sampling location, time of year, or civil water quality practices. The current study had a larger sample size, a greater number of variables, and additional analyses with logistic regression. In this study, 45% of cases and 47% of controls had seawater contact. Participants with wounds and seawater contact did not have an increased risk of developing *S. aureus* infection. Of those with infection, 44.7% had both seawater contact and a wound, while 50% of those without infection had both seawater contact and a wound. Although this study was not designed to examine the prevalence of MSSA and MRSA in the population, it is interesting to note that NHPI had a lower percentage of MRSA infections compared with MSSA than non-NHPI. Among NHPI cases, 73.2% were cultured with MSSA and 26.8% were cultured with MRSA. Among non-NHPI cases, 43.3% were cultured with MSSA and 56.7% were cultured with MRSA. This is not consistent with earlier research finding that Pacific Islanders accounted for a greater proportion of CA-MRSA infections than other races/ethnicities.<sup>9,20</sup> Speculative interpretation of the MSSA to MRSA ratio is withheld at this time, but the ratio may be worthy of observation in future studies.

In conclusion, the risk factors identified in this study contribute to a gap in the literature about the previously noted increased susceptibility to *S. aureus* infections among NHPI and children. From these risk factors proactive interventions to reduce transmission of infection can be developed.

## Conflict of Interest

None of the authors identify any conflict of interest.

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# A Pediatric Residency Research Requirement to Improve Collaborative Resident and Faculty Publication Productivity

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## Abstract

*Involvement in a research project can teach training physicians about the scientific process involved in medicine. For this reason, the University of Hawai'i pediatrics department developed a Residency Research Requirement and Program (RRRP) in 2001.*

*We studied a 14-year time period before and after the RRRP was initiated, and found a greater than ten-fold increase in resident publications and faculty involvement in these projects. Many of these manuscripts were the result of resident collaboration and this also increased significantly. The residents who later went into fellowship training were found to be more likely to publish their work.*

*An RRRP encourages residents and faculty to become involved in research publications and other scholarly activities. Its development may help to motivate training physicians to learn important research skills.*

## Introduction

Completing a research project can teach training physicians important skills and can help them develop character traits to become evidence-based physicians. A majority of residents (85%) feel that research is worth pursuing with exposure to skilled faculty members, but only 8% are actively involved in research.<sup>1</sup> Even if the residents are able to do some research, it has been difficult for them to publish their work. In one survey, as little as 7% of family practice residents published their results, in contrast to the 55% who had expressed a desire to do so.<sup>2</sup> In pediatric residencies, research involvement among residents has also been low, and has ranged between 14% to 26% in recent studies.<sup>3,4</sup> Residents cite time constraints, lack of faculty mentors, funding difficulties, and the lack of necessary perseverance to complete their projects.<sup>5</sup>

In an effort to improve research skills, many residency programs require that residents engage in some type of research during their training.<sup>6-9</sup> However, simply establishing a new requirement can be onerous for residents who are already quite busy. Some type of research program or curriculum must also be developed. A study of internal medicine residents in the military described increased presentations and manuscripts following the development of a research program with a requirement.<sup>9</sup>

Our pediatrics residency program started a Residency Research Requirement and Program (RRRP) in 2001. This RRRP consisted of didactic sessions on research, critical review of publications through journal clubs, the development of faculty mentorship program, and a research week dedicated to pediatric residents presenting their research.

The literature is mixed as to whether a research requirement helps or hurts our training physicians.<sup>4,10,11</sup> Some authors find considerable resistance to any type of clinical research requirement among trainees,<sup>10</sup> and some editorials even question if a research requirement may be a disservice to our house staff

trainees.<sup>11</sup> The question of whether a requirement could improve research productivity and possibly even improve collaborative work within a department was addressed by studying publications from our residents during two 7-year time periods—before and after the year our research requirement was started in 2001. While studying this 14-year time period, the following research questions were considered: (1) Does an RRRP make residents more productive in terms of research? (2) Does it increase research collaboration between residents and faculty? (3) and, Are residents going into fellowship training more likely to publish than those going into general pediatrics? The number of publications provided objective and unique data to measure the effectiveness of the RRRP. The results were contrasted with a review of the current literature, which in many cases utilized more subjective survey data.

## Methods

### Data Collection

Utilizing pediatric resident rosters from 1994 to 2007, a 14 year time period of publications from the University of Hawai'i pediatric residents was studied. This period was divided into two 7 year time periods—before and after the pediatric resident requirement went into effect in 2001. Specifically, the time period between 1994 and 2000 (TP1) and the time period between 2001 and 2007 (TP2) were compared. PubMed was used to search for research publications by looking up individual resident names. These publications were all research based and included case reports, hypothesis driven projects, and survey data. The residents' names were searched up to three years following the completion of their residency, as it often took some time to complete the publication. All publications with work done only during residency were included. The principle investigator (DK) had knowledge of their projects, as he is also the resident research coordinator. Even though the research requirement was established in 2001, the description of this requirement was communicated to the residents when they started residency in 1998. Communication of the requirement was given through the residency interviews and resident conferences dedicated to research topics. This project was reviewed by the Hawai'i Pacific Health Research Institute, which utilizes the Western Institutional Review Board, and it was felt that this project was exempt from the guidelines set by the Office of Human Subjects protection.

### Residency Research Requirement and Program

The RRRP consisted of a requirement for research, development of a research week for presentations, didactic sessions on

research, and a faculty mentoring program for the residents. The research week presentations were given at the end of the year for the pediatric faculty and the community general pediatricians, who were invited to a Monday noon conference and Thursday grand rounds dedicated to resident research presentations. Evaluations were then tabulated from the audience and research awards presented at the end of the year dinner for the residents. Didactic presentations on research and critical appraisal of research through journal clubs were also given throughout residency. The residents were asked to think of a research question during the first year and identify a research mentor with whom to start working during their first or second year. Many of them accomplished their research projects during the second and third years during elective months when clinical demands were generally less time consuming.

### Classifying Data

The number of publications was counted before and after the resident research requirement and presented as absolute numbers. The number of residents and pediatric faculty involved in that publication was also calculated and tabulated. The likelihood of publication of residents who went into fellowship training, as well as their colleagues who pursued general pediatrics and then primary care pediatrics, was also studied. The residents were thus classified into these two categories based on their planned job after residency, namely going into fellowship or into general pediatrics. The research committee gathered this information on a yearly basis. Triple board residents who were studying pediatrics, child psychiatry, and adult psychiatry were categorized as fellowship type training. Many of the triple board residents eventually ended up in academic centers and were functioning like our residents who went into fellowship training as academic physicians. In contrast, most of the pediatrics/internal medicine residents tended to go into general pediatrics and internal medicine and thus were categorized under general pediatrics.

### Statistical Analysis

Student's T test was used to test for significant differences in numbers of publications, resident involvement, and faculty involvement. Odds ratios (ORs) were calculated to estimate the probability of those going into fellowship or general pediatrics to eventually publish their work from residency. Statistical packages from Microsoft Excel and JavaStat software were utilized to calculate significance.

### Results

The two groups of residents before and after the research requirement was instituted had similar demographic characteristics in terms of gender and career goals. There were a total of 63 residents during the time period of 1994-2000 (TP1) and 72 during the time period of 2001-2007 (TP2). Gender differences were not significant (data not shown). During TP1, 17 residents went into fellowship training compared to 24 who went into fellowship during TP2, a difference that was not significant (Table 1).

Similarly, the number of those who went into general pediatrics in the two groups was not found to be significantly different.

When publications were compared between the two groups, a significant increase was found after the institution of the research requirement. As shown in Figure 1, publications increased from 2 to 26 between the two time periods ( $P<.001$ ). This was over a ten-fold increase. Our definition of the requirement for research was quite broad and included case reports, pediatric advocacy, patient safety projects, and patient education, in addition to more traditional hypothesized research projects.

One of the intents of the RRRP was to encourage residents and the pediatric faculty to become more involved collaboratively with research and other scholarly endeavors. Collaboration between resident co-authors increased from 5 to 31 between the two time periods ( $P<.001$ ). This demonstrated an increase from 8% of residents involved with published research prior to the requirement to 36% with the institution of the RRRP. In addition, the involvement of the pediatric faculty in the resident projects increased significantly from 1 to 48 ( $P<.001$ ), as shown in Figure 1. It was also noted that some senior residents had started projects and worked on institutional review board clearance and then transitioned their projects to junior residents as they graduated. A number of residents assisted faculty with their projects. As was noted in the literature, there were examples of faculty mentors helping to finish the work and publish once the resident graduated from the program.<sup>12</sup>

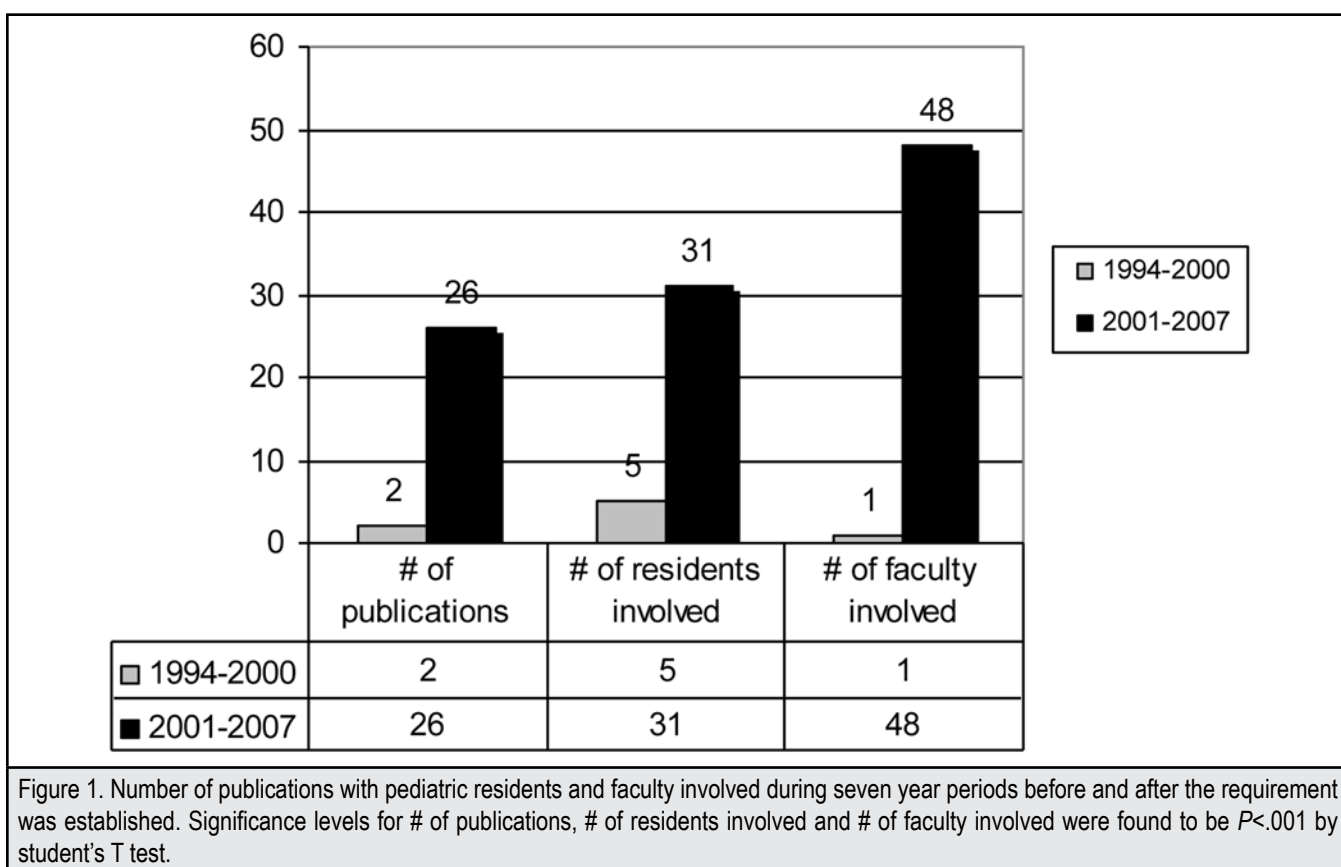
We found that residents planning to pursue fellowship work were more likely to publish their research. This finding was similar in both time periods. In TP1, prior to the research requirement, 18% of the residents who went into fellowship published vs 4% of those who went into general pediatrics. This finding increased to 63% of those who went into fellowship in TP2 vs 23% of those in general pediatrics. Combining both groups, residents who later pursued fellowship training were more likely to publish their work with an OR of 4.9 ( $P<.001$ ) when compared to those who went into general pediatrics. This OR increased to 5.6 ( $P<.01$ ) in the fellowship group of TP2 following the institution of the research requirement (see Table 2). In both groups, there was nearly a three to four fold increase in publication in the residents going into fellowship when compared to those going into general pediatrics. This finding may be an indication of early interest in academic endeavors and a stronger willingness to finish their projects for publication.

### Discussion

There was a significant increase in publications in the pediatric residency program following the institution of an RRRP. Publications increased ten fold when two 7-year time periods were compared before and after the requirement was established. A similar study of internal medicine residents, reported the acceptance of 21 manuscripts after requiring research in a 6 year time frame, but unlike our work, did not have a comparison group before the requirement.<sup>9</sup> Studies done through surveys have demonstrated similar findings of increased presentations at national meetings and increased publications in a residency

Table 1. Number of pediatric residents who went into fellowship or general pediatrics in the two time periods found no significant differences between the two groups using student's T test.			
Time period	# of residents	# who went into fellowship	# who went into general pediatrics
1994-2000	63	17 (27%)	46 (73%)
2001-2007	72	24 (33.3%)	48 (66.7%)
		NS	NS

Table 2. Proportion of residents who published in both time periods who went into fellowship or general pediatrics. The odds ratio of the fellows publishing was 4.9 (1.9-12.5) $P<.001$ for the whole group of fellows vs. general pediatrics bound residents. This OR increased to 5.6 (1.7-18.9) $P<0.01$ for the group after the research requirement (TP2).			
Time period	% who published went into fellowship	% who published went into general pediatrics	OR (95% Confidence Interval) of fellowship bound residents to publish
1994-2000	18% (3/17)	4% (2/46)	4.7 (.71-31.13), NS
2001-2007	63% (15/24)	23% (11/48)	5.6 (1.93 – 16.27), $P<.01$
1994-2007	44% (18/41)	14% (13/94)	4.9 (2.08 – 11.41), $P<.001$



program in Obstetrics and Gynecology.<sup>13</sup> Other works have shown that the likelihood of publishing increased if the program director also published (OR=4.1).<sup>14</sup> Our study was unique, as the number of publications could be identified accurately and objectively by utilizing PubMed, a method that had not been previously utilized to our knowledge. This study provides quantitative evidence of the effectiveness of an RRRP, adding to existing survey data which investigates opinions and perspectives regarding the role of research in medical residency programs.<sup>7,14-19</sup>

The development of a research program for residents is not a simple undertaking. Significant barriers exist for residents who have many clinical demands in their schedules. Lack of time, energy, and effort have been discussed in previous manuscripts.<sup>4,19-23</sup> Other barriers include lack of funding and available faculty mentors.<sup>4,19,20,22</sup> By establishing a requirement, research became a priority for both the residents and faculty, and as a result many of the previous barriers were overcome. In addition, with the development of the research program, cultural attitudes toward research appeared to become more



favorable and productivity improved. Increased collaboration between residents and faculty through the faculty mentorship program was an additional benefit, as it helped to establish an environment conducive to research. In many instances, faculty mentors helped to finish the projects and assisted by re-writing articles and in fielding arguments in the peer-reviewed journals. This assistance was invaluable and is a key ingredient in the success of any research program for residents, as has been seen in other programs like emergency medicine (EM).<sup>12</sup> As demonstrated in Figure 1, it resulted in a significant increase in resident and pediatric faculty co-authors in the residents' manuscripts. Although this study did not judge the quality of the research projects, it is hoped that the collaboration between residents and faculty helped to improve the research. This would be consistent with findings in physical medicine and emergency medicine resident research programs.<sup>24,25</sup>

In this study, the residents who went into fellowship or fellowship-like training were more likely to publish their research projects (Table 2). Overcoming the recognized barriers to developing a finished manuscript requires perseverance,<sup>21</sup> and these residents appeared to have greater motivation to publish their work. In one survey study of pediatric third year residents, those interested in a subspecialty were more likely to have had formal research training and to have assisted with a research project during residency. They also found that a favorable rating toward research was the strongest predictor of whether residents have a subspecialty rather than general pediatrics as their future goal (OR=3.7).<sup>3</sup> Our study found a similar odds ratio for the fellowship bound residents and their likelihood of publishing (OR=5.6). These research skills and the desire to do research are probably the most important factors in these residents publishing their work.

In reality, however, many of the residents, regardless of their perseverance, may not be able to publish during their residency, and so the requirement should not be for a publication, but for involvement in a research project. A review of the literature found the description of a program that regarded a publication as part of its requirement, but did not report on how many residents actually accomplished this part of the requirement.<sup>26</sup> In our group, 23% of the residents had become co-authors on a publication for the entire group studied. This finding is similar to a previous study done at the Cleveland clinic in which 30.5% of the pediatric residents developed their projects into manuscripts or abstracts once a research program or requirement was developed.<sup>14</sup> Developing a research requirement was a focal point to a successful program which encouraged our pediatric residents to become involved in a scholarly endeavor.

The guiding principle for the RRRP is to focus on research being as positive an experience for the residents as possible. Negative perceptions could hurt our training physicians and possibly prevent them from developing any desire to continue research into their attending careers.<sup>27</sup> Allowing them to champion a cause and develop their own interest in an area of pediatrics was of utmost importance. This led to the development of advocacy

projects for children in some cases. For example, one resident successfully lobbied the state legislature to pass a bill requiring the use of booster seats for children, while another resident strove to improve breastfeeding knowledge within the general pediatric clinic. These projects were enthusiastically accepted by our staff, even though it was felt that they would probably not end up as a published manuscript. Allowing residents to choose their own projects and be flexible in accepting projects within a broad definition of scholarly inquiry and activity was very important to the success of this program.

Research presentations gave the residents an opportunity to present their accomplishments. They also allowed for instantaneous peer review and feedback. Each year, residents tried to better the previous year's projects and presentations, which provided a forum for healthy competition among the residents trying to improve the level of their research projects. The residents were exposed to as much of the research process as possible, including the presentation of their research focus and results. Such active engagement in research may lead to a more positive experience and the desire to continue this type of activity.<sup>17</sup> Naturally, the residents were apprehensive about presenting their research in front of a large, formal audience of their peers, colleagues, and teachers. However, many later considered the experience very rewarding. This research week was purposely scheduled a few weeks prior to the completion of their residencies to provide them an opportunity to present their work done during residency.

In counseling junior residents about their research projects, it is important to provide guidance on how feasible their research ideas will be to complete. Our residents have had great success in developing a component of a research program on which a faculty member may already be working. Many times with these types of projects, institutional review may already be achieved, and the resident is simply added to the protocol. Giving residents primary responsibility for some phase or component of the project increases the success of that project, as seen in a large prospective study of hyponatremia, troponin elevation, and menstrual dysfunction among runners of the Boston Marathon.<sup>28</sup> This project allowed the residents to be part of a structured research experience and allowed the flexibility necessary to fit within a demanding work schedule, where much of the work was done around the weekend of the event.<sup>28</sup> This concept has been successful in our program, as some residents have asked to work on ongoing projects started by a faculty mentor. This appeared to lead to a greater probability of the project being published as the faculty mentor could finish once the resident graduated.

Ultimately, a requirement for research, the development of a faculty mentorship program, and resident research presentations were very effective at increasing the number of publications for our pediatric residents, in addition to increasing collaboration between faculty and residents on research projects. The RRRP was successful, as it provided a positive and flexible environment for scholarly projects among our residents.

## Conflict of Interest

None of the authors identify any conflict of interest.

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# A Case of Severe Airbag Related Ocular Alkali Injury

Shawn S. Barnes MSIV; William Wong Jr. MD; and John C. Affeldt MD, MPH

## Abstract

*While airbags have saved many lives and are clearly beneficial overall, sodium hydroxide (NaOH) powder produced by the inflation reaction can cause significant alkali ocular injury if not irrigated promptly. Here we report a case of severe airbag related ocular alkali injury as a way to bring attention to the need for prompt ocular irrigation following motor vehicle accidents (MVA) with airbag deployment.*

*A 47-year-old man was involved in a MVA with airbag deployment in a rural setting. Attention was paid to several other life-threatening traumatic injuries, however, ocular irrigation was not performed until some 6-7 hours after the MVA. Over the course of 6 months, airbag related alkali injury caused severe limbal ischemia, conjunctivalization of the cornea, corneal epithelial defects, cicatricial scarring, haze, and corneal/limbal vascularization despite amniotic membrane graft. Awareness of the importance of ocular irrigation following airbag deployment must be raised both in the ophthalmology and emergency medicine communities.*

## Keywords

Airbag, Keratitis, Cornea, Alkali

## Introduction

Airbag restraints have saved many lives since their mandatory incorporation into automobiles. However, we wish to report on a little-known, potentially devastating ocular implication of airbag deployment — airbag related alkali keratitis — and stress the importance of prompt ocular irrigation following airbag deployment.

Airbags are made of woven nylon, which are explosively deployed upon automobile impact, inflating within 50 msec. In addition to inflation-related thermal and blunt trauma, eye injury can occur as a result of alkaline burn due to the chemical components of the inflation reaction. In order to create rapid inflation within the airbag, a solid propellant, sodium azide, is ignited and converted to hydrocarbon gases, rapidly expanding the volume of the airbag. This conversion creates byproduct sodium hydroxide, sodium bicarbonate, and metallic oxides in a fine powder form. The airbag is deflated within two seconds of inflation through side exhaust ports. However, small amounts of sodium hydroxide powder can escape through the woven nylon meshwork upon impact, creating the potential for direct exposure of sodium hydroxide powder onto the cornea, conjunctiva, and in the cul de sac of the lids, particularly inferiorly due to Bell's reflex.<sup>1</sup> This exposure to caustic alkali chemicals may be magnified greatly if a tear in the airbag occurs, releasing large amounts of powder.<sup>2</sup> The alkali powder causes saponification of fatty acids and disruption of cell membranes. The elicited inflammatory response exacerbates the potential necrosis of corneal tissue.

## Case Report

A 47-year-old man was the restrained driver of a vehicle involved in a high speed, head-on collision with a drunk driver

in a rural locale. Airbags were deployed. He was taken to a small community hospital which was the highest level medical facility in the area. He sustained multiple traumatic injuries including multiple rib fractures, closed left femur fracture, left hemothorax, subluxation of vertebrae T3 on T4, subdural and epidural hematomas, and multiple abrasions. At presentation, the patient complained of blurry vision and was documented to have light perception vision in both eyes. Corneal opacification and chemosis were noted bilaterally by ER staff, however, ocular irrigation was not performed as the patient's other life-threatening injuries required immediate attention.

The medical facility stabilized the patient and he was subsequently transferred via air ambulance to a level 2 trauma center. Some 6-7 hours after the original MVA, the patient's eyes were finally irrigated bilaterally by emergency room staff with 500cc normal saline, pH measuring 7.0. The patient was urgently brought to the OR for surgical stabilization of his other injuries. At approximately 13 hours post-MVA, it was possible for the patient to be seen by ophthalmology service. As he was intubated, visual acuity was not assessed. External examination revealed absence of facial burns or singeing of eyelashes and facial hair, and patient was without eye pain. Ocular irrigation was repeated with 500cc normal saline, retained debris and foreign bodies were removed, and erythromycin ointment was initiated in both eyes (OU) four times/day. Three hours after initial ophthalmology evaluation, patient developed mucopurulent discharge, and Vigamox drops (gtts) OU four times/day was added.

The following day after extubation, vision was assessed as the ability to count fingers at 2 feet. Necrotic conjunctival tissue began to slough, with vascularized conjunctiva visible beneath the necrotic tissue. Bilateral corneas were de-epithelialized, but clear centrally with limbal opacification. Anterior chambers were deep, and appeared quiet with no anterior segment ischemia, pH was 8.0-8.5 OU (both eyes, Chemical keratoconjunctivitis was suspected with retained chemical particulates. Membrane stripping was performed, irrigation repeated, and erythromycin ointment was changed to Maxitrol ointment OU four times daily to help control inflammation.

At 1 week post-MVA, vision improved to 20/100 in the right eye (OD), and 20/200 in the left eye (OS), but with increasing eye pain. Severe limbal ischemia was seen OU, defining a Roper-Hall grade IV ocular surface burn.<sup>3</sup> Conjunctival necrosis continued and vascularization improved OU. The corneas were still de-epithelialized but the opacity was clearing (Fig 1a). The patient was stable enough to perform conjunctivoplasty with amniotic membrane graft OU to allow better healing and sparing of limbal stem cells.

At 3 weeks post-MVA, vision was ability to count fingers at one foot OD, 20/200 OS with persistent severe limbal ischemia,

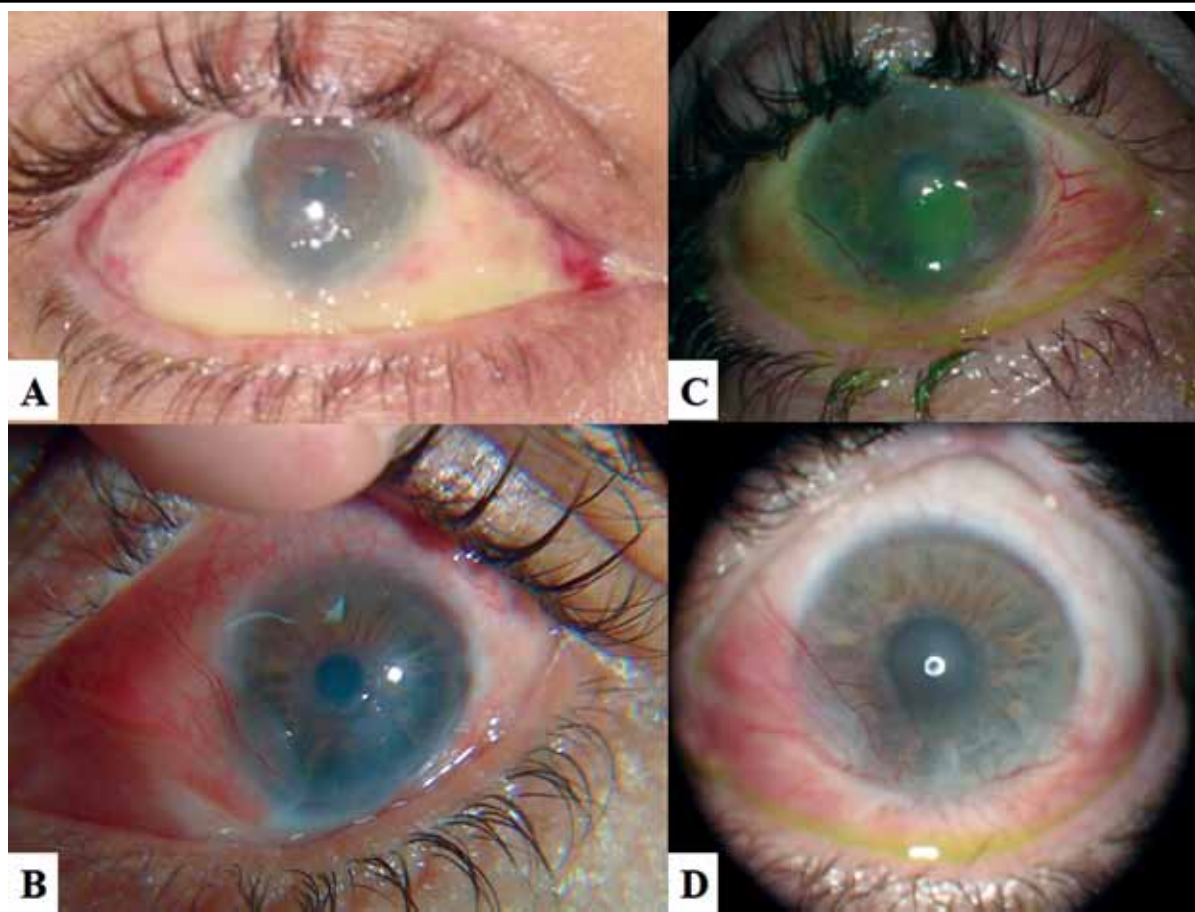


Figure 1. Photographs of right eye after airbag-related alkali burn at 1 week (a), 2 months (b), 4 months (c), and 6 months (d) after the initial MVA with airbag deployment. Note severe limbal ischemia at 1 week (a) leading to severe conjunctivalization of the cornea at later time points.

scarring, and avascularity of the conjunctiva OU, and a persistent area of corneal de-epithelialization OS. The amniotic membrane graft had since dissolved. At this time, pathology exam of right eye conjunctival tissue sample revealed focal necrosis with inflammation, granulation tissue, and fibrosis. Vigamox gtt OU four times daily and Fluorometholone ointment OU three times daily were continued.

At 2 months post-MVA, vision was documented at 20/400 OD; count fingers at 3 feet OS. Patient experienced dizziness when looking left or right. Conjunctivalization of corneas were seen OU. The conjunctiva of both eyes showed severe cicatricial scarring with injection. Both corneas showed epithelial defects with no signs of healing, mild haze, and severe corneal/limbal neovascularization (Fig 1b). At this time, Vigamox and FML were changed to Tobradex ointment OU 4 times daily.

At 4 months post-MVA, vision was documented at 20/200 OD, light perception OS. Persistent conjunctivalization was noted. The conjunctiva in both eyes continued to show severe scarring with injection. Both corneas showed epithelial defect, healed with 2+ haze and severe corneal/limbal vascularization (Fig 1c). Tobradex was changed to Durazol 6 times daily OU and Vigamox three times daily OU.

At 6 months post-MVA, vision was fluctuating at 20/200 OD, 20/80 OS. Persistent conjunctivalization OU was noted and OU conjunctiva continued to show severe scarring with injection. In addition, symblepharon was present on the OD inferior sulcus and a moderate contraction of the OS inferior sulcus was present. OU cornea showed epithelial defect healed with 1+ haze and severe corneal/limbal vascularization (Fig 1d). Restasis OU twice a day was added to decrease inflammation in preparation for possible limbal stem cell transplant.

## Discussion

Only a handful of airbag-induced keratitis cases have been reported in the literature since 1991.<sup>4-11</sup> Most of these cases have been reported in the emergency medicine literature and all have resulted in generally positive outcomes. Here we report a Roper-Hall grade IV ocular surface burn, the most severe case of airbag keratitis reported in the literature to date, owing to the lack of adequate attention to the eye and lack of initial irrigation to clear the eyes of chemical irritant. The severe limbal ischemia seen at 1 week post-MVA (Fig 1a) served as prognostic indicator of the severe conjunctivalization of the cornea seen at 2, 4, and 6 months post-MVA (Fig 1b-d).



In regard to chemical exposure, alkali burns are ultimately more severe than acid exposure. Acids are quickly self neutralized to normal pH by the body's natural buffering capability and acid's ability to coagulate protein lead to a natural barrier to further penetration. Bases however are lipophilic and continue to cause tissue necrosis into the deeper layers of tissue until removed by irrigation or tear secretion.<sup>12</sup>

Every vehicle in the United States is mandated to carry installed and operational airbag restraint systems. While airbags have been far more beneficial than harmful, this case demonstrates the potential for severe ocular surface injury due to airbag deployment in frontal motor vehicle collisions. The extreme severity of this case is a direct consequence of the delay in proper treatment for airbag related ocular injury. Six to seven hours had passed between the time of accident and first irrigation with 500cc normal saline. This marked delay in initial irrigation is the longest reported for a case of airbag keratitis, and is a result of necessary transfer of care from a small, rural health center to a large, urban trauma center. While standard emergency medicine textbooks call for immediate ocular irrigation for patients involved in airbag deployment MVAs,<sup>13,14</sup> emergency departments are often preoccupied with more pressing issues of life-threatening traumatic injuries, as was the case with this patient. Oversight in the treatment of the patient's ocular injuries however, has resulted in significant vision loss, and disability. Immediate irrigation for no less than 15 minutes with no less than 1 liter of eye rinsing solution, such as buffers (Cedorroths, etc) or amphoteres (Previn, etc), or lactated Ringer's or normal saline if the above are not available, is recommended for the prevention of serious ocular alkali burns.<sup>15</sup> Irrigation must be continued until pH testing is normalized. Awareness in the emergency medicine and first responder community should be raised in order to avoid disabling complications such as reported here.

## Conflict of Interest

None of the authors identify any conflict of interest.

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### **Neighborhoods and Health in Hawai'i: Considering Food Accessibility and Affordability**

**Stephanie Lee MPH; Melissa Oshiro BA; Laura Hsu MPH; Opal Vanessa Buchthal DrPH; and Tetine Sentell PhD; Dept. of Public Health Sciences, University of Hawai'i at Manoa, Honolulu, HI**

#### **Introduction**

Recent research has underscored the importance of community context to personal health. The neighborhood in which an individual lives has been associated with health behaviors and health outcomes.<sup>1,2</sup> This relationship persists in many, but not all, studies even after individual risk factors and characteristics have been considered.<sup>2,3</sup>

One health related activity that often takes place within the community context is the purchase and consumption of food.<sup>4</sup> Recently, dramatic differences in the accessibility and affordability of healthy foods across communities along with the possible health consequences from these differences have become very active areas of research and policy action.<sup>5-8</sup>

In Hawai'i, few empirical studies have specifically considered the health outcomes associated with neighborhood food accessibility and affordability. A much larger body of research describes the unique characteristics of food accessibility and affordability in Hawai'i overall and specifically within distinct communities.<sup>9-12</sup> Many of these studies reflect concern about Hawai'i's need for local, self-sustaining, and diversified agriculture.<sup>13</sup> A number of programs currently focus on improving accessibility and affordability of healthy foods across Hawai'i's diverse populations and communities. This article provides an overview of the research and some innovative interventions pertaining to neighborhood food environments and health outcomes in Hawai'i.

#### **Studies on the Relationship Between Neighborhoods and Access to Healthy Foods**

Studies outside of Hawai'i have found that local food environments vary widely. Factors associated with local food environment include neighborhood socioeconomic status (SES), rural, suburban, or urban location, and neighborhood racial/ethnic composition. Residents in poorer, inner-city neighborhoods are less likely to have proximate access to supermarkets, which typically have the most high-quality, healthy food items (eg, fresh fruits and vegetables, low-fat dairy foods, and whole-grain products), at the lowest prices.<sup>14,15</sup> The small convenience stores commonly found in inner-city neighborhoods often sell more prepared, high-calorie foods and less affordably-priced fresh produce.<sup>16</sup> Controlling for income and other associated variables, neighborhoods with greater proportions of African American residents have approximately one-half the number

of supermarkets seen in counterpart White neighborhoods.<sup>16</sup> Some areas particularly devoid of healthy food options have been termed "food deserts" and tend to be poorer areas with higher concentrations of minorities.<sup>8,17</sup> Many of these areas also have high numbers of fast food establishments. Having higher numbers of proximate fast food restaurants is associated with a greater likelihood of eating a poorer diet.<sup>18</sup> The lack of affordable, healthy food options within low-income neighborhoods is believed to contribute to health disparities across communities. Community differences in the availability of healthy food have been linked to health-related outcomes such as poor diet quality,<sup>19</sup> obesity,<sup>14</sup> and diabetes.<sup>20</sup> More research on the strength and characteristics of the relationship between food accessibility and health status is ongoing. This area of research is also somewhat controversial,<sup>21</sup> particularly as this topic has led to a number of high profile policy initiatives.<sup>6,7</sup>

Interestingly, in studies of health outcomes, neighborhood context has generally been found to have a stronger impact on the health of vulnerable populations, including children, racial/ethnic minorities, low-income populations, and the elderly.<sup>3</sup> One mediating factor that may explain the differential impact of the community context on the health of different populations living within the same community may be the level of access to community services factors, such as public transportation.<sup>22</sup> Because food shopping involves transporting multiple shopping bags or making frequent shopping trips, reliable transportation is an important aspect of access to healthy food options, particularly for communities that are a substantial distance from supermarkets. As poorer or less mobile groups within communities may be even less likely to have access to reliable transportation, limited food access within a neighborhood may differentially impact certain groups within that neighborhood.

#### **Studies in Hawai'i on the Relationship Between Neighborhoods and Access to Healthy Foods**

Approximately 90% of Hawai'i's food supply is imported,<sup>23</sup> leading to the highest food costs in the country. The cost of monthly meals prepared at home for a family of four in Hawai'i is \$1,016<sup>24</sup> compared to \$796<sup>25</sup> in the rest of the United States. While Hawai'i has an excellent climate for home and/or community gardens, growing one's own food demands time and garden space, which are luxuries for many Hawai'i families.

Hawai'i has 109 farmers' markets,<sup>26</sup> which sell healthy foods, although access to these markets can be limited. In Honolulu, farmers' markets are open less than any other store types, and tend to be located in higher SES areas.<sup>27</sup> Also, most farmers' markets in Hawai'i do not accept Electronic Benefit Transfer (EBT) cards, limiting accessibility for those with Supplemental Nutrition Access Program (SNAP) benefits (formerly known as food stamps). These environmental constraints suggest that Hawai'i's excellent agricultural climate and locally grown fresh fruits and vegetables may preferentially benefit individuals or communities with the time, resources and/or land to take advantage of these.

Studies have found that communities in Hawai'i vary in their access to supermarkets, farmers' markets, public transportation, and other factors that might be associated with health. One study in Honolulu found that, similar to findings in the continental US, supermarkets were most likely to be situated in higher SES locations while convenience stores were most likely to be found in the lowest SES locations.<sup>28</sup> Mau, et al,<sup>29</sup> found a more obesogenic environment in O'ahu communities with higher percentages of Native Hawaiians. The researchers defined an obesogenic environment as one that contributes to obesity by encouraging overconsumption of calorie-dense, low-nutrition foods and inhibiting adequate physical activity levels. Local research on the relationship between the environment and obesity is still limited. For instance, although the USDA offers an interactive map of food deserts in the United States. (<http://www.ers.usda.gov/data/fooddesert/fooddesert.html>), Hawai'i is not included in the maps.

The few studies examining neighborhood-level food accessibility and affordability in Hawai'i found both similarities and interesting differences when compared to studies in the continental US. For example, a study in Honolulu found that, in contrast to studies in other locations, the availability of fresh fruits did not systematically vary by the percentage of ethnic minority residents.<sup>27</sup> However, given Hawai'i's complex racial/ethnic mixture, with no predominant group, and with some minority groups (ie, Japanese and Chinese) having a better health profile than Whites, percent minority may not be the most useful metric for evaluating neighborhood differences. A more detailed consideration of racial/ethnic composition will be important to fully understand food accessibility and affordability by neighborhood. Also, the Honolulu study also did not assess rural or neighbor island locations, which may have different access issues than urban Honolulu.

Although health outcomes, especially those associated with diet, do vary by community, few empirical studies have been conducted to study the direct relationship between individual health and community food accessibility in Hawai'i. This would be interesting research to perform as some of Hawai'i's unique characteristics might lead to stronger neighborhood effects than those seen in the continental US. For instance, gas prices in Hawai'i are notably high. The high cost of gas, coupled with limited public transportation options, may augment the importance of neighborhood determinants of healthful food options.

As a result, neighborhood effects on food-related behavior and health outcomes might be stronger in Hawai'i, particularly for lower income residents and those in rural communities. Hawai'i also has a distinctive racial and ethnic composition, which may impact the relevance of racial/ethnic community-level effects.<sup>30,31</sup>

## Other Factors

There are limitations to the study of neighborhoods and health generally and in considering food accessibility and affordability specifically. A person's primary community, and the location where they purchase and/or consume food, may not only reflect where they live, but also where they attend school, go to work, or travel for that purpose.<sup>2</sup> Individual and social-network factors also affect the relationship between community context and health,<sup>32</sup> and may influence purchase and consumption of food, regardless of neighborhood availability. Family-level factors are important, particularly in Hawai'i, as are state and federal policy factors. Interaction effects may be seen between these predictors as well. Certain factors may be particularly relevant to a specific community or a demographic group. These considerations underscore the importance of more local research assessing Hawai'i's unique cultural, geographic, and ethnic/racial composition in neighborhood health effects.

## Comparison of Three Communities

Figure 1 shows the supermarkets, farmers' markets, and transportation options available in 3 diverse communities in Hawai'i: urban Honolulu (Kaimuki/Palolo/Waikiki), rural O'ahu (Waianae), and rural Big Island (Puna). Supermarkets are defined according to the United States Department of Agriculture definition as offering a full line of groceries, meat, and produce with at least \$2 million in annual sales.<sup>33</sup>

Kaimuki/Palolo/Waikiki, approximately 8 square miles and home to 80,838 people,<sup>34</sup> is an urban environment of many neighborhoods in the city of Honolulu. Supermarkets are generally well within reach; there are approximately 23 in urban Honolulu. However, housing costs are much higher in urban neighborhoods. The median gross rent in urban Honolulu is \$1,135 and nearly half the renters (44.9%) spend at least 35% of their income on rent,<sup>35</sup> placing a great financial strain on residents, and making healthful food and other necessities less affordable. Many urban rentals do not come with a full kitchen; some are equipped with a hot plate or microwave, while others have no kitchen at all, increasing reliance on prepared foods.<sup>27</sup> Bus transportation is plentiful, with many bus lines running through the neighborhoods, and operating at all hours of the day and night.<sup>36</sup> In Kaimuki/Palolo/Waikiki, diabetes prevalence is 4.6%<sup>37</sup> and 12.9% of adults are obese.<sup>38</sup>

In contrast, the Puna district of the Big Island has a median gross rent of \$644. The downside of living in a rural community is the scarcity of supermarkets. Puna is 499.5 square miles,<sup>39</sup> comparable to the size of O'ahu at 601 square miles, and home to 45,326 people.<sup>40</sup> Despite its large size, Puna only has 2 supermarkets. Fortunately, Puna is rich in agriculture and hosts 6 farmers' markets.<sup>26</sup> Public transportation in Puna

Waianae



Puna



Urban Honolulu: Waikiki-Palolo-Kaimuki



**Legend**

- Farmer's Market
- Supermarket
- Bus Route

Figure 1: Supermarkets, Farmers' Markets, and Bus Routes in Three Hawai'i Communities



is very limited, however. There are two bus lines, which are infrequent and operate only in the early morning and late afternoon hours.<sup>36</sup> The poor road infrastructure in Puna, with few paved roads and limited connectivity between neighborhoods, creates substantial challenges to the development of effective public transportation systems. In Puna, diabetes prevalence is 7.7%<sup>37</sup> and 28.8% of adults are obese.<sup>38</sup>

Waianae (5.36 square miles) is located on O'ahu, 33 miles from Honolulu, and is home to 13,177 people.<sup>41</sup> Food access and affordability in Leeward O'ahu more closely resembles rural Puna with only 2 supermarkets, although accessibility of fast-food outlets is higher. Gross rent is \$1,120, almost as much as urban Honolulu.<sup>41</sup> Bus service, while less convenient than in downtown Honolulu, is much more available than in Puna. At least six bus lines serve the Waianae area between 4 am-10 pm; three hourly circulator buses connect neighborhoods to the Waianae transit center, and three express buses provide half-hour and hourly transportation from the Waianae transit center to major shopping and employment centers in more urban centers such as Ewa, Pearl City, and downtown Honolulu.<sup>36</sup> In Waianae, diabetes prevalence is approximately double the Hawai'i average at 15.2%<sup>37</sup> and 50.1% of adults are obese.<sup>38</sup>

The food environment of communities in urban Honolulu, Waianae, and Puna differ greatly in terms of access to supermarkets, public transportation, and farmers' markets. They also vary across many other factors beyond the scope of this article (eg, fast food restaurants, SES, racial/ethnic composition, population size) that impact both the food environment and the use of that food environment within a community. There are also stark differences in diabetes and obesity rates between these neighborhoods. Further research should consider how the food environment is linked to these and other health effects within Hawai'i neighborhoods.

## Policy Options

Adding more supermarkets to underserved areas is an option for improving food environments. This can add local jobs while increasing access to cheaper produce and healthier foods.<sup>42</sup> However, this option has many barriers. Large chain supermarkets often have difficulty operating profitably in low-income communities.<sup>43</sup> Other challenges to opening supermarkets in underserved areas can include higher operating costs, more demanding regulations, and greater risk of crime, particularly in some urban environments.<sup>44</sup> Also, adding more supermarkets involves large-scale development that may be ill-suited for, and undesirable in, many of Hawai'i's communities. Finally, supermarkets may provide, on average, the cheapest access to many healthy foods, but they also provide a myriad of unhealthy choices. Thus, they may not be the most targeted means to improve access to healthy foods.

Smaller food establishments, such as farmers' markets, mobile markets, and grocery and convenience stores can have a major role in improving access to healthy foods. The recent federal initiative to expand EBT options within farmers' markets is an important new development that can help address the cost

challenges.<sup>45</sup> Small pop-up<sup>46</sup> or mobile markets<sup>47</sup> have a number of advantages compared to traditional supermarkets, including lower overhead, the possibility to focus on an inventory of healthy staples, and a smaller footprint. A study of a mobile market system in Buffalo, New York, found that by decreasing the average travel distance to healthy foods to less than one mile, residents had greater access to fresh fruits and vegetables.<sup>47</sup> Efforts to provide pop-up markets in Hawai'i's underserved communities are underway,<sup>48</sup> and, importantly, these do accept EBT cards.

Ensuring that nutritious options are available in the many mom-and-pop grocery or convenience stores already located in many lower income neighborhoods may be another means of improving access to healthy food and supporting local businesses without increasing development or out-of-state, corporate involvement. Examples of this type of initiative on the mainland include the Healthy Corner Stores' Network.<sup>49</sup> Other useful efforts may involve increasing the visibility of the healthy products within such stores.<sup>50</sup>

Addressing structural and built environment factors, such as transportation infrastructure, is also a possible solution, particularly for those who live in areas with limited healthy food options, so that they are able to travel to other locations more readily. Other efforts to improve the food environment have included banning fast food restaurants within a geographic boundary.<sup>6</sup>

Nevertheless, it is essential to recognize that the existence of food establishments such as supermarkets, farmers' markets, and fast food restaurants within a community are significant, but not singular, determinants of the quality of the food environment or the healthy food that people with a community consume. Examining consumer practices and preferences in tandem with designing a healthy food environment is critical to fully resolving our obesity and health crisis.<sup>51</sup> Nutrition education, coupled with cultural sensitivity and knowledge of community preferences, is particularly important.<sup>50</sup>

Further, rather than creating new projects, supporting, expanding, and evaluating our many innovative community projects aimed at promoting healthier nutrition in Hawai'i, many of which were created and sustained through community involvement, may be a particularly feasible and fruitful way to address healthy food environments and behaviors.

Also, maintaining and improving the locally grown supply of healthy foods, particularly fruits and vegetables, will also help to improve prices of these goods and supply jobs. To do this it may be critical to provide incentives, such as subsidies, to farmers, producers, purchasers, and consumers to advance awareness and demand for local nutritious food products.<sup>11</sup> Finding sufficient land for agricultural development is also a significant barrier in Hawai'i where the cost of land is particularly high and agricultural interests must compete with development. Maintaining and/or creating lands to increase local agriculture requires political, regulatory, financial, and infrastructural efforts. Policies that support partnerships between producers, purchasers, schools, and other community organizations

encourage greater access to agricultural lands and availability of healthy food options.<sup>9</sup>

Many efforts have set the stage for a more sustainable food supply in Hawai'i. For instance, the Hawai'i County Food Self-Sufficiency Baseline Study<sup>13</sup> focused on agricultural mapping, summarizing food production and consumption data, and developing a geodatabase for monitoring the progress of current and future agricultural activity. These efforts, which also promote traditional Hawaiian crops, can be extended throughout the state of Hawai'i to determine best agricultural practices. Creating a sustainable, equitable, and culturally-based food system will help to improve the health of Hawai'i's population. While not all efforts toward sustainable food access and food security in Hawai'i explicitly include health considerations, healthier communities and healthier choices within more of Hawai'i's communities are likely outcomes.

### **Efforts to Improve Food Availability and Affordability in Hawai'i**

Although a significant amount of research remains to be conducted on the relationship between the environmental context and obesity in Hawai'i, efforts are currently underway to improve the food accessibility and affordability in low-income neighborhoods in Hawai'i. The majority of these efforts focus on community context, and some of the many projects underway are described here. First, the Roots Project at Kōkua Kalihi Valley (KKV) directly addresses food accessibility and affordability in Kalihi Valley, an ethnically diverse, low-income community on O'ahu. This project, funded through a Kresge Foundation grant, uses neighborhood assets to build a stronger community with food as a focus. In Kalihi, closeness of neighbors and ohana are community strengths that can be enhanced through food sharing, growing, and civic engagement. KKV promotes increasing access to nutritious food as a way to strengthen the vitality and health of the community. For more information visit [www.hoouluaina.org](http://www.hoouluaina.org).

Second, the Waimanalo Food Systems Hui is funded through an agreement between the Hawai'i State Department of Health (DOH) and the Centers for Disease Control and Prevention. The Waimanalo community is partnering with the DOH to promote land stewardship and sustainable production and consumption of food according to traditional Native Hawaiian cultural values. Waimanalo families and other participants learn how incremental changes in production and consumption of fresh foods can positively impact their health. Projects include assembling backyard aquaponics systems, developing bucket gardens and community gardens, and mastering the skills of healthy food production. Through a "learn to teach" model, participants share what they have learned with others in the community. For more information visit <http://eaiponokakou.org>.

Third, The GreenWheel Food Hub aims to help Hawai'i's low-income residents gain better access to fresh, locally grown food. This organization started the Honolulu Farmers' Market at Blaisdell Center to increase food accessibility in central Honolulu. To improve affordability and access for low-income

residents, the GreenWheel Grow Bucks Project allows shoppers to use EBT cards to purchase Greenbucks, which can be used to purchase produce at market vendors stalls. It is also developing the GreenWheel Mobile Market, a produce truck, which will target food deserts, areas with limited access to healthy food options, on a weekly rotating basis. For more information visit [www.greenwheelfoodhub.org](http://www.greenwheelfoodhub.org).

Fourth, the Kauai Nutrition and Physical Activity Coalition (NPAC) and the Kauai Independent Food Bank worked together to solve structural barriers to low-cost fruit and vegetable purchasing among low-income families. The Eat Better Today program allows state SNAP participants to use their EBT cards to purchase fresh fruits and vegetables at farmers' markets throughout the island, and provides bonus coupons to encourage participation and stretch scarce food dollars further. For more information visit [www.getfitkauai.com/](http://www.getfitkauai.com/).

Additional examples of efforts underway include the Healthy Foods Hawai'i (HFH) study which worked to improve children's dietary behavior by modifying the food environment with community-selected foods,<sup>52</sup> Kanu Hawai'i which strives to combat food deserts in specific Hawai'i communities,<sup>53</sup> and school-based garden initiatives which promote sustainable agricultural practices and nutrition education within a community context.<sup>54,55</sup>

### **Conclusion**

Health is affected by a complex interaction of behavioral, social, genetic, and environmental factors. Socioeconomic, cultural, and environmental aspects of neighborhoods impact health. Health interventions that capitalize on the strengths of communities may be important to reducing rates of obesity and the incidence of diabetes. In Hawai'i, much empirical and practical work remains to be done to understand the relationship between neighborhoods and health generally, and the relationship between food accessibility/affordability and health specifically. However, many important initiatives are underway that may be fruitfully expanded, supported, and duplicated.

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## MEDICAL SCHOOL HOTLINE

SATORU IZUTSU PHD, CONTRIBUTING EDITOR

### Continuing in the Heart of Medicine: 2012 Convocation Address University of Hawai'i John A. Burns School of Medicine

**Marc A. Nivet EdD; Chief Diversity Officer, Association of American Medical Colleges, Washington DC**

On May 13, 2012, Marc Nivet EdD, presented the keynote address to the 2012 University of Hawai'i at Manoa, John A. Burns School of Medicine graduates. Dr. Nivet serves as the Association of American Medical Colleges (AAMC) Chief Diversity Officer. He provides strategic vision for all the AAMC's diversity and inclusion activities and leads the association's Diversity Policy and Programs department, which focuses on programs designed to increase diversity in medical education and advance health care equity.

As the Associate Executive Director of the Associated Medical Schools of New York for seven years, he oversaw several programs designed to increase enrollment and retention of minority students in the health professions. He has also held positions as director of state outreach for The Sallie Mae Fund and Director of the Office of Minority Affairs at the New York College of Osteopathic Medicine.

Most recently, Dr. Nivet served as Chief Operating Officer of the Josiah Macy, Jr. Foundation, where he oversaw day-to-day operations of the foundation and managed an endowment of \$150 million. The foundation supports programs designed to improve the education of health professionals in the interest of public health.

During the week before the convocation, Dr. Nivet met with administrators, faculty members and students to share his *mana'o*. Then after running a half marathon with his wife, he shared the following wisdom on professionalism, communication, and leadership.

We are collectively honored by this gift of time and wisdom.

*Jerris R. Hedges MD, MS, MMM;  
Dean, John A. Burns School of Medicine*

I was truly pleased when Dr. Jerris Hedges first contacted me to ask that I deliver this year's JABSOM convocation address. I love this time of year when we as administrators can join in celebrating the qualities of aspiration and hope, discipline and accomplishment that you have exerted on your journey to this point. This time of year is also about celebrating family; the love, support, and care emanating from all those who helped you get here is palpable today.

It was just under four years ago when you entered JABSOM eager to start your courses and now here you sit having completed your undergraduate medical education! If you can for a moment, I want you to think back to that summer day that marked your white coat ceremony and the beginning of your journey through medical school: do you remember who addressed you that day? You elected to be addressed by a respected member of your own JABSOM family, Dr. Jill Omori.

I realize so much has transpired since that July day but think back to when Dr. Omori spoke to you about the "heart of medicine". She urged, "you must start to look beyond the diseases and the stereotypes and start to see and hear your patients as individuals, their stories, their adventures, their hopes and dreams." Recall how you followed the customs of the day, donning a white coat as a symbol of your future profession and reciting the Hippocratic oath. Those words and actions were reminders of the values of service, compassion, caring and humanism espoused by the profession you've chosen to pursue.

As you continue to think back on that day, recall how you felt, poised as you were to begin your formal medical education. What drove you? What did you hope to achieve? Many students I talk to remember entering medical school driven by a desire to serve, to help, and to give back. But after four years many say they haven't thought about those early motivations in a while, instead many report that those thoughts have been replaced by a focus on passing the boards, securing a residency and their mounting debt. But, today I want you to think back to your white coat ceremony which was an emotional reminder of your calling, and a gratifying symbol that you were getting closer to the profession you've chosen.

Now that I have you in a reflective mood, perhaps you'll remember that Dr. Omori was addressing you on the heels of her own recognition by the Arnold P. Gold Foundation as a winner of their Humanism in Medicine Award, an acknowledgement of her embodiment of humanistic qualities and her ability and willingness to be a mentor to so many. It's a fortunate coincidence that I also have a connection to the Gold Foundation, as a Trustee to this laudable organization dedicated to "keeping the care in healthcare." It allows me to double down on her message to you at the beginning of this journey; her remarks aptly entitled "the Heart of Medicine."

Years from now you probably won't remember who spoke at your graduation. You've sat through a lot of pomp today and are probably itching to get on to celebrating with your friends and family. But I want to leave you with a message I hope you'll remember.

In the four years since your White Coat ceremony you've mastered a wealth of technical skills and built an incomparable scientific knowledge base. But as you go towards residency and eventually practice, remember the whole picture. Remember not just the specialized knowledge you've acquired, because the science will inevitably change. But what won't change is your



ability—your duty—to lend dignity to others, to give compassion in a time of vulnerability, to act ethically, to help others in need. Remember the key to being an excellent physician is ensuring the humanistic qualities of patience, deference, and empathy are made coequal with the technical and scientific acumen you now possess. As you go forth from this day to continue your path, I urge you to keep developing yourselves in both respects. To guide that continued development, I suggest you focus on three dimensions that distinguish excellent physicians: professionalism, communication, and leadership.

### **Professionalism**

The first dimension is professionalism. Being a professional is about much more than donning a white coat and appending an MD to your name. I think of health professionals as people who have committed themselves to a level of involvement that generates optimal outcomes. I want you to think about what it means to be a professional as you begin your careers in medicine, whether you pursue a primary focus in research, education, or direct patient care. Commit yourselves to extending your vocabulary for professionalism to include a continued optimization of both your scientific knowledge and your humanistic skills.

### **Communication**

A second dimension that distinguishes excellent doctors is the realm of patient-physician communication. The patient-provider relationship is a vehicle of empowerment, and an unrivaled opportunity to pass along information and inspire patients to participate in optimizing their own health. One aspect of this dimension that I am particularly passionate about is cultural competence: the skills, attitudes, and knowledge required to

bridge cultural, ethnic and linguistic gaps between patients and providers. I urge you to hone your ability to communicate effectively, mindful not just of the words you use, but the context in which they are delivered. Strive to communicate sensitively and without judgment, treating each patient as a person. Get to know your patients, know them as people, persuade them of your concern and compassion, and (above all) learn to explore the unconscious assumptions that might affect your interactions.

### **Leadership**

The last distinguishing dimension is leadership. Exercising your leadership skills as a health professional will be crucial to your impact and career satisfaction, no matter what arena you choose for utilizing the medical training you've received. As you join the ranks of health professionals, be sure you stay engaged in the issues I have raised today. We need concerned leadership from within the medical profession as never before.

Before I close, let me tell you something you may have already uncovered— and that is the importance of mentors. I have been fortunate to stumble upon several such luminaries in my career and each time I speak with them I learn something new. Even more importantly, I get an audience for sensitive questions and outlandish ideas without the worry of judgment. We all need mentors in our lives, so keep your eyes and ears peeled for such individuals because they exist!

Thank you for allowing me to spend time with you on such a momentous day. If you remember nothing else from these remarks today, remember that medicine is above all a profession of caring. Congratulations!

## Thyroid Cancer: Rising Incidence and Ethnic Disparities

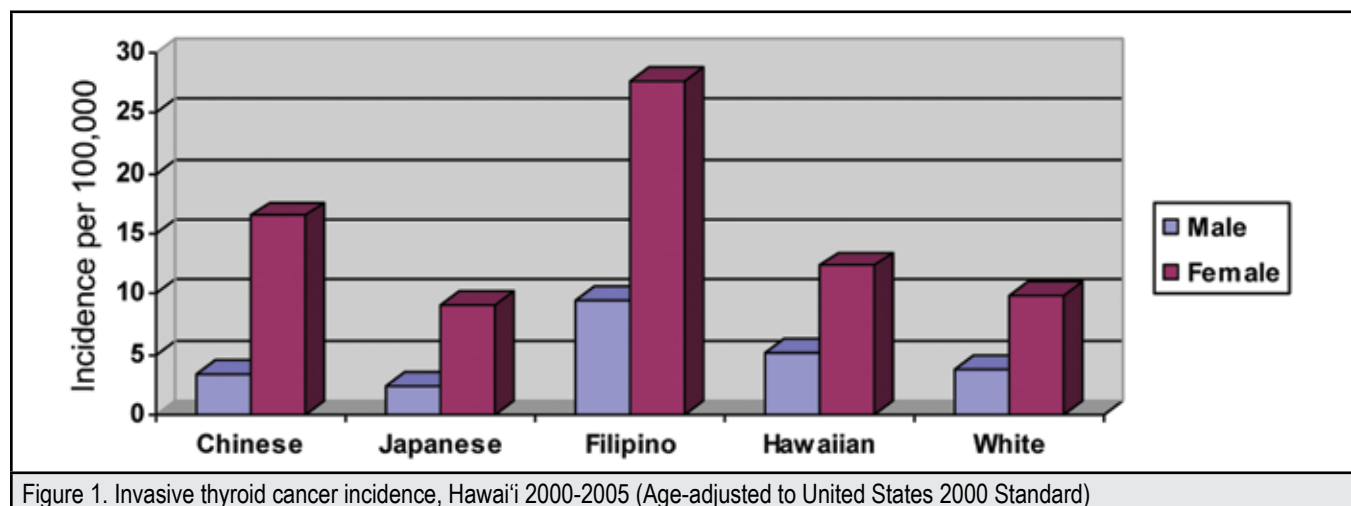
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The incidence of thyroid cancer has been steadily increasing in the United States over the past several decades. This trend is counter to that of most major cancers, which have experienced decreasing rates in the United States.<sup>1</sup> From 1975 to 2007, thyroid cancer rates more than doubled in the United States.<sup>2</sup> Although rates have been rising in both males and females, the increase has been most pronounced in women,<sup>2</sup> who traditionally have had 2 to 3-fold the risk of men. In 2003-2007, the age-adjusted incidence of thyroid cancer was 15.2 per 100,000 in females compared to 5.2 per 100,000 in males.<sup>2</sup> Today thyroid carcinoma is the fifth most common cancer among US women.<sup>1</sup> The increase in thyroid cancer has been primarily observed for papillary carcinomas, the most common histologic form.<sup>3,4</sup> It has been suggested that rising rates can be attributed to increased medical surveillance resulting in more frequent detection of small papillary tumors.<sup>4</sup> Nonetheless, national data have demonstrated increases in both large and small tumors indicating that the rising incidence can only partially be artifactual due to surveillance.<sup>3,5</sup>

The etiology of thyroid cancer is largely unknown and few risk factors are recognized. Exposure to ionizing radiation, family history, and a history of goiter or benign thyroid disease are among the only established risk factors.<sup>6-8</sup> Other possible risk factors include excess weight,<sup>9,11</sup> oral contraceptive use,<sup>12</sup> history of miscarriage,<sup>11</sup> use of fertility drugs,<sup>11</sup> advanced age at pregnancy,<sup>13</sup> and excessive intake of seafood and dietary iodine.<sup>11</sup> There is also some evidence of a protective effect of cigarette smoking and consumption of cruciferous vegetables<sup>11,13-15</sup> and, in areas of iodine deficiency, intake of fish.<sup>16</sup> The pronounced

gender disparity suggests that hormones play an important role in the etiology of thyroid cancer. Estrogen receptors are widely expressed in neoplastic thyroid tissue and there is evidence that estrogen may contribute to thyroid carcinogenesis.<sup>17,18</sup> Certain environmental chemicals can disrupt the action of thyroid stimulating hormone, which regulates the growth and function of the thyroid gland.<sup>19</sup> Genetic alterations have been suggested including the association of mutations in RET and BRAF with increased thyroid cancer risk.<sup>20</sup>

Hawai'i has among the highest incidence rates of thyroid cancer in the country.<sup>21</sup> Annually, approximately 160-200 Hawai'i residents are diagnosed with this malignancy. Substantial racial and ethnic disparities have been observed. From 2000-2005, among the major ethnic groups in Hawai'i, the age-adjusted incidence among women was highest in Filipinas (27.7 per 100,000) and lowest in Japanese (9.1 per 100,000) (Figure 1). Filipino men were also disparately affected (9.5 per 100,000) compared to males of other ethnic groups. Data from the Hawai'i Tumor Registry of the National Cancer Institute's Surveillance, Epidemiology, and End Results program reveal some differences in Filipino and non-Filipino patients in Hawai'i. Papillary tumors comprised a greater proportion of thyroid cancers in Filipino patients compared to other groups ( $P=0.004$ ). Historically, thyroid cancer rates have been higher for Filipinas born in the Philippines than for those born in Hawai'i. However, this gap has been attenuated in recent years with rates in Hawai'i-born nearly equal to that of Philippine-born Filipinas. The excess risk observed amongst Hawai'i's Filipinos has also been observed in Filipinos living in other parts of the United States.<sup>22-24</sup>



Future research is necessary to address the causes of thyroid cancer in order to develop strategies to curb this growing epidemic. The underlying reasons for the disparate risk among Filipinos remain unexplained and may provide clues to the pathogenesis of this malignancy.

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## IT SEEMED LIKE SUCH A GOOD IDEA AT THE TIME.

A none-too-rare complication experienced by women following childbirth, is weakness of the pelvic floor. Bladder, bowel, and/or uterus can drop down into the vagina and protrude, causing pain and other symptoms. In the 1970s surgeons began inserting mesh to support pelvic organ prolapse (POP) through an abdominal incision. In the 1990s specialists inserted the mesh less invasively through the vagina. Unfortunately, in some cases the mesh migrated causing hemorrhage, pain and inflammation, not to mention recurrence of symptoms. Pop goes the meshwork. Now after many lawsuits, Johnson and Johnson Ethicon division will no longer market the device. Admitting no problems, J&J spokesperson said, "This is not a product recall and we continue to have confidence in the safety and efficacy of these products." And the decision had nothing to do with the flurry of lawsuits, right?

## ONE MORE STRIKE AGAINST FAT AMERICA, AS IF WE NEEDED IT.

A recent report in the journal *Pediatrics* found that obese women are more likely to have children who develop autism than are normal-weight women. Moreover, tests show that a woman's diabetes, high blood pressure or obesity during pregnancy might place her offspring at risk of slightly impaired learning even if they don't have autism. The authors note that the results show associations, not causes. Co-author epidemiologist Irva Hertz-Picciotto at University of California Davis, said "We can't establish causation from this study, but it is interesting that obesity and diabetes are increasing as autism incidence is." The numbers held even after accounting for race, education, time of year of childbirth, geographical region, and mother's age.

## THIS MIGHT MAKE YOU WAKE UP SCREAMING WHEN YOU HAVEN'T EVEN FALLEN ASLEEP.

Two research teams, one in Wisconsin and the other in the Netherlands, wanted to determine the possibility of creating airborne versions of the H5N1 avian flu virus. Avian flu infects and kills mostly birds, but it has sickened more than 600 people worldwide since the 1997 outbreak in Hong Kong. Victims contracted the virus after handling infected birds or from contaminated environments, and about half of them died. Each team submitted a paper to a major scientific journal containing step-by-step instructions for turning H5N1 into an airborne virus. Their noble intent was to know more about the virus's potential to mutate that might help public health workers spot a budding pandemic. When the Dutch researchers presented their work at a scientific meeting in Malta in September, the stuff hit the fan! Multiple closed-door meetings, security reviews, publishing restrictions, and a voluntary halt on the research quickly ensued. A flurry of critical opinions by other scientists came out, some even threatening imprisonment. The Wisconsin team's story played out similarly, but with less drama. Initially, the United States government advisory board charged with determining whether the research was fit to print, decided that open publication posed too great a risk of misuse. Proponents of publishing argued that public health workers need to know which mutations could spell trouble. The board reversed its decision in March, ruling that the benefits of information sharing outweighed the risks. What made these board members so uncomfortable with publishing the information? H5N1 kills 59% of the people it infects. Other studies say the actual kill rate is far lower. Professor Michael Osterholm, director of Minnesota Influenza Research, said, "Even if it is 20 times lower, it would still have a mortality rate that far exceeds that of the 1918 flu."

## TOO MANY FREAKS, NOT ENOUGH CIRCUSES.

A 31-year-old Atlanta police officer was seen by his doctor for shortness of breath, some chest pain, exertional dyspnea and high blood pressure. No medications were prescribed nor did the physician recommend limiting strenuous activity. When the officer and a male friend engaged in three-way sexual activity with a woman at a motel near

the Atlanta airport, the officer collapsed and died. His wife brought and won a lawsuit against the physician for medical incompetence and was awarded \$5 million dollars. Still, the jury believed the officer was 40% at fault, and reduced the settlement to \$3 million. The plaintiff's attorney said, "The kind of sex he was engaged in is a type totally unacceptable in our community. He could of have had the heart attack while on a treadmill." Ah, but then would he be a legend to his fellow officers?

## WHEN YOU'RE HIGH ON POT, YOU CAN DO ANYTHING YOU NORMALLY WOULD. YOU JUST REALIZE IT'S NOT WORTH THE EFFORT.

The Centers for Disease Control and Protection reported in May that 23% of teenagers admitted recently smoking marijuana. Tobacco use was 18%. Cigarette smoking by teenagers has been on the decline for several years, but this is the first time cannabis has moved ahead of tobacco. A similar report came from the University of Michigan where one expert noted that teenagers now believe that pot is less dangerous than tobacco. The report did not include data on frequency of use.

## I DIDN'T HEAR THAT COMING!

The number of pedestrians killed while wearing headphones has tripled in the last six years. In 2004, 16 headset users managed to off themselves when they were oblivious to traffic, but by 2011 that number increased to 47. With the current popular use of MP3 devices, more pedestrians are strolling to work or wherever with little regard for cars, trucks, buses, vans, trains, or bicycles. Professor Richard Lichenstein at Maryland Medical School reported that over half of the victims were struck by trains. Two-thirds of deaths were under age 30. Interesting to note that in almost one-third of the cases, horns or sirens were sounded, but the headset apparently masked the warning.

## HOW MUCH IS THAT DOGGY IN THE WINDOW? AND THEREBY HANGS A TAIL.

Rhode Island House Representative Peter Palumbo has introduced a bill to ban dogs from riding in the lap of the driver. Focusing on safety, he cites various regulations enacted to keep the motorist from being distracted. Passing dog laws is often dangerous ground to tread upon and could cause a bite at election time. At least six other states, including California, Maryland, and Pennsylvania, have considered laws banning dogs from the driver's seat, but none have passed. Mr. Palumbo believes his bill will pass and has gathered support from several House members. The Providence Animal Rescue League is in favor, and even wants pet seat belts. However, there are dissenters. "It's an awful idea," said Tony Soares, owner of a doggy day-care facility in Providence. "Politicians wasting our tax money again." Pooch-packing Barbara Azverde, a 54-year-old salon owner, says "Winston" hangs on her left arm with feet in her lap and nose out the window. "We take him everywhere. I keep both hands on the wheel." Yes, but does he text while riding?

## ADDENDA

- The average beard (male, that is) has about 15,500 hairs.
- The diesel cruise liner QE II travels six inches to a gallon.
- The chance of making two holes in one during the same round of golf is 1 in 67 million.
- Sign over urinal in Phoenix, Arizona "Express lane, five beers or less."
- I was listening to rock music this afternoon. I didn't really have a choice — it was coming from a Jeep about two miles away.
- Chaos, panic, disorder. My work here is done.

## ALOHA AND KEEP THE FAITH *rts*

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