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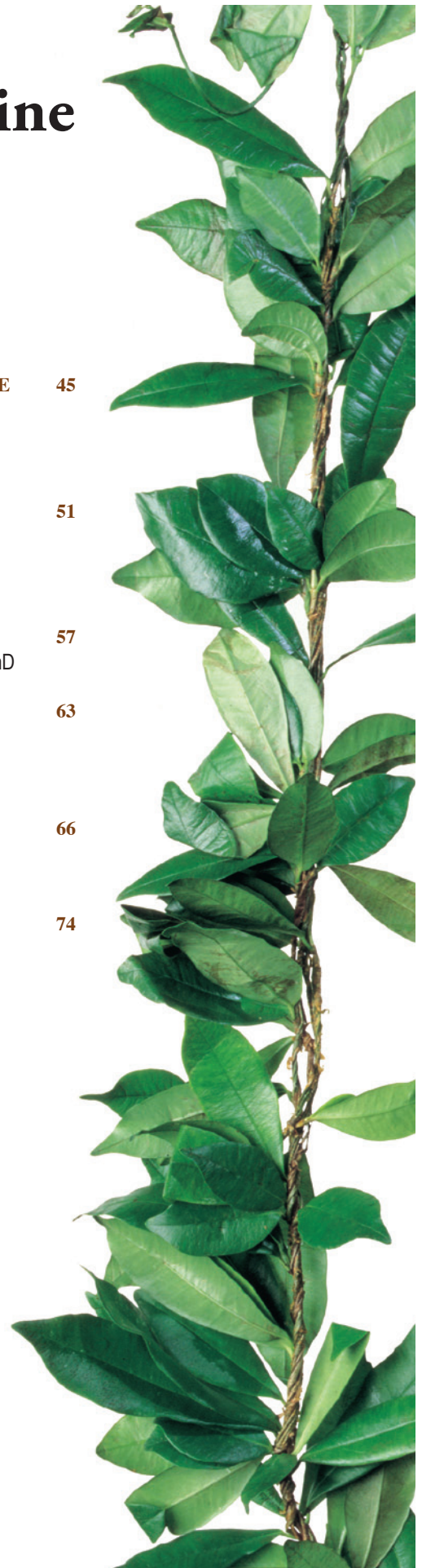
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Hawai'i's Nursing Workforce: Keeping Pace with Healthcare

Sandra A. LeVasseur PhD, RN and Kristine Qureshi PhD, RN, FAAN

Abstract

Nursing is the largest segment of the healthcare workforce, but over the next decade even more nurses will be required. Changing population demographics, new technologies, and evolving models of healthcare will stimulate expansion of nursing roles and the need for a highly educated nursing workforce. The current nursing workforce is aging, and large numbers of retirements are anticipated. By 2025, the United States is expected to experience a nursing shortage; in Hawai'i this shortfall is forecast to be 3,311 professional nurses. Currently there are nine nursing programs across the state in public and private universities and colleges. These programs are partnering to implement the Institute of Medicine's recommendations for the future of nursing. In Hawai'i, nursing practice is being expanded; different pathways to advanced nursing education are being implemented; and nurses are partnering with other groups to reshape healthcare. The Hawai'i State Center for Nursing collects ongoing data on the nursing workforce to inform strategic planning. Current gaps in nursing specialty education include school health and mental health. The purpose of this paper is to provide an overview of Hawai'i's nursing workforce in relationship to statewide population demographics, healthcare needs and gaps, and then outline steps being taken by the profession to address these needs and gaps while implementing the Institute of Medicine recommendations.

Keywords

nursing; nursing workforce; Hawai'i

Introduction

Over the next decade, healthcare will shift from a volume to a value based business model, with an increased emphasis on health and wellness, and community based chronic disease management.¹ These changes will occur as the population ages and the prevalence of chronic disease continues to increase. New technologies, consumer expectations for positive health outcomes, and governmental programs to increase access to care will reshape the healthcare system of today and tomorrow. Team work, patient and worker safety, culturally appropriate care, efficiency, and cost effectiveness will become even more critical, and citizen expectations for safety and quality of care will be the norm.² These challenges are fueling an accelerated evolution of the nursing profession. Many more nurses will be required, roles will be expanded, and new technologies such as genomics and informatics will provide new tools for the profession. The academic nursing sector must be prepared to rise to the challenge by educating more professional nurses who are better prepared to provide nursing care across the healthcare continuum (eg, preventative, acute, community, and end-of-life) using innovative health care delivery models.³

There are 2.8 million registered nurses (RNs) in the United States.⁴ Understanding the nursing workforce in relation to future healthcare system requirements will assure better planning. The Institute of Medicine's (IOM) report *The Future of Nursing: Leading Change, Advancing Health* (2010) recommends that nurses should practice to the full extent of their education and training, achieve higher levels of education, and be full

partners with physicians and other health care professionals in redesigning health care. The report also states that effective workforce planning and policy requires better data collection and improved information infrastructure.⁵ The purpose of this paper is to provide an overview of Hawai'i's nursing workforce in relationship to projected statewide population demographics, healthcare needs and current gaps, and report on steps taken by academic nursing to meet nursing workforce needs.

Hawai'i Population Demographics and Health

US Census population projections estimate that an ongoing demographic shift is likely to continue until racial and ethnic minorities make up the majority of the entire US population by 2050, but Hawai'i has already reached this level.⁶ As a proportion, Hawai'i has the highest majority-minority population in the United States.^{7,8} Overall, ethnic minorities account for 74% of the state's population.⁹ While 23.1% of the population reports a mixed race/ethnicity, 37.7% are Asian alone (the largest percentage in the nation), 23.0% are white alone, 10% are Native Hawaiians and other Pacific Islanders, and 9.8% are Hispanic or Latino alone.⁹ Nursing education and care in Hawai'i is shaped by the unique health beliefs and needs of this minority-majority in the state.¹⁰

Compared to the rest of the United States, the state enjoys the longest reported years of lifespan at birth (80.5 yrs.), the highest life expectancy (LE) at age 65 (21.3 yrs.) and the highest *healthy* life expectancy (HLE) at age 65 (16.2 yrs.).^{11,12} However, there are vulnerable groups in the state that require special nursing care consideration.

Elderly in Hawai'i

Currently 14.4% of the state population is 65 years and older.¹³ The US Census Bureau projects the number of elderly will rise, and by 2030, 25.7% of Hawai'i's population will be 60+ years (N=410,450) and 2.5% will be 85+ years (N=40,350).¹⁴ This projected increase in elderly and 5 year difference between LE and HLE signals future increased needs for geriatric services. Many senior citizens will develop serious chronic health problems, and need for geriatric nursing services in community, public health, and acute care settings will increase. As health care continues to shift from hospital based services to the community, needs for homecare, elder day care, and long term care, nursing services will rise. A larger number of elderly will ultimately lead to increased utilization of hospital services at the end of life. Nursing will contribute to initiatives for improved patient safety, quality, infection control, hospice care, and discharge planning services.

Chronic Disease, Medically Underserved, and Native Hawaiian Health

The burden of chronic disease is high. Chronic disease, health problems, and unhealthy behaviors are prevalent among school aged children in the state. In Hawai'i, 28.7% of 10-17 year old children are overweight or obese; 12.7% have asthma; only 18% of adolescents exercise every day for at least 60 minutes; and 5.7% miss ≥ 11 days of school each year due to illness or injury.¹⁵⁻¹⁸ The most prevalent diseases among adults include: arthritis (20.3%); asthma (14.3%); mental illness (11.5%), diabetes mellitus (7.8%), COPD (3.67%); chronic kidney disease (3.6%); and angina/ CHD (2.8%). In Hawai'i 3.3% of the adult population has had a myocardial infarction, and 2.9% reported having had a stroke.¹⁹ As the population ages, the burden of most of these chronic diseases will increase.

The Healthcare Association of Hawai'i (HAH) reports that all of the neighbor islands are designated as medically underserved for some portion of their population. While there are inadequate numbers of mental health providers on the neighbor islands, the most common reason for hospitalization in the state each year is a mental health diagnosis.²⁰ Adequate community based mental health services can reduce mental illness hospitalizations, but the state lacks advanced nursing programs for mental health nurse practitioners.

The HAH also reports serious health disparities among various racial/ethnic groups within the state, with the most serious disparities existing for Native Hawaiians.²⁰ Currently, the life expectancy of Native Hawaiians in the state is 74.3 years, which is 6.2 years shorter compared to the overall state population. In addition, Native Hawaiians have higher rates of serious chronic conditions (obesity, diabetes, hypertension, asthma) compared to any other ethnic/racial group in the state.²¹ The health of the Native Hawaiian population continues to be influenced by history as well as the unique Native Hawaiian culture, values, beliefs, and health practices.^{22,23} This speaks to the essential need for nursing educators in the state to pay close attention to the status of Native Hawaiians and understand how nursing care should be shaped to meet the needs of this vulnerable population across the age continuum.

The Professional Nursing Workforce Nursing Workforce in the United States

The US Bureau of Labor reports nursing workforce growth will occur primarily because of advancements in health technology; an increased emphasis on preventative care; and the large Baby Boomer generation who will require more health care services as they experience longer lives.²⁴ For these same reasons, Hawai'i will experience a similar need to expand its nursing workforce.

Nursing Workforce in Hawai'i

As of April 2013, 14,384 RNs, 807 advanced practice registered nurses (APRNs), and 383 advanced practice registered nurses with prescriptive authority (APRNs-Rx) live and work in the State of Hawai'i. (Table 1).²⁵ The majority reside on the island of O'ahu (Table 1). The neighbor islands of Hawai'i and Maui have a larger number of RNs compared to the less populated islands of Kaua'i, Moloka'i, and Lana'i. As a result, the supply of RNs per 1000 population varies markedly by island, with a high of 11 per 1000 on O'ahu compared with 5 per 1000 on Lana'i and Moloka'i. It should be noted that a significant portion of all tertiary care services are provided on O'ahu, which in part accounts for this higher ratio. The supply of APRNs is ≤ 1 per 1000 population on all Hawaiian islands.^{13,26}

Table 2 highlights the level of nursing education for RNs employed and working as a nurse in-state. Compared to national figures, Hawai'i has a larger proportion of RNs at the baccalaureate level, 54.7% compared to 42.0%.^{26,27} However, there are fewer RNs prepared at the graduate level with master's and doctoral degrees, 4.7% compared to 19.0%.^{26,27} Table 3 provides data about nursing employment by setting. Hospitals employ 61.1% of RNs and 36.4% of the APRNs in the state.^{26,27} The average age of working RNs in Hawai'i is 44 years and APRNs is 49 years.²⁶

Demand for Nurses

The Health Resources and Services Administration (HRSA) projects the United States will experience a shortage of 260,000 nurses by 2025.²⁸ In Hawai'i approximately 1,597 (11.1%) actively employed RNs intend to retire in the next five years.²⁶ Using the HRSA forecasting model, it is anticipated that by the year 2025 there will be a 28% shortfall in the nursing workforce in Hawai'i, or 3,311 full-time RNs.²⁹

Location	RN*	APRN*	APRN-Rx*	Hawaii Population**	RNs per 1,000 Population	APRNs per 1,000 Population
O'ahu	10,593	627	271	955,215	11	<1
Hawai'i	1,698	92	57	185,399	9	<1
Maui	1,367	49	34	145,602	9	<1
Kaua'i	678	33	16	67,113	10	<1
Moloka'i	31	4	4	5,906	5	1
Lana'i	17	2	1	3,429	5	<1
Total	14,384	807	383	1,362,664	11	<1

Data Sources: *Professional and Vocational Licensing Division²⁵; **U.S. Census Bureau. 2008-2012 American Community Survey¹³

Educational Level	Number of RNs*	Percent	Percent Workforce National** (N=41,018)
Diploma Nursing	877	6.1%	11.0%
Associate Degree	4,732	32.9%	29.0%
Baccalaureate Degree	7,868	54.7%	42.0%
Master's Degree	575	4.0%	17.0%
Doctoral Degree	101	0.7%	2.0%
Missing	230	1.6%	0.0%
Total	14,384	100.0%	100.0%

Data Sources: *LeVasseur, 2013²⁶; **Budden et al, 2013²⁷

Setting	Hawai'i RN* (%) (n=5,213)	Hawai'i APRN* (%) (n=308)	National RN Workforce** (%) (N=34,238)
Academic			
University/College	1.5%	12%	3%
Acute Care			
Ambulatory Care	5.5%	13.3%	9%
Hospital	61.1%	36.4%	56%
Community			
Correctional Facility	0.6%	0.0%	1%
Home Health	3.4%	2.3%	6%
Hospice	2.0%	0.6%	
Insurance Claims/ Benefits/Company/ HMO	2.2%	1.6%	1%
Nursing Home/Extended Care/Assisted Living	8.6%	2.9%	6%
Occupational Health	0.6%	1.0%	1%
Other			
Physician's Office	3.2%	9.7%	
Policy/Planning/Regulatory/Licensing Agency	0.3%	0.0%	<1%
Public / Community Health	1.4%	1.9%	44%
School Health Service	0.9%	0.3%	3%
Self-Employed	0.7%	3.6%	

Data Sources: *LeVasseur, 2013²⁶; **Budden, et al, 2013²⁷

Response to Hawai'i's Nursing Education Capacity and Response to Meets Needs of the State

Academic Nursing Programs in Hawai'i

Since 2005, nursing programs across the country have stepped up efforts to increase educational capacity and student enrollment to meet demand.³⁰ The University of Hawai'i (UH) system has the largest capacity for professional nursing education in the state. Within the UH system there are six units that offer a nursing program. UH at Manoa Nursing and UH Hilo offer baccalaureate, master's, and doctoral studies in nursing, while the UH community colleges (Kapi'olani, Hawai'i, Maui, and Kaua'i) offer associate degrees in nursing.

Three private universities in the state also host accredited

nursing programs. Hawai'i Pacific University (HPU) prepares students for entry into the nursing profession at the baccalaureate level and advanced nursing practice (NP) at the master's degree level. The University of Phoenix (UOPX) supports an online nursing program that focuses on up-skilling associate degree prepared RNs to the baccalaureate and masters levels. In 2011, Chaminade University introduced a new pre-licensure baccalaureate-level RN program. This nursing program engages students in community outreach projects, service-learning and supervised clinical experiences to educate nursing professionals prepared to care for Hawai'i's people.³¹

Graduate nursing education has continued to grow in the state with the demand for advanced practice nurses (APRNs) who can manage chronic illness in the community setting. Two

Table 4. Educational Programs Offered by Hawai'i's Nursing Programs									
Educational Programs Offered	CU ¹	HCC ²	HPU ³	Kap. CC ⁴	Kau. CC ⁵	UHH ⁶	UHM ⁷	UHMC ⁸	UOPX ⁹
Non-Baccalaureate Programs									
Licensed Practical Nurse (LPN)		X		X					
"Ladder" Program: Licensed Practical Nurse (LPN) combined with an Associate's degree in nursing (AS)					X			X	
Licensed Practical Nurse (LPN) to Associate degree (AS)				X	X				
Associate's degree in nursing (AS)		X		X					
Baccalaureate Programs									
Bachelor of science in nursing (BS)	X		X			X	X		X
LPN to bachelor of science in nursing (BS).			X						X
Registered Nurse (RN) to bachelor of science in nursing (BS)			X			X	X		
Accelerated RN to BS									X
Master of Science Programs									
RN to Master of Science in Nursing (MS)			X				X		
BS to MSN			X				X		X
Master's Entry Program in Nursing (MEPN)							X		
Doctoral Programs									
BS to Doctor of Nursing Practice (DNP)						X			
BS to Doctor Philosophy in Nursing (PhD)									
MS to DNP						X	X		
MS to PhD							X		X

¹Chaminade University; ²Hawai'i Community College; ³Hawai'i Pacific University; ⁴Kapi'olani Community College; ⁵Kaua'i Community College; ⁶University of Hawai'i at Hilo; ⁷University of Hawai'i at Manoa; ⁸University of Hawai'i Maui College; ⁹University of Phoenix

Doctorates in Nursing Practice (DNP) programs, initiated at UH Hilo and UH Manoa School of Nursing and Dental Hygiene respectively,^{32,33} will provide clinical leadership to inform health policy and evidence based practice in all health sectors. Across the state, the 9 nursing programs admit approximately 210 associate, 470 baccalaureate, and 132 graduate students each year. Table 4 summarizes the existing programs and various pathways for nursing education in the state. Collectively, these efforts among the nursing programs in the state have led to an increased number of graduates prepared to enter the nursing workforce each year (RN: 570; APRN: 80). However, it does remain uncertain what the actual demand will be for licensed RNs and APRNs over the next decade as job vacancies increase from retirements and the creation of new positions occur to meet access needs.

Numerous strategies have been implemented to increase the number of Native Hawaiian nurses in the state as well. UH Manoa Nursing supports the *'Ike Ao Pono* (*'Ike* translates as "a shared vision held and nurtured by all," *Ao* meaning "the everlasting quality of continuation," and *Pono* "wellbeing in life") program, which aims to recruit and support Native Hawaiian and Pacific Islander nursing students.³⁴ Once admitted, this program provides academic and social support to the nursing student to increase retention and graduation rates. UH

Windward and Kapi'olani Community Colleges both support nursing career transition programs that focus on Native Hawaiian nursing and health career ladder students.^{35,36}

Native Hawaiian, Pacific Island, and Asian culture in the nursing program curricula

All the nursing programs' curricula emphasize culture (including Native Hawaiian, Pacific Islander, and Asian culture) and its influence on health and healing. Nursing programs in the state also thread lessons on transcultural care throughout core classes such as community health, complex nursing care, and mental health in the undergraduate programs. The UH Manoa Nursing PhD program requires coursework in culturally competent research methods.

Statewide Academic and Practice Sector Responses to Institute of Medicine Recommendations

Much of Hawai'i's nursing workforce response is guided by the IOM recommendations for the future of nursing. Hawai'i has taken a leadership role in a national initiative, *The Future of Nursing: Campaign for Action*.³⁷ The aim of this campaign is to improve the quality of health care by enhancing nurses' skills and education and their ability to work collaboratively with other providers to ensure high-quality, patient-centered care

for all. The partnership is involved in a number of statewide efforts addressing the key IOM recommendations as follows:

1. Nurses practice to the full extent of their training and education

In Hawai'i APRNs including nurse practitioners (NP) and clinical nurse specialists (CNS) have global signature authority as well as prescriptive authority by the State. During the recent 2014 legislative session, initiatives to amend various sections of the Hawai'i Revised Statutes to remove barriers to APRNs practicing to the fullest extent of their training and education were championed by legislators and a diverse group of nurse leaders from the academic and practice sectors.^{38,39}

2. Nurses should achieve higher levels of education through an improved education system that promotes seamless academic progression

There are a variety of programs in the state supporting academic progression in nursing. The Hawai'i Action Coalition (HAC), co-led by the Hawai'i State Center for Nursing (HSCN), Hawai'i Medical Services Association (HMSA) Foundation, Prime Care Services Hawai'i, Inc., and HAH, is one of nine coalitions across the country leading an Academic Progression in Nursing (APIN) project.⁴⁰ The statewide APIN project brings together stakeholders from academic institutions, employer groups, and the community to support the IOM goal of increasing the percentage of baccalaureate prepared nurses to 80% by 2020. Funding for the project is provided by the Robert Wood Johnson Foundation in collaboration with the Tri-Council of Nursing. Partnerships have been formed with 8 public and private universities and community colleges in Hawai'i. Fourteen health care organizations in the state have implemented employee incentives for RNs returning to school for a baccalaureate degree, and as of summer 2014 there were 88 RN to BSN graduates (62 graduates from executive onsite programs hosted in health care organizations and 26 graduates from RN to BSN programs in participating academic programs).⁴¹

The UH system Hawai'i State Nursing Program Consortium supports academic progression by providing community college associate degree students seamless transition to the baccalaureate degree program at UH Manoa.

The UH Consortium participants are able to complete a bachelor's degree in one year. Additional nursing programs in the state are exploring joining this consortium. In addition there are a wide variety of master's program specialties for nursing in the state. All of the baccalaureate programs in the state articulate with the master's programs, and new graduate students from a Hawai'i baccalaureate program will have all of the prerequisite courses in place to begin graduate studies.

In 2011 the UH system nursing schools at Manoa and Hilo each initiated and received Board of Regents approval for a doctor of nursing practice degree (DNP). The DNP is the highest practice doctorate for nursing. DNP programs focus on evidence based practice, quality improvement and systems leadership. DNP graduates are well poised to serve as clinical leaders across the US health system.⁴² Currently there are 18

BS to DNP and 6 MS to DNP, for a total of 24 DNP students in the UH system.

3. Effective workforce planning and policy making requires better data collection and an improved information infrastructure

In 2003 the Hawai'i state legislation authorized the initiation of the Hawai'i State Center for Nursing (HSCN) through Act 198, HB 422.⁴³ Key activities of the HSCN include (but are not limited to): (1) Collect data and disseminate information about the nursing workforce in the state; (2) Conduct research on best nursing practice to support quality care; (3) Initiate strategies for recruitment and retention of nurses; and (4) Conduct research about recruitment and retention of the nursing workforce. The HSCN provides key information about the nursing workforce in the state on an ongoing basis, and this information is used for planning to assure that there is the right number of nurses, with the right specialties available to work in the right areas across the state.

Discussion

The composition of Hawai'i's nursing workforce will be influenced by changes in population demographics, newly emerging (or re-emerging) diseases, evolution of political will towards provision of specialty services (eg, mental health services), and changes in technology (eg, new information systems, telehealth, and advances in critical care). Over the next two decades workforce shortages are anticipated, given that the nursing workforce is aging and retiring while the need for nursing services is increasing.

Academe must be ready to respond to statewide health system needs. Some key elements in planning Hawai'i's future nursing and healthcare workforces include improvements in forecasting the overall numbers and skill sets required by level of practitioner and specialty. Gaps exist in community based mental health providers and cultivation of nurse practitioner programs could serve to alleviate these needs. Another gap area is school health, which is not discussed in detail in this paper.

Quick response to statewide needs by academe does have challenges. Nursing programs traditionally require the largest portion of student clinical rotations to occur in hospital settings. However, the described changes in point of care highlight the need to redeploy more of these clinical experiences into community settings where the elderly increasingly receive care. Similarly, growth in the primary and acute adult/geriatric APRNs workforce is required to assure access to geriatric care. Additional advanced public health nurses will be required to develop and manage population based programs focused on prevention, health, wellness, and early detection of disease in our racially and ethnically diverse population across the age continuum. Similarly, support for doctoral education will aid in the production of DNP leaders who translate research into practice in clinical settings and PhDs conducting integrative and interprofessional research to generate new knowledge.

New nurse roles create educational challenges, highlighting the importance of statewide collaboration among the nursing

programs. Currently, all nursing programs (public and private) in the state are partnering in support of seamless academic progression, decreasing the time to degree and cost of obtaining a degree. Academic partners also benefit by sharing expertise and resources that enrich programs, and create cost efficiencies. In addition, cooperation between nursing programs and the healthcare service sector is essential to promoting and supporting education and workforce planning in the state.

Conclusion

As healthcare needs change, academic, healthcare, and community partners must be prepared to respond by developing innovative educational delivery models, new specialty programs, and diverse clinical placement opportunities to ensure a pipeline of competent nurses across the state. Nursing as the largest segment of the healthcare workforce in Hawai'i and worldwide requires continued investment to yield dividends that improve access to care, quality and patient safety, patient care outcomes, and decreased healthcare costs.

Conflict of Interest

None of the authors identify any conflict of interest.

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Recurrent Papillary Thyroid Carcinoma with Pleural Metastasis Diagnosed by Effusion Cytology: A Report of Cases with Clinicopathologic Correlation

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Abstract

Papillary thyroid carcinoma (PTC) is typically an indolent disease characterized by slow growth and a favorable prognosis. In rare instances, this disease may metastasize to the pleura and manifest as a malignant pleural effusion. We report 3 female patients of Japanese/Okinawan ancestry with a history of PTC who presented with hydrothorax. Cytologic examination in conjunction with immunohistochemical staining enabled a definitive diagnosis of metastatic PTC. Molecular analysis of the mitogen activated protein kinase (MAPK) and phosphatidylinositol 3-kinase (PI3K) pathways demonstrated the presence of the v-raf murine sarcoma viral oncogene homolog B (BRAF)^{V600E} mutation in 2 of our 3 patients, with the absence of any other clinically significant mutations in all cases. Further investigation is necessary to elucidate the molecular and environmental mechanisms involved in this aggressive manifestation of PTC.

Keywords

metastatic papillary thyroid carcinoma, pleural metastasis, effusion cytology, BRAF^{V600E} mutation

Introduction

Papillary thyroid carcinoma (PTC) accounts for 80%-90% of all thyroid cancers and is the most common endocrine malignancy in the United States.¹ Thyroid cancer is especially prevalent in Hawai'i, with a higher incidence compared to national and worldwide averages.² PTC tends to be a low grade malignancy with an overall 5-year survival rate of 95%-97%. However, in 5%-10% of cases, distant metastasis may occur in the bone or lung,³ and in rare instances in the pleura with accumulation of effusive fluid. This paper reports on the clinicopathologic and molecular findings of 3 patients with PTC metastatic to the pleura who presented to the Queens Medical Center (QMC). Approval for this study was sought and obtained through the QMC Research & Institutional Review Committee (IRB# RA-2013-035).

Case Reports

Patient #1 DM

A 49-year-old woman of Japanese-Okinawan ancestry first underwent a near total thyroidectomy in 1982 for PTC followed by postoperative radioactive iodine therapy. The disease recurred at 7, 16, 24, and 25 years postoperatively, with multiple bilateral neck and pulmonary metastases. Twenty-nine years after her initial diagnosis, a chest CT scan showed a moderate sized left-sided pleural effusion; 900 cc of turbid, dark red/brown fluid was removed from the left pleura. Cytologic examination revealed cohesive tumor cell clusters with minimal nuclear pleomorphism and abundant finely vacuolated cytoplasm (Figure 1a). Papillary

clusters with intranuclear inclusions (Figure 1b) and grooves (Figure 1c) were also noted. Immunohistochemical staining was positive for thyroid transcription factor-1 (TTF-1) (Figure 1d), thyroglobulin (TGB) (Figure 1e), and negative for Napsin-A (Figure 1f), thus confirming the diagnosis of metastatic PTC. A subsequent CT scan revealed enlargement of the pleural effusion, as well as additional nodules in the right lung. The patient passed away later that year at the age of 79. Molecular analysis of the mitogen activated protein kinase (MAPK) and phosphatidylinositol 3-kinase (PI3K) pathways within the patient's original thyroid tumor demonstrated the BRAF^{V600E} mutation as the only clinically significant mutation (Table 2).

Patient #2 SK

An 82-year-old woman of Japanese ancestry with a history of PTC diagnosed 8 years previously, first presented to our hospital with a right neck mass. Fine needle aspiration cytology showed metastatic PTC, confirmed by removal of her jugular chain lymph nodes. The patient remained asymptomatic until 9 years later, when she developed a right cervical neck mass with accompanying weight loss and early satiety. A CT scan demonstrated multiple pleural-based metastases in the right lung base with a moderate to large sized pleural effusion; 900 cc of cloudy dark red fluid was aspirated from the right pleura. Cytologic examination was positive for papillary and follicular clusters, intranuclear grooves and inclusions, and cytoplasmic vacuoles, consistent with metastatic PTC (Table 1). No immunohistochemical staining was performed in this instance. Despite treatment with radioactive iodine, the pleural fluid continued to accumulate. The patient succumbed to her disease the following year at the age of 91. Molecular analysis of the MAPK and PI3K pathways within the patient's original thyroid tumor revealed the BRAF^{V600E} mutation as the only clinically significant mutation (Table 2).

Patient #3 CF

A 50-year-old woman of Japanese-Okinawan ancestry first presented to our hospital with a right neck mass. Thyroid ultrasound-guided core needle biopsy revealed PTC with chronic thyroiditis. A subsequent total thyroidectomy showed PTC in the right thyroid lobe with lymphatic invasion, multiple parathyroidal, mediastinal, and cervical lymph node metastases, and extension into the paratracheal soft tissues. The patient received postoperative radioiodine I-131 ablation. Three years

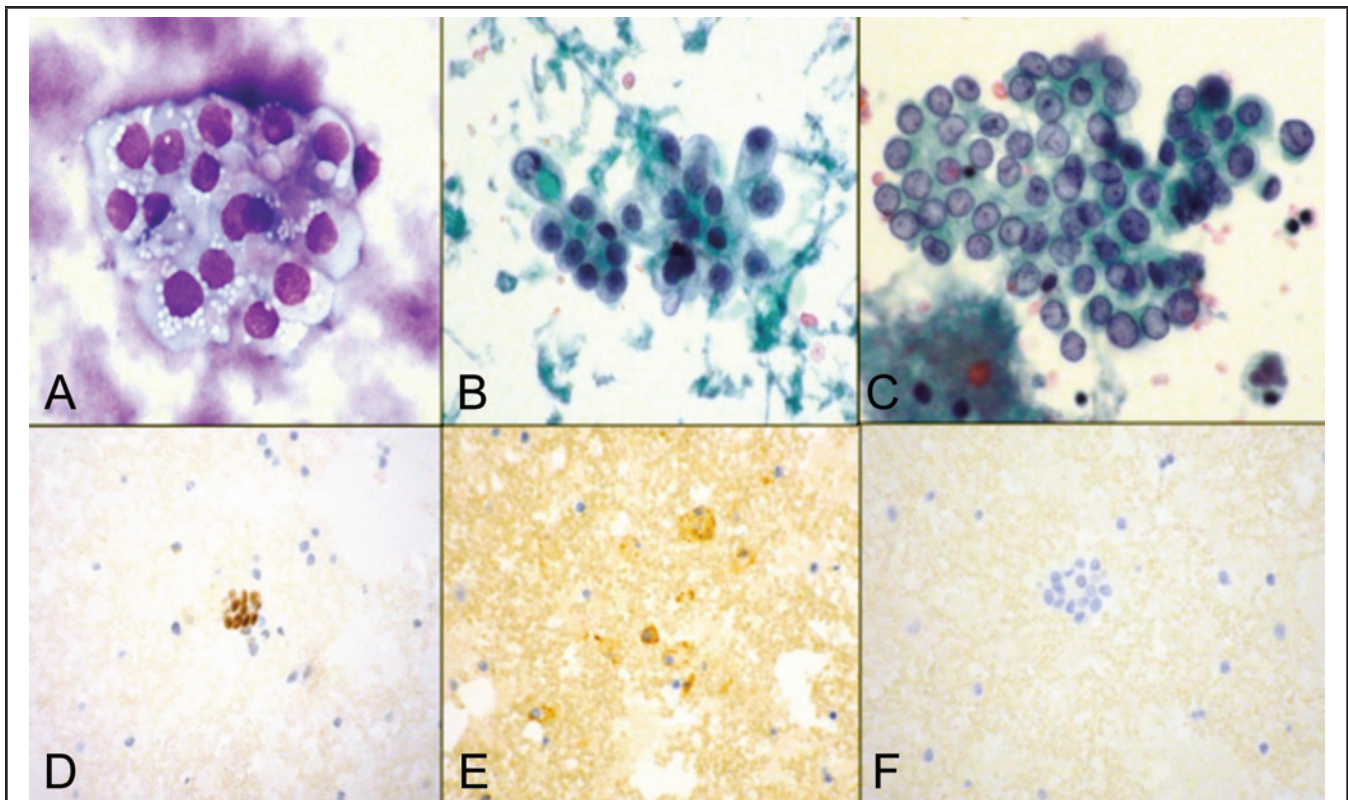


Figure 1. **Cytology of metastatic PTC to the pleura** (a) Cohesive cell clusters with minimal nuclear pleomorphism, and abundant finely vacuolated cytoplasm (Diff-Quik, 400x). (b) Papillary cluster with tumor cells displaying fine, powdery chromatin, thin nuclear membranes, and occasional intranuclear inclusion (Papanicolaou, 400x). (c) Papillary cluster with uniform bland nuclei and intranuclear grooves (Papanicolaou, 400x). (d) Immunohistochemical TTF-1 (thyroid transcriptase factor 1) staining (400x). (e) Thyroglobulin stain (400x). (f) Napsin-A stain (400x).

Table 1. Clinicopathologic Findings of Patients with Metastatic PTC to the Pleura			
	PT #1 DM	PT #2 SK	PT #3 CF
Age at First Diagnosis	49	74	50
Sex	F	F	F
Histologic Type	Papillary	Papillary	Papillary
Years Until Pleural Metastasis	29	17	4
Other Sites of Distant Metastasis	Lung	Lung	Pituitary, Lungs, Liver, Ribs, Pelvis
Papillary Clusters	+	+	+
Follicular Clusters	+	+	+
Intranuclear Grooves	+	+	+
Intranuclear Inclusions	+	+	+
Psammoma Bodies	-	-	+
Cytoplasmic Vacuoles	+	+	+
TTF-1	+	N/A	N/A
TGB	+	N/A	+
Napsin-A	-	N/A	N/A

Gene	CHR	CHR STR	SNP	PT #1 DM	PT #2 SK	PT #3 CF	Location	Function	Cancer Association
AKT1	14	105239894	C>T	+	-	+	Exonic	Synonymous	N/A
AKT1	14	105242966	T>C	+	-	+	Intronic, near exon		N/A
AKT1	14	105258972	G>A	-	+	-	Exonic	Synonymous	N/A
AKT2	19	40742320	T>C	+	+	+	Intronic, near exon		N/A
BRAF (V600E)	7	140453136	A>T	+	+	-	Exonic	Missense	PTC, Melanoma, Colorectal Cancer
GNAS	20	57478807	C>T	+	+	-	Exonic	Synonymous	N/A
GNAS	20	57478939	G>A	-	-	+	Intronic, near exon		N/A
KIT	4	55599436	T>C	+	+	+	Intronic, near exon		N/A
PIK3C2A	11	17111272	A>G	+	+	-	Untranslated region		N/A
PIK3C2A	11	17113483	C>T	+	+	+	Intronic, near exon		N/A
PIK3C2A	11	17126670	C>T	-	+	+	Intronic, near exon		N/A
PIK3C2A	11	17172133	T>C	-	+	+	Exonic	Synonymous	N/A
PIK3C2A (Q337R)	11	17190279	T>C	-	+	-	Exonic	Missense	N/A
PIK3C2A	11	17191019	A>G	-	+	+	Exonic	Synonymous	N/A
SNAPC5(MAP2K1)	15	66782048	C>T	-	-	+	Intronic, near exon		N/A

later, she presented with extensive metastases to the left neck, right paratracheal regions, ribs, paraspinal area, and lungs. Later that year, she developed abdominal pain, vomiting, and diarrhea. A chest X-ray revealed a right pleural effusion with diffuse pulmonary interstitial infiltrates, and 30 cc of turbid red fluid was withdrawn from the right pleura. The cytologic exam was positive for papillary and follicular clusters, intranuclear grooves and inclusions, psammoma bodies, and cytoplasmic vacuoles. Immunohistochemical staining was positive for TGB, confirming a PTC origin (Table 1). One year later, the patient was admitted to QMC with symptoms of panhypopituitarism and optic chiasm compression caused by a pituitary mass. Transphenoidal excision of this pituitary mass demonstrated PTC metastatic to the pituitary gland. A subsequent positron emission tomography (PET) scan showed extensive progression of metastatic disease, involving the right and left pleura, mediastinal and abdominal/pelvic lymph nodes, and multiple skeletal sites. The patient expired later that year at the age of 57. Molecular analysis of the MAPK and PI3K pathways within the original thyroid tumor did not reveal any clinically significant mutations (Table 2).

Discussion

The exact incidence of metastatic papillary thyroid cancer to the pleura is not well known. In order to ascertain this incidence within our institution, a retrospective search of the QMC pathology database from January 2002 to December 2012 was conducted. This search revealed a total of 4,046 pleural fluids submitted to our laboratory during this time period. Of the examined pleural fluids, 82% (3311) were benign effusions and 18% (735) were malignant. Lung (39%) and breast (15%) cancers were the most common primary malignancies. Our search revealed only 3 patients with metastatic PTC to the pleura, comprising only 0.1% of all pleural fluid exams and 0.5% of

all malignancies. Therefore, in our institution, metastatic PTC to the pleura is exceedingly rare.

For comparison, a literature review was performed and revealed 8 articles from 1979 to 2007, reporting a total of a mere 14 cases of metastatic thyroid carcinoma to the pleura (Table 3). In these prior reports, the patients' ages ranged from 46 to 88 years, with approximately equal numbers of men and women.⁴⁻¹¹ Five (36%) of the patients had an effusion as their presenting symptom. Six (43%) of the carcinomas were papillary, and one (7%) was anaplastic. The remaining 7 (50%) cases were described as being either papillary or follicular carcinomas without further distinction. Four (29%) were diagnosed by pleural effusion cytology.^{4,8,10,11} The cytologic features were described in these 4 cases.^{4,6,8,11} Papillary clusters and psammoma bodies were present in 2 (50%) cases, follicular clusters and intranuclear inclusions were present in one (25%), and no intranuclear grooves were noted in all cases. Fine cytoplasmic vacuoles were noted in only one (25%) of these prior studies.¹¹ Immunohistochemical staining was performed in one case,⁸ and was positive for TGB. Mutational testing was not performed in any of these studies.

Contrary to prior studies, many of the classic cytologic features of PTC were found in 4 pleural fluid specimens from our 3 patients, including 2 malignant effusions from patient 3 (CF). Intranuclear grooves and follicular and papillary clusters, as well as fine cytoplasmic vacuoles were identified in all 4 (100%) specimens (Table 1). Intranuclear inclusions were noted in 3 (75%), and psammoma bodies in one (25%). The diagnosis was confirmed with immunohistochemical TBG staining in 2(50%) cases, and TTF-1 in one (25%). Napsin-A, performed in one case, was negative. Utilizing cytologic examination and immunohistochemical staining with TGB, TTF-1, and Napsin-A, we were able to reliably render a definitive diagnosis of metastatic PTC in all four cases.

Table 3. Literature Review (1979-2006) of Metastatic Thyroid Carcinoma to the Pleura																
Authors	Year	# of Patients	Age	Sex	Histologic Type	Positive Cytology Cases	Presenting Symptoms	Other Sites of Distant Metastasis	Papillary Clusters	Follicular Clusters	Intra-nuclear Inclusions	Intra-nuclear Grooves	Psammoma Bodies	Cytoplasmic Vacuoles	TGB	TTF-1
Hyman (4)	1979	1	76	F	Papillary	1	Pleural effusion	Lung	+	-	-	-	-	-	N/A	N/A
Mizukami (5)	1990	7	-	-	Papillary and follicular	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vernon (6)	1992	1	50	F	Papillary	1	No	Lung, iliac crest, cervical LN	-	-	-	-	+	-	N/A	N/A
Koppl (7)	1993	1	88	F	Anaplastic	-	Pleural effusion	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kovacs (8)	1994	1	68	M	Papillary	1	Pleural effusion	Pericardium, cervical LN	+	-	+	-	+	-	+	N/A
Nomori (9)	1997	1	68	F	Papillary	-	No	Lung	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Perez (10)	2003	1	66	M	Papillary	-	Pleural effusion	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Siddaraju (11)	2007	1	46	M	Papillary	1	Pleural effusion	-	-	+	-	-	-	+	N/A	N/A

Certain histologic variants of PTC have been known to act more aggressively, including tall and columnar cell, as well as diffuse sclerosing variants.¹² The tall cell PTC variant presents at an older age, is associated with extrathyroid extension and nodal disease, and is comprised of tumor cells that are at least three times as tall as they are wide with abundant oxyphilic cytoplasm. The columnar cell PTC variant is more common in male patients and is associated with hematogenous spread to lungs and bone, as well as extrathyroidal extension. In this PTC variant, the tumor cells are columnar with nuclear stratification without abundant eosinophilic cytoplasm, and form parallel cords of markedly elongated follicles. The diffuse sclerosing PTC variant has a higher incidence in women, presents at a younger age, and has an increased likelihood of nodal and lung metastasis. It is characterized by a neoplastic follicular cell proliferation in a background of desmoplastic, sclerotic-type fibrosis associated with psammoma bodies, metaplastic squamous epithelium, and chronic thyroiditis. Interestingly, all of our cases presenting with metastatic pleural disease exhibited classic PTC histology. No aggressive tumor morphology was noted in any of our patients.

In addition to some of the highest rates of thyroid cancer in the world, Hawai'i also exhibits various gender and ethnic disparities within its PTC patient population. All three of our patients were women of Japanese or Japanese-Okinawan ethnicity born in the United States, ranging in age from 56 to 91 at the time of metastasis to the pleura. Women in Hawai'i have a 2-3 times higher risk of acquiring thyroid cancer than men, consistent with national data,¹³ so a preponderance of women amongst our patients is not surprising. However, a study conducted between 1962 and 1966 showed that the Japanese in Hawai'i had the lowest incidence of thyroid cancer among ethnic groups at a rate of 5.5 and 2.2 per 100,000 population for women and men, respectively.¹⁴ Interestingly, these rates were noted to be twice that of Japanese patients in Japan, where the incidence was 2.6 and 1.1 per 100,000 for women and men.¹⁴ A more recent survey in Hawai'i performed between 2000 to 2005 appears to show an increase in the incidence of thyroid cancer among Japanese in Hawai'i, with rates of 9.1 and less than 4 per 100,000 for women and men, respectively.¹³ Despite this increase, the incidence of thyroid cancer among Japanese in Hawai'i still remains the lowest among other ethnic groups. For example, by comparison, Filipino women and men displayed the highest incidence rates at 27.7 and 9.5

per 100,000. Although PTC is more common in other ethnic groups in Hawai'i, we observed this highly aggressive form of PTC solely in women of Japanese or Japanese-Okinawan ancestry. In addition to the pleural/pulmonary involvement noted in all 3 of our patients, and additional metastases to the liver, pelvic bone and ribs, and pituitary developed in one. All 3 of patients succumbed to their cancer within 1 year of development of their pleural effusions.

BRAF or rat sarcoma proteins (RAS) mutations, rearrangements to the receptor tyrosine-protein kinase (RET) proto-oncogene (RET)/PTC, and other activating mutations in the MAPK pathway are known to induce tumorigenesis in PTC.¹ Specifically, BRAF mutations are the most common tumor inducing alteration, occurring in up to 83% of all PTCs.¹⁵ Over 90% of these BRAF mutations are of the V600E variety, which has been associated with increased regional and distant metastases as well as a higher mortality rates.^{1,16} Molecular analysis confirmed the presence of BRAF^{V600E} mutation in 2 of our 3 PTC tumors (Table 2). In addition to BRAF^{V600E}, other mutations along the MAPK and PI3K pathways were studied, including AKT1 and AKT2 (v-akt murine thymoma viral oncogene homologs 1 and 2), GNAS (GNAS complex locus), KIT (v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog), PIK3C2A (phosphatidylinositol 3-kinase class 2 alpha), and SNAPC5/MAP2K1 (small nuclear ribonucleic acid activating protein complex polypeptide 5/mitogen-activated protein kinase 1) (Table 2). BRAF^{V600E} was the only clinically significant mutation noted in our investigation. However, despite the presence of widespread metastases to brain, liver, and lung in addition to pleura, one of our patients (Table 1, Patient #3) failed to demonstrate this BRAF^{V600E} mutation. Tumors from all 3 patients exhibited AKT2, KIT, and PIK3C2A mutations, but to date, there have been no reports in the literature regarding associations between these mutations and worsened prognosis in PTC. Therefore, additional molecular or environmental factors likely exist that may provide further prognostic and even therapeutic insight into aggressively behaving PTCs.

Certain populations in Hawai'i have been shown to exhibit a higher rate of the BRAF^{V600E} mutation in PTCs.¹⁷ In a recent study by Morita, et al, patients of Filipino ethnicity demonstrated the BRAF^{V600E} mutation in 83.8% of PTCs, which nearly equals the highest rates reported in the literature.¹⁷ Additionally, the purported five-year survival rate was lower in this population, supporting the association of a more clinically aggressive malignancy with the BRAF^{V600E} mutation.¹⁷ The Japanese population in Hawai'i was not investigated in Morita's study.¹⁷ There is no current evidence of the BRAF mutation occurring at higher rates in Japanese populations, with percentages varying from 29% to 52%.^{18,19,20} Furthermore, one report by Ito, et al, a large study of 631 Japanese PTC patients, failed to demonstrate a relationship between the presence of the BRAF mutation and aggressive tumor characteristics and poor patient prognosis.²⁰

To date, the etiology of thyroid cancer remains obscure.

Iodine deficiency and exposure to ionizing radiation appear to be the only recognized environmental factors known to cause thyroid cancer.^{13,14} However, various other environmental components have been suggested to increase risk. Several studies have revealed an association between the incidence of thyroid cancer and volcanic activity around the world.^{21,22,23} In addition to Hawai'i, volcanically active areas such as Iceland, the Philippines, Sicily, New Caledonia, and French Polynesia have some of the highest rates of thyroid cancer globally,^{21,23,24,25,26} ranging from 11.7 per 100,000 women in Iceland to 71.4 per 100,000 women in New Caledonia. The high incidence of thyroid cancers in these geographically distinct areas would suggest that some unknown carcinogenic agent produced by volcanic activity might be responsible for its induction. In one study, the authors speculated that a chemical carcinogen released by Mount Etna in Sicily might modulate BRAF activation in their ethnically homogeneous population, and thereby account for the higher rates of BRAF mutations found in the eastern part of the island (45.9%), compared to the west (22.7%).²⁷ This data is extremely interesting and relevant to Hawai'i's population due to the presence of frequently erupting volcanoes in the Hawaiian island chain. However, thus far, there have been no studies demonstrating any evidence of geographic variations of PTC across the islands. Therefore, further research is necessary to elucidate a possible relationship between volcanic eruptions and the molecular features of thyroid cancer.

Conclusions

PTC metastatic to the pleura is extremely rare, occurring in 0.1% of all pleural fluids received in our institution over a 10 year period. Contrary to the prior literature, our cases demonstrated characteristic cytologic features of PTC. Therefore, in conjunction with immunohistochemical staining, we were able to reliably make definitive diagnoses of metastatic PTC. All of our cases were in Japanese women, despite those of Japanese ethnicity historically having the lowest incidence of thyroid cancer in Hawai'i. Only 2 of our 3 patients demonstrated BRAF mutations. Therefore, there are likely other putative molecular markers of tumor aggressiveness that have yet to be determined. The potential association between volcanic emissions and thyroid cancer development in Hawai'i's population requires further study.

Conflict of Interest

None of the authors identify any conflict of interest.

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Impact of Utilizing Pharmacy Students as Workforce for Hawai'i Asthma Friendly Pharmacy Project

Carolyn S. Ma PharmD; Blythe Nett MPH; Gregg Kishaba BS; and Lara Gomez PharmD

Abstract

A partnership was formed between the University of Hawai'i at Hilo Daniel K. Inouye College of Pharmacy (DKICP) and the Department of Health to carry out the Hawai'i Asthma Friendly Pharmacy Project (HAFPP), which utilizes pharmacy students as a workforce to administer Asthma Control Tests™ (ACT), and provide Asthma Action Plans (AAP) and inhaler technique education. Evaluation of data from a pilot project in 2008 with first and second year students prompted more intensive training in therapeutics, inhaler medication training, and communication techniques. Data collection began when two classes of students were first and second year students and continued until the students became fourth year students in their advanced experiential ambulatory care clinic and retail community pharmacy rotations. Patients seen included pediatric (32%) and adult (68%) aged individuals. Hawai'i County was the most common geographic site (50%) and most sites were retail pharmacies (72%). Administered ACT surveys (N=96) yielded a mean score of 19.64 (SD +/-3.89). In addition, 12% of patients had received previous ACT, and 47% had previous AAPs. Approximately 83% of patients received an additional intervention of AAP and inhaler education with 73% of these patients able to demonstrate back proper inhaler technique. Project challenges included timing of student training, revising curriculum and logistics of scheduling students to ensure consistent access to patients.

Introduction

The National Asthma Education and Prevention Program (NAEPP) established new patient specific guidelines in 1991 with revisions in 2002 to emphasize the use of long-term asthma inhaler controller medications to reduce morbidity and mortality for chronic asthma sufferers.¹ Physicians have reported barriers to utilizing these practice guidelines including lack of awareness, familiarity, and training with the Asthma Control Test (ACT), and difficulty overcoming previous practice habits.²⁻⁴

Data from the 2008 Behavioral Risk Factor System (BRFSS) reported that the prevalence of asthma for both adults and children was higher in Hawai'i County (12.2% and 17.0%, respectively) as compared to 9.6% among adults and 12.7% among children statewide. Table 1 compares the prevalence and presents the breakdown within Hawai'i County. Survey results in 2012 produced similar results.⁵ A study by Berry, et al,⁶ described the concept of the Asthma Friendly Pharmacies (AFP) model that provided focused asthma education to community pharmacists, pharmacy technicians, and pharmacy students on various asthma-related interventions including resolving medication-related adverse effects, patient education on inhaler technique, and improving the pharmacist/patient and pharmacist/primary care provider relationship. Providers gave over 2000 patient interventions that included patient education on topics such as the difference between asthma controllers and quick relief medications, medication regimens, device technique, and side effects.⁶ Other studies have also demonstrated effective

pharmacist management as health extenders for chronic care asthma.⁷⁻⁹ While access to asthma specialists may be limited, asthma patients in Hawai'i have access to community retail pharmacists when they pick up their asthma inhaler prescriptions. Hence, training student pharmacists in Hawai'i on the use of the ACT and involving them in a public health project seemed appropriate.

A collaborative partnership was formed between the Daniel K. Inouye College of Pharmacy (DKICP) and the Hawai'i Department of Health (DOH) to carry out the Hawai'i Asthma Friendly Pharmacy Project (HAFPP) modeled after a study performed by Berry, et al. The objective of this four-year study was to explore the feasibility of utilizing pharmacy students as a workforce entity to aid in a public health project. This paper describes the results of this effort.

Methods

The project protocol and patient consent forms received approval from both the DOH Institutional Review Board and the University of Hawai'i Committee on Human Studies (CHS). Initial planning meetings were held with the DOH HAFPP project staff, the DKICP Director of Experiential Education and several community pharmacy leaders. This initial group formulated the list of targeted medications in Figure 1. As the project progressed, quarterly meetings were held to discuss project objectives, progress in pharmacist and student training,

Table 1. Behavioral Risk Factor Surveillance System		
Asthma Prevalence in Adults	2008	2012
Statewide	9.6%	8.9%
Hawai'i County	12.2%	9.7%
Hilo	16.7%	9.5%
North Hawai'i	12.9%	8.5%
Puna/Ka'u	8.0%	10.9%
Kona	10.3%	9.3%
Asthma Prevalence in Children	2008	2012
Statewide	12.7%	12.2%
Hawai'i County	17.0%	10.4%
Hilo	18.6%	13.7%*
North Hawai'i	12.8%	7.2%*
Puna/Ka'u	16.2%	10.5%*
Kona	7.3%	9.0%*

*Data combined from 2011-2012

HAWAII ASTHMA-FRIENDLY PHARMACY PROJECT

COMMON ASTHMA MEDICATIONS

QUICK RELIEVERS

Short-Acting Beta2-Agonists (SABA)

Albuterol (Accuneb[®], ProAir[®], Proventil[®], Ventolin[®])
Pirbuterol (Maxair[®])
Levalbuterol (Xopenex[®])

Systemic Corticosteroids

Prednisone (Deltasone[®], Orasone[®])
Prednisolone (Orapred[®], Pediapred[®], Prelone[®])
Methylprednisolone (Medrol[®])

LONG-TERM CONTROLLERS

Inhaled Corticosteroids (ICS)

Beclomethasone (Qvar[®])
Budesonide (Pumicort Flexhaler[™], Pulmicort
Respules[®])
Flunisolide (AeroBid[®], AeroSpan[™])
Fluticasone (Flovent[®])
Mometasone (Asmanex[®])
Triamcinolone (Azmacort[®])

Mast Cell Stabilizers

Cromolyn (Intal[®])
Nedocromil (Tilade[®])

Leukotriene Receptor Antagonists (LTRA)

Montelukast (Singulair[®])
Zafirlukast (Accolate[®])

Long-Acting Beta2-Agonists (LABA)

Salmeterol (Serevent[®])
Formoterol (Foradil[®])

5-Lipoxygenase Inhibitors (5-LO)

Zileuton (Zyflo[™])

Combination ICS+LABA

Fluticasone/Salmeterol (Advair[®])
Budesonide/Formoterol (Symbicort[®])

Methylxanthines

Theophylline (Slo-Bid[®], Theo-24[®], Theo-Dur[®])

Immunomodulators

Omalizumab (Xolair[®])

**** This is not a comprehensive list of all the medications for asthma. It is intended to be a guide for pharmacies participating in the Hawaii Asthma Friendly Pharmacy Project.**



Figure 1. Asthma Medications Included in Asthma Friendly Pharmacy Project

and project implementation. Prior to the start of the project in 2008, HAFPP funded a pulmonologist-led continuing education and implementation session for the community retail pharmacist preceptors and DKICP faculty in East Hawai'i. HAFPP funded the printing of hard copy ACT forms, Asthma Action Plans and other patient education materials (Figure 2).

Two phases of the project included a pilot study held in 2008-2009, and a second phase of the study occurring from May 2010-May 2012. The same students were studied in both phases of the study. The pilot study utilized 170 PY1 and PY2 students to administer the ACT test to patients in the community pharmacy retail sites and ambulatory care clinics. Due to

ASTHMA ACTION PLAN

Patient: _____ Doctor: _____ Dr. Phone #: _____
 Peak Flow Personal Best: _____ lpm Updated: _____

GREEN ZONE – GO AHEAD!

Signs & Symptoms (Yes to All)	OR	Peak Flow (Yes to All)
<ul style="list-style-type: none"> * "Rescue" or "quick relief" medicines needed less than twice a week * No wheezing, cough, chest tightness or shortness of breath * Can sleep without waking up due to asthma * Can do most activities * Work or school is not missed * Rarely, if ever, need emergency care 	OR	Your Green Zone Peak Flow Range: _____ - _____ Peak flow is 80 to 100% of your "Personal Best"

GREEN ZONE ACTION

1. Take your "controller" medicine(s), _____, everyday as prescribed to keep asthma in good control.

YELLOW ZONE – BE AWARE!

Signs & Symptoms (Yes to Any)	OR	Peak Flow (Yes to Any)
<ul style="list-style-type: none"> * Albuterol, or other rescue medication used more than twice a week * Cough, wheezing or shortness of breath * Wake from sleep due to asthma * Can do some, but not all usual activities 	OR	Your Yellow Zone Peak Flow Range: _____ - _____ Peak flow is 50 to 80% of your "Personal Best"

YELLOW ZONE ACTION

1. Take "rescue" medicine – 2-4 puffs albuterol or 1 nebulizer every 20 minutes – for up to 3 doses, then every 4 hours as needed to relieve symptoms
2. If asthma symptoms continue more than 2 days, you have continued trouble sleeping due to asthma, or if "rescue" medicine is needed more than every 4 hours, see Red Zone. Call for advice if needed.

RED ZONE – STOP & TAKE ACTION!

Signs & Symptoms (Yes to Any)	OR	Peak Flow (Yes to Any)
<ul style="list-style-type: none"> * Constant need for albuterol * Constant wheezing, cough or shortness of breath * Continued waking from sleep due to asthma * Difficulty breathing, walking or talking * Difficulty doing usual activities 	OR	Your Red Zone Peak Flow Range: _____ - _____ Peak flow is below 50 percent of your "Personal Best"


RED ZONE ACTION


If you need "rescue" medicine every 2 to 4 hours, and you still have red zone symptoms:


1. Start prednisone or prednisolone as directed by your doctor. Keep in mind that it may take 4 to 6 hours for the medicine to work.
2. You may take "rescue" medicine – 2-6 puffs albuterol or 1 nebulizer every 20 minutes – for up to 1 hour.
3. If you have tried the above steps and there is no relief, have someone take you to the nearest Emergency Room or call 911 immediately. Continue to take "rescue" medicine as needed.

- * Overuse of "Rescue / Quick Relief" asthma medications (such as Albuterol, ProAir®, Ventolin®, Proventil®, Xopenex® and Maxair®) is a danger signal that your asthma may not be in good control.
- * "Controller / Preventer" medications can prevent asthma flare-ups.
- * Talk to your doctor about using your personalized Asthma Action Plan to avoid asthma attacks.

Developed by the Hawaii Asthma Friendly Pharmacy Project, a partnership to improve asthma outcomes in the Hilo area.










Figure 2. Asthma Action Plan

the beginning level of training of these students, community pharmacist preceptors and DKICP practice faculty performed patient follow up for AAP and inhaler education if the patient was found to have uncontrolled asthma ($ACT \leq 19$). Analysis of the pilot study data revealed four major areas of concern: (1) the limited ability of the students to confidently perform the ACT early on in their training due to gaps in understanding of the disease, knowledge of the medications, and adequate communication and patient education skills; (2) insufficient data collection tools; (3) inadequate preparation of the pharmacist preceptor; and (4) inconsistent hours at practice sites, which limited student access to the patients.

Based on the 2008 pilot project data, the project group made suggestions to the DKICP on how to change the didactic curriculum specific to asthma therapeutics, patient interview, and counseling skills. Additional workshop time was added to supplement the asthma therapeutics learning module to develop students' communication and interview skills on inhaler technique and education. Changes were also made to the third year capstone course, Applied Pharmaceutical Care Didactic, implemented Objective, Subjective, Comprehensive Exams

(OSCE) to demonstrate proficiency on inhaler technique and patient education. Pharmacy preceptors were trained again on the study protocol, given the data from the 2008 pilot, as well as presented information on the challenges observed in the 2008 pilot.

Prior to the second phase of the study, better technology for data collection was implemented with a software program called E*Value which allowed for on-line data collection. Changes made to curriculum and rotation scheduling is detailed in Table 2.

The second phase of the study occurred from May 2010 – May 2012 when the same 170 students who had now advanced into their PY4 year were then dispersed to pharmacies on the islands of Maui (retail, ambulatory care), Kaua'i (retail), O'ahu (retail, ambulatory care), and Hawai'i (retail, ambulatory care, hospital). Students were asked to administer ACTs, provide an AAP and inhaler education and document their interventions. Students obtained consent from the patient or patient's guardian before administering the ACT. In the retail pharmacy rotations, possible patients were identified when they picked up targeted medications. In ambulatory care clinics, students performed the

Table 2. Didactic and Experiential Curriculum Changes		
Area	2008	By 2012
Curriculum	Brief orientation to interview skills and ACT (PY1)	Orientation and reinforcement of interview skills and ACT (PY1)
	Asthma therapeutics module (PY2)	Asthma therapeutics module + hands on inhaler workshop on various types of inhalers (PY2)
		Simulation mannequin in asthma patient case (PY2)
		Applied Pharmaceutical Care Course (PY3) Objective/Subjective Clinical Exams (OSCE) for inhaler education (PY3)
Technology	Paper ACT, manual collection, DOH link	E-value software to include ACT scores and interventions
Experiential Rotation Scheduling	PY1 rotation: 4 hrs/week x 15 weeks	PY1 rotation: daily x 4 consecutive weeks PY4 rotation: daily x 6 consecutive weeks
Preceptor training	1 hour CE on Asthma guidelines and Asthma Friendly Project	Annual preceptor training on ACT, AAP and student involvement

three steps as part of their regular medication intake interview at the start of a patient's clinic appointment. Students asked two additional survey questions pertaining to whether the patient had ever had an ACT performed or had ever been counseled with an AAP. Consistent with the scoring methodology for ACTs, the final scores were calculated by adding up the individual item scores of the five-item survey. The two additional questions were answered as "yes" or "no."

Students were asked to document their interventions into E*Value specifically documenting types of intervention such as AAPs and inhaler education, gender, site, ethnicity, and amount of time spent with the patient. HAFPP provided statistical analysis using SPSS 18.0, Chicago, IL.

Results

Table 3 describes the documented intervention data for the 96 ACT surveyed patients of whom 56% scored ≥ 19 (Mean ACT scores 19.64 (SD +/- 3.89)), indicating adequate control of asthma symptoms. Of these patients, 12% had previous ACTs performed and 47% were given AAPs previously. Of the 96 patients given ACTs, 83% were given additional interventions of an AAP and inhaler education. Of those given inhaler education, 73% were able to demonstrate back proper technique. Table 4 describes the demographics, geographic, and types of practice sites of patients who had documented interventions of AAP and/or inhaler education by student and patient demonstration (N = 80, 83%). The majority of patients were seen in retail practice sites. Geographically, most patients were seen on Hawai'i Island. Of the 170 students who were trained or eligible to participate in the study only 17% documented interventions.

Discussion

Asthma control requires vigilant monitoring of factors such as symptoms, dynamic pulmonary function, and patients' ability to function in their daily activities of life. Assessing one or several of these functions at any one point of care gives only a glimpse of a disease that requires chronic control with multiple assessment points over time. Tools such as the ACT were developed in 2004 by Nathan, et al,³ as a five-point patient-administered survey to assist practitioners in assessing asthma control in settings where

Table 3. ACT, AAP and Education Intervention for 2012	
Number of patients given ACT	96
% of patients given additional intervention (AAP and inhaler education)	83
% of patients able to demonstrate back proper inhaler technique after education	73
Avg. time spent/patient (min)	18

Table 4. Demographics of Patients who received AAP and/or Inhaler Education 2012	
	N=80 patients
% Pediatric	32
% Adult	68
% Male/Female	52/48
Ethnicities (%)	
African American	4
Asian	12
Caucasian	18
Filipino	6
Hispanic	2
Native Hawaiian	22
Mixed race	6
Other	16
Not noted	14
Geographic Sites (%)	
O'ahu	42
Hawai'i Island	50
Kaua'i	2
Maui Island	2
Continental US	4
Type of Practice Site (%)	
Retail	79
Ambulatory Care Clinic	21

spirometry or other testing may not be available.³ The ACT assesses, on a scale from 1-5, patients' scores for wheezing, coughing, chest tightness, and pain, as well as the frequency of use of short acting rescue inhalers. Also included is amount of time asthma has kept the patient from normal activities in work, school, or home; higher scores are indicative of better functioning. Scores of 19 or less indicate that asthma may not be well controlled.³ Schatz, et al,⁴ replicated the findings from Nathan in a population underserved by asthma specialists and concluded that the ACT is reliable, valid, and responsive to changes over time in asthma patients not under the care of an asthma specialist, and should help practitioners to improve assessment of asthma control in busy clinical settings.⁴ For patients with ACT score of 19 or higher, the study yielded a sensitivity and specificity of 71% for detecting patients with uncontrolled asthma. Hawai'i's asthma patient population is similar to the Schatz, et al, study population in terms of the lack of asthma specialists on neighbor islands and limited access to specialists on O'ahu. As a result, this study critically informed our study.

Other community-based asthma interventions by pharmacists have also been shown to be successful. In 1997, Rupp, et al, described an independent community pharmacy and local health maintenance organization (HMO) partnership that developed a Disease Specific Management (DSM) Program called Asthma Integrated Management (AIM).⁷ AIM targeted problematic pediatric patients aged 18 years or younger, and newly diagnosed or poorly controlled patients. Poorly controlled patients were defined as patients previously diagnosed with asthma experiencing one or more recent exacerbations. Problematic pediatric patients were defined as those who had learning impairments or disabilities; and those with a highly unstable social environment due to lack of a routine and reliable adult caregiver. The program was meant to supplement physician care. The clinical objectives were: (1) recognize and treat acute exacerbations; (2) minimize acute and chronic asthma symptoms; (3) maintain normal activities including exercise; (4) enhance patient education about asthma and its causes; (5) prevent side effects of treatment; (6) minimize the social and financial costs of asthma; and (7) achieve improvement in activities, symptoms, and emotional impact. The program required significant blocks of dedicated pharmacist interaction with the patient and the primary caregiver. Over a two-year period of time, 11 HMO patients were able to complete all the steps of the AIM program. Results showed significant improvement in quality of life and decrease in use of care services with a 77% reduction in hospitalizations, as well as lower emergency room and urgent care visits, by 78% and 25%, respectively. Although the numbers were small, the paper described an important component of a successful DSM program (an arrangement by which HMO patients had exclusive contracts with area chain pharmacies for their medications). When patients were allowed to fill prescriptions at non-HMO pharmacies (for convenience or other reasons), pharmacists were limited in their ability to carry out standardized type reviews such as drug use review, counseling and compliance; in addition, patients were more

often lost to follow-up. With routine pick up of prescriptions, DSM appointments could be concurrently scheduled. A key to success in this program was consistent quality of pharmacist care achieved by implementing a standard AIM pharmacist training program.⁷

In Hawai'i, Chan, et al, reported results specific to asthma education.⁹ The Military Community Asthma Program (MCAP) was developed in 1996 at the Tripler Army Medical Center on O'ahu to address the high rate of hospitalizations for their pediatric asthma patients. The program developed inpatient and outpatient education processes where critical pathways required utilizing pharmacists who were trained in asthma education. A pre-study in 1997 showed a hospitalization rate of 3.2 per 1,000 children. The study enrolled 107 patients from late 1997 through January 1999. After implementation of MCAP, hospitalization rates decreased to 2.1 per 1,000 children in 1998 and to 1.9 per 1,000 children in 1999. The study also reported a trend toward decreased pediatric admission to the Pediatric Intensive Care Unit for severe asthma, from 2.3-6.0 per 10,000 in 1994 to 1.7 per 10,000 in 1999. The study reported that the most critical element for successful asthma therapy was the delivery of the correct medication along with pharmacist education on correct multi-dose inhaler (MDI) therapy.⁹

In our study, the data collected from 2010-2012 indicated that students, if trained properly and in a stepwise fashion, are able to administer an ACT, create an AAP and provide counseling. However, due to the small size of the study, the impact on asthma control based upon interventions cannot be reliably discerned, although it is noteworthy that more than half of our patients (56%) had controlled asthma and that a majority of patients (73%) who were given education were able to demonstrate back proper technique.

A significant shortcoming of our study was the low percentage of documented participation by students. Although students were directed to take the initiative and report their scores and interventions, this project relied solely on voluntary student documentation. Students may have performed interventions and neglected to input the information. Other issues may have also affected the numbers of responses such as other disease management priorities during a patient's visit, patients not agreeing to participate, students forgetting to perform the task during the rotation, or students not being present when the patient came to pick up their prescriptions. Figures are not available to describe the total number of possible patient-student interactions based upon the number of eligible prescriptions from the list of earmarked inhalers. This would require all sites to report their total number of inhaler prescriptions over the study trial period of two years. In addition, many chronic medications such as asthma inhalers are refilled by mail order pharmacies as mandated by certain insurance companies, negating the need for a physical visit to the pharmacy. Future project design might target specific rotation sites to provide total number of possible patients, first time prescriptions, number of patients who refuse participation, and the number of patients seen by students as well as the type of interventions.

Conclusions

This small study explores the possibilities of utilizing pharmacy students in a public health project. Lessons learned were that students need consistent training in a disease state, medications, communication, and patient interactive skills in a building block model starting with their first year and with content and skills development continuing to build each year into their final fourth year. The changes developed for this study have been maintained in the curriculum and students know that ACTs are part of the assessment toolkit for managing asthma and are knowledgeable about the follow-up steps of giving AAP's and inhaler education. Project challenges included scheduling of students in rotation sites to provide consistent access to patients.

Although the majority of patients were seen in the retail pharmacy setting, time constraints and attendance to other duties limit the community retail pharmacist's availability to mentor early PY1 level students. The skill of administering ACTs could be taught in the first year, as students begin to develop patient interview and communication skills. This would allow them to continue to develop their communication skills during the second professional year while also being introduced to information on the disease and medication therapeutics. The third year would then solidify the didactic training and in the fourth year, the student would continue to practice these skills in the experiential setting. The limited patient data suggests that if given appropriate education, patients are able to demonstrate back proper inhaler technique.

Ideally, engaging students in a public health effort early in their professional education will instill the value for this type of service as a part of their professional career. Pharmacists are trained to provide service but not necessarily to think in terms of public health initiatives. This type of project helps to promote the professional contributions of pharmacists to public health.

Conflict of Interest

None of the authors identify a conflict of interest.

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MEDICAL SCHOOL HOTLINE

The University of Hawai'i John A. Burns School of Medicine Department of Psychiatry: Past, Present, and Future

Anthony P.S. Guerrero MD

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



*Dr. Naleen Andrade (back row, left); Dr. Walter Char (front row, center);
Dr. John F. McDermott Jr. (back row, center); Dr. Anthony P.S. Guerrero (back row, right)*

The University of Hawai'i John A. Burns School of Medicine Department of Psychiatry (UH JABSOM DOP) eagerly anticipates the medical school's 50th anniversary. The DOP was also founded in 1965 as a section under the Department of Medicine. Dr. Walter Char (front row, center) was Chair of the section, and he established psychiatry as an essential specialty within JABSOM.

In 1969, Dr. John F. McDermott Jr. (back row, center) was recruited to help reorganize the section as a full department in what would become a four-year M.D. degree granting program in 1973. A single four-year accredited residency program was born from the reorganization of the existing one year residency programs at the Hawai'i State Hospital and the Queen's Medical Center (QMC). He also founded the child and adolescent psychiatry fellowship program and chaired the Department of

Psychiatry from 1969 to 1995.

In the 1990s, the Department grew through the State–University collaboration. The Department provided faculty staffing for the Hawai'i State Hospital and child and adult community mental health clinics as well as psychiatric leadership to meet national accreditation standards. Dr. Naleen Andrade (back row, left) oversaw this collaboration. She would eventually become Chair of the Department from 1995 to 2012.

In the early 2000s, the DOP founded subspecialty training programs (the only ones in Hawai'i) in geriatric psychiatry and addiction psychiatry. Dr. Andrade also initiated the DOP Research Division, which has become the home for various nationally recognized research programs, including the National Center on Indigenous Hawaiian Behavioral health. The work of the Division has allowed the DOP to achieve national and

international recognition for its work in cross-cultural psychiatry and in mental health disparities with a focus on Native Hawaiians and Pacific Islanders.

Traditionally the DOP has hired faculty under a full-time practice model, which allowed for the development of academic clinical services that were valued by collaborating hospitals. In the 2000s, the DOP practice plan grew within the framework of JABSOM's faculty practice plan, or University Clinical Educational Research Associates (UCERA). This faculty practice model was expanded by Dr. Andrade and further developed by Dr. Anthony Guerrero (back row, right), who was appointed permanent chair of the Department in 2013.

The DOP's mission contributes to the overall mission of JABSOM by providing leadership in psychiatric education and training, research, faculty development, and clinical services in Hawai'i, Asia, and the Pacific Basin. The Department is committed to expanding knowledge within a cross-cultural, biological, psychological, and social framework.

The vision of the Department, updated in 2013, is to be an excellent provider, employer, training program, and research center in Hawai'i and the Asian/Pacific region, and to contribute to the overall JABSOM vision as an integrated, academic mental health care model comprised of: education, training, and workforce development; quality, accessible, and sustainable psychiatric care; development of mental health policy; mental health research and program evaluation that informs and improves all of the other components; professional development, engagement, and mentorship of faculty, residents, and staff; and administration and business management.

The four core values of the Department are *aloha*, *lokahi*, *'ohana*, and *maika'i loa*. Aloha is selfless giving without expectation of reciprocity. It is the ability to empathize with others and treat colleagues and those served with the sensitivity and respect that brings out their best qualities and strengths. Lokahi is the ability to be servant-leaders who strive to establish a set of working relationships that build a team or an 'ohana. These relationships seek to achieve balance or harmony. 'Ohana is a family or team bonded by a continuous thread of history, culture and/or aims. Maika'i loa is excellence in work done as individuals and as 'ohana.

In essence, the goal is to be an academic medical department in partnership with our collaborating hospitals. A team of physicians provides seamless quality coverage and access to multiple psychiatric subspecialties. In addition, the Department strives to be a key resource for Hawai'i for workforce development and intellectual capital. To accomplish this, the Department strives to maintain strong, fully accredited residency training programs that can benefit everyone in the community.

Currently, the department is organized into four major divisions, which include clinical services, education and training, research and evaluation, and administrative services. Each of the divisions collaborates closely in supporting the academic clinical unit, which is the basic unit of the department, and in the interface between the department and the collaborating medical centers.

There are 23 psychiatrists in the department, three of whom are fully general psychiatrists. In terms of additional fellowship training and additional board certification, we have 14 child and adolescent psychiatrists, five addiction psychiatrists, three geriatric psychiatrists, two consultation and liaison psychiatrists, one pain medicine specialist, one forensic psychiatrist, six physicians who are additionally certified in primary care general pediatrics, three physicians who additionally have a PhD degree, two physicians who have been certified in performing electroconvulsive therapy, and one physician who performs ketamine treatments for refractory depression.

The DOP provides the majority of psychiatric team care coverage and psychiatric service line leadership at QMC, including its medical/surgical units and emergency department, child and adolescent and adult psychiatric inpatient units, and child and adolescent and adult outpatient clinics. In addition, the DOP also collaborates closely with Kapi'olani Medical Center for Women and Children in its consultative behavioral health service. Furthermore, the DOP collaborates closely with the State Department of Health, Child and Adolescent Mental Health Division, in providing much-needed clinical and consultative services, via telepsychiatry, to rural neighbor island clinics, as well as in a primary care interface project that strives to serve as a model for healthcare transformation in the future.

The department provides education and training in the required disciplines of psychiatry and behavioral sciences for JABSOM students. Fully accredited programs in psychiatry, child and adolescent psychiatry, geriatric psychiatry, and addiction psychiatry are maintained. The majority of the program's graduates remain in Hawai'i and serve the public sector; they also provide much-needed psychiatric specialty care on the neighbor islands. In addition, the DOP provides continuing medical education for the healthcare community and general community, in the form of weekly grand rounds, journal clubs, and subspecialty conferences.

Current research programs include the National Center on Indigenous Hawaiian Behavioral Health; the Asian-Pacific Islander Youth Violence Prevention Center; the Pacific Addictions Research Center; and the Hawai'i Caring Communities Initiative, which focuses on suicide prevention and community outreach.

As a modern business unit, the DOP is fully supported through its comprehensive array of dedicated administrative services that include finance and contracts management, program administration for education and training, human resources and faculty practice operations, and information technology.

The annual operating budget of the DOP exceeds \$7 million. The majority of its revenue comes from clinical service, billed through the faculty practice plan, as well as from clinical coverage contracts with hospitals and healthcare partners. For every dollar that the DOP receives in state-appropriated funds for the University, the DOP generates approximately five additional dollars for these activities, mainly through clinical services and extramural research grants. The majority of the department expenses are in personnel.

Faculty members are employed in a full-time faculty employment model through JABSOM and University Clinical, Educational and Research Associates (UCERA) (faculty practice plan). They are employed within a model that specifically recognizes the different components of their academic job, including clinical, academic, research, teaching, and service ("CARTS" model). It is through this model that productivity in all of these areas is specifically incentivized. In addition, this model aligns itself with the collaborating medical centers' quality initiatives, which are important for any future model of health care in the Department.

Since 2009, the DOP has produced 126 peer-reviewed journal publications, two books, and 25 book chapters; in addition, there have been numerous national and international peer-reviewed presentations at meetings, seminars, and conferences.

Each year, the department engages in an annual strategic planning process. For 2014-15, the goals include improving recruitment and retention; solidifying funding and resource stability through new collaborations and optimizing outpatient practice with the goal of diversifying education and training

opportunities; promoting faculty development; utilizing new avenues and technology to improve communication; and advancing programs in cultural and global psychiatry.

Overall, through the current activities, the Department hopes to be a vibrant contributor to health care of the future and contribute to reducing the nearly one third of the (nationally) \$1.2 trillion of waste in healthcare every year, attributed to behavioral etiologies. The hope is to develop, implement, and evaluate new models of mental health care delivery that are focused on prevention and have the potential to address multiple downstream adversities. Finally, the department hopes to continue to partner with the major healthcare organizations in the State of Hawai'i, in order to be a valuable resource for workforce development, expertise in all specialty areas, and quality accessible care.

For updates on the Department of Psychiatry, please follow us at [blog Hawaii.edu/dop/](http://blog.Hawaii.edu/dop/)

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Electronic Cigarettes: Marketing to Hawai'i's Adolescents

Rebecca J. Williams DrPH and Rebecca Knight MPH

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

Abstract

Electronic cigarettes (e-cigarettes) are an emerging phenomenon that is becoming increasingly popular among adolescents. Current e-cigarette use among adolescents has more than doubled in the past few years nationally and more than tripled in Hawai'i, despite the fact that safety in terms of health and injury from use is widely unknown. The use of e-cigarettes among adolescents is of particular concern because they may act as a gateway to smoking conventional tobacco cigarettes, substitute for cigarettes where smoking would normally not be allowed, and weaken the effect of clean air policies, and displace effective smoking cessation treatments. Additionally, the use of e-cigarettes may lead to the use of conventional cigarettes. There is special concern that e-cigarette companies are recruiting adolescents who would not have otherwise tried smoking by using tactics such as offering e-cigarettes in attractive flavorings and using the same successful strategies to market their product as tobacco companies have used for conventional cigarettes in past decades. It has been shown that exposure to cigarette marketing is related to initiation and progression in adolescent smoking. Yet, there remains no regulation on the marketing of e-cigarettes to adolescents. It can be extrapolated that expanded regulation that includes limits on the marketing of e-cigarettes may help decrease use among adolescents and prevent the possible increase of smoking rates.

About E-cigarettes

Electronic cigarettes (e-cigarettes) are an emerging phenomenon becoming increasingly popular among both adults and adolescents. E-cigarettes are battery-powered devices designed to deliver an aerosol of addictive nicotine, flavor, and other chemicals when heated. This aerosol, or vapor, is inhaled in a similar manner as conventional cigarettes. Most e-cigarettes are manufactured to look like conventional cigarettes, and some resemble everyday items such as pens. The economic forecast of e-cigarettes is alarming for public health. Currently, the sales of e-cigarettes are estimated to be a \$1.5 billion market, with an estimated growth of 24.2% over the next four years.¹

Details on the use of e-cigarettes by adolescents are limited both nationally and in Hawai'i. National prevalence data from the 2011 and 2012 National Youth Tobacco Survey have reported a doubling in e-cigarette lifetime use (ever used) from 2011 to 2012 for both middle school (1.4% to 2.7%) and high school (4.7% to 10.0%) students.² Current use (in the past 30 days) of e-cigarettes also doubled from 0.6% in 2011 to 1.1% in 2012 among middle school students and 1.5% in 2011 to

2.8% in 2012 among high school students.² The 2013 National Youth Tobacco Survey showed rates of e-cigarette lifetime and current use again increasing for both middle and high school students.³ Lifetime use among middle school students was 3.0% and among high school students was 11.9%. Current use was 1.1% in middle school students (no change from 2012) and 4.5% in high school students.³

The Hawai'i Youth Tobacco Survey reported that lifetime use of e-cigarettes among Hawai'i's middle school students almost quadrupled from 2011 to 2013, from 1.9% to 7.9% respectively.⁴ Current use of e-cigarettes was 5.5% in 2013. Current e-cigarette use was not captured in 2011. For high school students, lifetime use more than tripled from 5.0% in 2011 to 17.6% in 2013. Current e-cigarette use was 10.0% in 2013.⁴ Another study using school-based data from 1,941 high school students in Hawai'i identified a prevalence rate of e-cigarette lifetime use as 29% and current as 18%.⁵ Of the lifetime users, 17% only used e-cigarettes and 12% used both conventional cigarettes and e-cigarettes (dual-users).⁵ Of concern is that that 96% of participants were aware of e-cigarettes and 67% considered them to be healthier than conventional cigarettes.⁵

Safety in terms of health and injury from e-cigarette use is widely unknown. Nicotine that is inhaled through e-cigarettes is a highly addictive substance with negative consequence seen in both animal and human brain development, which is a critical period of adolescence.⁶ One study done on adults found the most common undesirable effect for e-cigarettes users were dry mouth and throat, vertigo, and headaches or nausea.⁷ The Food and Drug Administration (FDA) has reported that e-cigarettes contain carcinogens and toxic chemicals that can be harmful to humans, including in e-cigarettes labeled as "nicotine-free."⁸⁻¹⁰ Additionally, carcinogens and toxic chemicals have been detected in the aerosols from e-cigarettes.^{11,12} Major injuries such as explosions and fire have also occurred from use, as well as burns or shocks from the batteries.¹³

E-cigarettes are a Public Health Concern for Adolescents

E-cigarettes are a public health concern that can potentially obstruct the further decline in the prevalence of smoking. They may

act as a gateway to smoking conventional tobacco cigarettes,¹⁴ may substitute for cigarettes where smoking would normally not be allowed, and weaken the effect of clean air policies, and may displace effective smoking cessation treatments.¹⁵ As a result, they have the potential to disrupt the declining trends in the prevalence of smoking that have been achieved through considerable public health efforts over the past two decades. There are concerns that e-cigarette companies are recruiting adolescents who would not have otherwise tried smoking.⁵ Additionally, e-cigarettes are offered in various flavors such as bubble gum, strawberry, pancakes, peach cobbler, and white chocolate to attract people (especially adolescents) to use them.⁹ Although the Family Smoking Prevention and Tobacco Control Act of 2009 has banned flavored cigarettes, it does not cover e-cigarettes.¹⁶ It is unknown the extent to which youth are attracted to e-cigarettes because of their different flavorings and advertising. This is an important gap to fill because policy prohibiting flavors may be an effective way to dissuade young people from trying e-cigarettes, and thereby preventing smoking initiation.

Marketing of E-cigarettes

Although the relationship between advertising and conventional cigarette use in adolescents is clear, evidence for the relationship between advertising and e-cigarette use is minimal. It is apparent that exposure to conventional cigarette marketing is related to initiation and progression of adolescent smoking.^{11,12} Tobacco advertisements influence key risk factors for adolescent tobacco use and adolescents are aware of, recognize, and are influenced by these advertisements.^{12,13} Measures of “receptivity” (being able to name a brand or favorite advertisement, or owning or being willing to own a tobacco promotional product) to marketing have also been found to be related to tobacco use. For example, greater receptivity predicts smoking uptake.^{17,21} Furthermore, naming a brand of cigarettes or a highly advertised cigarette brand predicts smoking initiation.²²⁻²⁴ The increase in e-cigarette use in adolescents may be a result of similar aggressive marketing campaigns by the e-cigarette industry.²⁵ A report published in 2014 by 11 US members of Congress investigated the targeted marketing of e-cigarettes to youth through written responses provided by nine popular e-cigarette companies.²⁶ It was concluded that marketing to adolescents is prevalent, although e-cigarette manufacturers claim they are not targeting this population. Anecdotally, it is our observation in Hawai‘i that e-cigarette advertising is prominent at shopping malls, movie theaters, and other venues that are easily accessible to and frequented by adolescents. Aside from these venues, the 2013 Hawai‘i Youth Tobacco Survey reported that in the past 30 days, 7.9% of middle school students and 6.6% of high school students received coupons from a tobacco company through the mail, email, internet, Facebook, Myspace, and/or text message.⁴ Additionally, 12.7% of middle school students and 8.8% of high schools students in Hawai‘i received advertisements directly from tobacco companies via one of these mechanisms.⁴

A significant relationship between adolescent e-cigarette use and frequent retail store and Internet advertising exposure has been identified.²⁷ Agaku and Ayo-Yusuf used data from the 2011 National Youth Tobacco Survey to examine the frequency of exposure to ads or promotions for cigarettes or other tobacco products in newspapers/magazines, at retail stores, and over the Internet for adolescents in grades 6-12.²⁷ They found a cumulative effect, where there were progressively greater odds of e-cigarette use for adolescents with frequent exposure to one, two, or three sources of tobacco advertising.²⁷ However, the results of this study are ambiguous because it did not distinguish e-cigarette advertising from other types of tobacco advertising. A dramatic increase in youth and young adult exposure to e-cigarette advertising on television between 2011 and 2013 was found as a result of advertising campaigns on national cable networks.²⁸ Other studies have suggested that point-of-sale (POS) advertising is increasing,²⁹ and there is evidence of a significant link between exposure to POS tobacco marketing and smoking initiation adolescents.³⁰⁻³³ Given this evidence, there is reason to believe that e-cigarette marketing will cause a similar reaction.³⁴

E-cigarette manufacturers are using the same strategies to market their product as tobacco companies have used for tobacco cigarettes in decades past prior to regulations on marketing, including associating smoking with sports and cultural sponsorship, obtaining celebrity endorsement, and through social networking, online advertising, POS displays, pricing strategies, and product innovation (See example in Figures 1 and 2).³⁵ This advertising is backed by stylish design, glamour, and association with celebrity and fashionable venues and events (such as the Academy Awards), and sponsorship at sporting events (such as the Super Bowl) where free samples are often given out. Major e-cigarette manufacturers are targeting young people by giving away free samples at music and sporting events and running radio advertisements during youth-oriented programs.³⁶ E-cigarette manufacturers may claim that e-cigarettes are a safer and cheaper method to satisfy a nicotine addiction; a “healthier alternative,” and “harmless.” E-cigarettes may also be promoted as “an indispensable tool in the pathway to quitting smoking.” Marketing of this product promotes long term use as a permanent alternative to tobacco and “the freedom to enjoy the personal pleasures associated with smoking in places where conventional smoking has been banned.”³⁵ It appears that these marketing techniques are successful in Hawai‘i, as e-cigarettes have been on the market less than a decade, and have already hooked 1 in 10 adolescents.⁴

Hawai‘i has its own branding of e-cigarettes, such as Volcano Fine E-Cigarettes, that sell flavors including “Aloha Apple,” “Cherry Lava,” “Halawa Guava,” “Hana Honeydew,” “Hawaiian Espresso,” and “Hula Punch.”³⁷ These are clearly targeted towards Hawai‘i’s population and may appeal to adolescents.



Current advertisement

← Traditional cigarette advertisement

Figure 1. Example e-cigarette advertisement (current advertisement) versus traditional cigarette advertisement (1929) using celebrities.



Figure 2. NJOY Facebook advertisement that may appeal to adolescents.

Reference: Stanford Research into the Impact of Tobacco Advertising

Current E-cigarette Regulation

Currently, e-cigarettes are not regulated by the FDA. The National Institute for Health and Care Excellence in the UK has noted that e-cigarettes “could, without regulation, be marketed in a way that may ultimately promote smoking.”³⁸ In April 2014, the FDA proposed regulations on sales of e-cigarettes to those under age 18. However, the proposed regulations do not have any restriction on the marketing of e-cigarettes or flavorings for e-cigarettes. Marketing and flavorings of e-cigarettes both have a great potential to influence adolescents’ use.

Some jurisdictions across the country have passed legislation to regulate the sale to minors, and most e-cigarette companies say they support regulation of their product.²⁶ The State of Hawai‘i passed legislation restricting the sale of e-cigarettes as of July 2013 to persons who are 18 years of age or older.³⁹ Since July, 2014 legislation in Hawai‘i County prevents the sale of cigarettes and e-cigarettes to those under the age of 21.⁴⁰ E-cigarette vendors are required to post correct signage stating this prohibition.³⁹ It can be hypothesized based on past successful conventional cigarette marketing techniques that regulation needs to expand to the marketing of e-cigarettes to help decrease use. Examples of successful policies limiting the marketing of conventional cigarettes include prohibition on

tobacco advertising that targets people younger than 18 (including the use of cartoons);^{41,42} limitations on outdoor, billboard, and public transit advertising;⁴³ limiting the color and design of packaging and advertisements;⁴⁴ prohibiting tobacco product sponsorship of sporting, entertainment, or other cultural events under the brand name of cigarettes or smokeless tobacco;^{45,46} prohibiting tobacco promotion items;^{41,46} prohibiting free sampling of cigarettes; and restricting free sampling of smokeless tobacco.⁴⁷ None of these regulations extend to e-cigarettes, thereby allowing e-cigarette companies to use these marketing tactics towards adolescents.

Conclusions

One method for decreasing adolescent use of e-cigarettes, and therefore possible cigarette use, is through policy limiting marketing. Since little is known about the health and behaviors of e-cigarette users, further research is needed. Health communication interventions that provide correct information on e-cigarettes are also needed to be created, distributed, and shared. Without evidence-based public health communications about e-cigarettes or policy limiting marketing, youth awareness and experimentation may increase. Increased surveillance, sales compliance inspections, and research into e-cigarette use by adolescents, especially among different demographic groups, in Hawai‘i is also warranted.

Conflict of Interest

None of the authors identify a conflict of interest.

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♥ Highest among Japanese (39.7%)

♥ Highest among retired or cannot work (53.5%)



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HJM&PH Instructions to Authors

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

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

Reviews summarize the literature, address current practice or issues within the medical or public health communities, and are intended to promote a discussion of different viewpoints.

Case Reports are original and interesting reports that contribute significantly to medical knowledge. They generally describe unreported or unusual side effects, unexpected or unusual presentations of a disease, diagnoses and/or management of new and emerging diseases, unexpected events during treatment, or observations that highlight the need for new practice standards in the management of certain disease conditions.

Viewpoints presented opinionated pieces on a topic of current controversy. Viewpoint pieces should nevertheless independently meet the scientific rigor for a published article through the inclusion of appropriate citations, and the use of non-inflammatory language. It is the journal's policy to present balanced opinions (ie, each viewpoint article must be paired with a counter-point article). Therefore, authors who submit a viewpoint article without the corresponding counter-point article may be delayed until an appropriate author for the counter-point piece can be found, and the article written. Authors are encouraged to work with colleagues to submit point-counterpoint articles together.

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Manuscripts

Manuscripts are reviewed by the editors, the peer review panel,

and other experts in the particular specialties. The HJM&PH only accepts articles that have not been published or currently under review by other journals.

I. Word Limit, Font, and Formatting:

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

- Please submit one copy on 8-1/2" x 11" paper, with regular 1 inch margins.
- Use Times font in 10 point size.
- Do not underline and do not use full caps.
- Use double spaces between lines. Do not use 1-1/2 spacing.
- Use a single space between sentences. Do not use two spaces.
- Number pages consecutively beginning with the title page.

II. Tables and Figures:

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

- All illustrations (ie, graphs, flow charts, diagrams, drawings, maps, and photographs) are identified using the word "Figure." Do not mix in alternatives such as "Photo" or "Chart."
- Tables and figures may be up to 7-1/2 inches in width.
- Tables and graphs must be prepared in Microsoft Word, PDF, or Excel.
- Flow charts, diagrams, drawings, maps, and photos must be submitted as a high resolution (300 dpi is optimal) in JPEG, TIFF or PDF format.
- All tables and figures must be numbered sequentially, and include a caption. They must be well-labeled, stand alone, and not require the reader to refer back to the text.
- All tables and figures must be referenced within the text (ie, readers must be appropriately referred to all tables and figures that are part of the article.)
- Data points on graphs should be labeled. Numerical data should accompany graphs.
- Do not embed tables, figures, and graphs within the text; their placement must be at the end of the manuscript.

III. Cover Letter

A cover letter should contain the following components:

1. The title of the submission
2. The names of all contributing authors, listed in the order in which they will appear in the manuscript. List first name, middle initial and last name of each author with highest academic degrees; and name of department and institution to which the work should be attributed.
3. Please provide each co-author's role in the preparation of the manuscript. As needed, please identify the primary

author responsible for each of the following areas:

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 - Study concept design
 - Data acquisition/analysis
 - Manuscript drafting/revision for intellectual content
 - Literature review
 - Clinical studies
 - Statistics
 - Manuscript editing
4. Name of the corresponding author; include an address, phone number, and email address.
 5. Information on whether the article submitted is Medical, Public Health or Cross Cutting
 6. The names of two potential peer reviewers for the article, along with their contact information (email address at minimum).

IV. Title Page and Abstract

Title Page— The title page of the manuscript should note the title, full names and highest academic degrees of all authors and word count. On the title page, please also notate if you are submitting an article that is medical, public health, or cross-cutting (both medical and public health).

Abstract— The second page of the manuscript should include an abstract that highlights for the reader the essence of the authors' work. It should focus on facts rather than descriptions and should emphasize the importance of the findings and briefly list the approach used for gathering data and the conclusions drawn. The abstract must be written as a standalone paragraph, and not be broken up into sections. ******Keep abstract to 250 words maximum.**

A few specific guidelines to consider in preparing an abstract follow:

- Do not begin the abstract with a repetition of the title.
- Cite no references.
- Avoid abbreviations.
- Use the salt or ester of a drug at first mention.
- If an isotope is mentioned, when first used spell out the name of the element and then, give the isotope number.
- Avoid the use of trademarks or manufacturers' names unless they are essential to the study.
- Include major terms in the abstract, since the abstract can be text searched in many data retrieval systems.
- Include Keywords

V. Sections of the Manuscript

We recommend that articles be divided into sections with headings. The traditional layout described below may not apply to all submission types (eg, editorials or case reports). Nevertheless, the journal recommends that authors create 3-5 sections with appropriate headings to optimize the organization and flow of their write-ups. In addition, a background/review piece, and a summary/discussion piece is recommended for all types of articles submitted to the journal.

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Introduction— Describe the purpose of the article and rationale for the study. Review the existing literature, and identify any gaps in the literature that the submission seeks to fill. Define any terms or concepts discussed in the remainder of the paper, and state any hypotheses associated with the study. For case reports, it may be useful to include the current body of knowledge and/or standard practice guidelines to provide context for the case described.

Methods/Case Report— Describe the patients or experimental animals clearly. For review articles, describe the methodology used for searching and identifying the appropriate articles to include in the review. Identify the methods, apparatus, and procedures in sufficient detail to allow other researchers, public health professionals, or physicians to reproduce the results.

NOTE: Ethical Approval of Studies and Informed Consent. For human or animal experimental investigations, formal review and approval, or review and waiver, by an appropriate Institutional Review Board (IRB) or ethics committee is required and should be described in the Methods section. For those investigators who do not have formal ethics review committees, the principles outlined in the Declaration of Helsinki should be followed. For investigations of human subjects, state in the Methods section the manner in which informed consent was obtained from the study participants (ie, oral or written). Where applicable, the manuscript must explicitly state that IRB approval was obtained, and provide a reference number whenever possible.

Results— Present the results in logical sequence. Do not repeat all of the data in the text; summarize important observations. Do not include any inferences or interpretations within this section. The results section may not be appropriate for all types of contributions to the journal (for example, editorial pieces, or case reports). If the results section includes statistical analyses, it may be helpful to additionally consult the HJMPH Statistical Guidelines (http://hjmp.org/HJMPH_StatGuide.pdf).

Discussion— Emphasize the new and important aspects of the study and conclusions taken from them. Do not repeat data in Results section. It is important to interpret the results or observations reported in the paper in the context of the background information presented in the introductory section, and discuss the implications of the results. State new hypotheses that emerge from the findings of the paper when warranted, but clearly label them as such. Please include study limitations, and recommendations that naturally flow from the conclusions.

Acknowledgments— Acknowledge only persons who have made substantial contributions to the study. Authors are responsible for obtaining written permission from everyone acknowl-

edged by name; readers might believe those acknowledged are endorsing the study and conclusions.

VI. Disclosure Statement

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A disclosure can be a team statement such as: “None of the authors identify any conflict of interest.” Or, “Dr. XXX reports serving on the scientific advisory boards of XYZ Company. Dr. YYY reports serving on... Associated honoraria for Drs. XXX and YYY are paid to... No other authors reported any financial disclosures.” Or “This work was supported by grant ABC from... Treatment and placebo capsules were donated by XYZ Company...” Please refer to JAMA or NEJM for model statements.

VII. Conflict of Interest

Authors must disclose all relationships that could be viewed as presenting a potential conflict of interest.

VIII. Citing References

Use JAMA style for in-text citations and references. A few key styling guidelines are presented below. For more details, please consult the AMA Manual of Style.

In-text Citations:

- Identify references with superscript Arabic numerals corresponding to the item in your reference list.
- If you are using the same citation in more than one location within the paper; you can refer to the same citation number.
- Place citations outside of punctuation marks.

Creating your References:

- List the citations in their order of appearance within your paper.
- Examples of reference style:

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

Additional JAMA Styling Tips:

- Statistical Probability P (upper case, italics)
- Standard Error SE
- Standard Deviation SD
- Relative Risk RR
- Title of books Italics
- Title of Journals Italics
- Use the objective case, such as “the team determined” or “the study involved,” not I or we, and avoid medical jargon.
- Use generic drug names unless citing a brand name relevant to your findings. Do not use abbreviations in the title and limit their use in the text.
- Use human terms, ie, men and women instead of males and females.
- Use a comma before the conjunction (and, or, nor, but) that precedes the last item in a series.
- Do not use periods with eg, ie, etc, vis, or similar abbreviations. Follow these with a comma and enclose the entire expression in commas or parentheses — (eg, eggs, apples, and nuts)
- Use close parentheses in numbered items (1), (2), (3), etc.

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NO PROFILING AT THE BLOOD BANK.

The Food and Drug Administration (FDA) is expected to issue guidelines for blood banks soon. While not required to do so, the FDA usually follows recommendations from its advisory committees. Most likely change is a reversal of the previous ban on gay men from donating blood. The testing of blood has become far more precise and is adequate to ensure that donated blood is safe. The ban on gay men from donating blood began in the 1980's at the outset of the AIDS epidemic when the connection between gay sex and HIV was demonstrated. Blood donation works on the honor system in which donors answer a questionnaire about their health. The final question is a secret yes/no if the blood is safe. Tests are used to detect infectious agents and verify the honesty of the donors.

WHAT A GREAT HOSPITAL. WHEN YOU GET DISCHARGED YOU AREN'T SICKER.

Hospital acquired ailments are on the decline. 2010 was the first year the Department of Health and Human Services (HHS) collected data on falls, infections, and drug reactions acquired in the hospital. At that time the number was 145 per 1,000 patient discharges. Last year that number had dropped to 121. Findings were based on a review of between 13,000 and 33,000 medical records for each of the years. Officials estimate that it translates into 1.3 million fewer harmful incidents with a commensurate \$12 billion in health care dollars. HHS officials could not identify a clear cause of the reduction.

YOU BETTER SMILE WHEN YOU CALL ME THAT.

"Whether the right to bear arms extends to outside the home is the next battlefield," according to UCLA law professor Adam Winkler. On June 28, 2010, the Supreme Court ruled that the second amendment provides Americans a fundamental right to bear arms that cannot be violated by state and local governments. The 5 to 4 decision did not strike down any gun control laws nor did it elaborate on what kind of laws would offend the Constitution. Since the Supreme Court ruling gun advocates have filed scores of challenges on all sorts of laws at the federal, state, and local levels. Gun advocates across the country are hoping to get a ruling that gun owners have a constitutional right not just to have guns in the home, but also to carry them in public. Lawyers on both sides are studying the language of the 2008 ruling of District of Columbia vs. Heller case as well as the 2010 judgment.

I DON'T WANT TO LOSE MY BEARINGS, SO I KEEP THEM IN A CABINET BY MY BED.

Recent research has provided the development of a blood test that can predict Alzheimer's disease in the patient's future. In certain cases it can be 100% accurate. Dimitrios Kapogiannis, neuroscientist and lead author of the study at the National Institute on Aging offered the paper at a meeting of the Society of Neuroscience in Washington, D.C. The blood test is still in the early stage of development with only 174 individuals tested. The author admits that a larger long-term study is necessary before widespread use, but he is optimistic the data will hold. The issue for those found to be positive for Alzheimer's in 10 years or so, would be, does the person want to know. Some ethicists wonder if a positive test might precipitate withdrawal from job, family and friends, or perhaps even suicide. Maybe the test will turn out to be like economists whose predictions are always wrong.

ON A CLEAR DAY YOU CAN SEE FOREVER.

In the always bright future of ophthalmology, researchers at the University of Pittsburgh School of Medicine believe that one day corneal

transplants will be history. Worldwide corneal infectious diseases have compromised the vision of more than 250 million people. The cornea is our window to the world and damage can cause scarring with blurring, haziness or even blindness. Lead author, Sayan Basu, a corneal surgeon from Hyderabad, India, developed a technique of removing a small sample of a patient's tissue at the corneal limbus. These cells are nourished on a culture plate using human serum and become human stem cells. These cells can be placed at the site of damaged corneal tissue and regenerate the scarred area. Very promising research, but it will be a considerable time before corneal transplant surgeons are out of work.

PARENTS HAVE RIGHTS, BUT —

Seven decades ago the Supreme Court of the United States struck down the exemption from prosecution of parents when they deny medical care to a child. Six states have retained such exemptions including Idaho. The parents claim that they trust no remedy except prayer, even when the remedy is as simple as antibiotics or insulin and fluids. Since 1994 all such deaths have occurred in Idaho, where prosecutors are reluctant to put a "trust-in-God" parent before a jury. Meantime across the state line prosecutors vigorously pursue parents, as in Albany, Oregon, where parents were convicted of watching their 13-year-old daughter die. It must require a special faith to refuse to save your dying child.

CALL IT ACNE MEDICATION WITH BENEFITS.

Public health officials are pushing for increased vaccination for human papilloma virus (HPV). When it was discovered that HPV is linked to cervical cancer, the disease was considered a female only issue. In recent years the women cancer rate is falling but oral cancer in males is steadily rising. The burden of diagnosis and therapy is shifting. Presently the rate of vaccination in females is 38% but males a mere 14%. The department of Health and Human Services wants to boost that figure to 80% by 2020. Discussing HPV vaccination is difficult because there is an implication of sexual activity. It can make some pediatricians uncomfortable with the topic. It is not about moral or family choices, the immune response is best with vaccination at age 11 or 12. It can be given to girls up to age 25 and males 21.

DON'T HURT YOURSELF TRYING TO BE TOO YOUNG.

A study published in the November issue of American Journal of Geriatric Psychology says feeling younger than one's age preserves memory and cognitive function. The study conducted by a research team in France collected data from 1352 men and women ages 50 to 75. A younger self-image was more common in physically active people with a lower body mass index. After 10 years in the study cognitive function was evaluated with tests of memory and the ability to plan and carry out complex tasks. The study found on average 89% of the subjects felt younger than their age and 11% felt older. Of the older 11%, they scored 25% lower on memory and cognitive tests. Caveat: social networks, history of depression, medication use, and cognitive related activities were not considered.

ADDENDA

- The White House was originally called the Presidential Palace.
- Most performed rock song in history: "You've Lost That Lovin' Feeling."
- If you don't want your dog to have bad breath, pour some Lavioris in the toilet.
- A zoo in Indiana is closing down their famous dolphin exhibit for a renovation project. The dolphins are putting on a special final show before their next appearance at a fish processing plant in Japan.
- Chicago politics is so corrupt even the dishonest people get screwed.

ALOHA AND KEEP THE FAITH **rts**

(Editorial comment is strictly that of the writer.)

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