

# Hawai‘i Journal of Medicine & Public Health

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## **TRANSLATIONAL RESEARCH EDUCATION AND TRAINING NEEDS IN HAWAI‘I**

164

Merle R. Kataoka-Yahiro DrPH, APRN; Jillian Inouye PhD, APRN, FAAN;  
Todd B. Seto MD; and Kathryn L. Braun DrPH

## **MEDICARE REIMBURSEMENT TO OPHTHALMOLOGISTS: A COMPARISON OF HAWAI‘I TO OTHER STATES**

169

Deborah Taira Juarez ScD; Alexander Guimaraes MBA; Brendan Seto;  
and James W. Davis PhD

## **EMERGENCE OF *RAOULTELLA ORNITHINOLYTICA* ON O‘AHU: A CASE OF COMMUNITY-ACQUIRED *R. ORNITHINOLYTICA* URINARY TRACT INFECTION**

174

Elizabeth S. Nakasone PhD, MSIII; Ricky Kaneshiro BS, MSIII;  
Kathleen Min BA, MSIII; and Jinichi Tokeshi MD

## **MEDICAL SCHOOL HOTLINE**

176

**Tropical Cyclone Haiyan/Yolanda Medical Relief Mission: Perspectives of  
John A. Burns School of Medicine 2nd Year Medical Students**  
Chanel Casamina MSII; Christine Lee MSII; and Ruel Reyes MSII

## **INSIGHTS IN PUBLIC HEALTH**

179

**A Tale of Two Politics: Health in Independent and American Samoa**  
Victoria Y. Fan ScD and Ruth Faioso Le‘au BA

## **THE DANIEL K. INOUE COLLEGE OF PHARMACY SCRIPTS Pharmacy School Graduates Continue Training in Postgraduate Residency Programs**

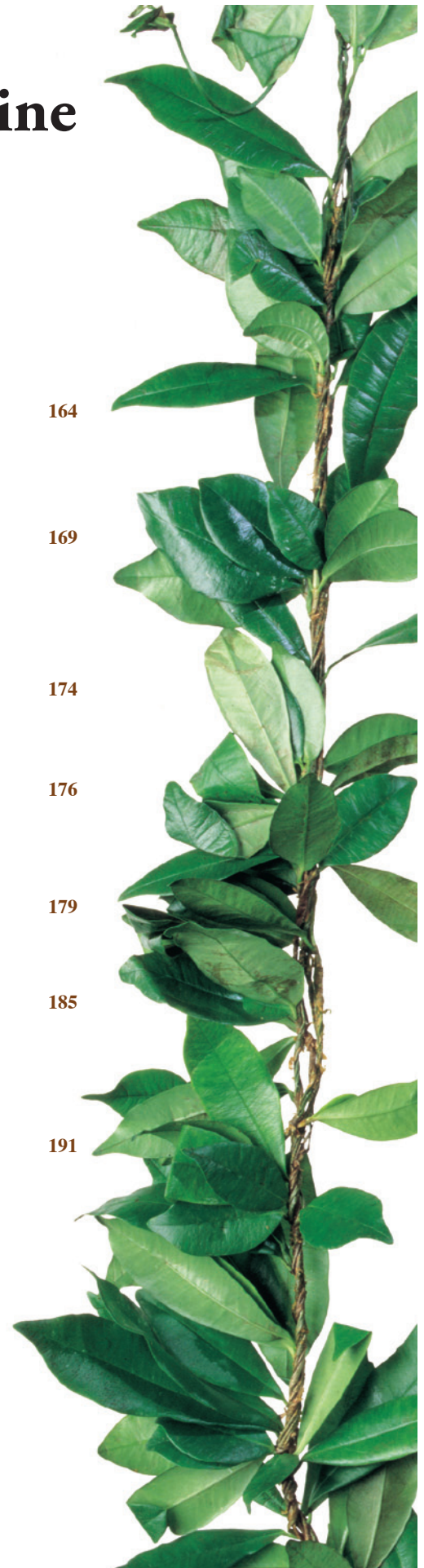
185

Carolyn Ma PharmD, BCOP; Sheri Tokumaru PharmD, BCPS; Roy Goo PharmD;  
and Anita Ciarleglio PhD, RPh

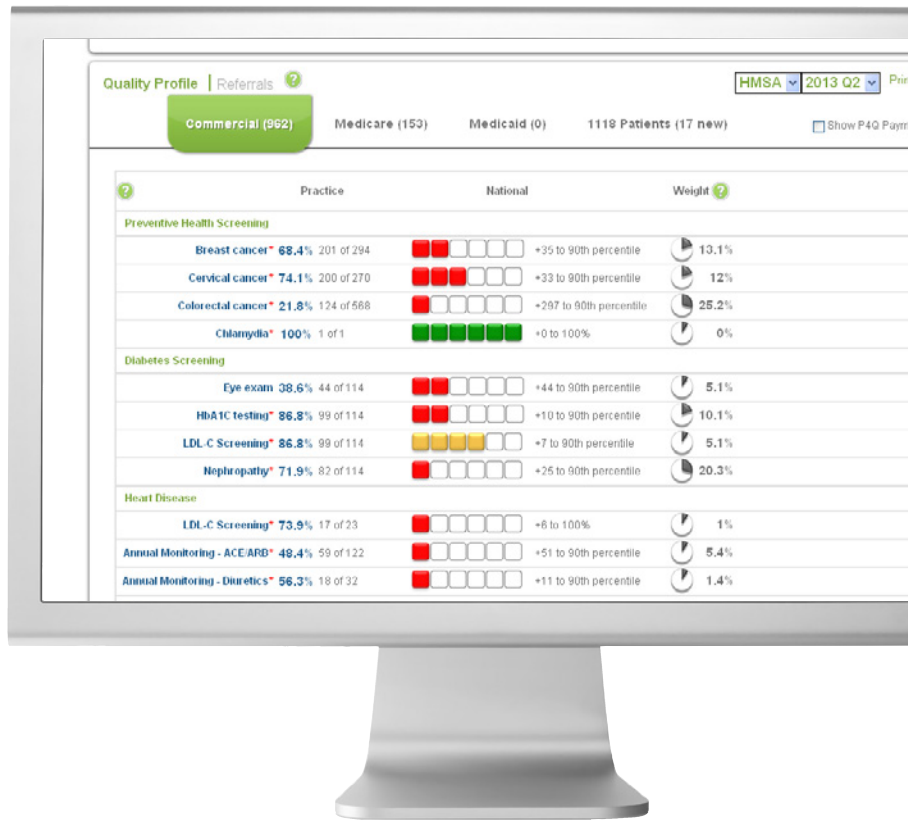
## **THE WEATHERVANE**

191

Russell T. Stodd MD



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# Translational Research Education and Training Needs in Hawai'i

Merle R. Kataoka-Yahiro DrPH, APRN; Jillian Inouye PhD, APRN, FAAN; Todd B. Seto MD; and Kathryn L. Braun DrPH

## Abstract

*The purpose of this needs assessment was to identify the translational research education and training needs of researchers and administrators working in Hawai'i's communities and to use the finding to develop an education and training plan. The assessment was led by a community advisory board with members from community health centers, social agencies, hospitals, and academia on O'ahu. The survey, developed with input of the community advisory board, was sent to 94 administrators and researchers involved or affiliated with research being conducted in Hawai'i. Forty-one respondents (43%) completed the survey. Respondents wanted education and training in research processes, specific research-related skills, and facilitating interactions between community and academic researchers. Sixty-one percent were interested in training related to community-engaged research and yearly seminars on "collaborative mentoring." Popular topics of interest were related to data monitoring, networking with different cultural groups, statistics, and human subjects review. A majority of respondents wanted to attend workshops, seminars, and presentations rather than take a class. Approximately 50% of the respondents wanted to gain information through on-line training. Findings guided the development of a translational research education and training plan for the University of Hawai'i National Institute of Health (NIH) Research Centers in Minority Institutions Multidisciplinary and Translational Research Infrastructure Expansion (RMATRIX) grant.*

## Major Terms

*community-engaged research; translational research education; translational research; health disparities*

## Keywords

*translational research; transdisciplinary/interdisciplinary research; health disparities*

## Introduction

Translational research is defined by Rubio, Schoenbaum, Lee, et al, as research that "fosters the multidirectional integration of basic research, patient-oriented research, and population-based research, with the long-term aim of improving the health of the public."<sup>1</sup> Traditionally, there are three types of translational research.<sup>2</sup> T1 research expedites the transition of basic scientific discovery to potential clinical applications. With T2 research, investigators test these new clinical interventions under controlled environments to form the basis for clinical application and evidence-based guidelines. With T3 research, investigators explore ways to apply these recommendations or guidelines into general, "real world" settings. Some investigators identify T4 research as studies of factors and interventions that influence the health of populations.

Translational research can be conducted within a single discipline or can include scientists from multiple disciplines, working in transdisciplinary/interdisciplinary research teams.<sup>3</sup> We

believe that a transdisciplinary translational research approach can transform how health disparities research is conducted. Although academic settings can provide the infrastructure and human resources to promote multidisciplinary partnerships within schools, across colleges, and with communities of interest,<sup>4,6</sup> strong community-academic collaboration is critical to translational research.<sup>7</sup> Partners in both settings have a vital role to play in closing this gap. However, designing an effective training program in translational research is a challenge because the program must offer researchers from different disciplines the opportunity to master a combination of skills that may not be taught in their discipline.

The University of Hawai'i RMATRIX (Research Centers in Minority Institutions Multidisciplinary and Translational Research Infrastructure Expansion) grant was funded initially in 2010 by the National Institute of Health to improve the health of Hawai'i's citizens who have disproportionately higher rates of illness, such as heart disease, diabetes, asthma, cancer, and dementia. University of Hawai'i RMATRIX researchers represent various disciplines—including medicine, nursing, law, public health, social work, information technology, and engineering—who collaborate with partners from community centers, social agencies, clinics, and hospitals to create an infrastructure for translational research. A key aim for RMATRIX is to help develop the capacity of scientists willing to engage in translational research in the community.

The first step in developing a translational research training program was to conduct a needs assessment to obtain information about the educational and training needs of administrators and researchers conducting or participating in research in Hawai'i's community. The Community Advisory Board (CAB) of the RMATRIX Community-Based Research Training Advisory Program (CBRTAP) led this effort. The CAB included 12 researchers, six from the community (eg, based in community health centers, social agencies, hospitals) and six from academia, including three researchers on the CBRTAP staff. The target groups were researchers in academic settings and researchers and administrators in community health centers, social agencies and organizations, and hospitals participating or conducting research who were interested in learning more about translational research. This paper presents (1) the results of the needs assessment survey conducted by CBRTAP to identify the research education and training needs of researchers in academia, and researchers and administrators in the community conducting or participating in research in Hawai'i and (2) application of assessment findings.

## Methods

This descriptive survey study used Survey Monkey (Survey Monkey, Inc; Palo Alto, California).<sup>8</sup> Human Subjects approval was granted by the University of Hawai'i at Manoa, Human Studies Program (reference number 19159).

The sampling frame was extracted from the University of Hawai'i at Manoa (UHM) faculty directory of health-related programs and schools and the Healthcare Association of Hawai'i Home Care & Hospice Division and Membership and Hawai'i Primary Care Association directories.<sup>9,10</sup> A list of 94 organizations that conducted health related research was compiled with addresses and contact persons. Contact persons identified were academic and community-based researchers and administrators of community health centers, social agencies, and hospitals. Eligibility criteria were (1) an employee of a community or academic organization, and (2) involved in research currently or in the past. Individuals who agreed to participate were sent a link to the survey. Non-respondents received two reminders.

## Survey

Based on discussions and feedback with the CAB, the CBRTAP researchers developed the survey items. The majority of survey items asked about interests in training in research processes, community/academic interaction and communication, and specific research-related skills. Other survey items asked if respondents were interested in community-engaged research and health disparities research, and which research roles they wanted to take on (eg, principal investigator or co-principal investigator, co-investigator, program coordinator or manager, research associate or assistant). Respondents were asked specifically about whether they were interested in a for-credit certificate program in community-engaged research, a non-credit certificate program in community engagement research, and/or a yearly training seminar on "Collaborative Mentoring." Respondents were asked to rate their interest in specific topics and modes of delivery (class, workshop, webinar, individual consultation, etc) and which topics they would be willing to teach (if any). The 19-item survey was finalized and approved by the CAB and administered and analyzed using Survey Monkey in fall 2011.

## Results

Forty-one respondents of the 94 (43%) completed the survey (see Table 1). Among respondents, 26 (63%) were from community organizations, and 15 (37%) were from academic settings. Respondents included PhD/DrPHs (29%), MDs (12%), MS/MSW/MPHs (32%), and BS/BAs (27%). Twenty-one (51%) were currently involved in a research project, and 19 (46%) were currently receiving funding for their research other than RMATRIX.

Findings from the survey are shown in Tables 2 and 3. Respondents want to be involved in research in a number of roles, including principal investigator (22%), co-investigator (34%), research associate or assistant (17%), and program coordinator or manager (12%). Sixty-one percent of participants were interested in training on community-engaged research and in a yearly training seminar on "Collaborative Mentoring," and

	Survey Respondents n (%)
<b>Agency Type</b>	
Community institution or organization	26 (63)
Academic institution	15 (37)
<b>Highest Degree Earned</b>	
PhD or DrPH	12 (29)
MD	5 (12)
MS, MSW, MPH	13 (32)
BS, BA	11 (27)
Currently working on a research project	21 (51)
Currently has funded research other than RMATRIX	19 (46)

	n (%)
<b>If multidisciplinary research projects were developed, how would you like to be involved (check all that apply)</b>	
Principal investigator or co-principal investigator	9 (22)
Co-investigator	14 (34)
Program coordinator or manager	5 (12)
Research associate or assistant	7 (17)
Other roles	2 (5)
<b>Interested in:</b>	
Training on community-engaged research	25 (61)
Training in health disparities research	15 (37)
Credit certificate program in community-engaged research	16 (39)
Non-credit certificate program in community engagement research	16 (39)
Yearly training seminar on "Collaborative Mentoring"	25 (61)
<b>Want to:</b>	
Take classes	7 (17)
Attend workshops, seminars, and presentations	22 (54)
Present or teach topics	8 (20)
Gain information through websites	20 (49)
Participate in Webinars, interactive or not	16 (39)
Receive personal research-related consultation	10 (24)
Receive mentorships	10 (24)

over a third wanted training in health disparities research. Approximately 39% were interested in a credit or non-credit certificate program. A majority of participants wanted to be involved in attending workshops/seminars/presentations (54%), gaining information through websites (49%), and participating in webinars (39%) rather than attending class (17%). A majority of respondents wanted research education training to be held during the weekday (Responses ranging from 15 - 20 on Monday to Friday and 5 - 9 on Saturday and Sunday) or in one to three-day workshops (Responses for one day to three-day workshops ranging from 22 to 7, respectively). About a quarter were interested in receiving personal research mentoring.

Table 3. Interest in Attending Sessions or Teaching Research Training by Topic		
Topic	Yes – I would attend, N=41 n (%)	Yes – I would teach, N=41 n (%)
<b>Research Processes</b>		
Data monitoring	16 (39)	0
Community-based intervention development	15 (37)	3 (7)
Research design and methods	15 (37)	5 (12)
Data analyses	14 (34)	2 (5)
Dissemination of results	14 (34)	2 (5)
Family intervention development	13 (32)	2 (5)
Measurement	12 (29)	3 (7)
Sampling	12 (29)	1 (2)
Data collection procedure	11 (27)	3 (7)
Research questions and hypotheses	10 (24)	3 (7)
Individual intervention development	10 (24)	2 (5)
Theory	8 (20)	4 (10)
Literature review	7 (17)	3 (7)
<b>Community/Academic Interaction</b>		
Networking with different cultural groups	16 (39)	2 (5)
Understanding community infrastructure/leadership	14 (34)	3 (7)
Engaging the community	14 (34)	2 (5)
Culture and ethnic factors (language barriers)	14 (34)	2 (5)
Building trust among stakeholders of research projects	12 (29)	2 (5)
Sharing and disseminating results	12 (29)	3 (7)
Building capacity within community to do research	12 (29)	3 (7)
Building in compensation for the community	11 (27)	1 (2)
Recruiting and retaining participants	11 (27)	2 (5)
Identifying partners that want and “fit” research	10 (24)	3 (7)
Funding to meet the organization’s and funder’s needs	9 (22)	2 (5)
Human resources issues	9 (22)	2 (5)
<b>Learning Specific Research Related Skills</b>		
Basic Statistics	12 (29)	3 (7)
Grant writing	12 (29)	4 (10)
Advanced Statistics	11 (27)	0
Proposal editing and review	10 (24)	4 (10)
Grants management	9 (22)	3 (7)
Working with multidisciplinary teams	9 (22)	2 (5)
Communications among team members	8 (20)	3 (7)
How to hire someone to do data analysis	8 (20)	0
Funding agencies (NIH, HRSA, AHRQ, CDC, NSF)	8 (20)	4 (10)
Funding applications and processes	8 (20)	4 (10)
Fiscal management	8 (20)	2 (5)
IRB process	8 (20)	0
Consent forms	7 (17)	0
How to do presentations and posters	7 (17)	4 (10)
Compliance	6 (15)	2 (5)
Writing for publication	5 (12)	4 (10)
Ethics	4 (10)	2 (5)

As shown in Table 3, respondents were interested in training on a variety of topics. Topics were grouped into research process (11 categories), community collaboration/interaction (12 categories), and specific research-related skills (17 categories). Respondents were given the option to provide multiple responses to each question.

To analyze the data, the most popular combination of answers for a given number of respondents that selected it was considered.<sup>11</sup> Under research processes, the five most popular groupings were: data monitoring; community-family based intervention development; research design, methods, and sampling; measurement and data analyses; and dissemination of results. Under community/academic interaction, approximately a third or more of respondents wanted to expand their skills in understanding community infrastructure/leadership, building trust among stakeholders of research projects, engaging the community, understanding culture and ethnic factors (language barriers), sharing and disseminating results, and building capacity within community to do research. Thirty-nine percent of respondents wanted to know more about how to network with different cultural groups.

For specific research-related skills, nearly half of respondents wanted to learn more about statistics (basic and advanced) and the IRB process (including consent forms and ethics), and approximately one third wanted training in grant writing. At least one respondent indicated willingness to teach every topic except advanced statistics, the IRB process and consent forms, data monitoring, or how to hire someone to do data analysis. About 60% said they would attend half-day trainings, with half wanting these trainings offered at university sites and the other half at community-based sites.

CBRTAP used assessment findings to develop a series of in-person workshops and on-line offerings. Face to face workshops focused on Research and Community Engagement (in years 1 and 2) and Grant Writing (in years

1 and 3). The Community Engagement workshops explored community-based participatory research (CBPR), community perspectives on research, and collaborative mentoring. The presenters from community and academia discussed successful research collaborations and lessons learned which could facilitate win-win experiences for researchers in both settings. These workshops focused on community agencies and organizations, and administrators and researchers interested in conducting research. Participants learned about fundamental CBPR principles from the community's perspective, and what it might look like in action. In both 2-day workshops on Grant Writing, participants learned about and practiced developing elements of a community research proposal from the aims to significance, methods, timeline, budget, evaluation plan, and organization/researcher capacity. Academics and community members joined together in these trainings, which facilitated networking and relationship building in research.

Second, to synchronize RMATRIX terminology in future correspondence, reporting, web postings, and grant renewal materials related to health disparities research at the University of Hawai'i, the RMATRIX team created a glossary. Some of the definitions included in the glossary were collaborations and partnerships; community engaged research; community-based participatory research; cultural and linguistic competency; health disparate population (priority populations); health initiatives; pilot project investigator; priority communities; and translational science. The RMATRIX group debated, defined, and operationalized key terms within the context of the grant.

Third, a RMATRIX CBRTAP web portal was created. Interested viewers could browse this site for information, register for on-line and face to face workshops, link to workshops held in the university distance-learning site, and view current news, seminars, and events. This web page informed viewers about what RMATRIX CBRTAP was about and its offerings, which could be accessed from a variety of modalities and settings. The web portal was maintained by two RMATRIX support staff (administrative and information technology) who were responsible for updating and announcing new topics, registering and answering any questions about enrolling and participating in the virtual classroom, and assisting with the preparation for each training session.

Fourth, a RMATRIX Blackboard Collaborate On-line Virtual Classroom was created to house the RMATRIX courses and workshops and to reach individuals at a distance using synchronous and asynchronous teaching modalities in the second and third years. Three workshops were held online via UHM BlackBoard Collaborate Virtual Classroom (Blackboard, Inc: Washington, DC).<sup>12</sup> The first on-line, 2-day (total of 4 hours) workshop was on Biostatistics. This was a basic workshop, which covered the concepts and statistical models most commonly used in real data analysis. The second on-line, one-hour workshop was on models and approaches for community and minority recruitment and retention in social and health research. The third on-line, one-hour workshop was on Motivational Interviewing, which included definition, background - principles/

strategies, examples and application, meta-analysis and review of articles. These three distance-learning workshops were held synchronously and recorded for those who could not attend. The Biostatistics on-line workshop was well received with over 50 on-line participants registered.

On-going process CBRTAP evaluations were collected during the grant period. Sample questions for evaluations were: (1) How well did the session meet your expectations? (2) How would you rate the effectiveness of the speakers? (3) Was there a sufficient amount of participation for attendees? (4) How would you rate the usefulness and quality of the handouts? (5) Were the audio/visual effective? (6) What is your overall rating for the workshop? (7) What was the most helpful aspect of the session? (8) What was the least helpful? (9) Do you have recommendations for future program of this kind? Items were scored on a Likert scale from 1 (lowest) to 5 (highest). Consistently, participants responded between 4 and 5.

## Discussion

The needs assessment identified research education and training needs of community and academia-based researchers involved in collaborative, translational research in Hawai'i. A majority of participants in the survey (65%) were non-academic researchers. There was a 43% response rate. Therefore, the results cannot be generalized and based on the sampling frame, may not be a representative sample of all researchers in Hawai'i involved translational research. However, this initiative provided relevant preliminary data for the development of RMATRIX education and training activities related to translational research in Hawai'i.

Major assessment gaps that were consistently evident included the need for networking with different cultural groups, training on human subjects protection (ie, data monitoring, IRB process, consent forms, and ethics), and more training on statistics (beginning and advanced). A majority of participants surveyed in this study wanted training in community-engaged research and collaborative mentoring from RMATRIX CBRTAP. Rubio, Schoenbaum, Lee, et al, recommend that all trainees could benefit from foundational research knowledge and skills such as study design, data collection, statistical analysis, ethics and research integrity, protection of human subjects, search for funding sources, writing of institutional review board protocols, and grant applications.<sup>1</sup> Estape-Garrastazu, Noboa-Ramos, et al, also found similar results with faculty and students. Research training needs mentioned in their study included: identifying major clinical/public health problems and relevant translational research questions; critiquing the literature regarding the status of a health problem; designing study protocol for clinical and translational research; studying methodology/design/implementation; laboratory, clinical, and population research methods; statistical methods and analysis; biomedical and health informatics; conducting ethnically responsible research; scientific communication skills and dissemination, population diversity and cultural competency, translational teamwork, leadership, cross disciplinary training and mentoring; and principles of community engagement.<sup>13</sup>

The on-line offerings reached a wider audience of trainees from rural and urban areas of O'ahu and the neighbor islands. This approach of translational training was flexible enough to accommodate the needs of individual trainees because they could join the sessions from their institutions without having to travel and could also view the sessions at their own discretion.<sup>1</sup> There were new on-line participants who registered in the third year, representing various Native Hawaiian organizations, hospitals, and non-profit health care organizations. Also in the third year, on-line viewers included a wider network of researchers at different levels of expertise (eg, research associates, research assistants, project facilitators, data and assessment coordinator, project coordinators) and community educators or administrators (eg, housing director, executive director, administrative assistant, regulatory coordinator, community health educator, patient navigator, training coordinator, facilitator, site supervisor; outreach case manager).

There were several lessons learned from the needs assessment relating to implementation of education and training of administrators and researchers interested in participating and conducting research in Hawai'i's community. In hindsight it would have been very helpful to have a glossary of definitions for individuals to use from the beginning of the grant as a common reference point for discussion among members from different disciplines. Using a variety of different teaching modalities (including both synchronous and asynchronous on-line distance learning) was helpful to reach a diverse group of people interested in research in the community. A needs assessment by Reich, Shipman, Narus, et al, described the complexity of building an information source that meets the needs of a diverse set of stakeholders and users and recommended developing a comprehensive information site with resources, support, and assistance through a variety of communication venues.<sup>14</sup>

There were training needs common to all participants as well as specific needs depending on individual levels of expertise in research. Continued discussion on defining and operationalizing key terms and integrating these concepts into a broader conceptual framework or model would be essential.<sup>15</sup> The RMATRIX CBRTAP developed an infrastructure for building community and academic capacity by providing research education and training and offering research and technical support to community partners in organizations interested in addressing and reducing health disparities of minority and underserved populations in Hawai'i.<sup>16,17</sup> CBRTAP also provided a comprehensive information website with resources from a variety of communication venues and teaching modalities.

## Conclusion

The needs assessment was helpful in building the CBRTAP education and training component of RMATRIX. The results of the needs assessment provided useful data for the development of education and training activities in translational research that met the needs of researchers and administrators engaged in research in Hawai'i's communities.<sup>18</sup> Further development of culturally appropriate and effective models and strategies for educating and training RMATRIX researchers from multiple

disciplines in translational research and evaluating and validating these models and strategies is needed in the future.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# Medicare Reimbursement to Ophthalmologists: A Comparison of Hawai'i to Other States

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## Abstract

*When Medicare publically released data on payments made to specific physicians in April of 2014, it quickly became apparent that a large portion of 2012 Medicare reimbursements went to ophthalmologists. Part of the reason for this unusually high level of reimbursement was thought to be the cost of injectable drugs such as ranibizumab (brand name Lucentis). This study was designed to compare Hawai'i ophthalmologists' Medicare reimbursements with those of other states. In 2012, Medicare payment to ophthalmologists in Hawai'i was \$18.2 million. Hawai'i ranked third in the nation in terms of percentage of total reimbursement going to ophthalmologists at 11.1% and 34th (8.2%) in percentage of ophthalmologist reimbursements going to injectable biological products. Hence, the high percentage of reimbursement going to ophthalmologists in Hawai'i is unlikely due to high use of injectable medications. Further research, based on a more detailed analysis of clinical data, is needed to determine how to slow the growth of health care costs while promoting high-value, effective care, not only for ophthalmic services but in other high-cost areas as well.*

## Introduction

In April of 2014, the Centers for Medicare & Medicaid Services (CMS) publically released Medicare data on payments made to specific physicians for the first time. Medicare paid physicians \$64 billion in 2012. According to the associated press, 2% of physicians received 25% of all reimbursement. A total of 151 of the 344 doctors who billed \$3 million or more to Medicare were ophthalmologists, making ophthalmology the highest reimbursed specialty group.<sup>1</sup> In fact, a South Florida ophthalmologist topped the list as the highest paid physician at \$21 million, according to the data that were released. One of the most heavily reimbursed procedures, costing a total of \$1 billion for 143,000 patients, is for a single treatment for age-related macular degeneration, an eye disorder.

Part of the justification for releasing the CMS reimbursement data to the public was to deter improper payments; however, physician groups have said that there is a danger the data will be misinterpreted. "The AMA is concerned that CMS's broad approach to releasing physician payment data will mislead the public into making inappropriate and potentially harmful treatment decisions, and will result in unwarranted bias against physicians that can destroy careers," said Ardis Dee Hoven, president of the American Medical Association (AMA).<sup>2</sup>

In some cases, physicians in a group may all bill tests under a single physician's name so a given physician may appear to be reimbursed more than he or she is actually receiving.<sup>3</sup> Moreover, total reimbursement to a physician reflects both the number of Medicare patients treated as well as the reimbursement per patient so a physician whose practice mix is heavily weighted toward Medicare patients will receive higher total reimburse-

ment than another physician with a different mix of patients. This may also be related to specialty, in that some specialists are more likely to treat older patients. Total reimbursement may also be higher for physicians who specialize in procedures that require costly overhead. Overhead for ophthalmologists might include expensive microscopes, photographic equipment, and lasers. In these cases, a large portion of the reimbursement may cover overhead for medical devices so most of the reimbursement may actually be going to the suppliers of equipment rather than to the physicians as income. A study in Ontario, Canada found that public payment to ophthalmologists ranked 2nd of all specialties when unadjusted, but 8th after adjustment for overhead expenses.<sup>4</sup>

For ophthalmologists, a large portion of reimbursement may also go to buying expensive injectable medications. In December 2000, Congress amended the Medicare statute to provide for coverage of self-injectable drugs under Medicare Part B when they are administered under a doctor's care and "are not usually self-administered by the patient."<sup>5</sup> This provision was a limited exception to Medicare's lack of coverage of outpatient prescription drugs prior to the passage of Medicare Part D legislation. Physicians purchase physician-administered drugs for their offices through manufacturers, wholesalers, Group Purchasing Organizations (GPOs), and local pharmacies.<sup>6</sup> For ophthalmologists, these injectable drugs include ranibizumab (brand name Lucentis), an injectable drug used to treat macular degeneration, a retinal disease that causes blindness and aflibercept (brand name Eylea) used in the treatment of visual impairment due to Diabetic Macular Edema (DME). Under Medicare's policies, physicians are paid separately for the cost of the drug and its administration. Medicare bases its payments for the cost of most injectable drugs on the average sales price (ASP), which is calculated from manufacturers' reports to CMS.<sup>7</sup> For most injectable drugs, CMS payment to physicians is set at 106 percent of ASP. Hence, when we see a physician getting reimbursed a large amount for a single treatment of an injectable drug, much of that payment may be covering the cost of acquiring that medication.

Despite difficulty in determining what conclusions to draw from the Medicare reimbursement information, analysis of these data can provide insight into geographical variation. The purpose of this manuscript is to examine the CMS payments that go to ophthalmologists as a percentage of all physician payments, and to determine what percentage of these payments for ophthalmologists were going to cover injectable drugs in Hawai'i relative to other states.

## Methodology

We conducted a descriptive study using the Medicare Fee-For-Service (FFS) Provider Utilization & Payment Data Physician and Other Supplier Public Use File for the year 2012, publicly released by CMS in April of 2014.<sup>8</sup> We excluded people living outside of the United States, in the District of Columbia, and in the US territories because we were focused on state disparities. Ophthalmologists were identified using the provider type “Ophthalmology” which is distinct from optometrists in this data set. Medications with Q or J codes were considered injectable drugs for our analyses. J-codes relate to permanent codes used to report injectable drugs that ordinarily cannot be self-administered, including chemotherapy, immunosuppressive drugs, and inhalation solutions as well as some orally administered drugs. Q-codes are temporary codes assigned to services. When medications are subsequently assigned J-codes, the Q codes are deleted.

For this study, injectables included ranibizumab injection (J2778), aflibercept injection (Q2046), bevacizumab injections (J9035), and unclassified biologics (J3590), as these were the only J or Q codes used by ophthalmologists in Hawai‘i. Providers submit claims for J3590 when a specific code for the drug is not available. For ophthalmologists, the unclassified biologics code is often used for off-label ophthalmic use of the drugs, such as bevacizumab or aflibercept, for administration in the office setting (rather than facility-based injections).<sup>9</sup> For instance, bevacizumab is not currently packaged and prepared by the manufacturer in doses (approximately 1.25 mg) for intravitreal injection. Therefore, physicians obtain single doses prepared by qualified compounding pharmacies to minimize risk of contamination of the injected drug (unless their offices meet necessary processing requirements). When bevacizumab is acquired from compounding pharmacies or outsourcing facilities (and not from pharmaceutical companies) for use in a physician’s office, it is considered an “unclassified biologic” (J3590).

For this descriptive study, we calculated the percent of total Medicare payments that went to ophthalmologists, ranking them by state. Our primary outcome variable was paid amount, defined as average amount that Medicare paid after deductible and coinsurance amounts have been deducted for the line item service. Similarly, we examined the percent of payment of ophthalmologist services that were paid for services involving injectable drugs with J or Q codes and ranked them by state. To determine whether there was an association between the two previous rankings (ie, percent of total reimbursement to ophthalmologists and percent of ophthalmologist payment that went to biologics), we used the Wilcoxon matched-pairs signed-ranks test.<sup>10</sup> The null hypothesis was that both distributions were the same. Finally, we ranked the services performed by ophthalmologists according to total Medicare reimbursement in Hawai‘i using the Health Care Common Procedure Coding System (HCPCS). For some of these codes, the cost included preparatory services and post-surgery services. For instance, payment with the 66984 code for cataract removal includes all services performed in a 90-day global period.

We did not seek IRB approval as it is the IRB policy that research that only involves secondary analysis of pre-approved public data files does not require IRB approval, as it does not constitute human subject research as defined in 45 CFR 46.102. All analyses were conducted in Stata V.11 (College Station, TX) and Microsoft Excel.

## Results

In Hawai‘i in 2012, \$18.2 million was spent on ophthalmology services, accounting for 11.1% of total Medicare spending in Hawai‘i (Table 1). This ranked Hawai‘i 45th in total Medicare spending, but 3rd in terms of percentage of total Medicare spending paid to ophthalmologists among the 50 states. The percentages ranged from a low of 4.4% in Wyoming to a high of 12.9% in North Dakota. On an individual physician level, six of the top ten highest reimbursed physicians in Hawai‘i were ophthalmologists, with two of them receiving over \$1 million in Medicare reimbursement.

Table 2 displays the percent of Medicare FFS ophthalmologist reimbursement paid for injectable drugs identified using J and Q codes for the top 20 states. The percent of ophthalmologists’ reimbursement used to pay for injectable medications ranged from 0% in three states—Wyoming, Delaware, and South Dakota—to over 50% in Louisiana. Hawai‘i ranked 34th with 8.2% of ophthalmologist reimbursement, or \$1.5 million, going toward injectable medications.

Because the Wilcoxon matched pairs signed-rank test was not statistically significant ( $P = .69$ ), we cannot reject the null hypothesis that both distributions (ie, the percent of Medicare reimbursement going to ophthalmologists [Table 1] and the percent of ophthalmologist reimbursement going to biologics [Table 2]) are the same.

Breaking down reimbursement of ophthalmologists by procedure codes in Hawai‘i, we found that the highest reimbursed treatments were cataract surgery, eye exams, injectable biologics, and office visits (Table 3). The total cost of ranibizumab injections ranked fourth at \$238,273 for only 29 Medicare beneficiaries, while the total cost of bevacizumab injections, an alternative to ranibizumab, was only \$2,388 for 18 patients.

## Discussion

In our analysis of 2012 Medicare FFS Reimbursement data, we found that the state of Hawai‘i ranked 3rd in percent of total reimbursement being paid to ophthalmologists. Of the ophthalmologist reimbursement in Hawai‘i, 8.2% went to injectable biologic medications, ranking it 34th in the nation. In Hawai‘i, high cost areas for ophthalmologists were cataract surgery, eye examinations, and office visits. The high cost of eye exams and office visits in Hawai‘i compared to other states may be due, in part, to the fact that Hawai‘i requires eye exams from either an optometrist or an ophthalmologist within a certain interval for patients to purchase prescription glasses or contacts. A comparison results from Table 1 and Table 2 suggest that states that have a high percentage spending on biologics do not necessarily have a higher percentage of Medicare reimbursement going to ophthalmic services. Hawai‘i is not an exception. Hence, while

Table 1. Top Twenty States According to Percent of Medicare FFS Reimbursement Paid to Ophthalmologists, 2012.				
	State	Total Medicare Reimbursement	Medicare Dollars Paid to Ophthalmologists	% Ophthalmology
1	North Dakota	\$ 136,658,136	\$ 17,618,811	12.9%
2	Iowa	\$ 615,326,968	\$ 75,525,495	12.3%
3	Hawai'i	\$ 163,803,535	\$ 18,219,827	11.1%
4	Nevada	\$ 416,058,166	\$ 43,583,769	10.5%
5	Maine	\$ 299,943,039	\$ 30,806,484	10.3%
6	Montana	\$ 162,857,858	\$ 16,023,157	9.8%
7	Utah	\$ 358,199,575	\$ 35,034,668	9.8%
8	Connecticut	\$ 1,027,614,147	\$ 100,107,982	9.7%
9	Oregon	\$ 508,573,804	\$ 49,160,626	9.7%
10	Kansas	\$ 732,918,063	\$ 66,959,702	9.1%
11	South Dakota	\$ 188,614,295	\$ 17,044,284	9.0%
12	Maryland	\$ 1,767,100,997	\$ 157,898,388	8.9%
13	Wisconsin	\$ 926,220,974	\$ 81,407,019	8.8%
14	Vermont	\$ 103,213,949	\$ 8,992,140	8.7%
15	Washington	\$ 1,250,775,990	\$ 108,415,630	8.7%
16	Pennsylvania	\$ 3,153,588,519	\$ 260,164,514	8.2%
17	Idaho	\$ 179,067,768	\$ 14,652,715	8.2%
18	Minnesota	\$ 633,594,332	\$ 50,184,172	7.9%
19	New Hampshire	\$ 276,581,213	\$ 21,398,058	7.7%
20	Florida	\$ 7,592,706,675	\$ 587,391,814	7.7%

Table 2. Top Twenty States According to Percent of Medicare Ophthalmologist Reimbursement Paid for Injectable Medications (identified using J and Q codes), 2012.			
		Medicare Reimbursements for Injectable Medications	% Injectable Medications
1	Louisiana	\$ 33,411,062	50.8%
2	Idaho	\$ 6,603,757	45.1%
3	New Hampshire	\$ 6,697,460	31.3%
4	Minnesota	\$ 13,718,558	27.3%
5	Utah	\$ 9,538,644	27.2%
6	Oregon	\$ 12,189,227	24.8%
7	Kansas	\$ 14,581,000	21.8%
8	Washington	\$ 22,314,368	20.6%
9	Wisconsin	\$ 16,372,163	20.1%
10	New Mexico	\$ 4,219,845	20.0%
11	Tennessee	\$ 25,373,752	19.8%
12	Pennsylvania	\$ 49,958,544	19.2%
13	North Carolina	\$ 34,188,905	19.0%
14	Colorado	\$ 10,187,643	17.4%
15	New York	\$ 64,495,684	15.7%
16	Michigan	\$ 32,289,645	15.4%
17	Ohio	\$ 22,540,437	14.7%
18	Connecticut	\$ 14,741,507	14.7%
19	Texas	\$ 54,781,531	14.7%
20	Virginia	\$ 20,090,648	13.3%

Note: Hawai'i was ranked 34th at 8.2%.

Table 3. Top 20 Health Care Common Procedure Coding System (HCPCS) Codes for Medicare FFS Reimbursement for Ophthalmologists in Hawai'i Based on Total Reimbursement, 2012.			
HCPCS code	HCPCS description	# Medicare beneficiaries	Total Reimbursement
66984	Cataract removal with insertion of intraocular lens prosthesis 1 stage	67	\$ 715,199
92014	Eye exam & treatment	262	\$ 699,888
92012	Eye exam established patient	100	\$ 278,472
J2778	Ranibizumab injection	29	\$ 238,273
66982	Cataract surgery complex	34	\$ 183,718
92083	Visual field examination(s)	54	\$ 136,724
92250	Eye exam with photos	197	\$ 124,801
99214	Office/outpatient visit established	30	\$ 122,831
66821	After cataract laser surgery	13	\$ 111,664
92004	Eye exam new patient	87	\$ 106,685
Q2046	Aflibercept injection	19	\$ 101,972
92134	Scanning computerized ophthalmic diagnostic imaging, retina	106	\$ 100,257
99213	Office/outpatient visit established	95	\$ 96,147
J3590	Unclassified biologics	48	\$ 83,256
92136	Ophthalmic biometry	96	\$ 78,135
99204	Office/outpatient visit new	180	\$ 58,831
67028	Injection eye drug	79	\$ 58,410
92133	Cmptr ophth img optic nerve	79	\$ 57,711
92235	Eye exam with photos	15	\$ 32,753
92025	Corneal topography	582	\$ 22,672

Note: Total reimbursement for bevacizumab injections, a potential alternative to ranibizumab injections, was only \$2,388 for 18 patients.

we cannot rule out the fact that biologics may contribute to high costs, our findings suggest that factors other than spending on biologics may drive higher than average reimbursement for ophthalmic services at the state level.

A prior study documented substantial geographic variation in use of biologics in the treatment of rheumatoid arthritis.<sup>11</sup> They found that 27% of rheumatologists prescribed biologic agents that were not indicated resulting in additional costs of \$2041 per patient per month. Another relevant regional variation study examined differences in performance of cataract surgery.<sup>12</sup> They found that, the variation in cataract surgery across large geographic areas was significant, but relatively low when compared with the geographic variation in provision of other surgical procedures. Further research is needed to examine regional variation in use of biologics by ophthalmologists and surgical procedures to determine if use is consistent with guidelines and if the most cost-effective treatments are being used.

The most common indication for biologic ophthalmic agents is macular degeneration. The American Academy of Ophthalmology does not indicate a preference between ranibizumab, bevacizumab, or pegaptanib for the treatment of this condition,<sup>13</sup> despite the fact that several studies have found bevacizumab to be more cost-effective compared to ranibizumab. Ranibizumab and bevacizumab have been shown to have similar effects on visual acuity and rates of death or arteriothrombotic events.<sup>14-16</sup>

Given the similar outcomes and cost difference, private health plans often insist on use of bevacizumab prior to prescribing ranibizumab; however, Medicare does not place any such restrictions on the prescription of the costlier medication. A US General Accountability Office (GAO) study found that ranibizumab was the 3rd most costly Medicare Part B drug in 2010.<sup>7</sup> In our study, a total of \$238,273 was spent on ranibizumab in Hawai'i in 2012, making it the fourth most costly of all treatments reimbursed to ophthalmologists.

One approach to lower the cost of injectable drugs has occurred in Britain and the Netherlands.<sup>17</sup> European governments with national health care systems have exercised their monopsony power when negotiating with pharmaceutical companies to obtain lower prices and sometimes refuse to approve expensive injectable medications that are not deemed cost-effective relative to other alternatives. Hence, these countries often pay about half of what Americans pay for the same drugs.

### Limitations

As mentioned in the introduction, we do not know what percentage of reimbursement went to physician income as opposed to covering the costs of expensive medication and overhead for medical devices. Second, Medicare data do not cover a physician's entire patient populations. Geographic variation may occur for other payers, including Medicaid. Moreover,

the file does not include data from Medicare Part C, which are Medicare managed care plans. Finally, this analysis focuses only on reimbursement to physicians. For other specialties, total reimbursement might be higher when you consider the total costs of episodes from all types of providers and facilities.

## Conclusion

Our analysis of Medicare reimbursement to physicians revealed that ophthalmologists in Hawai'i were paid \$18.2 million in 2012 and that Hawai'i ranked third in the share of total Medicare reimbursement being paid to ophthalmologists. In contrast, Hawai'i ranked 34th in the nation in terms of total ophthalmologist reimbursement that went to injectable biological products. Our findings raise questions that require further data collection and analysis to explore, including whether ophthalmologists are using the most cost-effective treatments in Hawai'i and elsewhere and whether we are getting the best value for our Medicare spending not only in the area of ophthalmology but in all areas. Also, does the government have a role in attempting to control the costs of overhead and the high costs that ophthalmologists pay for certain medications? This type of research may lead to systematic reform that encourages more coordination, better quality, and greater use of the most cost-effective treatments.

## Conflict of Interest

None of the authors identify any conflicts of interest.

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# Emergence of *Raoultella ornithinolytica* on O'ahu: A Case of Community-acquired *R. ornithinolytica* Urinary Tract Infection

Elizabeth S. Nakasone PhD, MSIII; Ricky Kaneshiro BS, MSIII; Kathleen Min BA, MSIII; and Jinichi Tokeshi MD

## Abstract

Human infection with *Raoultella ornithinolytica* is rare, with only ten cases having been reported previously. This case report describes a local patient diagnosed with community-acquired *R. ornithinolytica* urinary tract infection in 2014.

## Keywords

*Klebsiella*, *Raoultella*, *ornithinolytica*, Hawai'i, urinary tract infection

## Introduction

*Raoultella ornithinolytica* is a gram negative, non-motile, encapsulated, aerobic bacillus formerly named *Klebsiella ornithinolytica*.<sup>1</sup> It belongs to the family *Enterobacteriaceae*, and has been isolated from insects, fish, and brackish water. This bacterium, along with the closely related species *R. planticola*, has been shown to be the causative agent of histamine toxicity from fish (also known as scombroid syndrome), but is frequently misidentified as *Klebsiella pneumoniae*.<sup>2</sup> Histamine toxicity results from the expression of histidine decarboxylase, which enables the bacterium to convert histidine,<sup>2</sup> and produces symptoms that include flushing, pruritus, headache, and abdominal cramping.<sup>3</sup>

Over the past decade, *R. ornithinolytica* has emerged as an infrequent, but important causal agent of human infections. To our knowledge, ten cases of *R. ornithinolytica* infection have been reported, linking this pathogen to bacteremia and sepsis, and soft tissue and other infections.<sup>4-11</sup> *R. ornithinolytica* expresses  $\beta$ -lactamase, which provides resistance to commonly used antibiotics.<sup>12</sup> In this report, we describe and discuss a case of community-acquired *R. ornithinolytica* cystitis occurring in Honolulu in 2014.

## Case Report

This is a 73-year-old Japanese woman, with a history significant for rheumatoid arthritis, treated with methotrexate, and urosepsis due to community-acquired extended-spectrum  $\beta$ -lactamase (CA-ESBL) *Escherichia coli* in 2010.<sup>13</sup> She presented to her primary care physician with symptoms of urinary urgency of two days duration, with associated urinary incontinence and cloudy-appearing urine. Pertinent negative symptoms included dysuria, hematuria, flank pain, nausea, vomiting, and abdominal pain. No costovertebral angle tenderness or abdominal tenderness, including suprapubic tenderness, was noted on physical exam. Urinalysis performed during the office visit revealed 1+ nitrites (normal: negative), 3+ leukocyte esterase (normal: negative), 1+ blood (normal: negative), and 15-20 white blood cells per

hpf (normal range: 0-5), with the remaining parameters within normal limits. Her urine was sent for culture and sensitivity, during which time she was started on a 3-day course of oral double strength trimethoprim-sulfamethoxazole (TMP-SMX) 160-800 mg BID empirically. Urine culture and sensitivity returned positive for *Raoultella ornithinolytica*, >100,000 CFU/mL, resistant to ampicillin and susceptible to all other tested antibiotics (Table 1). On follow-up two days after completion of the course of TMP-SMX, the patient reported resolution of her urinary symptoms. However, repeat urinalysis continued to show 3+ leukocyte esterase and 15-20 white blood cells per hpf on microscopy. At that time, the patient was started on oral ciprofloxacin 500 mg for 5 days. The patient returned for repeat follow-up 1 day after completion of the course of ciprofloxacin, and urinalysis performed at that time showed negative bacteria and trace white blood cells (<3/hpf), indicating eradication of *R. ornithinolytica* infection.

## Discussion

*R. ornithinolytica* is a *Klebsiella*-like bacterium that expresses histidine decarboxylase, allowing it to produce histamine toxicity following ingestion of improperly preserved fish.<sup>2</sup> It has also been associated with acute suppurative of the pancreatic duct,<sup>4</sup> enteric fever,<sup>5</sup> renal cysts,<sup>6</sup> bacteremia, and sepsis,<sup>7,9,11</sup> soft tissue infection,<sup>8</sup> and urinary tract infection (UTI).<sup>10</sup> This is the first published case report of community-acquired *R. ornithinolytica* infection in the State of Hawai'i.

ANTIBIOTIC	SENSITIVITY	MIC*
Ampicillin	Resistant	$\geq 32$ $\mu\text{g/mL}$
Ampicillin-sulbactam	Susceptible	4 $\mu\text{g/mL}$
Amikacin	Susceptible	$\leq 2$ $\mu\text{g/mL}$
Ceftriaxone	Susceptible	$\leq 1$ $\mu\text{g/mL}$
Gentamicin	Susceptible	$\leq 1$ $\mu\text{g/mL}$
Tobramycin	Susceptible	$\leq 1$ $\mu\text{g/mL}$
Cefepime	Susceptible	$\leq 1$ $\mu\text{g/mL}$
Ciprofloxacin	Susceptible	$\leq 0.25$ $\mu\text{g/mL}$
Nitrofurantoin	Susceptible	$\leq 16$ $\mu\text{g/mL}$
Ertapenem	Susceptible	$\leq 0.5$ $\mu\text{g/mL}$
Piperacillin-tazobactam	Susceptible	$\leq 4$ $\mu\text{g/mL}$
Trimethoprim-sulfamethoxazole	Susceptible	$\leq 20$ $\mu\text{g/mL}$

\*Minimum Inhibitory Concentration

The patient's female sex, advanced age and post-menopausal status, long-term low-dose methotrexate use for rheumatoid arthritis, and past history of CA-ESBL *Escherichia coli* infection put her at risk for UTIs. She presented with typical symptoms and laboratory of an uncomplicated cystitis, including urinary frequency with associated incontinence, cloudy urine, and urinalysis positive for nitrites, leukocyte esterase, bacteriuria, and pyuria. In post-menopausal women, the loss of estrogen creates an environment less hospitable for vaginal lactobacillus growth, thereby increasing vaginal pH and promoting the growth of fecal organisms such as *Escherichia coli*. Furthermore, in the elderly population, *E. coli* is isolated from urine samples in up to 75% of patients who have an uncomplicated cystitis.<sup>14</sup> Other pathogens that are more frequently identified in patients  $\geq$  65 years of age as compared to younger adults include *Proteus*, *Klebsiella*, *Pseudomonas*, *Enterococcus*, and *Staphylococcus*.<sup>14</sup> Identification of *Raoultella ornithinolytica* in the patient's urine sample was therefore unexpected.

While *R. ornithinolytica* is an uncommon human pathogen, there are two clinical challenges associated with infection due to this bacterium. Firstly, *R. ornithinolytica* shares many characteristics with the related bacterium *Klebsiella pneumoniae*, which often results in misidentification of the organism. This has been shown to be the case for incidents of histamine fish toxicity, in which the histamine-producing *R. ornithinolytica* and the closely related *R. planticola* have been misidentified as the non-histamine producing bacterial species *K. pneumoniae* and *K. oxytoca*.<sup>2</sup>

The second challenge associated with *R. ornithinolytica* infections is the bacterium's expression of chromosomal class A  $\beta$ -lactamases, which confer resistance to ampicillin, and other aminopenicillins. A penicillin in combination with a  $\beta$ -lactamase inhibitor may provide good coverage, but *R. ornithinolytica* can be resistant to other commonly used antibiotics.<sup>1</sup> Sensitivity screening showed that this community acquired *R. ornithinolytica* species was susceptible to TMP-SMX and nitrofurantoin, the most common first-line antibiotic agents used for uncomplicated UTIs.<sup>15</sup> Empiric therapy with TMP-SMX resolved urinary symptoms but was unsuccessful in resolving bacteriuria and pyuria. Follow-up treatment with ciprofloxacin was required to resolve bacteriuria and pyuria, highlighting the challenge of eradicating *R. ornithinolytica* infection.

## Conclusions

*Raoultella ornithinolytica* is an uncommon human pathogen, with only ten cases having been previously reported. This organism can be misdiagnosed as *Klebsiella pneumoniae* or *Klebsiella oxytoca*, and its expression of  $\beta$ -lactamase confers resistance to ampicillin and other commonly used antibiotics. *R. ornithinolytica* is emerging as a causative agent of community-acquired UTIs which pose a potential challenge to the identification and treatment of these infections.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# MEDICAL SCHOOL HOTLINE

## **Tropical Cyclone Haiyan/Yolanda Medical Relief Mission: Perspectives of John A. Burns School of Medicine 2nd Year Medical Students**

Chanel Casamina MSII; Christine Lee MSII; and Ruel Reyes MSII

*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.*

During the early morning hours of 8 November 2013, Typhoon Haiyan (locally known as Typhoon Yolanda) made landfall in the Philippines on the island of Samar. Haiyan was the strongest tropical cyclone to make landfall in recorded history, with maximum sustained winds of 195 mph. Typhoon Haiyan/Yolanda brought more than just heavy rain, strong wind, and a strong storm surge, but also devastation and chaos as it took with it homes, businesses, and the lives of over 6,000 people. Of the survivors, 29,000 were injured and 4.1 million were displaced. Most affected were Tacloban City and surrounding villages.

Immediately following the typhoon, there was an outpouring of foreign aid in the form of monetary donations, donated supplies and food, as well as volunteer medical mission groups. One group was the 'Ohana Medical Mission (OMM), composed of Hawai'i-based physicians joined by volunteers from the Philippines. OMM later decided that there would be a follow-up mission in July 2014. Three medical students (Chanel Casamina, Christine Lee, and Ruel Reyes) joined the mission as volunteers from the John A. Burns School of Medicine.

Makeshift clinics were set up in typhoon-damaged churches, warehouses, and gyms. Multiple OMM teams examined patients, performed surgical procedures, and dispensed medications. The Tacloban typhoon victims greeted the mission group with open arms. Each day, the group split into 2-3 teams to serve simultaneously at different localities. The team met with an endless sea of patients. While primarily tasked with history taking and performing brief physical examinations under the supervision of a JABSOM faculty member, the students learned lessons in disease treatment, and the art of "healing." In addition to medications, patients required compassionate and understanding care.

Some of the challenges were the lack of primary care, inadequate infrastructure, and cultural differences. The contrast of the Philippine health care system compared to the US system was a shocking reminder of the many concerns physicians practicing medicine abroad must address such as continuity of care, lack of communication between volunteer healthcare providers, and the dictatorial role of finances even in emergent situations. From the moment of their arrival, the students witnessed the aftereffects of the typhoon as well as an underdeveloped medical system.

Despite Typhoon Haiyan's trail of destruction, the majority of ailments treated were due to a culmination of long-standing inadequate access to health care. The patient population served was isolated from adequate health care not only by distance, but by financial barriers. The majority of the patients, if not all, have no personal or medical insurance, which is commonplace in many of the poverty-stricken areas of the Philippines. For these reasons, mission trips, although irregular and unpredictable, became the mainstay for patient care.

For example, an 80-year-old male with no more than 10 interactions with physicians in his entire life came to the clinic for a check-up. He was diagnosed previously with multiple chronic conditions including hypertension and diabetes mellitus type 2. He was unable to manage his conditions because of the cost of medications. The price of medications in the Philippines often equals the income from many weeks, if not months, of work. He and many others in the area receive medications only when foreign medical missions come with supplies; otherwise, they go without medical management. In this case, the patient was motivated to become healthy, but lacked the financial means to do so.

Many patients delay seeking care until it is either too late, or their condition has progressed to a point that management became costly and difficult. Unfortunately for cases such as these, mission trips are ill equipped to provide the needed care. For example, a cachectic female was brought into the clinic, carried on the back of a family member. Another family member followed, carrying a handful of tissues and a can for her to dispose of her sputum. High on the differential diagnosis (a list of conditions that may explain the patient's presentation) was tuberculosis, but due to the high likelihood of transmission in the confined conditions, she was referred to the local hospital for diagnostic work-up and treatment. Another patient presented breast lesions very suspicious of malignancy based on history and physical exam findings. It seems that if regular care were sought, it is possible that this case could have been assessed earlier to rule out the possibility of breast cancer or to resect the lesion.

Inadequate diagnosis and treatment of highly infectious diseases are a major public health concern, particularly because



many infectious patients live in close quarters. Patients are unlikely to receive treatment due to the aforementioned barriers, and thus remain infectious for a longer period of time. Healthy family members are often the sole caretakers of the sick, and eventually contract the illness. This, compounded by the lack of hygiene and personal protective equipment, creates a vicious cycle of disease transmission within communities.

In addition to the inadequate access to health care, the poor living conditions and lack of disaster planning by city officials worsened the negative outcomes from Typhoon Haiyan. For example the city of Tacloban's disaster plan calls citizens to gather at the Tacloban City Convention Center which accommodates hundreds of people, however it also sits on the waterfront. Hundreds of people were trapped in the enormous building inundated by the storm surge's 20-foot tall waves. In hindsight, the plan was not appropriate. However it was all that the people of Tacloban had. The majority of those individuals that followed the guidance of the officials lost their lives.

Because of the Philippines' history of typhoons and tsunamis, a disaster plan that moves people further inland and away from the waters would be expected. However Tacloban not only lacked a well thought out plan, but lacked the infrastructure to protect its citizens from any type of natural disaster. Had such a strong typhoon affected a more developed country, the pre-existing infrastructure and policies would not have allowed so much devastation. This is another example of the devastation that falls on those who lack the financial resources and power to prepare for natural disasters. As MIT meteorology professor, Kerry Emanuel, states, "You have a very intense event hitting a very susceptible part of the world. It's that combination of nature and man. If one of those ingredients were missing, you wouldn't have a disaster."

Due to the close proximity of the ocean to Tacloban, fishing is a common occupation. Fishermen often build their houses if not on the waterfront, then a few feet in the water. Houses raised on stilts were common and convenient for families whose entire livelihood came from the sea. However, these houses were also immediately destroyed by typhoon winds and waves. Due to the lack of other available occupations in the small city and the historic tie of many generations of families to the ocean, people attempted to resume their fisherman lifestyle after Typhoon Haiyan. Once it was safe to return to the city, people began immediately rebuilding houses above the water in the exact same location. A survivor was seen picking up any usable building remnants he could find and trudging them through waist deep water. Many warning signs prohibiting houses built closer than 50 feet to the water were ignored. Fisherman who relied entirely on the ocean had no choice but to live as close to the water as possible. Without government intervention to protect and financially support these desperate citizens, they are forced to put themselves in vulnerable situations for the next typhoon that could strike Tacloban.

While Hawai'i, with its large Filipino population, is no stranger to Filipino culture, it was interesting for the medical students to encounter cases involving traditional Filipino medicines. One

such case involved a 10-year-old boy who came to the clinic with his grandmother. He had multiple small pearl-like lesions on his abdomen and lower extremities. Upon physical examination, these lesions were covered by a green-crusted layer that was later revealed by the grandmother to be malunggay leaves. In the Philippines, malunggay is one of several plants that is believed by some Filipinos to have "miracle" properties. It is often utilized by traditional faith healers known as "albularyo" and others who believe in their supposed effects. With the help of the attending physician overseeing the medical students, these lesions were found to be *moluscum contagiosum*. The medical students were tasked to instruct the child's grandmother on the proper treatment of his illness while maintaining cultural sensitivity. With such diverse cultures even within a single region, it was imperative to balance "western" medical treatment with the patients' personal belief systems. Fortunately, the students had translators as well as Filipino-American physicians participating in the medical mission to help them bridge gaps encountered.

Oddly, the medical students also encountered many patients who had reported multiple allergies (often to chicken or fish). While these allergies were, at the time, impossible to be further investigated with diagnostic testing, the sheer number of patients complaining of these allergies brought skepticism as to whether they were true allergies, misinterpreted reactions, or cultural commonalities. One physician from the Philippines suggested that it was common for parents to claim allergies to help children cope with poverty and their inability to obtain certain food items. Although these examples may represent the budding curiosity within the medical students, they serve as examples of cultural sensitivity.

Throughout the mission, additional culture differences were encountered that would have an impact on treatment outcomes, therefore requiring intervention. As an example, multiple patients were found to use antibiotic powders (which were meant to be reconstituted with water) inappropriately by rubbing them into wounds instead of taking them orally. It was important to educate the patients about their proper use so the drugs could achieve their intended purpose. Additionally, many antibiotics were available in the Philippines without prescription so patients were also counseled when to seek medical attention through their physicians or local government-run clinics.

Unfortunately, due to the lack of access to clean water compounded by infrastructural damage, patients continued to face the challenge of finding clean water suitable to reconstitute their medications. Furthermore, refrigerators were lacking in order to keep medications at the recommended storage temperature after reconstitution. To address this problem, the medical students practiced their patient education skills and communicated to the patients how they can make the most use of their medications. Fortunately, some of the patients had neighbors or family members that could provide assistance.

Six months following the typhoon, the typhoon's effects were still evident with mass gravesites, collapsed buildings, and the emotional impact that weighed heavy on the minds of typhoon victims. Many patients attributed their illnesses and conditions

to the typhoon, stating that anything from their headaches to hypertension began shortly after the typhoon hit. It is impossible to discern whether or not patients were attempting to garner sympathy and treatment from the physicians or if their emotional turmoil was explained as physical conditions such as a malingering disorder. Whatever the cause, the emotional impact was impossible to ignore. Patients wished the rest of the world to be concerned with their plight. The members of the mission gave them the opportunity to speak with American physicians who provided an empathetic ear.

For example, a 65-year-old woman presented herself with diffuse muscle pain, occasional headaches, and sporadic numbness in her left foot. Upon history taking with multiple providers, her symptoms fluctuated. A physician, who had participated in multiple mission trips, immediately recognized that this woman required a patient and understanding medical student more than any medication. After having lost her home and multiple family members, she merely wanted to share her story.

Typhoon Haiyan/Yolanda brought with it many lessons for typhoon victims, healthcare providers, and in this case medical students highlighting the significant lack of primary care and the role of finance in dictating patient outcomes. Mission trips have

increased awareness of the existing health disparities across the globe allowing physicians to better address these injustices. With its strategic geographic location, the John A. Burns School of Medicine has included in its medical curriculum issues unique to the Asia and Pacific regions, complementary and alternative medicine, and cultural sensitivity in addition to the importance of the history and physical examination. With this experience, the medical students were able to apply knowledge to practice as they addressed the unique needs of typhoon victims. For the medical students, it was a gratifying opportunity to be welcomed into the Tacloban community and care for its many deserving citizens.

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### Resources

World Health Organization-Philippines ([http://www.who.int/hac/crises/phl/sitreps/philippines\\_six\\_months\\_from\\_haiyan\\_may2014.pdf](http://www.who.int/hac/crises/phl/sitreps/philippines_six_months_from_haiyan_may2014.pdf))



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# INSIGHTS IN PUBLIC HEALTH

## A Tale of Two Polities: Health in Independent and American Samoa

Victoria Y. Fan ScD and Ruth Faioso Le'au BA

*Insights in Public Health* is a monthly solicited column from the public health community and is coordinated by HJMPH Contributing Editors Tetine L. Sentell 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 Lance K. Ching PhD, MPH from the Hawai'i Department of Health.

### Abstract

*Independent and American Samoa have a shared cultural, genetic, ethno-linguistic, and historical background but have been politically separated since 1899. In this essay, we examine the health of these two polities and identify two key health patterns that have emerged even as American Samoa has achieved a higher per capita income than Independent Samoa. Whereas the gender gap in life expectancy at birth has narrowed in Independent Samoa, this gap has not narrowed in American Samoa and its male life expectancy now lags behind that of Independent Samoa. Neonatal mortality rates in American Samoa are slightly higher than in Independent Samoa. These patterns may be linked to the higher rates of obesity and urbanization observed in American Samoa compared to Independent Samoa, as well as the differing political and institutional arrangements of the two polities. Limited data remains a persistent challenge to conducting analysis of public health in the Pacific islands, particularly in American Samoa.*

### Keywords

*Independent State of Samoa, American Samoa, US Territory, Insular Areas, Pacific islands, chronic diseases, diabetes, heart disease, obesity, neonatal mortality, immunization, skilled birth attendance, political economy, colonization, globalization, economic development, urbanization*

### Introduction

Why do certain countries with similar cultural and economic backgrounds have diverging health outcomes? Although cross-country, time-series studies offer some insight on factors explaining population-level differences, in-depth comparative case studies are necessary to understand the roles of institutions and delivery structures on health outcomes. Whereas the comparison between two societies with very different cultures, languages, and histories is limited by a variety of confounding factors, the comparison of two societies with a shared historical and ethno-linguistic background that have been subject to differing political arrangements and policies can yield insights to explain differential health outcomes. In this vein, comparative studies have examined North and South Korea, East and West Germany, and the Indian state of West Bengal and the nation of Bangladesh (formerly East Bengal) to explain measures of population health such as life expectancy and child mortality.<sup>1-3</sup>

The goal of this essay is to explore differential health outcomes between the Independent State of Samoa (henceforth abbreviated to Samoa) and American Samoa (an unincorporated

territory of the United States of America). Samoans of these two regions are ethnically identical but politically separated. During the Tripartite Convention of 1899, the United Kingdom agreed to relinquish imperialist claims and gave sole control to Germany over the Samoan islands to the west of 171° longitude (Western Samoa or present day Samoa), while the United States continued occupancy in the islands to the east (present day American Samoa).<sup>4,5</sup> This separation continued during World War I when control of Western Samoa was designated to the British Commonwealth of New Zealand. As a result, Western Samoa's Ministry of Health was modeled after New Zealand and the United Kingdom, whereas American Samoa's Department of Health is modeled after the United States.<sup>6</sup> Western Samoa gained independence in 1962, was admitted as a member state to the United Nations (UN) in 1976, and dropped 'Western' from its name in 1997. In contrast, American Samoa has been listed by the UN as a 'Non-Self-Governing Territory' since 1946. Moreover, American Samoa is classified as an unincorporated unorganized US territory because its Constitution was not authorized by US Congress (whereas Guam, the US Virgin Islands, the Commonwealth of the Northern Marianas Islands, and the Commonwealth of Puerto Rico are classified as unincorporated organized territories).<sup>7-9</sup>

In the context of rapid societal changes to lifestyle and diet as a result of colonization and globalization, obesity rates in the Pacific islands including the two Samoan polities are among the highest in the world.<sup>10</sup> How have political divergences differentially influenced health in these two polities? In this exploratory piece, we present standard indicators of population health as well as those pertaining to chronic diseases and risk factors in these two polities. We examine demographic factors followed by mortality indicators as well as coverage of services and risk factors that are associated with mortality. We conclude by raising hypotheses for research to further examine the role of institutions in explaining outcomes in these two polities.

### Data

The data in this essay for both Samoa and American Samoa have been previously collected and published by the World Health Organization (WHO) and the Secretariat of the Pacific

Community (SPC), a regional multilateral intergovernmental organization founded in 1947 with 22 Pacific island countries and territories. We verified data sources using publicly available information and other government sources of the same year. Indicators for the same year were used as much as possible.

There are several challenges and limitations to consider in conducting any analysis of public health in the Pacific islands. One limitation to accuracy is the exclusion of deaths that occurred during off-island referrals, particularly from American Samoa.<sup>11</sup> The existence of off-island referrals reflects limited capacity of the local health care systems. Residents of American Samoa may resort to seeking care in Hawai'i or other states for specialized secondary or tertiary care.<sup>12</sup> Similarly, residents of Samoa can resort to seeking tertiary care in New Zealand.<sup>13,14</sup> Off-island deaths would thus lead to the undercounting of local mortality rates.

A primary challenge to conducting analysis of the health of Pacific islanders is the scarcity and quality of health data in general. American Samoa, in particular, faces unique challenges in the data quality and availability given its political status as a US territory and a UN Non-Self-Governing Territory. American Samoa is thus routinely overlooked by international agencies. In contrast, Samoa regularly participates in reporting health statistics such as those relating to the UN Millennium Development Goals. As one example of such neglect of American Samoa, the SPC's National Minimum Development Indicators (NMDI) database reported values for 773 indicator-years for Samoa but only 181 indicator-years for American Samoa – a 4-fold differential.<sup>15</sup> In the World Bank's World Development Indicators (WDI) database for the years 1960-2014, there were reported values for 21,701 indicator-years for Samoa (or 394 indicators per year on average), compared to only 2,709 indicator-years for American Samoa (49 indicators per year on average), an 8-fold differential.<sup>16</sup> In addition, the WDI database reported Gross National Income for American Samoa only for the years 1973-1985, whereas it reports the same variable for Samoa since 1999 and continues to do so.<sup>16</sup> In 2010, the US government began to calculate gross domestic product per capita of American Samoa for 2007, the latest year for which data is available.<sup>17</sup>

In addition to American Samoa's limited international status, as a US territory American Samoa is not necessarily included in the full range of federally funded data collection efforts in states. When it is included, the reporting of such data is often incomplete. For example, although the annual survey of the US Centers for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) is conducted in all states and some territories including American Samoa, the data for American Samoa is not available online (unlike other states), and reporting for American Samoa on the CDC website is rare. In American Samoa, there is no centralized data system for public health information.<sup>18</sup>

The scarcity of data for American Samoa is a significant limitation and barrier to conducting this comparative study. Scarce data reinforces American Samoa's difficulty in securing health

resources, in turn perpetuating a lack of data.<sup>19</sup> This problem may be exacerbated in the coming years, since American Samoa's budget for health and welfare was recently cut from \$29.9 million in 2012 to \$10.5 million in 2013.<sup>14</sup> Even as American Samoa's primary source of revenues to finance public health and health care comes from US federal grants, American Samoa was not included in recent national US health care reforms, which expanded coverage of and subsidized purchase of health insurance for states.<sup>20</sup>

## Comparative Health Outcomes

**Demographics.** The population structure of the two polities is similar, and thus we did not make age-specific adjustments for rate comparison between the two regions. Approximately 35% to 38% of both populations are under age 15 years, and 5% are over 65 years old (Table 1).<sup>21-23</sup> Both population structures are indicative of a young population. However, population growth is 0.8% in Samoa and -3.1% in American Samoa (because of greater out-migration in the latter).<sup>14,24</sup> Gross domestic product (GDP) per capita (in constant 2005 US\$) was \$2,685 in Samoa in 2013 and \$7,874 in American Samoa in 2007.<sup>16,17</sup> Public health expenditure per capita was \$248 in Samoa in 2011 and about \$539 in American Samoa in 2012.<sup>13,14</sup>

**Life expectancy.** Life expectancy, an essential measure of population health, estimates the average number of additional years a person could expect to live if current mortality trends were to continue for the rest of that person's life. Life expectancy at birth in Samoa was 74.2 years in 2011.<sup>24</sup> From 1997 to 2012, the American Samoa government has reported the same life expectancy at birth of 72.7 years.<sup>25-29</sup>

Life expectancy at birth by gender over time for the two polities is publicly available originally from the Government of Samoa Census and the American Samoa Statistical Yearbook. As in most countries, female life expectancy is higher than male life expectancy. Female life expectancy at birth is slightly higher in American Samoa (77.8) than in Samoa (75.6), but male life expectancy at birth is lower in American Samoa (71.1) than in Samoa (72.7).<sup>14,24,25</sup> In other words, there is a 2.9 year gap between males and females in Samoa, but a 6.7 year gap in American Samoa, suggesting greater gender inequality in the latter.<sup>30</sup> Over time, the gap in life expectancy between females and males has narrowed in Samoa from 7 years in 1998 to 2.9 years in 2011, whereas this gap may have increased in American Samoa from 6 years in 1997 to 6.7 years in 2013 (see Figure 1). (Comparisons between the two polities for the same year were not possible due to lack of data.)

**Mortality.** Diseases affecting both regions are shared, but they appear to occur at different rates. Diabetes, cancer, cerebrovascular diseases, and heart disease are the top four leading causes of mortality for both populations, but the rates of death from these diseases are higher in American Samoa than in Samoa.<sup>31,32</sup> There were 50 deaths per 100,000 population caused by diabetes in American Samoa in 2005, compared to 29 deaths per

Table 1. Demographic Indicators for Samoa and American Samoa				
Indicator	Samoa		American Samoa	
	Value	Year	Value	Year
Land area (1000 km <sup>2</sup> )	2.934	2013	0.199	2013
Population (in thousands)	187,820	2011	55,519	2010
Population aged 0-4 years (%)	12.55	2010	11.52	2010
Population aged 5-14 years (%)	25.71	2010	23.68	2010
Population aged 65 years and older (%)	5.0	2010	4.5	2010
Population growth (%)	0.8	2006-2011	-3.1	2000-2010
Urban population at last census (%)	20	2011	50	2010
Per capita GDP (constant 2005 US\$)	2,685	2013	7,874	2007
Per capita public health expenditure (current US\$)	248	2011	539	2012
Government health expenditure as % of total government expenditure	13.8	2013	9.7	2013
Government education expenditure as % of total government expenditure	18.5	2013	9.0	2013

Table 2. Health Indicators for Samoa and American Samoa				
Indicator	Samoa		American Samoa	
	Value	Year	Value	Year
<b>Chronic Diseases</b>				
Diabetes mortality (per 100,000)	29	2007	50	2005
Cancer mortality (per 100,000)	25	2007	55	2005
Cerebrovascular disease mortality (per 100,000)	23	2007	38	2005
Heart disease mortality (per 100,000)	19	2007	69	2005
Pneumonia mortality (per 100,000)	16	2007	18	2005
Adult overweight and obesity (%)	85.2	2002	93.5	2007
<b>Maternal and Child Health</b>				
Neonatal mortality rate (per 1000 live births)	4.2	2002	7.4	2002
Infant mortality rate (per 1000 live births)	15.6	2011	14.9	2010
Proportion of 1-year-old children immunized against measles	61	2010	77	2011
Skilled birth attendance (%)	81	2009	99	2013

100,000 population by diabetes in Samoa in 2007, a 1.7-fold differential (see Table 2).<sup>31,32</sup> There were 69 deaths per 100,000 population caused by heart disease in American Samoa in 2005, compared to 19 deaths per 100,000 population by heart disease in Samoa in 2007, a 3.6-fold differential.<sup>31,32</sup> These mortality differentials between the two polities are consistent with the higher prevalence of overweight and obesity, a risk factor for both diabetes and heart disease, in American Samoa (94%) compared to Samoa (85%).

Neonatal mortality rates exhibit differences between American Samoa and Samoa. The neonatal mortality rate in American Samoa is 7.4 per 1000 live births, compared to 4.2 in Samoa – a 1.8-fold differential – even as skilled birth attendance is 99% in American Samoa compared to 81% in Samoa.<sup>22,33</sup> Infant mortality in the two polities was similar at 14.9 per 1000 live births in American Samoa and 15.6 in Samoa, and the proportion of

one-year-old children immunized against measles in American Samoa was 77% compared to 61% in Samoa.<sup>14,24</sup>

### Potential Determinants of Differential Outcomes

What might explain these observed differences in health outcomes? Countries typically exhibit a positive relationship between life expectancy and GDP per capita but with diminishing marginal returns in life expectancy to additional per capita income.<sup>34</sup> One might have expected a priori that, because American Samoa has a higher per capita gross domestic product (GDP) than Samoa (\$7,874 in 2007 compared to \$2,685 in 2012), health in American Samoa would be higher.<sup>22,23</sup> Given diminishing marginal returns to health, Samoa with a lower per capita income has made larger gains in life expectancies compared to American Samoa (Figure 2).<sup>11</sup> Nevertheless, both

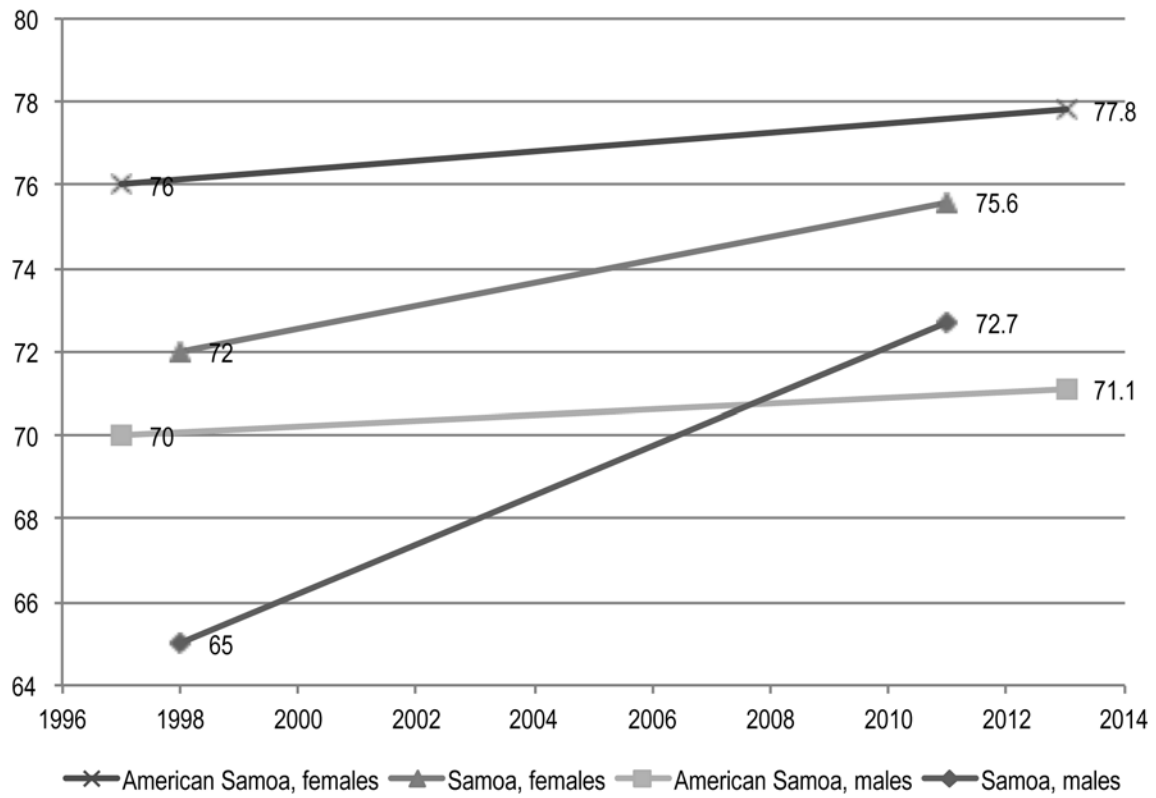


Figure 1. Female and Male Life Expectancy in Samoa and American Samoa, 1997-2013

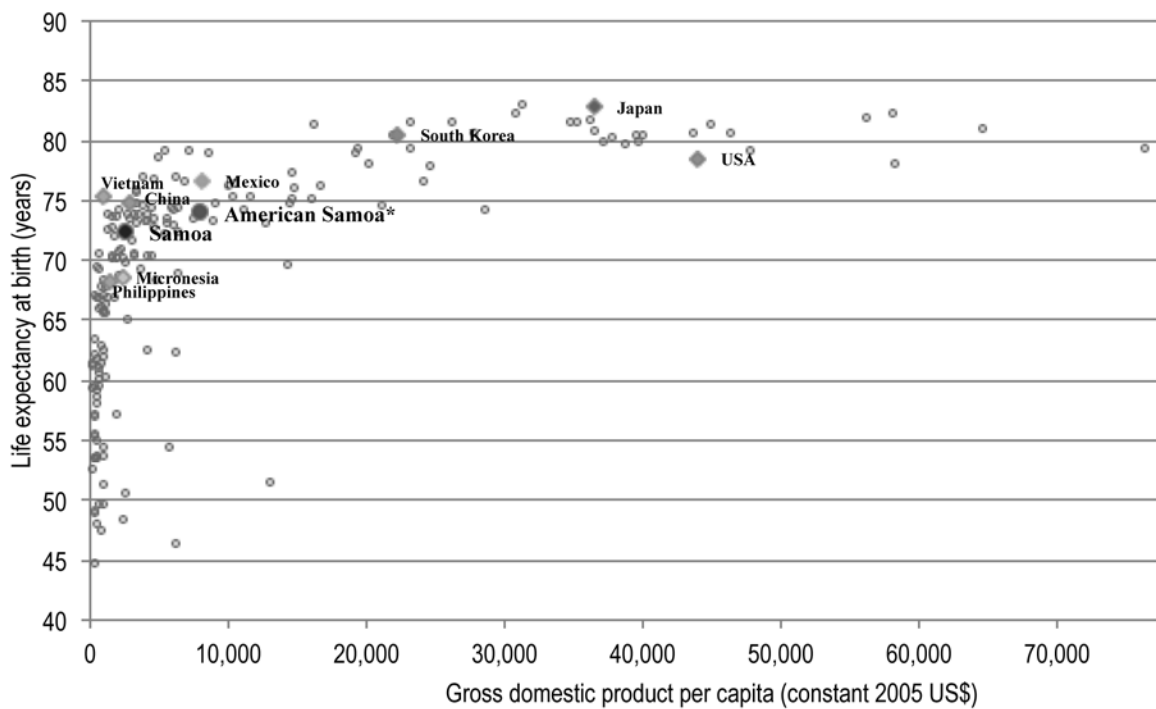


Figure 2. Life Expectancy at Birth and Gross Domestic Product Per Capita (Constant 2005 US\$), 2010

Note: \*GDP per capita for American Samoa refers to 2007, the latest year for which data are available.

life expectancies in Samoa and American Samoa are lower compared to countries with similar per capita GDP. For example, life expectancy in China exceeds that of Samoa by 2.5 years, and life expectancy in Mexico exceeds that of American Samoa by about 2 years.

At the individual level, various studies have examined a complex relationship between income and health.<sup>35,36</sup> Whereas higher incomes are positively associated with greater cardiovascular disease risk in Samoa, this association is inverted in American Samoa, ie, lower incomes are associated with greater cardiovascular disease risk. It has been argued that the adoption of Westernized diets and lifestyles help to explain these differences.<sup>35,37</sup>

Given the greater income of American Samoa, we identified two key puzzles: (1) the lagging (and now lower) health of males and (2) the higher neonatal mortality rates in American Samoa compared to in Samoa. A recent study by Baker and colleagues found that the lower male life expectancy may be explained by higher catecholamine variations, an indicator of stress which is attributed to both psychological and habitual behavioral differences usually related to a higher degree of participation in Western lifestyles in Samoan men.<sup>38</sup> Although Baker's catecholamine study focused on men in Samoa, it could be hypothesized that this phenomenon could also be attributed to the greater urbanization in American Samoa (50%) compared to Samoa (20%).<sup>23,38-41</sup>

Another hypothesis pertains to the role of military and athletic recruitment of American Samoan males, which is among the highest in the nation, leading to significant out-migration.<sup>42,43</sup> Those who are recruited may be healthier compared to those who stay back, leaving behind a disproportionately unhealthy male population in American Samoa. If males go off-island for higher education and/or health care referrals at higher rates than females, then such out-migration may also be a factor. To our knowledge, formal studies on these topics have not been conducted to date and merit further investigation.

Given the higher GDP per capita of American Samoa, it is puzzling that American Samoa has relatively higher neonatal mortality compared to Samoa. This conundrum is further compounded by the differentially higher coverage of skilled birth attendance in American Samoa, which might be expected to reduce risk of neonatal death. However, obesity is an independent risk factor for neonatal (and maternal) mortality, and hence the higher rates of obesity in American Samoa compared to Samoa may explain some of the differences in neonatal mortality.<sup>44-46</sup> Past research by Hawley and colleagues found high levels of weight gain in excess of recommended standards during pregnancy and high levels of overweight and obesity pre-pregnancy in American Samoa.<sup>47</sup> However, Hawley's study did not explore the association between gestational weight gain and neonatal mortality. Further investigation into the association between gestational weight and neonatal mortality as well as maternal

morbidity in these populations is needed, particularly in relation to socioeconomic status and urbanization.

Policies and political arrangements of the two polities are likely a major factor in explaining these observed patterns of health. German, British, New Zealand, and American colonialism pressured the adoption of Westernized institutional arrangements that differ from the indigenous Samoan system.<sup>4,7,48-50</sup> The impacts of colonial history encompass expropriation and resource exploitation of indigenous lands, racism, denial of rights, and welfare dependency, which in turn limit opportunities and freedoms to lead healthy lives.<sup>51</sup> Since Samoa's independence and autonomy from colonizing powers in 1962, Samoa may have obtained and utilized the political freedom to reform the Ministry of Health to better reflect the needs of the Samoan community.<sup>6</sup> In contrast, the effects of continued colonization and its relation to institutional and political arrangements of American Samoa as a determinant of health merits further investigation. The current colonization in American Samoa is linked to the lack of usual democratic freedoms of either US states or nation-states, such as voting representation in any significant federal capacity (even as it competes with other American states for health financing) or in any international capacity such as through multilateral institutions.<sup>52</sup>

## Conclusion

This essay identified key puzzles in population health in the two polities, including the lagging life expectancy of males of American Samoa as well as higher mortality rates due to chronic diseases and higher neonatal mortality rates in American Samoa, despite American Samoa's higher economic development. We hypothesized a variety of potential determinants that may explain these differentials. As Samoan populations are largely genetically homogenous, the differences observed could have resulted from environmental factors that may be altered by informed, culturally appropriate planning.<sup>5</sup> Future research is needed on the political economy, institutional arrangements, especially in the health care system, and the role of decolonization in generating autonomy for decision making in the health sector.<sup>36,51</sup> Given the dire lack of consistently available statistical information for analysis, Pacific island countries and territories (supported by the Secretariat of the Pacific Community) should make greater progress in collecting population, economic, and health statistics in order to make policy decisions and support program planning, evaluation, and surveillance.<sup>19,53</sup>

## Conflict of Interest

None of the authors identify a conflict of interest.

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# THE DANIEL K. INOUE COLLEGE OF PHARMACY SCRIPTS

## Pharmacy School Graduates Continue Training in Postgraduate Residency Programs

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### Abstract

*Residency training is designed to provide recent pharmacy school graduates who have the profession's terminal Doctor of Pharmacy (PharmD) degree with accelerated growth beyond entry-level professional competence. Placement into residency programs is highly competitive through an application and match process. These programs provide additional training in patient-centered care with advancement of skills in clinical judgment, pharmacy operations, clinical research, project management, and leadership. Approximately 20% of a pharmacy graduating class will apply for a residency. With increasing numbers of pharmacy schools across the country, the availability of residency programs is falling behind applicants. The establishment of the Daniel K. Inouye College of Pharmacy (DKICP) has addressed the shortage of pharmacists within the state. In recent years, resident positions in Hawai'i have doubled to a total of ten first year residency (PGY1) and two second year (PGY2) specialty residencies. Given the limited availability of positions in Hawai'i, graduates continue to return to the continental US to seek positions, thus increasing the likelihood of them not returning to practice in Hawai'i. Establishing residency programs is essential to elevate the level of pharmacy practice toward innovation and adherence to best practices, academia/teaching and scholarly research. This descriptive paper will detail the general components and types of pharmacy practice residency, the unique components of the Hawai'i programs, the career placement of Hawai'i's programs graduates and future challenges.*

### Introduction

The Accreditation Council for Pharmacy Education (ACPE) accredits professional programs within the United States for the terminal degree of Doctor of Pharmacy (PharmD). Graduates are eligible for the national licensing exam that will enable them to practice as registered pharmacists.<sup>1</sup> The majority of graduates will enter the workforce in a multitude of practice settings such as community retail, hospital, ambulatory care clinics, nuclear pharmacy, and other types of practices. Prior to 2007, Hawai'i residents planning to enter the profession relocated to the continental US for formal training to obtain their PharmD degree with a small percentage returning to Hawai'i to begin their career. On a national level, 10-year trend figures from the Pharmacy Workforce Center (PWC) describe the Aggregate Demand Index (ADI) for pharmacists at a stable level of 4 (moderate demand) from 2002 through 2008.<sup>2</sup> The most recent figures from August 2014, indicate that the national ADI has,

since 2008, begun a downward trend to the equilibrium point of "3" with the community pharmacy figures reported at 3.38 and institutional pharmacy at 2.78 (3 = demand in balance with supply; 2 = demand is less than pharmacist supply available).<sup>2</sup> Pharmacy Forecast 2013-2017, a strategic planning report for institutional pharmacy reports a vacancy rate drop from 78.2% in 2002 to 2.4% in 2011. The demand for hospital staff pharmacists has leveled off but there remains difficulty in filling managerial and clinical specialist positions.<sup>3,4</sup> The Accreditation Council of Pharmacy Education (ACPE) has seen rapid increases in the numbers of US schools of pharmacy. In 2000, there were 80 colleges. As of 2014, a 60% increase in schools has swelled the number to 130 schools.<sup>4,5</sup>

After 10 years in the making, the Daniel K. Inouye College of Pharmacy (DKICP) was established in 2007 to meet pharmacist shortage as demonstrated by Hawai'i's 2005 ADI figures of 3.3 with the highest ADI of 4.5 in the last quarter of 2005.<sup>2</sup> The September 2014 ADI figures show that DKICP graduates have helped to address the local pharmacist shortage with the state's ADI now at 1.5 as compared to the Western Pacific Region's ADI of 3.54. (2 = demand is less than the pharmacist supply available, 1 = demand is much less than the pharmacist supply available).<sup>2</sup> The average class of 86 graduates from DKICP is comprised of approximately 50% Hawai'i residents. Self reported alumni data on post-graduate placement generally indicates that resident students are remaining within the state for jobs and non-residents return to the continental US.<sup>6</sup> The majority of graduates gain employment into community pharmacy retail settings. Typically the top 20% of the graduating class seek a post-graduate resident program.<sup>6</sup>

Pharmacy residencies were originally developed in the 1930s as internships to train pharmacists for hospital pharmacy management.<sup>7</sup> The American Society of Health-System Pharmacists (ASHP), known in 1948 as the American Society of Hospital Pharmacists, began to further develop these programs into "residencies."<sup>7</sup> Programs rapidly developed in the 1970s with accreditation standards outlining general and clinical residencies as separate programs. By the early 90s the two types of

programs were combined and replaced with the term “post graduate residency” in pharmaceutical care (PGY1).<sup>7</sup> Post-graduate residency training is an optional but desirable next step in the education of pharmacists and is designed to provide recent pharmacy school graduates with accelerated growth beyond entry-level professional competence. Graduates of residency programs are better positioned to enter into practice settings such as academia and advanced clinical practices in acute care hospitals in specialty areas and ambulatory care clinics. Nearly 1,000 US health care organizations offer pharmacy residency programs that graduate about 2,200 residents each year.<sup>8</sup> In 2013, a 6-percent increase in PGY1 and a 10% increase in PGY2 candidates was seen; nevertheless, demand exceeded supply and nearly 35% of applicants remained without placement.<sup>8,9</sup> In 2014, PGY1 and PGY2 applicants increased by 5% and 18% respectively.<sup>10</sup> Thus with the higher number of pharmacy graduates, greater competition for available jobs, and overall rising interest in specialty training, there has been an increasing need to develop more residency programs to elevate the level of pharmacy practice and develop future leaders.

Articles have identified that physicians are most likely to stay in the geographic area in which they train, and this trend appears to be paralleled in pharmacy residents. Yet, of the 20% of DKICP graduates who apply for residency, only 50% will match into available slots and more than half of these individuals return to the continental US because of lack of available resident positions within Hawai‘i,<sup>11</sup> raising concern that pharmacists with the highest degree of training in the profession are still not being retained within the state.<sup>12</sup>

Hawai‘i pharmacy residency training programs began in 1988 at The Queen’s Medical Center (QMC), followed by Tripler Army Medical Center (TAMC) in 1992 and Kaiser Permanente/ Kaiser Foundation Health Plan, Inc. (KPM) in 1999, yielding five PGY1 positions that have remained funded for over 10 years.<sup>13-15</sup> In the last 5 years, an additional five PGY1 positions have been made available from the DKICP (2), KPM (1) and the Veterans Administration Honolulu (2).<sup>16</sup> There are also two PGY2 positions available in Critical Care from the DKICP in partnership with QMC, and a Psychiatry/Mental Health specialty position from the DKICP in partnership with Pharmerica at Hawai‘i State Hospital. Table 1 outlines the various types of PGY1 and PGY2 residencies.

A resident’s year focuses on patient-centered care with advancement of skills in clinical judgment, pharmacy operations, clinical research, project management, and leadership. Some PGY1 graduates may progress to a second year of residency (PGY2) especially if they plan to specialize in areas of pharmacy practice such as critical care, emergency medicine, ambulatory care, oncology, infectious disease, or ambulatory care.<sup>7</sup>

### Resident Matches and Program Accreditation

The ASHP Commission on Credentialing is responsible for the accreditation of pharmacy residencies.<sup>17</sup> Accreditation follows evaluation of a program’s quality through an on-site survey and

requires rigorous compliance with standards pertaining to the site(s) of practice, program director, preceptors, and program activity components. Once accredited, additional surveys by ASHP will take place every few years in order to maintain accreditation.<sup>13</sup>

Although the student application and match process begins about six months before graduation, most successful applicants have been working toward residency beginning from their first year in pharmacy school. Successful applicants are encouraged to demonstrate not only excellent didactic and experiential aptitude but also ongoing leadership and exemplary community service.<sup>7</sup> Placement of pharmacy graduates and practitioners into PGY1 programs is extremely competitive. Data from the national ASHP Residency Match for 2014, describes 2,640 PGY1 candidates matched into positions; however 1,502 were unmatched with only 222 positions remaining available. For PGY2 positions, 706 candidates matched with 211 unmatched applicants vying for 87 remaining positions.<sup>10</sup> For pharmacy graduates who do not place into a resident position at first try, a second or third attempt in subsequent years has proven successful in some cases. Successful candidates are those who demonstrate persistence in application in addition to seeking innovative and more clinically oriented practice settings, increasing their portfolio in teaching or education, and becoming involved in clinical research.

### Description of Residencies

There are three main types of PGY1 residency: General Practice, Community Pharmacy and Managed Care. Hawai‘i’s PGY1 and PGY2 residency programs are described in Table 1.

#### General Practice PGY1

PGY1 General Practice residency programs are designed to provide graduates with a structured program intended to develop problem solving, leadership, and clinical skills applicable to

Program Location	Year of Start	Level (# of positions)	Type of Residency
QMC	1988	PGY1 (2)	General Practice
TAMC	1992	PGY1 (3)	General Practice
KPM	1999	PGY1 (1)	Ambulatory Care ('99-'06) General Practice ('07-present)
VA	2012	PGY1 (2)	Ambulatory Care
DKICP	2011	PGY2 (1)	Critical Care Psychiatry/Mental Health
	2012	PGY2 (1)	
	2012	PGY1 (2)	General Practice Community Pharmacy
	2010	PGY1 (2)	

QMC (The Queens Medical Center), TAMC (Tripler Army Medical Center)  
 KPM(Kaiser Permanente-Moanalua), VA(Veterans Administration Honolulu)  
 DKICP (The Daniel K. Inouye College of Pharmacy)  
 PGY1 – Post Graduate Year 1  
 PGY2 – Post Graduate Year 2

any practice setting. PGY1 programs provide experiences in a wide variety of patient populations. In fact ASHP requires that PGY1 residents spend no greater than 1/3 of their total time managing any one particular patient population. To meet these objectives PGY1 residency programs are composed of required and elective rotations with each rotation emphasizing a different aspect of pharmacy practice. Required rotations typically include acute care, ambulatory care, critical care, formulary management, administration, and leadership, as well as inpatient hospital pharmacy operations. Elective rotations offered are meant to tailor the resident's experience to their particular area of interest and highlight unique characteristics of the individual program. Table 2 provides a synopsis of the various elements in each of Hawai'i's residency programs.<sup>13-16</sup> The DKICP/Hawai'i Pacific Health program held at Wilcox Memorial Hospital and Straub Hospital offers the core rotations

with emphasis on rural populations, academia, education, and community health programs. QMC's required rotations support their center of excellence in acute care and as the Level 2 trauma center of the state; rotation time emphasizes intensive care and internal medicine patient care areas. TAMC requires five core rotations in ambulatory care, acute care, critical care, inpatient pharmacy operations, and formulary management. Unique to their mission is the emphasis on active duty military and their dependents, military retirees and disabled veterans, Pacific Island nations, as well as support for deployment of armed forces. KPM's residency program originally began as an ambulatory care residency and has evolved into a general practice care/hospital residency to reflect their patient population and the institution's strengths in both hospital and ambulatory care types of patient care areas. The required rotations include ambulatory care services in anticoagulation, medication therapy

Table 2. Components of Residency Programs				
Program	Required Rotations	Elective Rotations	Longitudinal (year long)	Teaching
QMC PGY1	<ul style="list-style-type: none"> <li>• Acute care</li> <li>• Administration</li> <li>• Intensive Care</li> <li>• Inpatient Pharmacy</li> </ul>	<ul style="list-style-type: none"> <li>• Ambulatory Care</li> <li>• Psychiatry</li> <li>• Behavioral Health</li> <li>• Oncology</li> </ul>	<ul style="list-style-type: none"> <li>• Transitional Care</li> <li>• Progressive Care Unit (PCU)</li> </ul>	<ul style="list-style-type: none"> <li>• Experiential</li> </ul>
TAMC PGY1	<ul style="list-style-type: none"> <li>• Ambulatory care</li> <li>• Acute care</li> <li>• Critical care</li> <li>• Formulary management</li> <li>• Inpatient pharmacy</li> </ul>	<ul style="list-style-type: none"> <li>• Anticoagulation</li> <li>• Emergency Medicine</li> <li>• Infectious disease</li> <li>• Neonatal Intensive Care Unit (NICU)</li> <li>• Nuclear pharmacy</li> <li>• Oncology</li> <li>• Pain management</li> <li>• Pediatrics</li> <li>• Cardiology</li> </ul>	<ul style="list-style-type: none"> <li>• Ambulatory care</li> <li>• Pharmacy administration</li> <li>• Medication safety</li> <li>• Literature evaluation</li> <li>• Research</li> </ul>	<ul style="list-style-type: none"> <li>• Didactic DKICP</li> </ul>
KPM PGY1	<ul style="list-style-type: none"> <li>• Acute care</li> <li>• Intensive care</li> <li>• Administration</li> <li>• Inpatient Pharmacy</li> </ul>	<ul style="list-style-type: none"> <li>• Emergency medicine</li> <li>• Hepatitis</li> <li>• Pediatric/Neonatal Intensive Care Unit (NICU)</li> <li>• Oncology</li> <li>• Nephrology</li> </ul>	<ul style="list-style-type: none"> <li>• Formulary Management</li> <li>• Pharmacy Administration</li> </ul>	
DKICP PGY1 (Hawai'i Pacific Health)	<ul style="list-style-type: none"> <li>• Acute care</li> <li>• Critical care</li> <li>• Infectious disease</li> <li>• Administration</li> <li>• Inpatient Pharmacy</li> </ul>	<ul style="list-style-type: none"> <li>• Native Hawaiian Health</li> <li>• Infectious Diseases</li> <li>• Cardiology</li> <li>• Anticoagulation</li> </ul>	<ul style="list-style-type: none"> <li>• Administration</li> <li>• Formulary management</li> </ul>	<ul style="list-style-type: none"> <li>• Didactic</li> <li>• Experiential</li> </ul>
DKICP PGY2 Critical Care (QMC)	<ul style="list-style-type: none"> <li>• SICU</li> <li>• MICU</li> <li>• NICU</li> <li>• CICU</li> </ul>	<ul style="list-style-type: none"> <li>• Emergency medicine</li> <li>• Research</li> <li>• Academic</li> </ul>	<ul style="list-style-type: none"> <li>• Simulation (Critical Care)</li> </ul>	<ul style="list-style-type: none"> <li>• Seminar</li> <li>• Didactic</li> <li>• Experiential</li> </ul>
DICP PGY2 Psychiatry/ Mental Health	<ul style="list-style-type: none"> <li>• Inpatient Psychiatry (HSH)</li> </ul>	<ul style="list-style-type: none"> <li>• Academic</li> </ul>	<ul style="list-style-type: none"> <li>• Ambulatory Clinic (WHC)</li> </ul>	<ul style="list-style-type: none"> <li>• Seminar</li> <li>• Didactic</li> <li>• Experiential</li> </ul>
VA (PGY1)	<ul style="list-style-type: none"> <li>• Mental Health</li> <li>• Palliative Care</li> <li>• Medicine</li> <li>• Inpatient</li> </ul>	<ul style="list-style-type: none"> <li>• Hemodialysis clinic</li> <li>• Women's Health</li> <li>• Rural Health</li> <li>• Hepatitis C Clinic</li> <li>• Research</li> </ul>	<ul style="list-style-type: none"> <li>• Administration</li> <li>• Anticoagulation</li> </ul>	

QMC (The Queens Medical Center), TAMC (Tripler Army Medical Center); KPM(Kaiser Permanente-Moanalua), VA(Veterans Administration Honolulu); DKICP (The Daniel K. Inouye College of Pharmacy); Hawai'i Pacific Health – participating sites include Wilcox Memorial Hospital Straub Hospital, Pali Momi Medical Center; HSH – Hawaii State Hospital, WHC Waimanolo Health Center; SICU – Surgical Intensive Care Unit; MICU Medical Intensive Care Unit; NICU Neurosciences Intensive Care Unit; CICU Cardiac Intensive Care Unit; PGY1 – Post Graduate Year 1; PGY2 – Post Graduate Year 2

and chronic disease state management (diabetes, hypertension, and secondary hyperlipidemia), inpatient critical care, telemetry, internal medicine, and surgery. The VA Ambulatory Care Residency's required rotations include mental health and long term/palliative care with electives in specialty clinics of Hepatitis C, hemodialysis and women's health.

Although PGY1 residencies stress clinical pharmacy rotations, a component of inpatient pharmacist operational staffing is usually required. This role in the more traditional distribution function encourages the resident to better understand the critical processes in the order entry, verification, and distribution process as they relate to clinical drug recommendations, therapeutic monitoring, and follow up.

### **Community Pharmacy PGY1**

Both in Hawai'i and on the continental US many patients live in rural, somewhat isolated communities that may be great distances away from hospitals and clinics. Community pharmacists serve a critical role in these instances often providing the only local liaison to health care. Specialty community pharmacies have also begun to play a larger role in areas such as oncology, HIV, psychiatry, and medication therapy management in diabetes.<sup>18,19</sup>

PGY1 Community Pharmacy Residency Programs are designed to provide residents with experiences that allow graduates to grow into effective patient-centered pharmaceutical care providers in the community setting. Resident graduates who complete a community pharmacy residency program will be prepared to take positions in retail community pharmacies, ambulatory care settings, medication therapy management-based organizations, and community pharmacies providing disease state management services.

One example of a community pharmacy residency in Hawai'i is the DKICP/ Maui Clinic Community Pharmacy Residency program, established in 2010. The program focuses on providing evidence based pharmaceutical care in collaboration with interdisciplinary teams in rural community settings. Residents serve as providers of continuity of care between the community, clinics, two long-term care facilities, and the only acute care hospital on the island of Maui. Due to their availability in these settings, residents offer immunization services, medication management, and disease-state management support as a critical and trusted part of the medical community. Maui Clinic's rural health care system provides a unique opportunity for community pharmacy residents to participate in a medical home type model where patients may be followed from community clinic to hospital, rehabilitation, long-term care, and often back to their homes. Pharmacists in this setting follow many patients for a lifetime and form long lasting professional and personal bonds. In addition, pharmacists serve as volunteers on the Hawai'i Medical Reserve Corps to assist in disaster preparedness and public health emergencies.

### **Managed Care PGY1**

A managed care residency is the third type of PGY1 residency. Hawai'i does not currently have any managed care residencies. Health care plans, pharmacy benefit management companies,

managed care organizations, and colleges of pharmacy may be the primary hosts of these types of residencies that focus on disease state and formulary management specific to the sponsoring organization.

### **Components of a Post Graduate 2nd Year Residency**

Midway through the PGY1 residency year, similar to medicine subspecialties, residents may decide to pursue additional specialized training in an additional year of residency. This will require them to enter into another round of residency interviews and repeat the match process. ASHP currently recognizes more than 30 PGY2 pharmacy specialties. Most board certified specialties require either a specialized PGY2 training with practice experience in the area or at least 4 years of practice experience in the specialty.<sup>20</sup> There are two PGY2 pharmacy residencies in Hawai'i administered through DKICP: Critical Care (QMC) and Psychiatry/Mental Health (Hawai'i State Hospital). The goal of these PGY2 residencies is to develop specialists in the respective areas with a focus on clinical practice and academia/research. Required rotations for the Critical Care Residency are two months in duration in each of the cardiac, medical, neuroscience, and surgical/trauma intensive care units at The Queen's Medical Center. The rotations for the PGY2 residency in Psychiatry and Mental Health are held mainly at the Hawai'i State Hospital (HSH) within wards that care for all psychiatric illnesses, with patients ranging in age from eighteen to geriatric; a longitudinal experience in ambulatory care occurs in parallel at Waimanalo Health Center.

With the DKICPPGY2 residents' emphasis on academia and research, the hope is that graduates begin their careers in clinical pharmacy academe. PGY2 residents help with precepting pharmacy students on advanced pharmacy practice experiences (APPE) and assist with weekly case-based seminars for both acute care and ambulatory care learning experiences. Didactic teaching each semester includes 2-3 hours of lectures and workshops for integrated therapeutic topics with creation of appropriate exam questions and case assessment exercises.

### **Research and the Value of Longitudinal Experiences**

Every pharmacy residency program requires completion of a pharmacy practice research project. Components of projects must include the usual research process such as literature review, study design and methodology, data collection, and conducting appropriate statistical analysis. The project must be approved by all related Human Research Subject Committees and receive appropriate institutional review board (IRB) approval. Projects can range from the implementation of a new patient care service to assessment of a formulary conversion or the creation of a new pharmacotherapy protocol. The research project should be completed with a manuscript suitable for publication and project results are presented formally at both regional meetings such as the Hawai'i Pharmacists Association Annual Meeting and specialty/national conferences such as the Western States Pharmacy Residency Conference held in California for all residents, preceptors, and program directors within the western region of the United States.

Longitudinal experiences also comprise a valuable component of the residency, as they allow the resident to develop patient relationships over time and to better understand the challenges of chronic disease management from a pharmaceutical standpoint. Hypertension, hyperlipidemia, diabetes, and cardiovascular disease are common diseases for which residents will often have their own patient panel. Experiences that expose the resident to the continuum of care from hospital acute care to the ambulatory care setting helps with follow up with patients' medication adherence, screening for adverse drug reactions, side effects, and drug interactions.<sup>21</sup> Longitudinal projects involving formulary management allow the resident to shepherd a drug from formulary addition, monitoring of usage, and tracking of outcomes or reports on adverse drug reactions. Administrative experiences will expose a resident to project management steps from design and planning, to implementation and problem solving for new services, such as antibiotic stewardship or the implementation of electronic medical records. Residencies that focus mainly on inpatient or acute care may have a longitudinal ambulatory care component. An example is the DKICP PGY2 Psychiatry/Mental Health Program where, in addition to spending time at HSH, the resident works in the Waimanalo Health Center and assesses patients from an outpatient standpoint not only for chronic mental health medication management but also in chronic disease management.

### Career Choices Post-Residency

As of June 2014, 99 pharmacy residents have graduated from all of the Hawai'i's pharmacy residency programs with 75% remaining in Hawai'i to practice (range 67%-100%) Table 3. The areas of practice for the residency graduates are described in Table 4. In alignment with the type of residencies in Hawai'i, most graduates are practicing in hospitals with a growing number in the ambulatory care clinics. Graduates from the community pharmacy residency are practicing in both community retail pharmacy and ambulatory care settings.

### Discussion

Two main challenges that face pharmacy residency programs include funding sources for start up and as well as for continuation, and, secondly, availability of qualified pharmacist

preceptors who are trained in post-graduate residencies. Most funding sources for residencies come from the either the host site or from a pharmacy school. Increasingly harder to obtain are external funding sources from foundations, grants, and scholarships.<sup>8</sup>

For hospital-based residencies, aid for funding can occur with pass-through funding from the Center for Medicare Services' (CMS) current regulations (42 CFR 413.85).<sup>21</sup> Eligible programs must show proof of ongoing accreditation by the ASHP and proof that some pharmacist positions in the hospital require residency training as a condition of their employment.<sup>22</sup>

Funding for community pharmacy residencies may pose the least challenges given that their fiscally inclined business model helps to offset a resident salary. Some states pay community pharmacists to provide various levels of cognitive services to State Medicaid beneficiaries. Certain Medicare Part D Prescription Drug Plans (PDP) may contract for medication therapy management (MTM) services with private payers.<sup>23</sup> Activities related to diabetes care and insulin pump training can be charged if the pharmacy is an accredited Diabetes Self-Management Education (DSME) program.<sup>21</sup> Funding challenges for ambulatory care residencies will continue as long as the profession itself continues to seek status as health care providers as opposed to charging via Medicare Part B services as "incident-to" the physician supervising in the practice or

Table 3. Number of Pharmacy Resident Graduates Per Program and Percent Remaining in Hawai'i

Program	# Graduates (1988 -2014)	% Graduates Remained in Hawai'i after Residency
QMC	35	71%
TAMC	24 civilian, 15 officers	75% of civilian, Officers Unknown
KPM	13	92%
DKICP PGY1	7	100%
DKICP PGY2	2	100%
VA	3	67%

QMC (The Queens Medical Center), TAMC (Tripler Army Medical Center)  
 KPM (Kaiser Permanente-Moanalua), VA (Veterans Administration Honolulu)  
 DKICP PGY1 (The Daniel K. Inouye College of Pharmacy Post Graduate Year 1)  
 DKICP PGY2 (The Daniel K. Inouye College of Pharmacy Post Graduate Year 2)

Table 4. Known Practice Site of Hawai'i Pharmacy Resident Graduates

Program	Hospital/Acute Care (#)	Ambulatory Care (#)	Academia (#)	Community (#)	Administration (#)
QMC	35				
TAMC	11	5	1		1
KPM	3	5		2	2
DKICP PGY1	2		1 (ambulatory care)	4	
DKICP PGY2			2 (acute care)		
VA		2			1

QMC (The Queens Medical Center), TAMC (Tripler Army Medical Center), KPM (Kaiser Permanente-Moanalua), VA (Veterans Administration Honolulu)  
 DKICP PGY1 (The Daniel K. Inouye College of Pharmacy Post Graduate Year 1), DKICP PGY2 (The Daniel K. Inouye College of Pharmacy Post Graduate Year 2)

clinic. Currently, pharmacists are restricted to billing at the 99211 code and must see the patient on a different day than the physician visit.<sup>21</sup> Reimbursement for this service is capped at \$22/visit, which does not come close to covering the average hourly salary for a pharmacist (\$60/hr) who will spend 45-60 minutes per visit.<sup>21</sup> The state of California recently passed legislation, SB 493, that recognizes pharmacists as health care providers that will expand the role for pharmacists and increase access of patients to pharmacists' patient care services.<sup>21,24</sup> With recognized provider status, billing at a separate rate will help with funding of not only clinical pharmacist positions but also resident positions. The caveat will be not to fall into the same time pressures that physicians and other primary care providers face to cover costs with declining reimbursement rates.

Additional challenges for continuing positions and increasing the quantity of positions fall in the realm of pharmacist's training. By 2020, ASHP's standards will require all practicing hospital pharmacists to be either residency trained or specialty board certified in order to precept residents.<sup>7</sup> Since hospital residencies are the oldest type of program, a growing number of hospital pharmacists are meeting this standard. However, many pharmacists who practice in the ambulatory care and community pharmacy areas have not been resident trained and thus do not fulfill preceptor qualifications let alone qualify to be a residency program director for these types of residencies, thus leading to a "cart before the horse" scenario. But over time, as more ambulatory care and community pharmacy residents graduate, the shortage of qualified preceptors will hopefully recede. Institutions and community pharmacies are partnering with pharmacy schools to offer mini-residency programs while a pharmacist is employed in order to fulfill accreditation standards. Whether ASHP will allow for grandfathering in of pharmacist practitioners has been discussed but remains unresolved.

## Conclusion

Over the past 60 years, post-graduate pharmacy training has gained tremendous momentum, with substantial movement especially in the last two decades. However, with the increasing number of pharmacy school graduates, the need to establish more residency programs has reached an urgent level and is essential to elevate the practice of pharmacy toward innovation, adherence to best practices, and encourage careers in academia/teaching and scholarly research. The doubling of residency positions in the past few years in Hawai'i has helped stanch the drain of graduates who leave for the continental US and remain there after attaining the highest level of training. Next steps include seeking more secure funding in the three general practice types in order to increase availability.

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## AT LAST THE SGR IS DEAD, WELL MAYBE.

After years of pleading by physicians and organized medicine organizations, Congress has at last hit upon a plan for eliminating the SGR (sustainable growth rate) formula for Medicare reimbursement. Speaker John Boehner and Democrat leader Nancy Pelosi, together with representatives from both sides of the aisle, have agreed to sponsor the House bill. The change would allow the following: (1) completely eliminate the SGR as of March 31, (2) Increase Medicare physician reimbursement 0.05% per year for four years. The law is expected to be up for discussion and vote before the end of the month when the current SGR patch expires. It is way past time! Senate minority leader Harry Reid is set to obstruct passage if he doesn't get quid pro quo re abortion issues. He has announced that he will not run for reelection, so he has nothing to lose. Thanks for nothing, Harry. I hope he can find a family doctor in Nevada.

## HE STILL HAS HIS WITS ABOUT HIM.

Staying sexually active, and considering sexuality an important part of life, may be tied to higher cognitive abilities as people age. The American Journal of Geriatric Psychiatry, reported a study in the Netherlands, involving 1,747 men and women from a larger study of aging. Subjects averaged 71 years old. About three quarters had partners. Researchers assessed cognitive function with tests of memory, mental processing speed, and general fluid intelligence (the ability to reason and think abstractly). Subjects were given four questions about the importance of personal sexuality, the need for intimacy and touching with aging. A quarter of the subjects rated their current or personal sexuality as important or very important. Forty-one percent rated it as unimportant. Sixty-seven percent believed intimacy and touching are still needed in older people while 12% did not. Subjects who didn't see a need for sexual activity and considered their current sex life as unimportant or unpleasant had lower average cognitive scores compared with those who felt sexuality was important and needed their current sexual activity. A belief that sexuality was unimportant was significant in both sexes, but seemed stronger in women.

## COUMADIN CAN MOVE TO THE SIDELINES?

Boston Scientific Corp. won approval for their stroke device designed to protect the heart in cases of atrial fibrillation. The device, called Watchman, works as a plug sealing off the left atrial appendage so blood can't coagulate and escape into arteries. The Food and Drug Administration (FDA) had twice declined to approve the device because of fears about its safety and effectiveness. On three occasions, the FDA convened advisory committee meetings of outside experts to evaluate Watchman. The device will serve as an alternative to a commonly used blood thinner (frequently Coumadin) to prevent stroke in patients with atrial fibrillation. Boston Scientific estimates the global market for Watchman is \$500 million annually. They need the revenue to offset sluggish growth in its core markets of pacemakers and defibrillators.

## COME ON, DOC, TALK TO YOUR PATIENT.

Alzheimer's Disease affects 5.3 million Americans and is the sixth leading cause of death in the nation. There is no cure. Among other factors about the disease, doctors sometimes withhold the news, due to uncertainty about the diagnosis, lack of time to fully discuss it, or fear of causing emotional distress. Of the patients whose doctors listed Alzheimer's in their Medicare claims, 45% said they'd been told they had the disease. By contrast, 90% of patients with cardiovascular disease or breast, prostate, or colorectal cancer were told of their conditions. Seventy-two percent of Parkinson's disease patients said they were informed. The same survey revealed that 53% of Alzheimer's caregivers knew the diagnosis. When patients answered, only 33% said they had been told of the diagnosis. Beth Kallmyer, Alzheimer's Association vice-president said, "We are alarmed. This means that people are being robbed of the opportunity to make important decisions about their lives." The course of the disease is highly variable, and there are medications that can slow its progress. Some patients live 10 years or more after diagnosis and can participate in decisions about their care.

## I'VE MADE UP MY MIND. DON'T CONFUSE ME WITH FACTS.

Bisphenol-A or BPA is used in the lining of metal cans and plastics to ensure structural integrity and keep bacteria like E.coli off the dinner table. It has been widely used for more than 50 years as a covering for everything from tomato soup cans to bicycle helmets. The chemical has been tested and retested in more than 4500 studies over the last 30 years. The FDA has affirmed once again in November 2014 that human exposure to low levels of BPA is not dangerous. All that is not sufficient for anti-chemical activists who have maligned BPA as a toxic substance. The claim is it might act as an "endocrine disrupter" by mimicking hormones in the body. BPA has been allegedly linked to cancer, obesity, impotence, and you name it. Nalgene, a water bottle maker, has stopped using it and label their products "BPA-free."

## MARY AND JESUS WORLD TOUR

Jesus on a serving of chicken breast in Pocono Summit, Pennsylvania;  
Jesus in the fur of a Yorkshire terrier's ear, Swansea, Wales;  
Mary on a tree trunk in Polk City, Iowa;  
Jesus in the smoke of a house fire in Fresno, California;  
Jesus in the bird poop on a car in Crowthorne, England.

## ADDENDA

- Gadsby, a novel by English author Ernest Wright, has no word with the letter "e."
- Until Eve arrived this was a man's world.
- Do not use a cell phone in your car. Keep hands free for making gestures.
- O Lord, help me to be pure, but not yet.

## ALOHA AND KEEP THE FAITH *rts*

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

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