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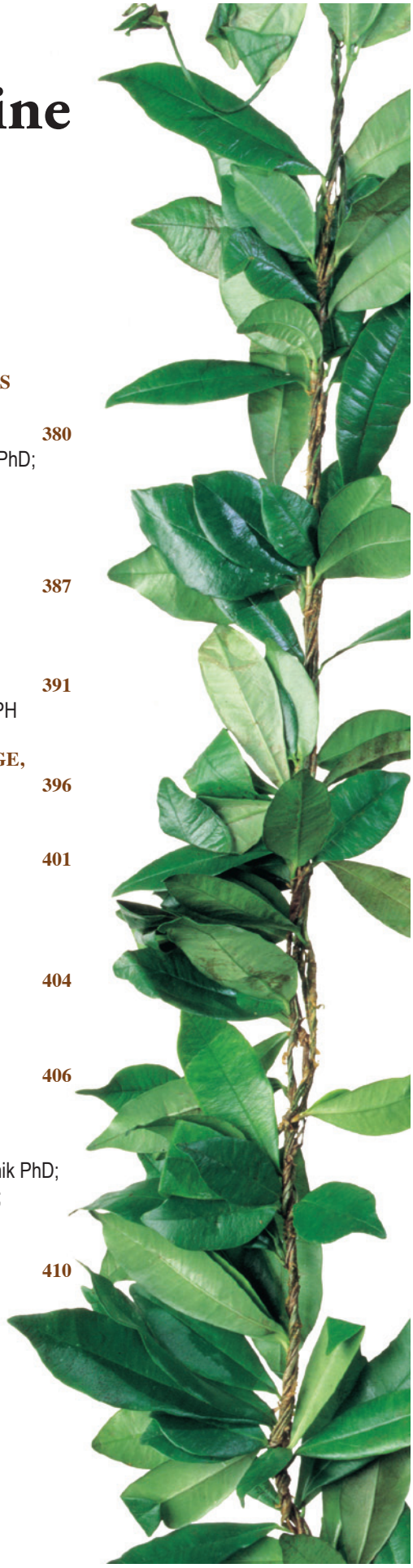

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# Hawai'i's Multiethnic Adolescent and Young Adult Survivors of Childhood Cancer: Are Their Health Behavior Risks Similar to State and National Samples?

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## Abstract

*Due to toxicities associated with their malignancies and treatments, adolescent and young adult survivors of childhood cancer (AYASCC) are at high risk for developing chronic diseases. This can be compounded by a greater prevalence of unhealthy behaviors relative to similarly aged non-cancer peers. Disparities in health behaviors have been noted for Black and Hispanic AYASCC, but data on Asian American (AA) or Native Hawaiian and Other Pacific Islander (NHOPI) minorities are lacking. The purpose of this study was to help bridge these information gaps by gathering data from Hawai'i AA and NHOPI AYSCC. Telephone surveys were used to collect health behavior data from survivors 13-24 years of age (N=64); 55% of the sample was female, 77% AA or NHOPI, 63% leukemia/lymphoma survivors, and 32% overweight/obese. These were compared to state/national survey data for similarly aged individuals (Youth Risk Behavior Surveillance System data for 13-17 year olds, and Behavioral Risk Factor Surveillance System data for 18-24 year olds). While Hawai'i AYASCC had significantly lower rates of tobacco/alcohol use, a higher proportion did not eat five fruits/vegetables a day (96%) compared to state (83%) and national (78%) samples (P < .001). Although many met age-specific physical activity recommendations, 44% of <18 year olds and 29% of ≥18 year olds still failed to meet national guidelines. Low intake of fruits/vegetables and suboptimal levels of physical activity place these vulnerable, ethnic minority cancer survivors at higher risk for chronic disease. These findings underscore the need to assess and advise survivors about their diet and exercise habits as part of post-treatment care.*

## Keywords

*Childhood cancer survivors; Asian and Native Hawaiian/Pacific Islander; Nutrition; Physical activity*

## Introduction

Due to advances in therapy over the last 30 years, five-year survival rates for children afflicted with cancer are high (70% - 80%), and these rates are sustained for up to 20 years after diagnosis.[1,2] Thus, the majority of pediatric cancer patients are likely to live many years after their therapy ends. However, due to the added burden of toxicities associated with their primary malignancies and treatments,[3-5] adolescent and young adult survivors of childhood cancer (AYASCC) are at increased risk for development of chronic diseases relative to the general population.[6]

While a healthy lifestyle can mitigate the severity of these problems, results from the National Cancer Institute (NCI) funded Childhood Cancer Survivor Study (CCSS) and the Children's Oncology Group (COG) revealed a disconcertingly high incidence of tobacco and alcohol use as well as physical inactivity among AYASCC.[7-11] The CCSS reports are from a multi-institutional (N = 26 institutions) study of children (less than 21 years of age) who survived 5 years or more after being treated between 1970-1986 for specific types of cancer including leukemia, brain tumor, Hodgkins lymphoma, non-Hodgkins lymphoma, etc.[12] A detailed description of eligibility and survey methods used in the CCSS cohort is available elsewhere.[12-14] The COG is a NCI funded clinical trials group devoted to childhood and adolescent cancer research conducted at over 200 children's hospitals, universities, and cancer centers across the United States and in foreign countries.[10,15,16] A study investigating the high risk behaviors of 117 childhood survivors of leukemia, previously treated in COG trials but who are currently young adults, found that 22% percent had smoked cigarettes in the last 30 days and 25% reported binge drinking in the last month.[10] A 2009 study by Tai and colleagues identified survivors of childhood cancer who participated, as adults, in the Behavioral Risk Factor Surveillance System (BRFSS) survey, and found that the childhood cancer survivors had significantly higher rates of smoking, obesity, heart disease, hypertension, and diabetes compared to respondents with no history of cancer.[6] A recent COG study of adult survivors of childhood cancer found they had high prevalence rates for adverse health outcomes related to pulmonary, auditory, reproductive, cardiac, and neurocognitive disorders/abnormal function.[17] Another recent single institution study showed that adolescents and young adult survivors reported significantly poorer health related quality of life than both the general population and those diagnosed at an earlier age. In addition, a significant proportion also failed to meet national recommendations for fruit and vegetable intake (76%), energy from fat (39%), fiber intake (96%), and physical activity (65%).[18] It is therefore disconcerting that although most childhood cancer survivors receive post-therapy medical care, only 18% of these encounters involved discussion of risk-based screening or counseling on behavioral changes to reduce risk.[11,19] Nevertheless, data indicate that survivors in the most at-risk subgroups are generally more interested in participating in diet and physical activity interventions, suggesting the benefit of future research to develop interventions in these areas.[18]

Disparities in health behaviors exist by race/ethnicity among AYASCC. The (2003) CCSS survey found that more AYASCC black survivors, compared to white, Hispanic or "other races/ ethnicities," were not meeting national guidelines for physical activity.[7] There is a lack of granularity with respect to these "other races/ ethnicities," including Asian Americans (AA), Native Hawaiians, and Other Pacific Islanders (NHOPI), where cultural or social factors can contribute significantly to health behaviors. For example, Lowry and colleagues combined the data from four nationally representative samples of United States high school students surveyed in the 2001, 2003, 2005, and 2007 Youth Risk Behavior Surveillance System (YRBSS). They found that AA were significantly less likely than black, Hispanic, or white students to have drunk alcohol, used marijuana,

or be currently sexually active; while NHOPI were much more likely than other ethnic groups to have contemplated suicide.[20] However, due to low numbers of AA and NHOPI in the CCSS national cohort study of AYASCC, their data are listed under the "other" race/ethnicity category and are not typically included in the statistical analyses for ethnic minorities. Thus, most of our current understanding has been gleaned from analyses of largely Caucasian populations, and there is practically nothing published about the prevalence of adverse health behaviors among AYASCC of AA or NHOPI ancestry.[7,18,21,22]

This study was undertaken to help bridge information gaps about AA and NHOPI AYASCC in Hawai'i, specifically to see if they had a higher prevalence of selected adverse health behaviors than similarly aged representative samples from Hawai'i and across the United States.[6,9,11,23]

## Methods

### Study Design

This study was a cross-sectional telephone survey of AYASCC from a children's cancer clinic on O'ahu, and all surveys and protocols were approved by the institutional review board of Kapi'olani Medical Center for Women and Children (KMCWC; RP#07-006-1HPH2).

### Eligibility and Enrollment

AYASCC patients who were diagnosed and treated from 1983 to 2008 at KMCWC and were between the ages of 13-24 years at the time the study was conducted, at least one month post-treatment, and could speak English were eligible. KMCWC providers at the cancer clinic pre-screened potentially eligible AYASCC and removed those patients who were currently in treatment, had moved or lived out of state, died, or who were still recovering from recent cancer therapy. The telephone surveys were conducted from 2007-2008. Parents of potentially eligible patients were mailed a recruitment letter along with a HIPAA (Health Insurance Portability and Accountability Act) consent and assent forms granting permission to access information in the patient's medical records and to participate in a telephone survey. A "do not contact" postcard was also included for uninterested parents or patients. Research staff called non-responders two weeks after the mailing to assess their interest in the study.

### Data Collection

Different age-specific surveys for AYASCC < 18 years old and ≥ 18 years old were used to assess health behaviors: the YRBSS for high school students, and the BRFSS for adults > 18 years of age.[24,25] Only selected questions on alcohol and tobacco use, physical activity, and fruit/vegetable intake were administered, as opposed to the entire YRBSS or BRFSS surveys. Verbatim questions from the YRBSS were slightly modified for administration via a telephone interview, so as to maintain the privacy of the youth answering at home (eg, questions were read to the respondent but there were no probing or follow-up questions, nor insistence on a reply, ie, respondents could answer "don't know" or "prefer not to answer"). The BRFSS and YRBSS questions used in this study are available, on request, from the first author.

### Comparison Samples

Age-matched results from our sample were compared to statewide and national surveys (for YRBSS < 18 years and BRFSS for ≥ 18 years). We downloaded (using the CDC online tool) United States and Hawai'i YRBSS (high school) prevalence data for a specific question and compared it to our < 18 years old AYASCC sample's percentages. We used a similar online tool to download the prevalence data for 18-24 year old adults who completed the United States and Hawai'i BRFSS, and compared their prevalence data to our 18-24 year old AYASCC.[26,27] Data from the 2005 or 2007 national surveys were used if available; otherwise data from the most recent previous year were used and noted in the results. Our sample of <18 year old survivors had a proportion of AA and NHOPI (70%) that was comparable to the 2007 Hawai'i YRBSS sample of 79% AA or NHOPI described in analyses conducted by Eaton and colleagues.[28]

### Statistical Methods

Statistical analyses were done using SAS (version 9.2; SAS Institute Inc., Cary, NC). Comparisons with state, national, and other research data were conducted using Chi-square analyses, Fisher's exact tests, t-tests, and two proportion z-tests.[29]

## Results

### Patient Characteristics

Of the 332 patients diagnosed from 1983-2008 who were between 13 and 24 years at the time of the study, 215 patients (64.8%) were potentially eligible and sent recruitment letters. Very few (4%) returned the "do not contact" postcard. One-fifth (20%) of the letters were returned undeliverable, and 3% were determined to be ineligible during follow-up contacts. No response was provided by 43%. Thus, the positive response rate was 29.8% (64 of 215 contacted). There was no difference between the proportion of respondents versus non respondents by age group (< 18 or ≥ 18 years old). Regardless of age, females were significantly more likely to participate than males (40.9% vs 22.8%, $P = .006$). There were no significant differences between the proportion of respondents versus non-respondents by race (white versus non-white) or cancer diagnosis. The total sample (Table 1) had a mean age of 18.9 ± 3.4 years, and 36% of the sample was < 18 years, with 19% white, 47% AA, 30% NHOPI, 2% African American, and 3% other. Most had leukemia or lymphoma, with an average of 9.1 ± 5.3 years since diagnosis, and many (66%) used state or federal insurance. About a third (32%) of the total sample was classified as overweight or obese according to age-specific criteria.

### Health Risk Behaviors

The AYASCC < 18 (13-17 years old) reported fewer risk behaviors than the YRBS samples from both Hawai'i and nationwide (see Table 2).[28,30,31] Only one (4%) AYASCC had

| Table 1. Demographic Characteristics of Adolescent and Young Adults Survivors of Childhood Cancer in Hawai'i | | | |
|---|---|---|---|
| | **Total Sample** | **<18 years** | **≥18 years** |
| **Total N** | 64 | 23 | 41 |
| **Mean Age (years ± S.D.)** | 18.9 ± 3.4 | 15.3 ± 1.5 | 20.9 ± 2.3 |
| **Age Range (years)** | 13-24 | 13-17 | 18-24 |
| **Gender n (%)** | | | |
| Female | 35 (55) | 13 (57) | 22 (54) |
| Male | 29 (45) | 10 (44) | 19 (46) |
| **Ethnicity n (%)** | | | |
| Hispanic | 10 (16) | 5 (23) | 5 (12) |
| Non-Hispanic | 54 (84) | 18 (78) | 36 (88) |
| **Race n (%)** | | | |
| Asian | 30 (47) | 11 (47) | 19 (46) |
| White | 12 (19) | 7 (30 ) | 5 (12) |
| Native Hawaiian or Pacific Islander | 19 (30) | 5 (22) | 14 (34 ) |
| African-American | 1 (2) | 0 (0) | 1 (2) |
| Other | 2 (3) | 0 (0) | 2 (5) |
| **Cancer diagnosis* n (%)** | | | |
| Leukemia, Lymphoma | 40 (64) | 15 (68) | 25 (61) |
| Brain tumor | 6 (10) | 1 (5) | 5 (12) |
| Solid tumor (extracranial) | 16 (25) | 5 (23) | 11 (27) |
| Other | 1 (2) | 1 (5) | 0 (0) |
| **Time since diagnosis (years ± S.D.)*** | 9.1 ± 5.3 | 7.6 ± 3.4 | 9.9 ± 6.0 |
| **Body Mass Index (BMI kg/m$^2$)*** | 23.9 ± 5.4 | 22.4 ± 5.0 | 24.7 ± 5.5 |

*One cancer Dx, one time since diagnosis, and one BMI were missing

| Table 2. Behavoral Risk Factors among AYASCC 13-17 Years and similarly aged Hawai'i/National representative samples | | | | | |
|---|---|---|---|---|---|
| | **13-17 Yrs AYASCC Sample (n=23)** | **High School YRBS Hawai'i (n=1,191)** | ***P*-value*** | **High School YRBS United States (n=13,840)** | ***P*-value**** |
| **Tobacco Use** | | | | | |
| Ever tried cigarette smoking | 4 % | 67.2%† | < .001 | 50.3% | < .001 |
| Smoked a cigarette in last 30 days | 0.0% | 27.9%† | < .001 | 20.0% | < .001 |
| **Alcohol Use** | | | | | |
| Ever had a drink of alcohol | 9% | 58.7% | < .001 | 75.0% | < .001 |
| Had 1 drink in last 30 days | 4 % | 29.1% | < .001 | 44.7% | < .001 |
| **Nutrition** | | | | | |
| Did not eat ≥ 5 fruits/vegetables per day | 96% | 82.8% | < .001 | 78.6% | < .001 |
| **Physical Activity** | | | | | |
| Not Active ≥ 60 min/day for ≥ 5 days in last week | 44% | 65.7% | < .001 | 65.3% | < .001 |
| Did not play on sports team in past 12 mo | 52 % | 45.4%† | .052 | 43.7%† | .013 |

*Comparison of sample to state YRBS data; **Comparison of sample to national YRBS data; † Data from 1999 YRBS

| Table 3. Behavioral Risk Factors among AYASCC 18-24 Years and similarly aged Hawai'i/National representative samples | | | | | |
|---|---|---|---|---|---|
| | **18-24 Years AYASCC Sample (n=41)** | **18-24 years BRFSS Hawai'i (n=319)** | ***P*-value*** | **18-24 years BRFSS United States (n=15,396)** | ***P*-value**** |
| **Tobacco Use** | | | | | |
| Smoked ≥100 cigarettes in entire life | 21 % | 32.4% | 0.004 | 31.5% | 0.004 |
| Current smoker† | 0% | 66.9% | <0. 001 | 75.6% | <0. 001 |
| **Alcohol Use** | | | | | |
| Had 1 drink in last 30 days | 44% | 52.6% | 0.009 | 52.2% | 0.004 |
| Average drinks per drinking day†† | 4.88 | 4.29 | 0.66 | 3.84 | 0.514 |
| **Nutrition** | | | | | |
| Did not eat ≥5 fruits/vegetables per day | 78 % | 73.1% | 0.105 | 73.4% | 0.086 |
| **Physical Activity** | | | | | |
| Did not meet recommendations for physical activity (ie, > 150 minutes of moderate to vigorous physical activity per week) | 29 % | 41.1% | <0. 001 | 45.1% | <0. 001 |

*Comparison of sample to state BRFSS data; **Comparison of sample to national BRFSS data; †Now smoke every day or some days, of those who have smoked ≥100 cigarettes in entire life; ††Of those who drank in last 30 days.

ever tried smoking, compared to 67.2% and 50.3% of the state and national YRBS samples, respectively. Likewise, alcohol consumption rates were lower among AYASCC, with only 9% reporting that they had ever drunk alcohol compared to 58.7% of the Hawai'i and 75% of United States YRBSS samples. All of these comparisons were statistically significant, with *P*-values < .001. AYASCC <age 18 were more likely to be physically active than the state and United States YRBSS samples < 18 years of age. However, nearly all AYASCC (96%) ate fruit/vegetable fewer than 5 times per day, compared to 82.8% in the Hawai'i and 78.6% national YRBS samples (*P* < .001 for both). Results for AYASCC >18 (18-24 years) are shown in Table 3. Relative to respondents to the BRFSS national survey, they were significantly less likely to have smoked ≥ 100 cigarettes in their entire life, to be a current smoker, and to have had a drink in the past 30 days. A larger proportion (78%) reported eating fruit/vegetables less than 5 times per day compared to the state and national BRFSS samples (73.1% and 73.4%, respectively); however, these differences were not statistically significant. Our ≥ 18 years old sample was more likely to meet physical activity recommendations. Only 29% did not meet the recommendations (ie, ≥ 150 minutes per week of moderate to vigorous aerobic physical activity[32]), compared to 41.1% in the state (*P* = .003) and 45.1% nationally (*P* < .001).

## Discussion

This study is the first to examine multiple health risk behaviors in a sample of primarily AA and NHOPI AYASCC. KMCWC is the only hospital in Hawai'i that delivers comprehensive care for children with cancer. Its clinic was well suited for our investigation due to the large percentage of AA and NHOPI in Hawai'i.

Our results indicate that our sample of largely AA and NHOPI < 18 years AYASCC had significantly lower rates of tobacco and alcohol use compared to state and national data, regardless of race, and when compared to YRBSS rates reported for AA and Pacific Islander high school students (data combined across four years).[20] The ≥ 18 year old sample was less likely to have smoked in their entire life or be a current smoker than both state and national samples (*P*-values < .001). More Hawai'i AYASCC met national guidelines for physical activity compared to their peers, although many (44% < 18 years and 29% ≥ 18 years) still failed to meet their national age-specific guidelines. A significantly higher proportion of AYASCC ate fewer than 5 fruits/vegetables a day.

Direct comparisons with previously published studies are difficult due to differences in sample sizes, survey methodology, and patient characteristics. However, our results appear consistent with previous CCSS findings with respect to smoking in ethnic minority (Hispanic and Black) adult survivors of childhood cancer.[21] Also, our >18 year old AYASCC sample had much lower smoking rates than similarly aged AYASCC in two large studies- the CCSS and COG.[10,11] Reported drinking rates were significantly lower among both of our AYASCC samples compared to BRFSS data from national samples and previous AYASCC samples.[10,21] The levels of inactivity in the Hawai'i AYASCC were comparable to several previous findings for AYASCC,[7,11] but not as high as the 70-80% rates of inactivity reported in other studies.[33,34] Thus, for several behavioral risk factors, including tobacco, alcohol, and physical activity, the risks in our largely AA and NHOPI sample of AYASCC were lower than risks for their similarly aged non-cancer peers in Hawai'i, across the United States, and the largely white AYASCC samples in previously published reports.

It should be emphasized that an overwhelming majority of both our < 18 year old and ≥ 18 year old AYASCC did not meet national guidelines for eating fruit and vegetables five times a day. The 96% non-compliance rate seen in our < 18 year olds

was higher than previously reported (75.6%) for AYASCC pre-adolescents,[35] and was significantly higher than the state or national rates for this age group. Insufficient fruit/vegetable intake for our ≥18 year old AYASCC was no different from state and national averages, and was similar to the amounts (76% and 79%) in previous evaluations of the dietary practices of AYASCC.[18,36]

There are numerous influences that shape adolescents' food choices, particularly for fruits and vegetables, including genetic, social, cultural, media/marketing, and physical environmental factors.[37,38] It is difficult to pinpoint why so many of our adolescent AYASCC in Hawai'i failed to meet national recommendations with regard to diet, particularly in light of their levels of physical activity, since both healthy and unhealthy behaviors tend to cluster together.[39,40] It could possibly reflect residual influences resulting from a required avoidance of some fruits and vegetables during cancer treatments undergone during developmental phases (6-10 years of age) when taste preferences are formed or solidified.[41,42] Although our data is cross-sectional, since AYASCC ≥18 years had a higher consumption of fruits/vegetables, perhaps it is because AYASCC eventually increase their consumption as they grow up, and their intake then becomes more comparable to the US average for adults. The instruments used to measure fruit and vegetable intake in the YRBSS / BRFSS collected the number of occasions or times per day a fruit or vegetable was eaten (ie, serving sizes were not described or reported), and so this method may underestimate the intake of some foods. For example, a large green salad could represent three or more servings of vegetables, but using the YRBSS method it would only count as one occasion or time per day when a vegetable was eaten.

## Study Limitations

Although it was comparable to some other studies of childhood cancer survivors, a possible limitation of our study was its 29.8% response rate and the resulting small sample size. One survey of young adult cancer survivors recruited from cancer organizations (aged 18-40 years) had a lower response rate of 14.7%,[43] while other surveys of adolescent and adult cancer survivors identified through medical records and registries had similar response rates of 33%-38%.[44-46] Another potential limitation is social desirability, or a tendency to answer questions in ways subjects thought were more acceptable. The study's sample size precluded analyses based on time from diagnosis, cancer type, or gender and race comparisons. Thus, we aggregated data from the diverse race/ethnic groups that comprise our AA and NHOPI survivors, which is unfortunate since research with healthy teens has found differences in the prevalence of health behaviors across these ethnicities/races.[20,47,48] For example, our results for a combined sample of AA and NHOPI cancer survivors could mask substantial differences in high risk behaviors between populations with very different social and cultural backgrounds, as was found in national YRBSS data where healthy Pacific Islander teens had significantly higher rates of smoking and alcohol use, compared to Asian teens.[20] Finally, our sample combined middle school and high school aged survivors, while the YRBSS representative samples differentiate between these two age groups. The YRBSS is also only conducted in public schools across the United States, and we did not ask our survivors if they went to public or private school. However, the majority of our AYASCC were from families that used state or federal-funded insurance; thus, our respondents may have been more likely to have attended public schools. These factors including the differences in our survey methodologies, especially the telephone survey we used for <18 year old survivors, affect the generalizability of our findings, particularly with respect to the health behaviors of specific race/ethnic subgroups within AA and NHOPI adolescent/young adult survivors of childhood cancer.

## Implications

These results reveal a need for AYASCC survivors to have a better appreciation of the late effects of their cancer therapies, including an increased risk for chronic diseases. Intake of fruits and vegetables and physical activity are behaviors that have been identified as opportunities for improvement in AYASCC.[49] Previous research by others indicates that AYASCC with a higher level of readiness to make a change in physical activity were more motivated and had fewer barriers to increasing their physical activity.[18,33] These results and those from the published literature raise several important questions that could be addressed in future research projects. Differences in health behavioral risk factors based on medical issues (ie, time since cancer diagnosis), cancer diagnosis, race/ethnicity, level of motivation to make a change in a risky behavior, and psychosocial factors could be pursued in future investigations of AYASCC. Also, research might be proposed to test the design and evaluation of a clinical management system (linked to or delivered via an electronic medical records program) that would assess AYASCC's motivation to change a health behavior and also facilitate appropriate physician-based advice to decrease lifestyle risks tailored to that level of motivation.

## Conflict of Interest

None of the authors identify a conflict of interest.


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# A Pilot Structured Resident Orientation Curriculum Improves the Confidence of Incoming First-Year Obstetrics and Gynecology Residents

Mark Hiraoka MD; Ginny Kamikawa; Richard McCartin MD; and Bliss Kaneshiro MD

## Abstract

*A prospective, observational study was performed to evaluate a pilot orientation curriculum which involved all 7 incoming obstetrics and gynecology residents in June 2012. The objective of this study was to assess how a structured orientation curriculum, which employs an evaluation of baseline competency, affects the confidence of incoming first-year obstetrics and gynecology residents. The curriculum included didactic lectures, online modules, simulation, and mock clinical scenarios. Pre- and post-course surveys were conducted online via SurveyMonkey™ and were sent to all incoming obstetrics and gynecology residents. All seven incoming obstetrics and gynecology residents completed the orientation curriculum which included evaluations at the end of the orientation to assess baseline competency prior to taking part in clinical care. Confidence levels improved in all 27 elements assessed. Statistically significant improvement in confidence levels occurred in cognitive skills such as obstetric emergency management (2.9 vs 3.9, P< .05) and technical skills such as knot tying (3.9 vs. 4.6, P< .05). Certain teaching skills also demonstrated statistically significant improvements. A structured orientation program which improves resident self-confidence levels and demonstrates baseline competencies in certain clinical areas can be valuable for many residency training programs.*

## Introduction

The transition from medical student to resident physician often invokes anxiety, particularly among those entering a surgical specialty where procedural skills are required for patient care. This transition has primarily been fostered through on the job training where residents learn through trial and error to care for patients over the course of weeks or months. In 2000, the Institute of Medicine released the report *To Err is Human: Building a Safer Health System*.[1] This report focused attention on patient safety and outlined why this non-standardized, trial and error type of orientation is flawed.

The senior year medical school boot camp has been integrated into some residencies. Some medical student graduates, however, do not have access to these boot camps prior to entering residency.[2] Many residency training programs instead employ a program-specific orientation curriculum for incoming first-year residents. A survey of emergency medicine training programs revealed that 93% had resident orientation programs.[3] Orientation programs take place either prior to starting clinical rotations or during the first few months of clinical duties. These programs orient incoming residents, provide clinical skills training and conduct competency assessments. They often employ a structured curriculum which reviews knowledge, technical and clinical skills. Orientation programs have been well-received by residents in many disciplines including obstetrics and gynecology.[4,5]

Pre-clinical general surgery orientation programs have been shown to improve incoming resident confidence levels in many elements of patient care.[6,7] Unfamiliarity with staff and patient care settings, coupled with uncertainty about clinical skills and medical knowledge, can lead to higher levels of stress for first-year residents. Stress, demonstrated by tension-anxiety scores and physiologic parameters, has been shown to be the highest for residents at orientation and while on call.[8,9] Increasing resident confidence levels could potentially ease this stressful transition period.

Confidence does not necessarily result in improved competence.[10] Orientation programs should also result in improved resident competence. A recent study involving internal medicine first-year residents, described a simulation-based orientation program which incorporated a rigorous assessment of competency for various procedures that was well received by the participants. They demonstrated increased resident confidence levels and skills examination scores after course completion.[11] A similar effect was reported in continuing obstetrics and gynecology residents.[12] The objective of this study was to describe a structured pre-clinical obstetrics and gynecology orientation curriculum, which adds a formal evaluation of baseline competency in certain elements of patient care, and assesses how it affects resident confidence.

## Methods

A prospective observational study of the University of Hawai'i Obstetrics and Gynecology resident orientation curriculum was conducted in June 2012. Exempt status was granted by the University of Hawai'i Institutional Review Board. The orientation curriculum took place over 10-days. The goal of the orientation program was to achieve baseline competency in certain medical knowledge areas and clinical skills which were based on the evaluations of previous residents, the program director, and faculty. The curriculum was taught by faculty and fourth-year chief residents. Teaching methods included lectures, online modules, simulations, and mock clinical scenarios.

Each medical knowledge area and technical skill was assessed by an appropriate method (Table 1). Cognitive and communication elements were assessed via written and oral examinations, standardized online course completion, and performance in simulation exercises. Competence in technical skills, such as knot tying, were confirmed when first-year residents were able to successfully demonstrate these skills to a faculty member. Competency was confirmed for medical knowledge topics by completion of various training programs. As an example, residents demonstrated proficiency in contraceptive implant training by demonstrating insertion using a training model. Residents demonstrated proficiency with fetal heart rate interpretation

| Table 1: Intern Orientation Educational Curriculum | | | |
|---|---|---|---|
| **Educational Objective** | **Teaching Method** | **Evaluation Method** | **Proof of Competency** |
| Professionalism and Communication Skills in Residency | Didactic and demonstration | Oral examination with cased based scenarios | Passed oral examination |
| Research as a Resident and Evidence Based Medicine | Didactic | Written examination | Passed written examination |
| CITI Training | Online courses | Post-module online examination and certification | Passed online examination and received certification |
| Documentation and Dictations | Didactic and demonstration | Simulation: dictate a procedure | Passed skill performance examination |
| Duty Hour and Procedural Logging | Didactic and demonstration | Simulation: log a procedure | Passed skill performance examination |
| Ultrasound Basics | Didactic and demonstration | Written examination | Passed written examination |
| Management of labor | Didactic | Oral and written examination | Passed oral and written examination |
| Management of Obstetric emergencies | Simulation | Oral and written examination | Passed oral and written examination |
| Pelvic and Perineal Anatomy with Clinical Correlation | Didactic | Written examination | Passed written examination |
| Gowning, Gloving, Scrub Training | Skills Lab with hospital provided supplies | Simulation: gown, glove and scrub at sink | Passed skill performance examination |
| Knot tying | Skills Lab with knot tying boards | Simulation: tie one-handed and two-handed knots | Passed skill performance examination |
| Surgical Instruments | Didactic and demonstration | Written examination | Passed written examination |
| Introduction to Laparoscopy | Skills Lab with box trainer | Simulation: basic skills with box trainer | Passed skill performance examination |
| Implant Contraceptive Training | Skills Lab with Industry provided kits and online course | Post-training written examination and simulation | Passed written and skill performance examination and received certification |
| SAFER Sleep Deprivation Program | Online course | Post-module online examination | Passed online examination and received certification |
| Fetal Heart Tracing HealthStream Course | Online course | Post-module online examination | Passed online examination and received certification |
| Neonatal Resuscitation Program | Standardized training course | Post-course examination | Passed course examination and received certification |

by completing an on-line course and passing an on-line exam. Only residents who demonstrated adequate competency in all areas were allowed to start clinical rotations.

Pre- and post-course survey questions were piloted prior to starting the study. The surveys were conducted online via www.surveymonkey.com and were distributed to all incoming obstetrics and gynecology residents (N=7). Surveys were anonymous. Responses were rated on a Likert scale of 1 to 5 with "strongly agree" and "very good" assigned a value of 5 and "strongly disagree" and "very poor" a value of 1. Surveys included questions that assessed the confidence levels of 27 clinical, technical, and teaching skills required of obstetrics and gynecology interns.

Descriptive statistics, including mean values were calculated and data was analyzed utilizing paired t-tests. All analyses were performed using SPSS 16.0 for Windows (SPSS Inc., Chicago, IL). The level of significance was alpha <0.05.

## Results

All seven incoming first-year residents participated in the obstetrics and gynecology orientation course. Residents reported low baseline confidence levels (scores <3.0) in many cognitive elements including: management of abnormal labor, management of obstetric emergencies, and knowledge of perineal anatomy. In addition, they reported low confidence in documentation skills such as dictating a surgical procedure note and writing proper postpartum transfer orders. Residents were more confident (scores ≥4.0) in gowning, gloving, and writing labor and delivery progress notes. Statistically significant post-course improvements in confidence were demonstrated in clinical skills such as obstetric emergency management (2.9 vs 3.9, $P < .05$) and abnormal labor management (2.9 vs 4.0, $P < .05$). Additionally, statistically significant improvements in confidence levels also occurred in technical skills such as knot tying (3.9 vs 4.6, $P < .05$) and teaching skills such as proper medical student evaluation skills (2.9 vs 3.9, $P < .05$). The complete results are displayed in Table 2.

## Discussion

In 1999, the Accreditation Council for Graduate Medical Education (ACGME) launched the Outcome Project to focus residency education on six core competencies: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice.[13] Since the ACGME developed the six core competencies, residency programs have strived to develop competency-based educational methods and tools to teach and evaluate residents. These tools and evaluation measures have

| Table 2. Curriculum Impact on Resident Confidence Levels | | | | |
|---|---|---|---|---|
| | | **Pre-Course Score** | **Post-Course Score** | ***P*-Value** |
| **Medical Knowledge** | Understanding of normal and abnormal labor | 3.7 | 4.2 | .20 |
| | Understanding the management abnormal labor | 2.9 | 4.0 | .03 |
| | Common drugs given on labor and delivery (eg. induction, hemorrhage, etc.) | 3.3 | 4.3 | .09 |
| | Understanding a fetal heart tracing and the ability to differentiate the categories | 3.3 | 4.0 | .18 |
| | Management of an obstetrical emergency (at an intern level) | 2.9 | 3.9 | .02 |
| | Perineal anatomy in relation to obstetric laceration repair | 2.7 | 3.9 | < .01 |
| | Anterior abdominal wall anatomy | 3.3 | 4.3 | .11 |
| | Basic pelvic anatomy | 3.0 | 4.1 | .07 |
| | Basic surgical instruments on a c-section tray | 3.0 | 4.7 | < .01 |
| | Fundamentals of neonatal resuscitation | 3.6 | 4.1 | .10 |
| | Fundamentals of evidence based medicine | 3.6 | 3.9 | .36 |
| | Designing an effective resident research study | 3.1 | 3.9 | .09 |
| **Surgical Skills** | Tie a one handed surgical knot | 3.7 | 4.6 | .08 |
| | Tie a two handed surgical knot | 3.9 | 4.6 | .04 |
| | Properly gown and scrub for surgery | 4.1 | 4.6 | .08 |
| **Interpersonal and Communication Skills** | Performing a proper patient handoff | 3.6 | 3.9 | .36 |
| | Performing a proper informed consent | 3.1 | 3.7 | .17 |
| | Performing as part of the care team in obstetric emergency | 3.0 | 4.0 | < .01 |
| **Medical Documentation** | Writing a labor and delivery admission history/ physical and admission orders | 3.1 | 4.1 | .13 |
| | Writing a labor and delivery progress note | 4.0 | 4.6 | .03 |
| | Writing a proper delivery note | 3.3 | 3.9 | .23 |
| | Dictating a surgical procedure note (eg, c-section) | 2.4 | 3.4 | .04 |
| | Transferring a patient from the labor unit to the postpartum unit (eg, postpartum orders) | 2.9 | 4.3 | .04 |
| | Writing discharge orders and dictating a discharge summary | 3.0 | 3.4 | .41 |
| **Teaching Skills** | Teaching medical students effectively | 3.1 | 3.7 | .17 |
| | Giving feedback to medical students effectively | 3.0 | 3.7 | .09 |
| | Evaluating medical students effectively | 2.9 | 3.9 | < .01 |

become increasing important as the ACGME has required that programs demonstrate residents are prepared for progressive authority and responsibility. Medical students graduate with varying levels of clinical experience. Thus, ensuring that all incoming first-year residents possess a baseline competency in key clinical domains is an essential prerequisite to providing clinical care.

Past studies in other specialties have demonstrated improved resident confidence levels following traditional orientation programs.[6,7] In June 2012, the incoming obstetrics and gynecology first-year residents completed a structured orientation curriculum. Although elements of the curriculum had been used for many years, the orientation, for the first time, included competency assessments to assure that all incoming residents possessed baseline competencies in certain domains. Even with a potentially stress-provoking competency evaluation process, confidence levels still improved significantly in various cognitive, technical, and teaching skills. The curriculum was successful in significantly improving confidence in all areas which were identified as baseline areas of low confidence such as obstetric emergency and abnormal labor management.

Irrespective of actual improvement in confidence, knowledge of post-course confidence can be useful in understanding a resident's self-perceived strengths and weaknesses. Areas with the lowest post-course confidence levels can be identified and emphasized in future training. These areas can be reassessed at various points throughout their training to determine if there were improvements.

Significant improvement in resident confidence was demonstrated; however there are several study limitations. It is unclear whether our subjective measures of confidence actually translate into improved clinical care and patient safety.

However, a number of studies have demonstrated simulation-based training correlates with improved patient outcomes in the area of rapid response medical teams and procedures such as central venous catheter placement.[14-16] These investigators reported a statistically significant decrease in catheter-related blood stream infections following a structured simulation-based catheter placement training course which involved internal medicine and emergency medicine residents.[17] Since the survey was anonymous, we were unable to track residents forward to determine whether patient care was affected by our orientation program.

This study was conducted at a single residency program limiting generalizability. Even if we had included a larger, multi-institutional cohort, differing rotation schedules and the changing duty hour program requirements would have affected our results. Study results may also be confounded by social desirability bias, where incoming residents thought that they should feel more confident following training. Future studies should build on the findings of increased confidence and examine the impact of pre-clinical training programs on obstetric and gynecologic patient safety outcomes. The effect on competency could be used as a preliminary surrogate for patient safety outcomes and could be assessed by comparing objective pre-course and post-course competency test results.

The transition from medical student to resident can be an anxiety-provoking experience. New residents often feel unprepared for their new role as physicians with real clinical responsibilities. This anxiety can be reflected in their interactions with staff and patients, serving to further undermine their confidence. A structured orientation program which improves self-confidence could help ease this transition. This study demonstrated that an obstetrics and gynecology resident orientation program can both assess competency and improve resident confidence levels. This may prove useful as programs strive to meet new ACGME competency requirements prior to starting clinical duties.

## Conflict of Interest

None of the authors identify any conflicts of interest or significant financial disclosures relevant to this paper.

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# An Exercise Program to Prevent Falls in Institutionalized Elderly with Cognitive Deficits: A Crossover Pilot Study

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## Abstract

*Falls are the leading cause of injury among older adults in the United States, with the institutionalized elderly at elevated risk for injury and death. Physical weakness and mental frailty, prevalent in institutionalized elderly, are major risk factors for falls. The purpose of this study was to evaluate a program that addresses both the physical and mental aspects of exercise to reduce falls in institutionalized elderly. Twenty-seven volunteer subjects residing in an assisted living facility participated in the 24 week randomized crossover study. After demographic, fall history, and mental status examinations, subjects were randomly assigned first to ten weeks of either an exercise class or a control group, followed by a four week "washout period" of no activity, then cross assigned to ten weeks as either a control group or exercise class, respectively. Falls as well as mental status changes were monitored during the study. After adjusting for differences in baseline risk between the control and treatment groups, and for potential residual effects of the treatment during the crossover phase, a statistically significant (P = .025) reduction in falls was found during treatment compared to the control periods. No change in mental status was seen. This small, pilot study shows that exercise programs, which emphasize mental strengthening as well as physical fitness, have the potential to reduce falls among mentally impaired, institutionalized seniors.*

## Introduction

Falls amongst the elderly represent a major public health concern in Hawai'i, with falls contributing to excess morbidity and mortality in the geriatric community.[1] As of 2012, falls were the leading cause of death from unintentional injuries in Hawai'i and 79% of the deceased were seniors over the age of 65. Additionally, 68% of all hospitalizations from falls occurred in elderly residents.[2] In the United States as a whole, one out of three adults aged 65 and over experience a fall annually, with falls being the leading cause of injury-related deaths among older adults.[3,4] As the population of the United States ages, falls are projected to become an increasing burden on the health care system. From1980 to 2008, the population of individuals in the United States over 75 years of age nearly doubled, with this age cohort currently composing 6% of the population.[1]

Due to the changes in strength, gait, vision, and mental clarity that accompany the natural process of aging, the elderly tend to suffer serious medical consequences such as brain injuries, hip fractures and lacerations when they do fall.[5] In 2007, the United States reported 400,000 hospitalizations for falls. The elderly whose falls result in hip fractures have a 20% to 30% mortality rate within a year of the fall incident.[6,7] In addition to the physical damage that falling causes, the experience of suffering a fall has negative effects on the mental health of older adults. The majority of the elderly who fall develop an intense fear of falling, causing anxiety and self-imposed mobility restrictions amongst both community dwelling and independently living seniors.[8] This inhibition of mobility as a result of fear decreases physical fitness and activity levels in the elderly, in turn increasing the risk that an individual will experience another fall.[9]

Seniors who reside in assisted living institutions, on average, tend to be in worse health than their counterparts living in the community, making them especially prone to health problems associated with (leading to and resulting from) falls. Over 25% of residents in assisted living suffer from 4-10 chronic health conditions including dementia, osteoporosis, arthritis, cancer, and heart disease.[10] Older adults in institutions also tend to have lower levels of mental clarity as compared to their home dwelling counterparts, often exacerbated by extensive medication use.[11] The combination of these factors puts seniors in assisted living facilities at high risk of falls due to their functional limitations and overall elevated levels of frailty. Almost 10% of those who fall in institutions sustain a serious injury and 25% to 75% of them do not recover their pre-fall level of mobility or ambulatory function in daily life.[12] Injuries sustained from falling are a common reason for the need to transfer older adults from assisted living to skilled nursing facilities, leading to an increase in cost and a decrease in independence and autonomy for the individual.[13]

While modifications to the built environment such as ramps and grab bars have been shown to reduce falls in the independently living elderly, residents of assisted living continue to fall despite extensive physical modifications for safety within elder care facilities.[14] Almost 30% of falls in these facilities can be attributed to hazards that are not directly related to the built environment, including spills on the floor, sedative medication use, and an inability of the seniors to be safely motile while simultaneously performing a mental task.[14] Previous research has shown that exercise programs can mitigate these fall risks in seniors by improving balance and cognitive functioning.[11,13,15] In this paper, we present findings from a randomized controlled study in which we examine the effects of the exercise program *Move With Balance*® (MWB) on reducing the incidence of falls. We did not examine the effect on the severity/consequences of falls, once they occurred.

## Methods

The study was conducted at a 98-unit assisted living community located in Kahului, Maui, Hawai'i. An integrative physical and mental exercise program served as the study intervention. The study program (MWB) consisted of a set of 60 activities combining strength and balance training with cognitive and spatial awareness tasks. The latter can involve any type of sensory input, mental processing, and expression. The two specific exercises from MWB exemplify these principles: Participants were paired off facing each other, one showing the other an "arrow chart"; a sequence of arrows in 4 random directions. The first round of exercises asked the responder to thrust out their arms and call out the direction of the indicated arrow. When this was mastered, the next round had the responder say and

do the opposite of what the arrow showed. In the final round, the participant was to say the opposite direction but move their arms in the same direction as the arrow. Roles were subsequently switched. Another exercise had the participants slowly march in place touching opposite hands to knees. After a rhythm was established this basic cross crawl pattern was repeated with eyes closed, eyes open while walking around, eyes moving left and right, and finally while counting out loud backwards from 100 by 3. In 2012, the program was selected by the American Society on Aging and the MetLife Foundation as the winner of the MindAlert Award in the category for programs designed to enhance mental fitness in older adults.[16]

A randomized crossover study design was used to examine the effects of the intervention. The study subjects, who gave either personal or guardian informed consent, were randomly assigned to begin the study in either the treatment (Group A) or control (Group B) groups. Treatment consisted of weekly exercise sessions for 10 weeks, each an hour-long MWB class. During their period as controls participants were monitored for falls but did not participate in exercise classes. No placebo was offered. Following the initial ten weeks, all participants were placed in a 4 week "washout period" in which no intervention was given. After the washout period, the two groups crossed-over, with Group A continuing in the study for 10 weeks as controls and Group B serving as the intervention group. For this study the term exercise arm will refer to the combined exercise periods of both groups A and B and control arm as the combined control periods of both groups A and B.

The study ran for 24 weeks. Baseline demographic data was collected on subjects at the start of the study and falls were monitored throughout. A fall incident was defined as an event in which at least three points of the body made contact with the ground. Prior to the study, the staff at the assisted living facility had routinely kept records of all falls experienced by residents of the institution. The study team chose the number of recorded falls during the previous 18 months as the key marker for the subjects' baseline risk of falling. Because not all of the study participants had resided at the facility for that time period, the average of the number of falls for those living in the facility for the previous 18 months was chosen as a representative sample of the entire group of study subjects. The crossover design of the study was intended to balance the baseline risk factors for falling between treatment and control arms.

Three stages of data analysis were planned for the results. The first stage was to compare fall incidence densities during the treatment sessions with falls during the control sessions. Both randomization and the crossover design would minimize confounding variables between the intervention and control arms. The second stage was to examine if the 4 week washout period was an adequate length of time to remove the residual effects (if any) of the treatment from Group A. If this refinement were needed only the controls from Group B would be used, as they had no previous exposure to the exercise program which could "contaminate" their use as controls. This refinement would remove the power of the crossover design to match the study and control arms with respect to confounding factors, such as baseline risk of falls. If an adjustment for baseline risk of falls between arms was needed a third stage analysis would be done. No other (stratified, modeling, etc) analysis was planned to assess intervention efficacy.

Previous research has shown a correlation between poor mental state and falls amongst the elderly, validating mental clarity as a possible marker for fall risk.[17] In order to account for changes in mental state as a result of the intervention, mental status testing was administered to the study subjects before and after participation. The facility at which the research was conducted uses its own mental status examination consisting of a series of verbally administered questions over the course of a 3-minute interview. These questions test the subjects' orientation to time, remembering/recalling 3 objects, and counting backwards from 20. Scores on this examination range from 0 to 9 with 9 being the maximum possible score of mental clarity. Tests were administered by the staff of the assisted living facility before and after each 10 week session.

The statistical tests used were exact binomials and t-tests of means for descriptive data. The first analysis and two refinements use an incidence density approach, equivalent to a 2 X 1 Chi-square comparison of the observed to expected number of falls in each study arm.[18] The third stage analysis would also incorporate a theoretical model based on baseline fall rates analogous to a Chi-square goodness of fit approach. It is in the calculation of the expected number of falls that one can adjust for unequal group size as well as an unequal baseline risk of falls. The unit of analysis used is a man-session. The analysis does not pair data but uses aggregate data. For example, if 7 subjects were randomized to treatment then to controls (Group A) while 6 other subjects were first assigned as controls then crossed over to treatment (Group B) there are 13 man-sessions in the treatment arm and 13 man-sessions in the control arm. The expected number of falls are calculated from the null hypothesis that exercise had no effect; ie, that the baseline fall rates continue for the duration of each 10 week arm. These arms are the combination of Groups A and B but may not be identical if some subjects dropped out of one arm but not the other.

If a third stage analysis were needed to adjust for differences in the baseline fall risk between study arms the method to calculate the expected number of falls under the null hypothesis (no exercise effect) is as follows:

Exercise Arm: Number in arm = $N_{exercise}$; baseline fall risk = $B_{exercise}$; rate of falls per 10 week duration = $R_{exercise}$

Control Arm: Number in arm = $N_{control}$; baseline fall risk = $B_{control}$; rate of falls per 10 week duration = $R_{control}$

Total Number of observed falls is equal to the total number of expected falls = $T_{falls}$

The two unknowns are $R_{exercise}$ and $R_{control}$.

The two equations used to solve for these values are:

$$B_{exercise}/B_{control} = R_{exercise}/R_{control}$$

$$N_{exercise} \text{ X } R_{exercise} + N_{control} \text{ X } R_{control} = T_{falls}$$

After solving the values of $R_{exercise}$ and $R_{control}$ one multiplies by the number in each arm to get the expected number of falls under the null hypothesis.

The State of Hawai'i Department of Health Institutional Review Board gave approval for the use of human subjects.

## Results

Twenty-seven subjects volunteered to participate in the crossover study, of whom all were current residents of assisted living. If subjects did not keep more than 70% of their treatment sessions they were dropped from the study. By random assignment 12 subjects were assigned to Group A and 15 to Group B (of which 6 dropped out during their intervention period.) Of these 6 who dropped out from Group B, 3 did so after the first week, 2 after the second and 1 after the third. Of the 6 who dropped out there was a total of 11 falls registered during the 18 months prior to the start of the study (baseline). No subject dropped out during assignment as a control (initially or after crossing over). This resulted in a total of 27 man-sessions in the control arm and 21 man-sessions in the treatment arm.

Eighty-five percent of the subjects were women with an average age of 88 years (standard deviation [SD] 5.2) and average time in facility of 35 months (SD 23.8). During the 18 months prior to the start of the study those who were in the facility (n = 21) reported an average of 2.3 (SD 3) falls per individual. For those who were institutionalized for the entire 18 month period prior to the start of the study, Group A had a fall rate for these 18 months of 33 falls/11 subjects = ave. 3 and Group B had an average of 16 falls /11subjects = ave. 1.5.

Using baseline fall data, the expected number of falls during the study period for the study arms was 9 for intervention and 11 for control. The first stage of analysis using data from both groups A and B shows the intervention (n = 21) and control arms (n = 27) experiencing an observed number of falls of 7 and 13, respectively (Table 1). Chi-square value for this analysis is 0.80, corresponding to a *P*-value of 0.35. Baseline fall rates between intervention and control arms did not differ significantly, even after adjusting for dropouts in the exercise groups.

The 15 subjects in Group B (started with assignment to control arm) experienced a total of 10 falls during their control weeks. For the 12 controls from Group A, however, there were only 3 falls during the control period. This lower rate of falls during Group A's control session suggests that there might have been a residual effect of the exercise session carrying over and tainting results in the control period. Furthermore, this argument is strengthened if one considers that baseline fall rates were higher for Group A (3 per subject per 18 months) than for Group B (1.5 per subject per 18 months). After removing the potentially contaminated controls of Group A, the intervention arm (n = 21) had an observed fall number of 7 while the control arm (n = 15) experienced 10 falls. These values correspond to new expected total falls of 9 for the intervention group and 7 for the control group (Table 2). Chi-square value for this first refinement is 2.20, corresponding to a *P*-value of .15.

Table 1. Table of expected vs observed number of falls for the intervention vs control groups using aggregate data from both Groups A and B. Corresponding *P*-value is .35.

| | Intervention (n*=21) | Control (n=27) |
|---|---|---|
| Observed Total Falls | 7 | 13 |
| Expected Total Falls | 9 | 11 |
| Baseline Falls | 39 falls/15 persons=2.6 ave. | 49 falls/20 persons=2.45 ave. |

*N = number of man sessions

Table 2. Table of expected vs observed number of falls for the intervention arm and uncontaminated controls. Corresponding *P*-value is .15 for this first refinement of the data.

| | Intervention (n=21) | Control (n=15) |
|---|---|---|
| Observed Total Falls | 7 | 10 |
| Expected Total Falls | 9 | 7 |
| Baseline Falls | 39 falls/15 persons = 2.6 ave. | 16 falls/9 persons = 1.8 ave. |

Table 3. Table of expected vs observed number of falls for the intervention arm and uncontaminated controls following a second refinement of the data. *P*-value corresponding to this table is .025.

| | Intervention (n=21) | Control (n=15) |
|---|---|---|
| Observed Total Falls | 7 | 10 |
| Expected Total Falls | 11.3 | 5.7 |
| Baseline Falls | 39 falls/15 persons = 2.6 ave. | 16 falls/9 persons = 1.8 ave. |

The third data analysis adjusts for the higher risk of falls at baseline present in the treatment arm compared to the control arm as a result of removing controls contaminated by primary participation in the intervention group. This relative risk at baseline is 2.6 : 1.8 = 1.4, causing it to be a potential confounding factor. The calculation of adjusted expected values is described in the methods section with results shown in Table 3. The Chi-square value for the comparison between observed and expected number of falls is 4.9, corresponding to a *P*-value of .025 showing a statistically significant reduction in the number of falls for subjects participating in the program.

The average mental status score for all subjects at the beginning of the study was 4.6 with a 95% confidence interval (CI) (3.4-5.8). For those (n = 21) who participated in MWB sessions the average change in mental status scores was -0.17 with a 95% CI (-1.2- 0.93). Excluding contaminated controls and controls who lacked before and after mental status testing, the change was 0.83 with a 95% CI (0.0-1.7) for those in the control group (n = 12.) These results do not show a significant change. The six dropouts had a mean mental status score of 3.7, near the lower limit of the confidence interval of the mean scores of the entire group.

## Discussion

The risk of falling is a clear burden on the elderly that can lead to physical and psychological complications, as well as the need to transfer previously independent seniors to expensive skilled-nursing facilities. This pilot study has shown that participation in physical and mental exercise classes may offer some risk reduction potential for ambulatory seniors. The data indicates that seniors experienced a statistically significant ($P < .05$) decrease in fall incidence as a result of treatment after accounting for contamination of controls and adjusting for different baseline risk of falls between the treatment and control study arms. Besides the promise of efficacy during the intervention itself, our study shows the possibility that the residual effects of exercise may be significant as well. While this effect ruined the cross over study design, the authors were happy to see it, as it could represent a valuable aspect of this public health intervention – especially when programs are short of resources and cannot provide ongoing MWB classes for everyone. Future studies, which try to confirm our results, should focus on this equally important aspect of residual effect. Until it can be clearly shown how long this effect lasts a cross over design to control for confounders should not be attempted. .

While this study has shown some promise for demonstrating the effects of an effective treatment program for fall prevention, a longer study period with a larger sample size is necessary to achieve more certain results. The original study design and protocol were also based on the assumption that 4 weeks was a reasonable period of time for residual effects of the exercise classes to subside. Previous research, however, has shown persistent effects of exercise programs on reducing fall incidence in the elderly.[19] The mental status examination given to subjects may not have been sensitive enough to pick up potential benefits of the exercise program. Alternatively there may have been a subtle effect on mental status change but only detectable following a much longer period of intervention. For now the reduction in falls is the best outcome marker to follow.

One remaining source of confounding that needs further discussion are the dropouts of Group B, who left after they starting the exercise arm. These 6 dropped out during the first 3 weeks of MWB sessions after completing the control arm. Could it be that these six were especially vulnerable to falls? That had they continued in the exercise arm their higher rate of falls would have lowered the significance of our findings regarding exercise efficacy? If one examines their baseline fall risk there were a total of 11 falls during the 18 months prior to the start of the study, a rate that is lower than the average baseline of 2.6 falls per person in the included treatment group subjects. This difference in risk suggests that had they not dropped out from the exercise arm the intervention might have shown an even greater effect on reducing falls.

Further research on the effects of physical fitness programs on elderly falls is necessary given the negative consequences on quality of life that the elderly suffer as a result of falling. In terms of prevention, exercise programs have the ability to enhance physical balance, reaction time, and visual-spatial awareness; a lack of which predisposes individuals to experience a fall.[20, 21] Of course the effects of exercise in this group may not be so direct. It may be that exercise simply affords participants a good night's sleep that leads to reduced falls the following day. Reducing the incidence of falls amongst our nation's elderly will only become increasingly relevant as the population ages and the physical, mental, and financial toll of elderly falls rises.

## Disclosures/Conflict of Interest

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Karen Peterson is the founder of *Move With Balance®* and has published a book *Move With Balance®: Healthy Aging Activities for Brain and Body*, which outlines the method of the program for further duplication. (2013, ISBN-13 978-0-9859938-0-1).

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# Shared Decision Making and Patient Decision Aids: Knowledge, Attitudes, and Practices Among Hawai'i Physicians

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## Abstract

*Background: As the health care field moves toward patient-centered care (PCC), increasing emphasis has been placed on the benefits of patient decision aids for promoting shared decision making (SDM). This study provides a baseline measure of knowledge, attitudes, and practices (KAP) among Hawai'i's physicians with respect to patient decision aids (DAs). Physicians throughout the State of Hawai'i were invited to complete a survey assessing their knowledge, attitudes, and practices with respect to the clinical use of DAs.*

*One hundred and seventy four valid surveys were analyzed. Reported awareness and use of DAs were low, but recognition of the benefits of SDM and openness to the use of DAs were very high. The leading perceived barriers to the implementation of DAs were lack of awareness, lack of resources, and limited physician time to learn about DA technology. However, a significant majority of the respondents reported that DAs could empower patients by improving knowledge (88%), increasing satisfaction with the consultation process (81%), and increasing compliance (74%). Among physicians currently employing DAs, use of brochures or options matrix sheets was the most common aid tool. However, leading recommended DA formats were paper-based brochures for clinic use (75%) and interactive online website programs for outside clinic use (73.5%). Given growing emphasis on the PCC model and the recognized desire of many patients to participate in the medical decision making process, positive responses toward SDM and the use of DAs by Hawai'i physicians are promising.*

## Keywords

*Shared Decision Making; Patient Decision Aids; Physician Knowledge, Attitudes, Practices*

## Introduction

Increasing clinical evidence demonstrates that patient involvement in medical decision making significantly improves health care outcomes.[1-3] As a result, the shared decision making (SDM) paradigm and related decision support technology have become central to the patient-centered care (PCC) movement. Since many health care decisions have medically acceptable treatment and screening options with costs and benefits that are valued differently by individual patients and their families, SDM stresses active consideration of patient needs, values, and preferences as part of the medical decision making process. Such consideration increases patient confidence in medical decision outcomes by reducing uncertainty and decisional conflict.[4-6] As a result, adherence to treatment improves.[7,8]

Patient decision aids (DAs) have been shown to promote SDM between patients and physicians while increasing patient knowledge and risk perception accuracy, lowering invasive surgery rates, and reducing indecision and passivity during the medical consultation.[9,10] Recent DA implementation studies clearly demonstrate these points. For example, Banegas, et al,[11] found that review of a DA by women deciding on prophylactic tamoxifen and ralozifene use lowered decisional conflict and helped patients choose the treatment most consistent with their own values. Similarly, Belkora, et al,[9] found the use of DAs in routine care significantly improved knowledge, especially among patients with low baseline knowledge of breast cancer, high decisional conflict, and of Hispanic ethnicity. A study by Fraenkel, et al,[12] using a decision support tool designed for nonvalvular atrial fibrillation (NVAF), suggests that such tools can effectively improve knowledge and clarify values. Furthermore, an observational study by Arterburn, et al,[13] found that viewing a video-based DA for knee and hip osteoarthritis lowered elective surgeries and resulted in a 12%-21% reduction in 180-day cost of care.

To date, use of DA technology to facilitate SDM remains relatively limited throughout the United States. While some medical centers such as Mayo Clinic and Dartmouth Medical College routinely employ DAs as part of their patient education programs for preference sensitive decisions, many others do not. DA adoption is even more limited at the individual group or solo physician practice level. To our knowledge, the extent and nature of DA use by Hawai'i's health care providers has not been formally studied. Thus, the study's purpose is to provide a baseline measure of knowledge, attitudes, and practices (KAP) among Hawai'i's physicians with respect to DAs. The study is descriptive in nature and represents the first step in an ongoing research program on SDM and DA technology in Hawai'i.

## Methods

### Participants and Survey Design

Although multiple health care providers play a vital role in the SDM process,[14] this study focused on improving overall understanding of communication and collaboration between doctors and patients and the use of DAs in clinical practices. We invited physicians throughout the State of Hawai'i to complete a survey measuring knowledge, attitudes, and practices with respect to DAs and SDM. The list of physicians was comprised of primary care doctors and specialists from two sources: Hawai'i Independent Physicians Association (Hawai'i IPA) and the 2010 Hawai'i Medical Service Association (HMSA) directory of preferred plan participating providers. Duplicates were removed.

For the Hawai'i IPA physicians, email invitations to participate were sent to approximately 200 members. Thirty-four responded to an online version of the survey. Those who participated received a $20 Starbucks gift card. To obtain a larger, more representative sample, the HMSA directory, which lists approximately 3,752 health care providers, was used. Following removal of non-physicians from the list, as well as Hawai'i IPA physicians who responded to the online version of the survey, a random sample of 1,000 physicians was obtained and a paper

survey along with a paid return envelope were mailed. Over a period of several weeks, 140 surveys were received. As incentive for participating in the survey, respondents were given the option to enter a raffle to win a gift card for one of the major shopping malls in Hawai'i.

The survey consisted of three sections designed to measure: (1) patient information and decision-making preferences; (2) physician awareness, attitudes, and use of DAs; and (3) physician demographic information (gender, age, ethnicity, specialization, etc). Modified Likert scales (Strongly Agree/Strongly Disagree) were used throughout with exception of demographic measures. The first section featured 8 items measuring physician perceptions of patient information preferences (eg, "as my patients become sicker, they want to be told more about their illness") and 6 items measuring physician evaluations of patient preferences for decision-making (eg, "my patients feel that the important medical decisions should be made by the doctor, not the patient"). The second section contained 3 items measuring DA awareness/use, 8 items measuring perceived DA barriers, and 7 items measuring perceived benefits. This section also requested physicians to recommend DA formats for use in Hawai'i (eg, paper-based, PC-based, online computer program, DVD, etc). Scaled points (7 versus 8) were varied across question sections to minimize common method variance[15] and to provide a neutral option when appropriate. Items and scales were adapted from similar studies in refereed journals.[16,17]

## Results

Analysis of all major outcomes of interest and demographic information revealed no significant differences between the Hawai'i IPA and HMSA physicians. The two samples were therefore collapsed and analyzed together. We received 174 survey responses (an overall rate of 174/1,200 or 14.5%). Of the respondents, 130 were male and 43 female with one missing on gender (see Table 1). The average age for the sample was 52 years. Major self-reported ethnicities among the physicians included: White (34.9%), Japanese (32%), and Chinese (19.2%). Internal medicine (21.8%), Pediatrics (13.8%), Family Practice (12.6%), and OB/GYN (9.8%) were the most represented specialties in the sample. A majority of physicians reported seeing between 11 and 30 patients a day. Of the patient population (as reported by the physicians), the major ethnic groups were: White (23.2%), Japanese (22.2%), Filipino (16.5%), and Hawaiian/Pacific Islander (14.3%; see Table 2).

Only 14.3% of the physician sample reported use of DAs in their clinical practices. Although time availability was a factor (mean = 5.3; 64% selecting 5 or higher on an 8-point scale), the leading three barriers, measured on an 8-point scale, were: lack of awareness (mean = 6.5; 87% selecting 5 or higher), lack of resources (mean = 6.3; 85% selecting 5 or higher), and limited physician time to learn about DAs (mean = 6.1; 84% selecting 5 or higher). Furthermore, although overall awareness of DAs, measured on a 7-point scale, was fairly low (mean = 3.9; 55% selecting 4 or lower), Hawai'i physicians were receptive to the use of DAs to facilitate the SDM process. Benefits were also measured with a multi-item 8-point scale, in which a higher score indicates greater perceived need and a more positive attitude towards the use of DAs (Cronbach's alpha = .93). Current DA use among the sampled physicians positively correlated with perceived benefit ($r = .36$; $P < .001$) and negatively with perceived barriers ($r = -.27$; $P < .001$). Furthermore, while low awareness of DAs was perceived as a barrier, a strong positive correlation was found between current use and awareness ($r = .80$; $P < .001$).

Table 1. Demographics of Survey Respondents

| | Frequency | Percentage |
|---|---|---|
| **Physician Survey Respondents (N=174)** | | |
| **Gender** | | |
| Female | 43 | 24.9% |
| Male | 130 | 75.1% |
| **Age** | | |
| Less than 49 | 55 | 31.6% |
| 50 and Older | 112 | 68.4% |
| **Ethnicity** | | |
| Black | 1 | 0.6% |
| Chinese | 33 | 19.2% |
| Filipino | 7 | 4.1% |
| Hawaiian | 7 | 4.1% |
| Japanese | 55 | 32% |
| Korean | 5 | 2.9% |
| White | 60 | 34.9% |
| Other | 4 | 2.3% |
| **Specialty** | | |
| Allergy/Immunology | 1 | 0.6% |
| Family Practice | 22 | 12.6% |
| General Practice | 5 | 2.9% |
| Pulmonology | 2 | 1.1% |
| Internal Medicine | 38 | 21.8% |
| OB/GYN | 17 | 9.8% |
| Pediatrics | 24 | 13.8% |
| Oncology | 3 | 1.7% |
| Cardiology | 3 | 1.7% |
| Neurology | 2 | 1.1% |
| Dermatology | 6 | 3.4% |
| Surgery | 12 | 6.9% |
| Geriatrics | 3 | 1.7% |
| Psychiatry | 13 | 7.5% |
| Other | 16 | 9.2% |
| **Number of Patients on Average Day** | | |
| 1-10 | 25 | 14.5% |
| 11-20 | 58 | 33.7% |
| 21-30 | 56 | 32.6% |
| 31-40 | 26 | 15.1% |
| 40+ | 6 | 3.5% |

| Table 2. Patient Population by Ethnicity | |
|---|---|
| | **Average Percentage** |
| Chinese | 10.4% |
| Filipino | 16.5% |
| Hawaiian/Pacific Islander | 14.3% |
| Japanese | 22.2% |
| Korean | 4.0% |
| Other Asian | 3.8% |
| White (Non-Hispanic) | 23.2% |
| Other (African American, Hispanic, etc) | 2.9% |

| Table 3. Barriers to the Use of DAs in Clinical Practice | | |
|---|---|---|
| | **Average Rating*** | **Percentage**** |
| Lack of Awareness | 6.5 | 87% |
| No Additional Resources (ie, money, human resources) | 6.3 | 85% |
| Limited Physician Time to Learn about DAs | 6.1 | 84% |
| Availability of DAs | 5.6 | 74% |
| No Time to Use DA in Clinic | 5.3 | 64% |
| Difficulty of DA Use by Patients | 4.8 | 57% |
| Effectiveness of DA not Established | 4.7 | 57% |
| Not Relevant to Patient Care | 3.1 | 24% |

*8-point Scale 8 = "strongly agree" and 1 = "strongly disagree"
** Percentage that selected 5 or higher

| Table 4. Benefits to the Use of DAs in Clinical Practice | | |
|---|---|---|
| | **Average Rating*** | **Percentage**** |
| Improves Knowledge | 6.4 | 88% |
| Increases Satisfaction with the Consultation Process | 5.9 | 81% |
| Increases Compliance | 5.6 | 74% |
| Improves Quality of Life | 5.4 | 70% |
| Improves Clinical Outcomes | 5.4 | 69% |
| Decreases Anxiety | 5.5 | 68% |
| Reduces Counseling Time | 4.8 | 55% |

*8-point Scale 8 = "strongly agree" and 1 = "strongly disagree"
** Percentage that selected 5 or higher

This openness to SDM can be seen in the positive responses to the benefits of DAs for clinical use. For example, a majority of Hawai'i physicians agreed that the use of DAs empowers patients in the following ways: improves knowledge (mean = 6.4; 88% selecting 5 or higher); increases satisfaction with the consultation process (mean = 5.9; 81% selecting 5 or higher); increases compliance (mean = 5.6; 74% selecting 5 or higher); improves quality of life (mean = 5.4; 70% selecting 5 or higher); improves clinical outcomes (mean = 5.4; 69% selecting 5 or higher); decreases anxiety (mean = 5.5; 68% selecting 5 or higher); and, reduces counseling time (mean = 4.8; 55% selecting 5 or higher).

Of the physicians currently employing DAs in their practices, most used paper-based decision aids, such as brochures or options matrix sheets, for use in clinic (34.5%) and outside the clinic (29.3%). The format least used was DVD and workbook both inside (2.9%) and outside (2.9%) the clinic (see Table 5). The leading recommended DA formats were paper-based brochure for clinic use (75%) and interactive online website program for outside clinic use (73.5%; see Table 6).

| Table 5. Current DA Use | | |
|---|---|---|
| **Type of Decision Aid Used in Practice** | **Frequency** | **Percentage** |
| Paper-based such as a brochure or options matrix sheet for use in the clinic | 60 | 34.5% |
| Paper-based such as a brochure or options matrix sheet for use outside the clinic | 51 | 29.3% |
| PC-based computer program for use in the clinic | 8 | 4.6% |
| PC-based computer program for use outside the clinic | 6 | 3.4% |
| Online computer program for use in the clinic | 12 | 6.9% |
| Online computer program for use outside the clinic | 8 | 4.6% |
| DVD and workbook for use inside the clinic | 5 | 2.9% |
| DVD and workbook for use outside the clinic | 5 | 2.9% |

| Table 6. Recommended DA Use | | |
|---|---|---|
| **Type of Decision Aid** | **Disagree** | **Agree** |
| Paper-based brochure or options matrix sheet for use in the clinic. | 25% | 75% |
| Paper-based brochure or options matrix sheet for use outside the clinic. | 28% | 72% |
| DVD plus worksheet for use with a TV or PC in the clinic. | 54% | 46% |
| DVD plus worksheet for use outside the clinic (ie, at home or office). | 45% | 55% |
| Interactive online website program for use with a PC or notebook in the clinic. | 39% | 61% |
| Interactive online website program for use with a PC or notebook outside the clinic. | 26.5% | 73.5% |
| Informational DVD for use with a TV or PC inside the clinic. | 50% | 50% |
| Informational DVD for use outside the clinic (ie, at home or office). | 37% | 63% |

## Discussion

This analysis suggests that physicians in Hawai'i share similar, but widely diverse attitudes towards the use of DAs than those reported in related studies.[18-20] At 13.2%, use of DAs in Hawai'i appears to be substantially lower than the 43% figure reported in a recent national survey of 402 primary care physicians.[21] Understanding possible reasons for lower diffu-

sion of DAs among Hawai'i physicians appears warranted. Of Hawai'i physicians sampled in this study, the leading barriers to the implementation of DAs in clinical practice were lack of awareness and limited resources. These responses are similar to a recent study by King, et al, on perceptions of SDM among rural primary care clinicians, in which a majority of the respondents was unfamiliar with the term "shared decision making" and what it entailed.[22] However, King, et al, found that despite low general awareness, most physicians surveyed recognized the value of SDM and were open to the use of DAs in multiple formats. Similarly, our survey indicated that while awareness of DAs remains low, Hawai'i physicians recognized the importance of SDM and are highly receptive to the use of DAs, especially computer- and print-based formats. Recognition of the benefits of interactive online DAs by Hawai'i physicians is particularly interesting since a growing body of literature suggests that computer-based DAs can facilitate SDM and more effectively improve patient knowledge and satisfaction, especially among patients with low literacy skills compared to other decision support tools.[10,23-26] The positive responses toward SDM and the use of DAs are promising since recent federal and state level policies adopt and expand the use of SDM as part of an overall strategy to improve health care quality and patient experience.[27,28]

## Conclusion

Despite recognition of numerous benefits (eg, increased partnership in consultation, improved clinical outcomes), SDM has yet to be adopted in many clinical practices.[29,30] In addition, implementation of DAs into routine clinical practice is taking place slowly.[31] Acknowledging the importance of the patient-centered care model, with its emphasis on SDM for improving patient-physician communication, the survey administered in this study assessed the knowledge, attitudes, and practices of a sample of Hawai'i's physicians regarding the use of DAs in clinical practice. While the physicians in this study identified lack of awareness and availability of resources as leading barriers to implementing DAs, they also recognized the benefits of DAs, particularly those that are paper-based or online, for improving SDM. Although diverse in terms of physician ethnicity and practice specialization, the sample size is small and represents a small fraction of practicing physicians in Hawai'i. Overall, these findings speak to the need for further research on the challenges of and opportunities for improving patient-centered care in Hawai'i through SDM and related decision aid technologies.

## Conflict of Interest

None of the authors identify any conflicts of interest or significant financial disclosures relevant to this paper.

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# Medical School Affects the Career Location of Pediatric Resident Graduates

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According to the Hawai'i Physician Workforce Assessment Project, Hawai'i currently has a physician shortage of 600, with an impending shortage of up to 1,600 physicians by the year 2020. A way to offset this growing situation is by supporting University of Hawai'i residency programs to train future physicians. To better understand the contributions that these residency programs make to the community the history, alumni data, and program highlights of the University of Hawai'i Pediatric Residency Program (UHPRP) are explored.

## History of UHPRP

There is a long and colorful history of UHPRP with the first group of residents trained in 1955. The residency program was a one-year program located at Kauikeolani Children's Hospital. At that time, three residents made up the entire program. Over the next two years, the number of residents increased to eight house staff physicians. The training period was extended to two years. There was no pediatric faculty. Two visiting professors helped to train the residents. From its humble beginnings, the program has grown to include every pediatric specialty with 24 pediatric residents and 83 faculty members. These physicians care for children in the intensive care units, emergency departments, in-patient wards, and outpatient clinics at Kapi'olani Medical Center for Women and Children (KMCWC), the only children's hospital in Hawai'i.

In 1967, the John A. Burns School of Medicine (JABSOM) was established. The UHPRP has been linked to the medical school ever since. The pediatric teaching program was expanded under the direction of Dr. Ralph Platou who was the first Chair of Pediatrics. In 1971, Dr. Sherrel Hammar arrived as Director of Outpatient and Adolescent services, and in 1973 he was appointed Chair. Dr. Hammar developed the residency into a three year accredited program. In 1975 this program met the requirements for the American Board of Pediatrics. Continuing his strong leadership, from 1996 to 1999, Dr. Hammar served as interim Dean of JABSOM. He helped to guide the school towards its present level of excellence.

A major change occurred for the program in 1978, when the pediatric residency program and hospital moved to its present-day location at KMCWC. The merger produced a premier example of a successful hospital collaboration. This laid the groundwork for a more recent development whereby KWCMC, Pali Momi, Straub, and Wilcox hospitals united under Hawai'i Pacific Health Corporation (HPH). Both KMCWC and HPH have supported the pediatric residency program for over 35 years. The financial strength of this large merger has insured continued support of training programs for the pediatricians in Hawai'i.

## UHPRP Alumni

Since 1975, the Department of Pediatrics has maintained an alumni database that tracks all resident graduates of the program. Initially this database was used to examine the number of publications by our resident graduates; however data is now extended to track UHPRP alumni careers. The database is now used to study the different career choices and specialties that graduates have chosen over the years (see Table 1). The alumni database revealed that 259 pediatricians have graduated from the program since 1975 through 2011. To further track our graduates, their career choices were categorized into the types of pediatric careers. A majority of the residents (59%) went into general practice, while the remaining residents (41%) went on to further training. This included 9% who went into both internal medicine and pediatrics, and 6% going into psychiatry and pediatrics. The data reveals that 27% of UHPRP residents went into pediatric subspecialty fellowships following the completion of their residency. As shown in Table 1, UHPRP graduates undertook a wide variety of subspecialties, which provides much needed expertise to the pediatric community (specialization allows for a higher level of care that leads to the improvement of health outcomes for the pediatric population) . The location of practice of the alumni pediatricians was examined using Internet search engines and information from the department of Pediatrics. It was found that two thirds (67%) of the physicians who graduated from the residency program remained in Hawai'i to practice (n=174). The impact of these 174 pediatricians is significant considering that the average pediatrician cares for approximately 1,564 patients. This would

Table 1. Career Choice for the Pediatric Resident Graduates of the Hawai'i Residency Program.

| Career Choice | Total |
|---|---|
| Adolescent | 4 |
| Allergy | 2 |
| Anesthesia | 4 |
| CDC Fellowship | 1 |
| Pediatric Critical Care | 5 |
| Dermatology | 1 |
| Development | 6 |
| Emergency Medicine | 12 |
| Medicine and Pediatrics | 23 |
| Neonatology | 6 |
| NIH Fellowship | 1 |
| Pediatrics-Categorical | 152 |
| Pediatric Cardiology | 5 |
| Pediatric Endocrinology | 2 |
| Pediatric Hematology | 5 |
| Pediatric Infectious Disease | 2 |
| Pediatric Nephrology | 1 |
| Pediatric Neurology | 4 |
| Pediatric Pulmonary | 3 |
| Pediatric Rheumatology | 3 |
| Physiatry | 1 |
| Psychiatry and Pediatrics | 15 |
| Sports Medicine | 1 |
| **Total** | **259** |

The career choices for the graduates of the Hawai'i Pediatric Residency program where tabulated to illustrate the variety of the different pediatric subspecialties pursued by our graduates. This represents the graduates from 1975 to 2011.

amount to the program's pediatricians potentially caring for 272,136 children or 89% of Hawai'i's pediatric population as projected by 2011 census data. This data shows that UHPRP has made an impact on the majority of the state's children.

The database also revealed that the medical school attended has an impact on where students choose to go for their residency, and eventually where they choose to practice. The alumni database was useful in studying some of these concepts. The majority of these graduates (51%) attended medical school at JABSOM. The remaining residents attended medical school either in the continental US (36%), or were international medical graduates (13%). Thus, the role a local medical school plays in supplying quality medical students for the local residency program is apparent. It was estimated that it was four times more likely that the graduating resident from JABSOM, would remain in Hawai'i to practice after residency (odds ratio 4.3 [*P*-value <.001] with 95% CI [2.4-7.9]). It is concluded that the pediatric residents who attend JABSOM were more likely to stay in Hawai'i to practice. The implication of this finding is that our resident recruitment process should begin early in our medical school to maintain the number of pediatricians needed to care for Hawai'i's children.

## UHPRP Program Highlights

There are many reasons why sixty-seven percent of UHPRP graduates decided to stay in Hawai'i to practice. The program has had an excellent continuity clinic where pediatric residents can follow their own patients through their three years of residency. As part of the program, teams of first, second, and third year residents were developed. Each of these teams was assigned to care for a particular community. The teams continue to be responsible for these children when they were admitted to hospitals. These teams served children from Kalihi Palama, Waimanalo, Kalihi Kokua Valley, and the Wai'anae Coast Comprehensive Health Centers. The upper level residents were team leaders and were responsible for these patients as well as the junior residents in their groups. The third year residents were on call for and were responsible for any of these patients coming into the emergency department or inpatient wards for six months at a time on a daily and nightly basis. When a national call for the reduction of resident work hours was instituted, this type of day and night coverage was not possible. With this change, the residents lost this valuable opportunity to be responsible for a community population, yet their personal quality of life improved. Within the department, there is a group interested in re-developing this team concept for continuity clinic, and to do this within the 80-hour work week, which is the national accreditation standard.

Some of the programs in place to encourage positive experiences for the medical students by the Department of Pediatrics include supporting interest groups, providing mentorship opportunities, and encouraging small group classes. The Pediatric Interest Group, which occurs during the student's pre-clinical first and second year, has been supported by the faculty and department. In the clinical years, each third year student is assigned a pediatric faculty member as an advisor and mentor during their clinical rotations. The students meet weekly with faculty members during their clinical pediatrics block. This activity is designed to support both the student's personal and professional growth. Through this relationship with a Pediatrics faculty member, the student expands their network and may be encouraged to remain in Hawai'i to practice. Many students start to realize that an important aspect of training is developing a network of specialists needed to properly care for their patients. An advantage of going to residency where the student did their medical school training is that many of their mentors during this training become a part of their personal network. It is easier to discuss patient care with a mentor or former teacher, which strengthen relationships that prove to be valuable into later years of practice.

To have 107 JABSOM graduates successfully apply, and finish a specialty fellowship is an accomplishment considering that UHPRP is a small program. Most of these graduates did not have difficulty getting into their top choice for fellowship.

Being from a smaller program may be advantageous to our residents since many of those applying can be mentored by attending physicians who are in the specialty that the resident wishes. This is an example of the network developed by the training physician that begins from the time resident graduates are in medical school. Faculty physicians can mentor the resident graduates throughout the entirety of training and even into practice.

The trust between attending specialists and future graduates is formed during the trainee's early development that carries over to the patients who are cared for by both specialists and future graduates. Mentorships do not end when the training program is finished. These personal relationships benefit not only the trainees but the advisors as well. These interactions enrich the careers of the residents, faculty, and community pediatricians. It helps in patient care by allowing open and trusted consultation between physicians.

Current pediatric residents who completed medical school at JABSOM cite many reasons for staying in Hawai'i to train. First and foremost was the caliber and collegiality of the faculty and staff which is enhanced by the small size of the program. Second is the diverse patient population at KWCMC. It is a busy hospital. The volume of patients is nearly always at a maximum, thus allowing residents to have more than adequate patient rosters. Being at the gateway of the Pacific provides the residents an opportunity to care for patients with unique and often rare pathology, which stimulates the academic learning process. Third, since the program usually does not have fellows, the students and residents can interact directly with the attending specialists. These close-knit and easily accessible interactions help to strengthen relationships that can last throughout ones' career.

In larger programs, the students and residents often interact only with the training fellow who has less experience to offer than an attending faculty. Additionally, residents mentioned they had gotten to know the attending very well, and it was evident that these faculty truly enjoyed teaching. Residents also felt that the diverse backgrounds of the faculty further broadened their perspectives on patient care.

## Conclusion

Pediatrics and medical care in general have become increasingly complex. As a result in improvements in technology, and a decrease in mortality in pediatric medicine, there have been increases in morbidity from complex conditions. In turn, improvements in medical technology and pharmacology have increased the need for pediatric subspecialists who have received advanced training to care for these complicated cases. The need for well-trained general pediatricians and specialists is an important aspect of providing for the needs of an entire state. Many of the pediatric subspecialty training programs are now three-year programs and involve intense training in one area of pediatrics. Research is often an important aspect of this training and many physician scientists are developed from these training programs. Good clinical outcomes and cutting edge treatment are important aspects for further training, and these specialists then return home to offer these advanced procedures and knowledge to the local community. This not only benefits the children and their families, but also benefits general pediatricians who see improved care of complex medical and surgical conditions for their patients.

The continued recruitment of quality physicians will require pro-active strategies and processes. It has been noted that resident graduates were more likely to remain and practice in Hawai'i if they had gone to JABSOM, the local medical school. This point underscores the importance of a strong medical school to support the health care needs of the community. Without either JABSOM or the pediatric residency programs, the number of pediatricians that choose to practice in Hawai'i may be affected and the children in Hawai'i may not have the quality of care that they receive today. The partnership between the medical school and residency programs is vital to maintain an adequate number of pediatricians in our community to care for our *keiki* (children) population. It is important that the program continues to provide postgraduate training to benefit the local community. One could question, "are the residents graduating from this program good physicians and pediatricians?" Nationally, this is an area of deep concern and it is difficult to study this component objectively and quantitatively. There is the additional concern with the reduction of work hours mandated by national accreditation boards to help insure patient safety concerns. Despite the fact that clinical duty hours are restricted and less experience occurs, residents continue to develop into excellent physicians. The faculty feels comfortable with the level of care offered by JABSOM graduates, since they have been observed in clinical roles and have interacted with them as fellow specialists.

## Conflict of Interest

None of the authors identify a conflict of interest.

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# The Facts about Depleted Uranium in Hawai‘i

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

Public interest and concern is sometimes raised about the medical effects of exposure to depleted uranium (DU). The Hawai‘i Department of Health (HDOH) responds, investigates, monitors, and recommends actions to minimize the general public's exposure to unnecessary ionizing radiation including DU. In this article, HDOH will discuss common concerns about DU and examine the evidence to evaluate the potential health risks associated with DU in Hawai‘i.

Uranium is a dense, weakly radioactive metallic element that naturally exists in the environment. Uranium is found in rocks, soil, water, and air, as well as in plants, animals, and humans.[1]

• Natural uranium consists of a mixture of three isotopes, which are identified by the mass numbers $^{238}$U (99.27% by mass), $^{235}$U (0.72%), and $^{234}$U (0.0054%). Uranium in the environment also contains other radioactive elements such as thorium and radium.[1]

• Depleted uranium is uranium whose isotopic composition has been changed by the removal of the more radioactive isotopes ($^{235}$U and $^{234}$U), leaving it about 99.8% $^{238}$U. Depleted uranium is less radioactive than natural uranium.[1]

Due to its high density (about 60% heavier than the same volume of lead), DU is used as ballast and counterweights in airplanes and ships. It is also used to shield some medical devices and in containers transporting radioactive materials. The military uses DU in armor to protect military tanks and their crews from enemy anti-tank munitions. DU is also used in armor-piercing projectiles because of its high density, ability to self-sharpen as it penetrates a target, and propensity to ignite on impact at temperatures exceeding 1000 degrees Fahrenheit.[1]

DU was used by the military in Hawai‘i as part of the Davy Crockett Weapon System (M101 spotter rounds — see Figure 1) from 1960 until 1968. In 2005, fragments from the 1960's era M101 (see Figure 2) were discovered on the firing range at Schofield Barracks, O‘ahu. The Army then investigated the history of use of the Davy Crockett weapon system on Hawai‘i ranges and acknowledged that the Pohakuloa Training Area on the Big Island was also used for training with the Davy Crockett.[2]

The M101 20mm spotting round was used to verify the aiming point of the weapon system. The M101 was about 8 inches long and 1-inch in diameter. It weighed about one pound and contained 6.7 ounces of DU alloy (92% DU, 8 % Molybdenum).[2]

Unlike modern munitions that use DU as penetrators to defeat enemy armor, the DU in the M101 was used to provide weight sufficient for the spotting round to simulate the flight of the Davy Crockett projectile. Army and DOD regulations now prohibit the use of munitions that contain DU in training.[2]

Depleted uranium is regulated under the sole authority of the US Nuclear Regulatory Commission (NRC).[3] The Army has recently received a license from the NRC to possess DU; HDOH served as a consultant in discussions related to the license application between the NRC and the Army. The HDOH does not have any jurisdiction on federal property for radioactive materials. However, the HDOH has and will continue to independently monitor ambient radiation levels in areas adjacent to federal property where DU has been used. To that end, ambient background surveys have been performed routinely at 12 locations on the Big Island of Hawai‘i and 4 locations on O‘ahu since 2007. The results of the surveys indicate that all radiation levels have been within normal background levels. In addition, air sampling performed near Waikoloa Villages from February to May 2009 found normal background levels of natural uranium, and no detectable DU.

The health effects of uranium are due primarily to its chemical toxicity to the kidney rather than radiation.[1] According to the Agency for Toxic Substances and Disease Registry (ATSDR), uranium emits very small amounts of radiation, and therefore poses little radioactive danger.[4] Natural and depleted uranium have the same chemical effect on the body. Like all chemicals, harm caused will depend on how much, how long, and how a person is exposed. Uranium is toxic to the kidneys at high enough exposures. Kidney damage is the only health effect that has been consistently found in humans after exposure to elevated levels of uranium compounds.[4] Some human studies of uranium miners have found significant increases in the risk of lung cancer, although it was not clear whether uranium or other chemicals caused the cancer.[5] It is not known whether uranium is harmful to an unborn child.

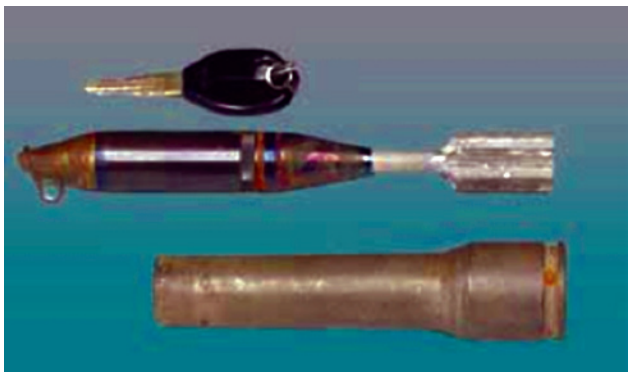

Figure1. M101 spotting round and cartridge case.


Figure 2. M101 spotting round fragment.

In 2008, the Hawai'i Tumor Registry, operated by the University of Hawai'i Cancer Center, and the Hawai'i Department of Health, prepared a report on the number of cancer cases of people living on the Big Island of Hawai'i compared to the whole state. From 1995 to 2000, no difference in overall cancer incidence was observed between the state and either West or East Hawai'i residents.

For the period of 2001-2005, both West and East Hawai'i residents exhibited melanoma and bladder cancers that were significantly higher than the state. In addition, breast cancer was higher in East Hawai'i compared to the state. Notably, lung cancer, the cancer associated with uranium inhalation exposure, was not elevated in either West Hawai'i or East Hawai'i during these time periods.[6] More studies would be needed to determine the specific characteristics of the population such as ethnicity, age, gender, occupation, exposure history or personal habits such as smoking to determine the factors responsible for any increase in cancer rates.

Some Hawai'i residents have expressed concern about exposure to depleted uranium from dust at Pohakuloa Training Area (PTA). Of concern is the possibility that depleted uranium has been burned and carried down wind. Concerned individuals contend that such DU dust could enter the lungs of a nearby person and stay in the body for months with possible negative health impacts. However, despite these concerns, it is highly unlikely that the public is inhaling small particles of DU. The M101 spotting round does not vaporize, but instead breaks into large fragments upon impact. Wind would not carry DU particles from the spotting rounds very far because DU metal and particles are heavier than soil and not easily carried through the air. Studies carried out at test ranges found that most DU contamination settles within a short time of impact, but is measurable up to several hundred feet away.[7]

In 2008, the Waiki'i Ranch Homeowners Association, the closest civilian community to PTA, collected a sample from a 20-year accumulation of dust in their polo pavilion and had it analyzed for DU. The Natural Environment Research Council (NERC) Isotope Laboratory in England reported that the dust sample had a uranium concentration that was 0.68 parts per million and was "overwhelmingly or entirely dominated" by natural uranium.[8] Additionally, limited soil and sediment testing around PTA did not detect DU. Air monitoring of a controlled burn at the Schofield Barracks training area showed no evidence of depleted uranium. Soil sampling at Schofield Barracks indicated that DU did not move significantly from the point of impact.

In conclusion, given the nature of the spotting rounds, the environmental data indicating a low potential for DU to become airborne, and the distance to populated areas, it is highly unlikely that the general public would be exposed to DU. A health consultation for Hawaiian military sites performed by the Agency for Toxic Substances and Disease Registry (ATSDR), a federal health agency, concluded that the general population around PTA is not exposed to DU.[9] HDOH concurs with ATSDR's findings and will continue working with all involved parties to ensure the safety of the people of our state.

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# The Pacific Way to Child Wellness: The Children's Healthy Living Program for Remote Underserved Minority Populations of the Pacific Region (CHL)

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*The Cancer Center Connection is a standing column from the University of Hawai'i Cancer Center and is edited by Carl-Wilhelm Vogel MD, PhD; HJMPH Contributing Editor. Dr. Vogel is professor and former director of the University of Hawai'i Cancer Center and has been the editor of this column since 2001.*

The Children's Healthy Living Program for Remote Underserved Minority Populations of the Pacific Region (CHL) is a partnership among land grant colleges in the US Affiliated Pacific region. The jurisdictions in the CHL partnership are American Samoa, Alaska, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia (Chuuk, Kosrae, Pohnpei, and Yap), Guam, Hawai'i, the Marshall Islands, and Palau.

CHL responds to a recent regional declaration of emergency,[1] as was similarly declared globally by the United Nations,[2] due to the high prevalence of non-communicable chronic diseases (especially diabetes, heart disease, and cancer) and the important relationship that obesity has to all of these conditions. It was recognized that poor diet and low levels of physical activity in early life was linked to development of these often preventable conditions. It was further recognized that monitoring of these factors and conditions was lacking and was needed. Few data on diet, physical activity, obesity, or other health indicators are available in the Pacific region, especially for children. National and international nutrition and health monitoring systems do not include children from the US Affiliated Pacific region which includes the states of Hawai'i and Alaska.[3,4] Thus, data to guide resource allocation, programs and policy actions are needed to curb the epidemic of non-communicable chronic diseases.

CHL builds on several prior initiatives. In 2001 a Pacific collaboration was formed creating the Healthy Living in the Pacific Islands Initiative[5] with funding from a USDA Agricultural Development of the American Pacific project grant (Hashimoto: 99-38826-7854). In 2004, a USDA National Research Initiative grant (Novotny: 2004-35215-14252), the Healthy Living in the Pacific Islands: Healthy Pacific Child Project, emerged from that initiative, providing child obesity prevalence data for the Commonwealth of the Northern Mariana Islands,[6] a food based intervention trial, Healthy Foods Hawai'i,[7,8] and initial development of the Pacific Tracker dietary assessment tool.[9,10] Child obesity prevalence data were further elaborated[11] and the Pacific Tracker was further developed in 2008 with the Pacific Kids DASH for Health Study[12] funded by a USDA National Institute for Food and Agriculture grant (Novotny: 2008-55215-18821). Additionally, two sequential NCI grants in 2003 and 2009 (Vogel: U56 CA96254 / Allen: U56 CA96278; Vogel: U54 CA143727 / Whippy: U54 CA143728) to address cancer disparities were developed during this time, between the University of Hawai'i Cancer Center and the University of Guam, providing further development of obesity information for Pacific Islander adults,[13] and which is developing a food frequency questionnaire for the Mariana Islands, a tumor registry in Guam, and a model of breast cancer risk for Pacific Islanders. The current CHL intervention efforts are also guided by a physical activity and nutrition program that served over 20,000 children in Hawai'i.[14]

CHL aims to build sustainable community-based systems and environments to raise healthy children in the Pacific Region. Our target group is children age two to eight. In partnership with our community, our mission is to elevate the capacity of the region to build and sustain a healthy food and physical environment to help maintain healthy weight and prevent obesity among young children. Our purpose is to incur change that results in a Pacific environment with an indigenous-led obesity prevention workforce, data systems and information sharing on health of young children, community leaders who model healthy living, and environments and policies that promote child health.

The specific CHL objectives and responsible CHL team units are:

1. Compile program and data inventories and conduct a situation analysis of Pacific communities (Situation Analysis Center)
2. Train 22 Pacific professionals & paraprofessionals in obesity prevention in formal degree programs ranging from Associates to Doctorates (Training/Education Center)
3. Develop Pacific food, nutrition and physical activity data management and evaluation system (Data and External Communications Centers)
4. Develop and conduct an environmental intervention to prevent, maintain or decrease young child overweight and obesity in the Pacific Region (Intervention Center)

5. Evaluate the community-based primary prevention environmental intervention (Data Center)
6. Incur at least one obesity prevention policy change per jurisdiction (Program Steering Committee and External Communications Center)

The CHL management structure includes an External Advisory Committee of international experts, Local (Jurisdiction) Advisory Committees of community leaders, a Program Steering Committee composed of CHL Co-investigators, and a CHL Coordinating Center that includes Situation Analysis, Data, Intervention, Training/Education, and External Communications Centers (Figure 1).

Our methods involve partnership among and support of leaders and role models in Pacific communities to build and sustain a healthy food and physical environment to help maintain healthy weight and prevent obesity among young children. Our methods involve community engagement,[15] systems change, training in degree programs and community workshops, and supporting successful social, cultural, economic, political, and

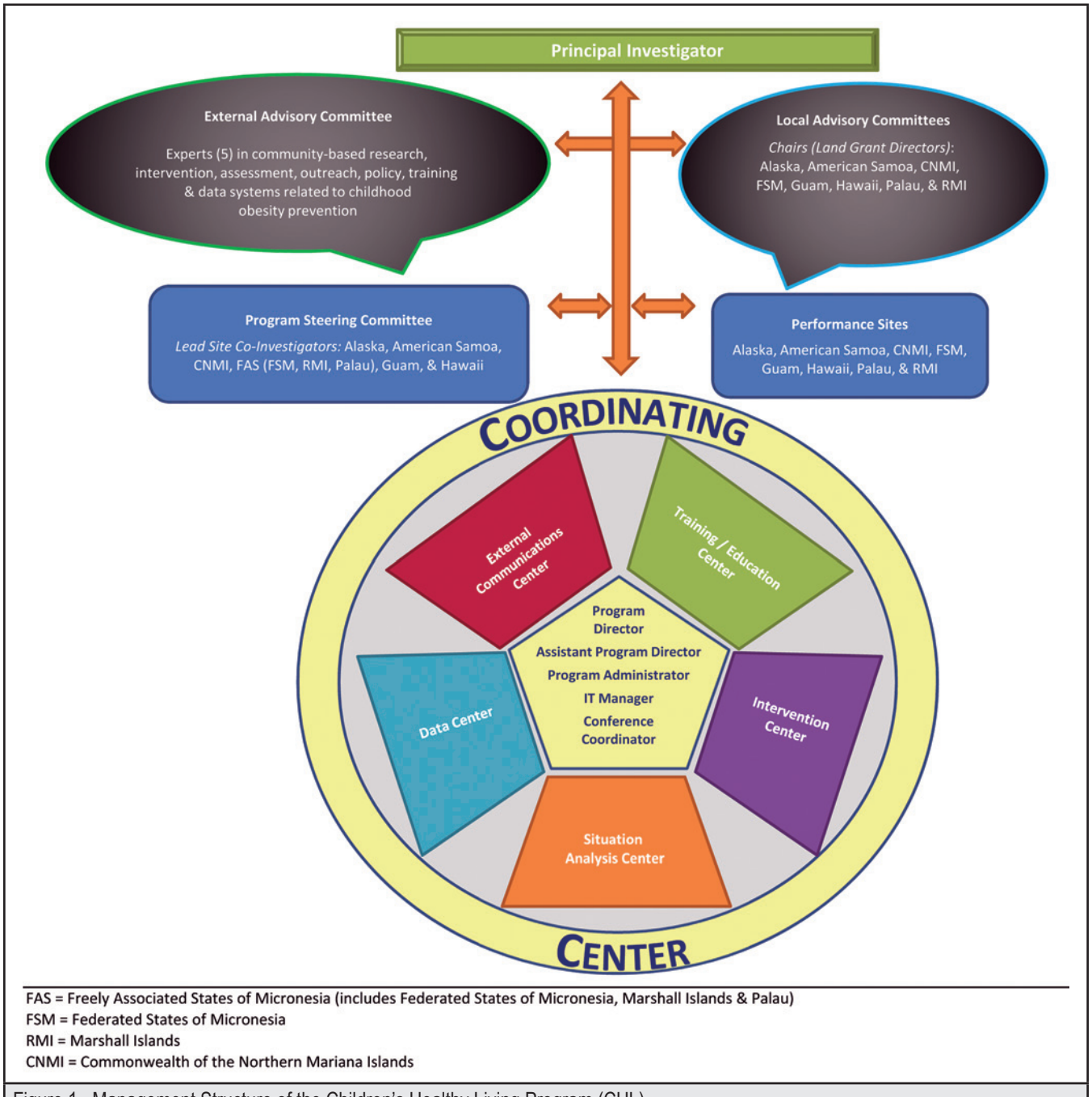


Figure 1. Management Structure of the Children's Healthy Living Program (CHL)

physical aspects of communities and jurisdictions of the Pacific for enhancing child wellness.

CHL work is occurring in phases beginning with community engagement and selection of communities with a high proportion of indigenous populations for testing effective strategies. We conduct situation analysis of the environment and collect measures of nutritional status, physical activity, sleep, body size, and acanthosis nigricans in young children in the selected communities. An intervention template is developed based on a systematic literature review for effective relevant interventions and the results of the community-specific situation analyses. Interventions are tailored to respond to each jurisdiction's level of readiness and to fit their cultures and contexts. Jurisdictions work to modify the school, food, and community policies and environments to improve healthy eating and increase physical activity, water intake, and sleep, and to decrease sedentary behaviors and sugar sweetened beverages intake by young children. Efforts are made to build on existing community strengths and to further empower existing leaders and groups to take up the CHL cause — to enhance the environment for child wellness. Formal degree training of two individuals from each jurisdiction is occurring in fields of health sciences, nutrition, nursing, public health, and resource management.

The support of people, community- and evidenced-based intervention activities, data systems and policies is occurring in these communities. Measures of the young children in these communities will allow CHL to identify approaches that showed improvement in child health, which will be disseminated. Please join CHL in supporting Pacific ways to enhance child wellness.

## Conflict of Interest

None of the authors identify a conflict of interest.


## Acknowledgements

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Revised November 1, 2012

# THE WEATHERVANE

RUSSELL T. STODD MD; CONTRIBUTING EDITOR

**WE HAVE THE IPAD, THE IPHONE AND NOW THE IKNIFE.**

A new tool is being developed that could tell surgeons in seconds whether they are slicing through cancerous or healthy tissue. Reporting in *Science Translational Medicine,* Zoltan Takats and associates of Imperial College London are working with a blade called the iKnife. The scalpel consists of an electric blade hooked up to an instrument that performs chemical analysis. As it cuts tissue, the rising smoke is captured and analyzed with a mass spectrometer. The smoke from each type of tissue and cancer has characteristic proportions of different fat molecules. When analyzing a new sample, the iKnife can compare its mass spectrum to the ones in the database and determine its tissue type. The team used the iKnife to test the database's predictions removing many kinds of cancers. They found it to be accurate in 95% of 91 surgeries in matching postoperative tests. Regulator trials are going forward.

**WANT TO BE A DOCTOR? FUGGITABOUTIT!**

Regnal Jones, executive director of Chicago Area Health and Medical Careers Program, stated that he no longer encourages people to go to medical school. "The minute a student says to me he/she wants to be a physician, I reply it is saying you want to be an indentured servant." He feels so strongly because medical school tuition can cost hundreds of thousands of dollars, and the investment in time can be prolonged depending upon specialty. After medical school, hospitals expect house staff to work 80 to 100 hours a week or more for about $40,000 a year. He believes fewer new doctors, particularly doctors of color, will be able to afford their own practices and more will be entering contractual relationships with hospitals or medical plans. Jones was enthusiastic about other medical careers, ie, nurses, nurse practitioners, and physician assistants.

**COUPLES WHO GET TATTOOED WITH THEIR LOVER'S NAMES, ARE THE MOST OPTIMISTIC IN THE WORLD.**

A growing number of people regret the tattoos they got some years ago in their youth. Often small groups or couples, perhaps precipitated by alcohol or other drugs, got an image portrayed on a body part. As many as 22% of college students have at least one tattoo, and almost half later want them removed. Dermatologists have long known that certain colors can be erased easier than others but a current study found that smoking also has an impact. Research on tattoo removal was managed in Milan, Italy, from 1995 through 2010 with 352 patients, 201 were males with a median age of 30 years. Using a standard technique with a Q-switched laser, doctors found it takes about 10 sessions several weeks apart. Blacks and reds are the most responsive pigment, green is more difficult but yellow, blue and pink show little response to the laser. Overall the study found a success rate of 47%. Removal was less successful if the patient was a smoker or if the tattoo was larger than 12 inches.

**EYE DROPS FOR MACULAR DEGENERATION? COULD IT BE?**

Cholesterol-lowering eye drops may one day halt or diminish developing macular degeneration. Rajendra Apte and the research team at Washington University School of Medicine in St. Louis previously found that macrophages help protect the retina by removing cellular cholesterol. Recently it has been shown that with aging, macrophages get bloated with cholesterol and deposits can form at the posterior pole of the globe causing dry macular degeneration. Apte's team found that old macrophages could be stimulated with cholesterol-shedding drugs and had fewer encroaching blood vessels than placebo animals. Anand Swaroop, geneticist who studies eye diseases at the National Eye Institute in Bethesda, Maryland, admits that cholesterol is involved, but doubts it is the underlying cause of macular degeneration. Hey, Doc, whatever helps!

**AN APPLE A DAY (NO ALAR, PLEASE) IS A GOOD START.**

In September 2012 the Archives of Internal Medicine published a study that concluded organic food isn't significantly more nutritious than conventionally grown food. The American Academy of Pediatrics (AAP) analyzed existing scientific evidence and weighed in with a report that vitamin and mineral content between organic and regular foods weren't much different. Researchers said organic milk has no significant benefit for children, and the growth hormone given cows doesn't affect humans. One caveat mentioned by the pediatricians was that children may benefit from organic produce because it isn't grown with synthetic pesticides. The AAP cited several studies linking pesticide exposure to memory problems and cancer in adult farm workers. They noted one study that showed that switching to organic produce for just five days dramatically reduced the levels of pesticide residue in the urine of children who usually ate a conventional diet.

**BLOW THE SMOKE AND MIRRORS AWAY.**

The Physician Payment Sunshine Act compels pharmaceutical and medical device companies to disclose payments they make to doctors, hospitals, and other health care providers. The intent of the act is to put light on financial relationships that companies make with doctors and facilities. For years companies have engaged in a marketing strategy in which they develop "consultative" agreements with a large number of doctors by paying them to use their products. A recent example is the story of DePuy Orthopedic's ASR XL metal-on-metal hip replacement. A jury awarded $8.3 million in damages and considered the allegation that doctors were reluctant to publicly report the failures of the device. DePuy, a division of Johnson and Johnson, denied the claims, but removed the ASR XL when it was revealed that 12% of patients required revision surgery. 93,000 patients worldwide have received the ASR XL and, with a 12% complication rate, DePuy may not survive the law suits.

**THE LOTTERY YOU DON'T WANT TO WIN.**

Autopsy confirmed the diagnosis of Creutzfeldt-Jakob Disease (CJD) in a patient who died following brain surgery at a New Hampshire hospital. The one-in-a-million disease takes decades to develop, but when symptoms appear, ie, memory loss, impaired coordination, behavior changes, CJD progresses rapidly. Because the proteins that cause the disease are not sterilized by normal measures, officials must warn eight patients who had surgery later with those tools. Five patients in Massachusetts were also notified, since equipment used in the original surgery was eventually transferred to a Cape Cod Hospital. Really scary stuff.

**IRONY WAITS IN OFF-ROAD KARMA.**

In Berne, New York, a 50 year-old man was riding in his all terrain vehicle (ATV) when he ran into nearly invisible wires. He was decapitated by wires he had strung himself to protect his marijuana crop. A 40 year-old woman was joy riding in the moonlight on a back road in Spring Lake, Florida, on her dirt bike. She collided head on with her husband who was skylarking in his ATV. Both were killed.

**ADDENDA**

- It takes six hundred cows to make enough footballs for one NFL season.
- Saint Lydwina is the patron saint of ice skating.
- Is it illegal to charge admission to a free-for-all?
- Economy section flatus on an inbound flight from the third world is the deadliest a traveler will ever encounter.

**ALOHA AND KEEP THE FAITH rts**

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

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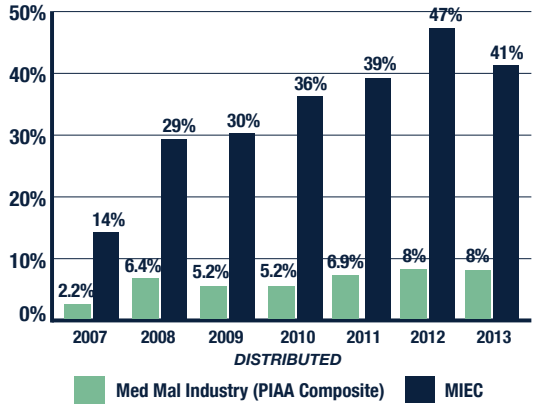


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