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Increasing dental health care utilization for all: Understanding individual-factors and place-factors in Hawaii

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Abstract

Introduction—Dental service utilization is an important global health problem. Studies report that when people are able to access oral health care, they are more likely to receive basic preventive services versus emergency care. Previous studies also report that dental care utilization varies by individual patient and place factors. However, studies on the interplay of individual and place factors are limited. This study investigated the associations of dental care utilization by urban/rural setting and by individual patient factors such as demographic, health care, health behavior, and financial autonomy.

Methods—The association of dental care utilization by individual factors and place was investigated by analyzing the Hawaii Behavioral Risk Factor Surveillance Survey (BRFSS). The BRFSS is a health-related telephone survey system that collects state data about U.S. residents regarding their health-related risk behaviors, chronic health conditions and use of preventive services.

Results—We found that health care, behaviors and financial autonomy were not substantially different between urban vs. rural sites in terms of the odds of dental service utilization. Results showed that individual factors such as financial autonomy were more consistently associated with dental service utilization.

Discussion—Financial autonomy as well as socioeconomic factors need to be considered to improve dental service utilization in Hawaii.

Keywords

Access to oral care; Hawaii; Dental care utilization; Oral health policy; Socioeconomic status

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COMPETING INTEREST

None

ETHIC STATEMENT

The University of Hawai'i institutional review board (IRB) granted the study an exemption from review. This analysis has been in full accordance with the World Medical Association Declaration of Helsinki. The authors did not obtain consent from participants as the study was a secondary data analysis of de-identified data set.

INTRODUCTION

Oral health is integral part of general health and wellbeing and a basic human right.^{1,2} When people are able to access oral health care they are more likely to receive basic preventive services and education on how to attain and maintain good oral health.³ They are also more likely to have oral diseases detected in the earlier stages.³ Despite these well-established public health interventions, inequality in dental service utilization persists as a global health problem.⁴

Previous studies have shown associations between dental service utilization and individual-level factors such as demographics⁵⁻⁷, general health behavior^{5,8}, and financial barriers.⁹ Dental service utilization has also been reported to be related to place factors such as geographical location (rural vs urban).¹⁰ Rural differences in dental care related to transportation^{11,12} and availability of providers¹¹ have been cited in studies, and issues in accessing dental health care in Hawaii have been noted in reports.¹³

There has been no study that comprehensively and quantitatively investigates dental care utilization in Hawaii. To improve the oral health of all, including underserved minority communities and those living on the neighbor islands, we must understand how individual factors (ex. demographics, health behaviors, etc.) and place factors (ex. urban vs rural) interplay in dental service utilization.

Therefore, this study investigates how individual-level factors such as demographic, health care, health behavior, and financial autonomy interact with dental health care utilization by place (urban vs rural) in Hawai'i.

METHODS

Study Design

The utilization of dental services in Hawaii was studied using the Behavioral Risk Factor Surveillance Survey (BRFSS) for the years 2011 to 2014. The BRFSS is a nationally representative survey of non-institutionalized adults conducted yearly by the Centers for Disease Control and Prevention. Data was provided by the Hawaii Department of Health, which collects more detailed ethnic data than available nationally. Participants' ethnicity included Caucasian, Filipino, Japanese, Native Hawaiian, other Asians, other Pacific Islanders (PI) and other. The University of Hawaii institutional review board (IRB) granted the study an exemption from review.

Variables

The study outcome variable was dental service utilization based on the answer to a question asking participants if they visited a dentist in the past year. Analyses included individual-level factors such as demographic variables, health care, health behaviors and financial autonomy. Demographic variables included age, gender, ethnicity, education, income and marital status. Age was categorized into four groups, 18–24, 25–44, 45–64 and 65 years. Ethnicity included Caucasian, Filipino, Japanese, other Asians, Native Hawaiian, other

Pacific Islanders and other. Education was classified as high school, attending college or technical school, and graduation from college or technical school. Income was classified as < \$25,000, \$25,000-\$34,999, \$35,000-\$49,999, \$50,000-\$74,999 and \$75,000. Marital status was defined as married/unmarried couple, never married, divorced/separated and widowed. Healthcare variables included yes or no for having a personal doctor, health coverage, and not being able to see a doctor because of medical cost. Health behaviors assessed were smoking status (current, former, or never), soda consumption (per day, per week, per month, or never) and exercising in the past 30 days. Financial autonomy was determined based on participant's job type (salaried or not salaried), home ownership status and if they had enough money to pay the mortgage (always/usually, rarely/sometimes, never, not applicable).

Rural/urban status was determined by responses to a question asking the participant's geographic location. There are seven inhabited islands in the State of Hawaii, six of which are publically accessible. Island of Oahu is the most populated publically accessible island, and it is reported that 992,605 individuals lived within the City and County of Honolulu as of 2016.¹⁴ The remaining five publicly accessible neighbor islands were designated as "rural" for this study. Neighbor island cities have less than 50,000 residents, and access to specialized health care services requires an airline flight to Honolulu, Oahu. (The Census Bureau identifies Urbanized Areas (UAs) as 50,000 or more people.¹⁵) Thus, for purposes of this study we defined Oahu as the sole urban location and all of the other neighbor islands as rural. The study population included a total of 14,564 individuals, with 7,754 (53%) from Oahu (urban) and 6,810 (47%) from the combined (rural) neighbor islands.

Dental utilization, the primary study outcome, was classified as yes or no. Visiting a dentist in past year was the reference category.

Data Analysis

Descriptive statistical significance of demographic variables, health care, health behaviors and financial autonomy by Oahu and neighbor islands were tested using Rao-Scott chi-square tests and summarized using frequencies and percentages. Multivariable logistic regression models were performed separately for Oahu and neighbor islands to obtain both unadjusted odds ratios and odds ratios adjusted for demographic variables. Some models tested interactions between other study variables and residence on Oahu or neighbor islands. In these analyses three models were fit: one without the interaction term for Oahu, one without the interaction term for the Neighboring islands, and one including both interaction terms (i.e., indicators for residence on Oahu or on the Neighboring islands multiplied by the study exposure [e.g., home ownership]). Results of logistic regression models were reported as odds ratios and 95% confidence intervals.

All analyses included stratification and weight variables to appropriately account for the complex survey design of the BRFSS were analyzed using SAS version 9.4. A p-value of less than 0.05 was considered statistically significant.

RESULTS

All demographic variables with the exception of gender were significantly different between urban and rural sites. (Table 1) The “urban” Oahu site had younger residents (age 18–24 y.o.), a greater percentage Japanese (26%), more college graduates (30%) and more residents with incomes >\$75,000 (37%) compared with people residing on the “rural” neighbor island. Rural residents were less likely to have a personal doctor, less likely to have seen a dentist in the past year, less likely to have health insurance, and less likely to see a medical doctor because of cost. Urban residents were more likely to be never-smokers but consumed similar amounts of soda and had exercise levels comparable to their rural counterparts. Among rural residents financial autonomy was slightly more favorable in that a higher proportion always paid their mortgage, owned a own home and were non-salaried workers compared with urban residents.

Table 2 examines the odds of dental service utilization by individuals factors. Dental service utilization rates varied between ethnic groups, with lower utilization among Caucasians than those of Japanese/Other ethnicity. Higher dental service utilization was also found among older individuals and women. Lower dental utilization was observed with lower education, lower incomes, non-married status, not having a personal doctor and no health coverage. Lower utilization was also found among those who consumed any amount of soda, were active smokers, or do not exercise. Individuals who were unable to pay their mortgage regularly were more likely to seek dental service utilization but not if they did not own their home or were non-salaried.

Table 3 presents results adjusted for all demographic variables and stratified by urban vs. rural residence to examine whether “place” influences the relations between health care access, behaviors and financial autonomy with dental service utilization. We found that health care, behaviors and financial autonomy were not substantially different between urban vs. rural sites in terms of odds of dental service utilization. Consequently, we combined both sites to examine the adjusted odds for dental service utilization. In this final model (Table 4), the individual factors that were positively associated with dental service utilization were older age (>65years old), not seeing a doctor because of medical costs and never having enough money to pay the mortgage. (ORs ranged from 1.73–1.99; p-values <0.001–0.023) Lower dental service utilization was significantly associated with poverty level based on income (< \$25,000), having less than a college education, being divorced/separated, not having a personal doctor, lacking health coverage, being an active smoker, not exercising, not having home ownership and not being salaried. (OR range 0.47–0.77; p-value range <0.0001–0.026)

DISCUSSION

Dental service utilization is an important factor that is known to be associated with better dental care (i.e. early screening and treatment of dental or periodontal disease). Access to dental services is a necessary precursor to dental service utilization but it is not sufficient to ensure oral health or dental health equality. In this study, we examined individual demographic, health and financial factors across a single urban site (O‘ahu) compared with

rural sites (Neighbor Islands) to better understand the influence of place and individual factors on dental service utilization. Our results found no significant differences between individual factors and dental service utilization by place. This finding contrasts with other studies that found that individuals living in rural areas experience lower dental services.⁴ One potential explanation is that questions on availability of transportation and dental/oral health care providers were not included in this survey. Availability of transportation and dental/oral health care providers are often discussed, and descriptive reports are available.¹³

The large number of individual factors associated with lower dental service utilization found in our study is consistent with the existing literature.⁵⁻⁹ Some of the important exceptions are that ethnic minorities and sex were not significantly associated with the utilization of dental services in our final model. The lack of ethnic dental disparities may be related to the fact that Hawaii's state populations is characterized by five major ethnic groups and no single dominant ethnic group. Thus, ethnic relationships are complex and nuanced in contrast to most US states. Rather, we found that overall financial autonomy factors were more uniformly associated with dental service utilization. This finding suggests that social determinants (housing, jobs, etc.) have a critical role in dental utilization and thus dental and oral health. In a dental health insurance environment where public health insurance programs such as Medicaid and Medicare do not provide comprehensive dental health coverage for adults, the cost of private dental health premiums and co-payments may be out of reach to many who face financial challenges. This has important public health implications for improving dental service utilization throughout the State.

Limitations

The current study has several limitations. First, the BRFSS is a cross-sectional survey of health behaviors and risk factors. Thus, it is not possible to ascertain cause-and-effect of the factors on dental utilization. Second, the BRFSS may not adequately capture the healthcare utilization of highly vulnerable populations in Hawai'i, e.g., homeless and institutionalized adults since the survey is conducted over the phone. The current study also does not account for the possibility of how current dental workforce shortages may have affected the participant responses on the BRFSS data. Lastly, the data collected on the BRFSS does not allow for the inclusion of other predictors of dental utilization (i.e. "perceived need for care"¹², "transportation"^{11,12}, "fear"¹¹ and "distance from dental clinic"¹¹). Nonetheless, this study provides sufficient sample sizes of both urban and rural populations within a State that is unique in its multi-ethnic population and thus provides novel insights to the residual causes of dental utilization inequality.

Conclusion

The implications of this study are that utilization of dental services is significantly associated with social determinants such as financial autonomy (home ownership and jobs), education (college graduate), and social relationships (marital status) in addition to the well known correlates of health care coverage and available service providers (dentists/doctors). While ethnicity has been reported as an important predictor of dental service utilization in prior studies, our study suggests that in the context of and the lack of a dominant ethnic group, other social determinants seem to contribute more significantly to the observed inequalities

of dental service utilization. In summary, future plans for reducing oral health inequalities and improving dental health may need to consider a multi-pronged approach that includes improving the overall standard of living for all individuals while maintaining broad dental health coverage to all locations with adequate dental providers focused on comprehensive dental care.

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Table 1.

Comparison of Oahu (Urban) and Neighbor Island (Rural) Place by Individual Factors of Demography, Health Care & Behaviors and Financial Autonomy (N=14,534)

Variable	Total (n=14,564)	Type of Island (n, %)		P-value
		Oahu (n=7,754)	Neighbor Islands (n=6,810)	
<i>Demographic variables</i>				
Age Group (years)				<0.001
18–24	1,135 (11.6)	742 (12.1)	393 (10.4)	
25–44	3,767 (33.7)	2,267 (34.8)	1,500 (31.3)	
45–64	5,535 (34.3)	2,730 (32.8)	2,805 (37.8)	
65	4,127 (20.4)	2,015 (20.3)	2,112 (20.6)	
Gender				0.888
Male	6,850 (49.9)	3,702 (49.9)	3,148 (49.8)	
Female	7,714 (50.1)	4,052 (50.1)	3,662 (50.2)	
Race				<0.001
Caucasian	5,581 (31.7)	2,231 (26.4)	3,350 (44.2)	
Filipino	1,774 (16.9)	1,001 (17.0)	773 (16.8)	
Japanese	2,729 (22.3)	1,812 (25.7)	917 (14.4)	
Native Hawaiian	1,941 (12.4)	977 (11.5)	964 (14.7)	
Other Asians	1,016 (8.9)	834 (11.4)	182 (3.2)	
Other	662 (5.4)	378 (5.7)	284 (4.9)	
Other Pacific Islanders	306 (2.2)	202 (2.3)	104 (2.1)	
Education				<0.001
High school	4,615 (39.4)	2,250 (36.6)	2,365 (46.0)	
Attended college or technical school	4,115 (33.5)	2,108 (33.4)	2,007 (33.6)	
Graduated from college or technical school	5,810 (27.1)	3,378 (30.0)	2,432 (20.4)	
Income				<0.001
< \$25,000	3,486 (24.9)	1,594 (22.4)	1,892 (30.8)	
\$25,000 - \$34,999	1,482 (11.4)	714 (10.5)	768 (13.7)	
\$35,000 - \$49,999	1,943 (14.4)	985 (14.0)	958 (15.4)	
\$50,000 - \$74,999	2,201 (16.4)	1,181 (16.5)	1,020 (16.2)	
\$75,000	4,026 (32.8)	2,494 (36.7)	1,532 (23.9)	
Marital Status				<0.001
Married/Unmarried Couple	7,468 (53.6)	3,918 (53.4)	3,550 (54.3)	
Never Married	3,423 (28.9)	2,059 (30.1)	1,364 (26.4)	
Divorced/Separated	2,234 (10.6)	1,073 (10.0)	1,161 (11.9)	
Widowed	1,385 (6.8)	664 (6.5)	721 (7.5)	
<i>Health Care</i>				
Personal Doctor				<0.001
No	2,090 (15.1)	1,016 (13.6)	1,074 (18.5)	
Yes	12,444 (84.9)	6,719 (86.4)	5,725 (81.5)	
Visited a dentist in past year				<0.001

Variable	Total (n=14,564)	Type of Island (n, %)		P-value
		Oahu (n=7,754)	Neighbor Islands (n=6,810)	
No	4,251 (29.1)	2,141 (27.4)	2,110 (31.1)	
Yes	10,266 (70.9)	5,590 (72.6)	4,676 (68.9)	
Could not see doctor because of medical cost				<0.001
No	13,184 (91.1)	7,126 (92.2)	6,058 (88.4)	
Yes	1,366 (8.9)	620 (7.8)	746 (11.6)	
Health Coverage				0.007
No	1,198 (9.0)	585 (8.4)	613 (10.4)	
Yes	13,334 (91.0)	7,151 (91.6)	6,183 (89.6)	
Health Behaviors				
Smoking Status				<0.001
Never	8,156 (59.9)	4,623 (61.2)	3,533 (54.4)	
Former	4,137 (25.9)	1,953 (24.2)	2,184 (29.6)	
Current – some day	612 (4.4)	308 (4.1)	304 (5.0)	
Current – every day	1,352 (9.9)	696 (9.4)	656 (10.9)	
Soda Consumption				0.807
Never	3,536 (44.6)	1,916 (44.4)	1,620 (45.0)	
Per day	659 (10.4)	408 (10.6)	251 (9.9)	
Per week	732 (11.7)	461 (11.9)	271 (11.1)	
Per month	2,266 (33.4)	1,313 (33.1)	953 (34.0)	
Exercise in past 30 days				0.299
No	2,748 (19.3)	1,499 (19.6)	1,249 (18.6)	
Yes	11,812 (80.7)	6,253 (80.4)	5,559 (81.4)	
Financial Autonomy				
Have enough money to pay mortgage				0.009
Always/Usually	787 (11.4)	430 (10.7)	357 (13.1)	
Rarely/Sometimes	2,058 (34.7)	1,156 (33.7)	902 (36.9)	
Never	3,230 (50.8)	1,855 (52.6)	1,375 (46.7)	
Not applicable	206 (3.1)	91 (3.0)	115 (3.3)	
Home Ownership				<0.001
Own	8,149 (63.4)	4,031 (62.0)	4,118 (66.5)	
Rent	4,586 (25.1)	2,645 (26.0)	1,941 (23.1)	
Other arrangement	1,630 (11.5)	957 (12.0)	673 (10.4)	
Salaried job				<0.001
Salaried	1,664 (38.8)	1,083 (42.0)	581 (31.0)	
Not salaried	2,433 (61.2)	1,360 (58.0)	1,073 (69.0)	

Weighted column percentage. Rao-Scott chi-square tests were used to account for complex sampling design.

Table 2.

Odds of Dental Service Utilization by Individual Factors of Demography, Health Care & Behaviors and Financial Autonomy

Variable	OR	95% CI	P-value
<i>Demographic variables</i>			
Age Group (years)			
18–24	Ref.	Ref.	Ref.
25–44	0.83	0.68, 1.01	0.069
45–64	1.34	1.10, 1.64	0.003
65	1.60	1.30, 1.96	< 0.001
Gender			
Male	Ref.	Ref.	Ref.
Female	1.36	1.22, 1.52	< 0.001
Race			
Caucasian	Ref.	Ref.	Ref.
Filipino	0.77	0.65, 0.92	0.004
Japanese	1.50	1.28, 1.75	< 0.001
Native Hawaiian	0.57	0.48, 0.67	< 0.001
Other Asians	1.38	1.11, 1.73	0.004
Other	0.53	0.41, 0.68	< 0.001
Other Pacific Islanders	0.37	0.26, 0.52	< 0.001
Education			
High school	0.32	0.28, 0.36	< 0.001
Attended college or technical school	0.55	0.48, 0.63	< 0.001
Graduated from college or technical school	Ref.	Ref.	Ref.
Income			
< \$25,000	0.23	0.20, 0.27	< 0.001
\$25,000 - \$34,999	0.38	0.31, 0.46	< 0.001
\$35,000 - \$49,999	0.61	0.51, 0.74	< 0.001
\$50,000 - \$74,999	0.68	0.56, 0.82	< 0.001
\$75,000	Ref.	Ref.	Ref.
Marital Status			
Married/Unmarried Couple	Ref.	Ref.	Ref.
Never Married	0.49	0.43, 0.55	< 0.001
Divorced/Separated	0.46	0.39, 0.54	< 0.001
Widowed	0.64	0.53, 0.78	< 0.001
<i>Health Care</i>			
Personal Doctor			
No	0.41	0.36, 0.48	< 0.001
Yes	Ref.	Ref.	Ref.
Could not see doctor because of medical cost			
No	Ref.	Ref.	Ref.

Variable	OR	95% CI	P-value
Yes	2.81	2.36, 3.35	< 0.001
Health Coverage			
No	0.35	0.29, 0.42	< 0.001
Yes	Ref.	Ref.	Ref.
Health Behaviors			
Smoking Status			
Never	Ref.	Ref.	Ref.
Former	0.90	0.80, 1.03	0.117
Current – some day	0.39	0.31, 0.51	< 0.001
Current – every day	0.38	0.32, 0.46	< 0.001
Soda Consumption			
Never	Ref.	Ref.	Ref.
Per day	0.50	0.38, 0.65	< 0.001
Per week	0.72	0.56, 0.94	0.015
Per month	0.83	0.69, 0.99	0.042
Exercise in past 30 days			
No	0.69	0.60, 0.78	< 0.001
Yes			
Financial Autonomy			
Have enough money to pay mortgage			
Always/Usually	Ref.	Ref.	Ref.
Rarely/Sometimes	1.57	1.21, 2.04	0.001
Never	2.69	2.10, 3.45	< 0.001
Not applicable	2.29	1.36, 3.85	0.002
Home Ownership			
Own	Ref.	Ref.	Ref.
Rent	0.39	0.35, 0.44	< 0.001
Other arrangement	0.45	0.38, 0.53	< 0.001
Salaried job			
Salaried	Ref.	Ref.	Ref.
Not salaried	0.50	0.41, 0.63	< 0.001

OR=Odds Ratio; CI=Confidence interval.

Table 3.

Adjusted* Odds of Dental Service Utilization and Individual Factors (Health Care & Behaviors and Financial Autonomy) stratified by Place (Oahu [urban] vs Neighbor Islands [rural])

Variable	Oahu			Neighbor Islands			Interaction P-value
	OR	95% CI	P-value	OR	95% CI	P-value	
Health Care							
Personal Doctor							
No	0.59	0.47, 0.75	< 0.001	0.54	0.42, 0.68	< 0.001	0.816
Yes	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Could not see doctor because of medical cost							
No	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Yes	2.01	1.48, 2.72	< 0.001	1.43	1.11, 1.84	0.006	0.086
Health Coverage							
No	0.56	0.42, 0.75	< 0.001	0.56	0.42, 0.73	< 0.001	0.828
Yes	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Health Behaviors							
Smoking Status							
Never	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Former	0.84	0.68, 1.03	0.091	0.95	0.78, 1.16	0.599	0.528
Current – some day	0.54	0.36, 0.81	0.002	0.62	0.42, 0.94	0.023	0.494
Current – every day	0.58	0.44, 0.77	< 0.001	0.64	0.49, 0.84	0.001	0.405
Soda Consumption							
Never	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Per day	0.70	0.48, 1.01	0.055	0.98	0.62, 1.55	0.939	0.187
Per week	0.80	0.55, 1.16	0.239	0.90	0.57, 1.43	0.654	0.496
Per month	0.88	0.67, 1.16	0.354	0.96	0.71, 1.30	0.807	0.535
Exercise in past 30 days							
No	0.76	0.62, 0.95	0.013	0.74	0.60, 0.91	0.005	0.573
Yes	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Financial Autonomy							
Have enough money to pay mortgage							
Always/Usually	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Rarely/Sometimes	1.13	0.76, 1.67	0.557	1.56	1.07, 2.30	0.022	0.488
Never	1.59	1.07, 2.37	0.023	2.35	1.57, 3.54	< 0.001	0.670
Not applicable	1.86	0.69, 5.01	0.217	1.62	0.80, 3.27	0.180	0.545
Home Ownership							
Own	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Rent	0.64	0.52, 0.79	< 0.001	0.78	0.62, 0.97	0.026	0.063
Other arrangement	0.81	0.61, 1.08	0.150	0.67	0.49, 0.90	0.009	0.433
Salaried job							
Salaried	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Not salaried	0.70	0.51, 0.96	0.029	0.85	0.59, 1.24	0.409	0.604

All models included age, gender, race, education, income, and marital status.

OR=Odds Ratio; CI=Confidence interval; Interaction term = variable * island.

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Table 4.

Adjusted* Odds of Dental Service Utilization and Individual Factors of Demography, Health Care & Behaviors and Financial Autonomy in Combined O‘ahu (Urban) and Neighbor Islands (Rural) Places.

	OR	95% CI	P-value
<i>Demographic variables</i>			
Age Group (years)			
18–24	Ref.	Ref.	Ref.
25–44	0.83	0.54, 1.27	0.391
45–64	1.22	0.78, 1.91	0.393
65	1.99	1.10, 3.59	0.023
Gender			
Male	Ref.	Ref.	Ref.
Female	1.25	1.00, 1.58	0.053
Race			
Caucasian	Ref.	Ref.	Ref.
Filipino	0.82	0.58, 1.17	0.278
Japanese	1.03	0.75, 1.43	0.846
Native Hawaiian	0.78	0.55, 1.10	0.157
Other Asians	1.12	0.71, 1.76	0.621
Other	0.59	0.34, 1.03	0.065
Other Pacific Islanders	0.74	0.35, 1.53	0.409
Education			
High school	0.56	0.42, 0.75	< 0.001
Attended college or technical school	0.72	0.54, 0.96	0.026
Graduated from college or technical school	Ref.	Ref.	Ref.
Income			
< \$25,000	0.47	0.32, 0.69	< 0.001
\$25,000 - \$34,999	0.67	0.45, 1.01	0.055
\$35,000 - \$49,999	0.78	0.54, 1.10	0.159
\$50,000 - \$74,999	0.89	0.64, 1.22	0.460
\$75,000	Ref.	Ref.	Ref.
Marital Status			
Married/Unmarried Couple	Ref.	Ref.	Ref.
Never Married	0.80	0.59, 1.07	0.137
Divorced/Separated	0.57	0.40, 0.79	0.001
Widowed	0.79	0.41, 1.53	0.480
<i>Health Care</i>			
Personal Doctor			
No	0.58	0.49, 0.68	< 0.001
Yes	Ref.	Ref.	Ref.
Could not see doctor because of medical cost			
No	Ref.	Ref.	Ref.

	OR	95% CI	P-value
Yes	1.73	1.40, 2.13	< 0.001
Health Coverage			
No	0.53	0.43, 0.66	< 0.001
Yes	Ref.	Ref.	Ref.
Health Behaviors			
Smoking Status			
Never	Ref.	Ref.	Ref.
Former	0.88	0.75, 1.02	0.086
Current – some day	0.58	0.43, 0.79	< 0.001
Current – every day	0.61	0.49, 0.75	< 0.001
Soda Consumption			
Never	Ref.	Ref.	Ref.
Per day	0.70	0.48, 1.01	0.055
Per week	0.80	0.55, 1.16	0.239
Per month	0.88	0.67, 1.16	0.354
Exercise in past 30 days			
No	0.75	0.64, 0.88	< 0.001
Yes	Ref.	Ref.	Ref.
Financial Autonomy			
Have enough money to pay mortgage			
Always/Usually	Ref.	Ref.	Ref.
Rarely/Sometimes	1.24	0.92, 1.67	0.151
Never	1.75	1.30, 2.37	< 0.001
Not applicable	1.74	0.93, 3.28	0.086
Home Ownership			
Own	Ref.	Ref.	Ref.
Rent	0.68	0.58, 0.80	< 0.001
Other arrangement	0.77	0.62, 0.96	0.022
Salaried job			
Salaried	Ref.	Ref.	Ref.
Not salaried	0.75	0.58, 0.97	0.026

All models included age, gender, race, education, income, and marital status.

OR=Odds Ratio; CI=Confidence interval; Interaction term = variable * island.