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Hepatitis B Among Pacific Islanders in Southern California: How is Health Information Associated with Screening and Vaccination?

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Abstract We measured Hepatitis B virus (HBV) transmission knowledge and self-reported screening/testing behavior among Pacific Islanders (Guamanians/Chamorros, Samoans, and Tongans) in Southern California. We also examined access and trust by Pacific Islanders of varying health information sources. We administered and analyzed survey data ($N = 297$), using a convenience sample in Los Angeles, Orange, and San Diego Counties in spring 2009. We found that while Pacific Islander respondents reported that they receive health information from physicians, and largely trust this source, information from and trust in physicians were not statistically significant in explaining whether respondents sought HBV screening or vaccination.

Keywords Hepatitis B screening and vaccination · Health information · Pacific Islander health · Southern California

Introduction

Pacific Islanders in the US face a complex set of health challenges. This population, from a myriad of islands both US governed (e.g., the state of Hawai'i and US territories, including American Samoa, Guam, Commonwealth of the Northern Mariana Islands) and sovereign nations (e.g., Fiji, Federated States of Micronesia, Palau, Papua New Guinea, Samoa, Tonga), are often aggregated with Asian Americans, but are a distinct set of communities with different cultural norms, access to health, and health challenges.

Hepatitis B virus (HBV) infection, and the health problems associated with this (including but not limited to liver conditions such as cirrhosis and hepatocellular carcinoma) are highly prevalent among Asians/Pacific Islanders (APIs) in the US [1, 2], and chronic HBV infection is endemic in the Pacific Islands [3]. However, most studies on API populations tend to focus more on Asians with less attention paid to Pacific Islanders, leading to an urgent need to examine the knowledge among US Pacific Islanders about Hepatitis B transmission and testing behavior.

In this paper we analyze the results of a recent community needs assessment survey of a convenience sample of Pacific Islanders in Southern California to investigate the associations among information sources, trust in sources, and self-reported HBV screening/testing and vaccination behavior. Though respondents largely reported that they were screened and vaccinated for HBV because of recommendations by their physicians, and that if they had not been screened and vaccinated for HBV, they would seek screening vaccination

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on advice from their physicians, multivariate logistic regression analysis of the survey results suggest that obtaining information from and trust in physicians were not significant predictors of HBV screening or vaccination. Instead, for those respondents who sought screening/testing or vaccination for HBV, significant factors included employment status and lack of knowledge about HBV.

To present these findings, the paper proceeds in the following manner. First, we describe the data and methods used, including a description of the convenience sample and a comparison of this sample to US Census data on the Pacific Islander population in Southern California. We then provide descriptive analysis of Pacific Islander respondents' knowledge about HBV transmission, questions about which sources of health information would lead respondents to be screened and vaccinated for HBV, and trusted health information sources. Next, we present the results of multivariate logistic regression analysis of self-reported HBV screening and vaccination behavior. These results show that while respondents tend to report that physicians provide information and are highly trusted by these respondents as sources of information, information from and trust in physicians are not significant predictors of variations in self-reported HBV screening and vaccination. We conclude the paper with implications from this analysis for enhancing HBV screening and vaccination among Pacific Islanders in Southern California, and elsewhere.

Methods

A community needs assessment survey of Pacific Islander communities in the counties of Los Angeles, Orange, and San Diego in Southern California was conducted to measure Hepatitis B (HBV) knowledge, screening/testing, and vaccination, and trusted sources of health information.

Questionnaires

A survey questionnaire developed originally by the B Free CEED at the Center for the Study of Asian American Health, New York University School of Medicine (originally designed for surveys of Asian immigrants in New York City) was revised by several of the co-authors to be more culturally appropriate for Southern Californian Pacific Islanders. In November 2008, the Center for the Study of Asian American Health at NYU School of Medicine reviewed the adapted questionnaire, and made additional suggestions, including deleting several questions.

There were four English versions created of the survey questionnaire that targeted, respectively, Chamorro, Samoan, Tongan, and other Pacific Islander respondents. The English versions targeting Chamorro and Samoan

respondents were translated into Chamorro and Samoan by several of the co-authors, and backtranslated into English. The two English versions (original and back-translated) were compared by one of the co-authors; minor revisions were made to the translated Chamorro and Samoan versions to improve clarity. The English and translated versions were pilot tested in late November 2008 with a total of 21 Chamorros, 1 Samoan, and 1 native Hawaiian; again, minor revisions were made to improve clarity.

The questionnaires were copied such that both the English and in-language versions were included in all questionnaires (English version on front and in-language version on back of each page). Respondents could therefore complete the questionnaire entirely in English, entirely in-language, or could move between the two depending on the respondent's preferences.

Sampling Design

A convenience sampling approach was used. Several of the co-authors distributed and collected the questionnaires from mid-February to mid April 2009 at community/church meetings, cultural gatherings, and other community venues in Los Angeles, Orange, and San Diego counties. To minimize potential respondent bias, individuals were asked to complete the self-administered questionnaire and deposit the completed questionnaire in a sealed box.¹ Each respondent was given a \$5 gift card as an incentive for completing the questionnaire.

The characteristics of the respondents overall and comparison to 2005–2007 Public Data Microdata Sample data² are listed in the Table 1. Compared to the PUMS sample, the convenience sample was more female, had lower annual household income, had larger household sizes, and was less often employed.

Knowledge of Hepatitis B (HBV) and Reasons for Vaccination

Respondents were asked questions about HBV transmission and ethnic group prevalence to assess their

¹ As this was a community needs assessment survey conducted by community organizations, the survey and sampling were not reviewed by any IRB.

² Instead of the 2000 Census PUMS 5% sample, the more current pooled data over the three years (2005–2007) of 1% samples of annual data were used for comparison. Samoan and Guamanian/Chamorro self-identified individuals living in the metropolitan areas of Los Angeles-Long Beach, Orange County, and San Diego were aggregated ($N = 616$). The unweighted counts of both groups were compared to survey respondents based on similar demographic, economic, and household characteristics included in the PUMS sample.

Table 1 Sample characteristics compared to 2005–2007 PUMS

Demographic or health variable	Respondent characteristics (<i>N</i> = 297)	Comparison to 2005–2007 PUMS (<i>N</i> = 616)
Ethnic background	51% Samoan 49% Chamorro	53% Samoan 47% Chamorro
Gender	55% female 44% male	49% female 51% male
Age	Average = 40 years Range: 16–82 years	Average = 38 years Range = 16–82 years
Place of birth	45% California 27% Guam 14% American Samoa 4% Samoa/Western Samoa	46% California 18% Guam 10% American Samoa 8% Western Samoa
Number of years in US (for immigrants only)	Mean = 29 years Range = 4–55 years	Mean = 28 years Range = 4–55 years
English language capacity	62% speak English fluently 24% speak English very well	80% speak English fluently 8% speak English well
Pacific Islander language capacity	27% speak Pacific Islander language fluently 13% speak very well 11% speak not at all	9% speak Chamorro/Guamanian 27% speak Samoan 45% speak only English
Marital status	43% Married 31% Single or never married 10% Divorced or separated	51% Married 37% Single or never married 9% Divorced or separated
Health insurance	17% No insurance	N/A
Education	9% Elementary school 8% Junior high school 51% High school or GED 11% Tech/vocational school 19% College or university graduate	15% Elementary school 4% Junior high school 28% High school or GED 20% Some college 10% Junior college/college graduate
Employment status	63% Full/part time employed 19% Unemployed	89% Full/part time employed 11% unemployed
Household size	Average: 5.6 Range: 1–40 persons	Average: 4.9 Range: 1–12
Household members younger than 18	Average: 1.9 Range: 0–13 household members < 18 years	Average: 0.85 Range: 0–6 own children present
Household composition	95% Family	99% Family or sub-family
Approximate total household income during last year	5% Less than \$10,000 7% \$10,000–\$19,999 17% \$20,000–\$29,999 12% \$30,000–\$39,999 7% \$40,000–\$49,999 28% \$50,000 or more 24% Not sure/Don't know	2% Less than \$10,000 5% \$10,000–\$19,999 9% \$20,000–\$29,999 6% \$30,000–\$39,999 8% \$40,000–\$49,999 70% \$50,000 or more

knowledge, about whether they had been advised or referred for HBV screening/testing and vaccination, and their self assessment of risk of HBV transmission (Table 2). A large proportion of respondents (63%) reported that they had heard of HBV, however, over half reported that they did not know which ethnic group(s) tends to most commonly have HBV. There also appears to

be some confusion among respondents between HBV and Hepatitis A; 30% of respondents, for example, reported that HBV could be transmitted by eating unclean food, 26% reported that HBV could be transmitted via sharing food with an infected person and 21% reported that HBV could be transmitted via sharing utensils or chopsticks (these are transmission modes for Hepatitis A).

Table 2 Knowledge of Hepatitis B virus transmission

Knowledge variable	Response
Heard of Hepatitis B (<i>N</i> = 289)	63% yes
	23% no
	14% don't know
In your opinion, in which ethnic group is Hepatitis B most common? (<i>N</i> = 283)	3% White
	8% Black
	1% Hispanic/Latino
	4% Asian Americans
	4% Pacific Islanders
	24% All equally common
In your opinion, Hepatitis B can be transmitted by: (<i>N</i> = 250; more than one answer possible)	56% Don't know
	63% unprotected sex
	63% using contaminated needles
	61% contact blood or bodily fluids from an infected person
	38% an infected mother to her baby at the time of delivery
	30% heredity
	30% eating unclean food
	26% sharing food with an infected person
	21% sharing utensils/chopsticks
	19% kissing
	6% other (le ilor, raw food, ti utungo, toilet seat)

Between 61 and 63% of the respondents reported correctly that HBV could be transmitted via contact with blood or bodily fluids from an infected person, via unprotected sex, or via contaminated needles.

Of the total sample, 53 (19%) reported that they had been screened for HBV, and 61 (21%) reported that they had been vaccinated for HBV. These are much lower rates than reported in a recent study of Cambodian and Vietnamese Americans drawing from the Annual REACH 2010 Risk Factor Surveys [2].

Sizable proportions of respondents reported that they had not ever been told that they should be screened for HBV (40%) or that they had never heard of HBV before participating in this community needs assessment survey (26%). Of the one-third of total respondents who had been told that they should be screened for HBV, most had been advised to do so by a doctor and most of those respondents had been screened or tested for HBV (though about 16% of this group did not know or were unsure if they had been tested).

The 40% of the total respondents who reported that no one had suggested that they be screened for HBV indicated varying reasons for not being screened. The most common reasons were lack of knowledge, feeling well, not being suggested by a doctor, and not knowing where to get screened.

Table 3 Hepatitis B risk and most influence in screening/vaccination

Awareness variable	Response
What influenced or would influence you to get Hepatitis B screening and vaccination? (<i>N</i> = 252) ^a	64% Doctor told you to get screened
	35% Family member is a carrier
	34% Free screening/vaccination or if covered by insurance
	32% Fear of being infected by the virus
	31% Encouraged by family members
	28% Attended Hepatitis B educational workshop
	22% Encouraged by spouse
	21% Encouraged by friends
	9% Other (Bakura, Teacher, Employer, Galuega, Travel)
Do you think you could be infected with Hepatitis B? (<i>N</i> = 280)	6% Yes
	52% No
	41% Not sure/Don't know
Have you ever been diagnosed with Hepatitis B infection? (<i>N</i> = 280)	1% Yes
	78% No
	21% Not sure/Don't know

^a Total percentages may add up to more than 100% as respondents were asked to list all that apply; the only responses that were highly correlated (using Pearson correlation coefficient) were being encouraged by friends and family members

Similar patterns were exhibited concerning whether respondents were ever told that they should be vaccinated for HBV. About one-third of the respondents (36%) reported that they had been told that they should obtain a vaccination for HBV, while 39% reported that they had not ever been told to obtain a HBV vaccination, and 25% reported that they had never heard of HBV before participating in this community needs assessment survey. For the 36% of the respondents who had ever been told that they should obtain a HBV vaccination, almost all of the respondents (87%) were told to do so by a doctor, and about two-thirds of those respondents reported that they had been vaccinated for HBV.

For the 39% of the respondents who reported not ever having been told to obtain an HBV vaccination, the most common reasons for not getting vaccinated included lack of knowledge and feeling well.

Over half of the respondents believed that they were not infected with HBV, but 41% reported that they did not know (6% believed that they might be infected) (Table 3). Over three quarters of the respondents reported that they had not ever been diagnosed with HBV, but 21% reported that they did not know or were not sure if they had ever been diagnosed with HBV. The most important influence appeared to be physicians' recommendations; almost two-thirds of the respondents reported that if a doctor

recommended that the respondent be screened, then this would influence that respondent to obtain HBV screening and vaccination.

Physicians Appear to be Highly Trusted and Accessed Sources of Health Information

Respondents were asked to indicate whether they had obtained information about health and health care from varied provider and community sources. The results are reported here by source, and then by utilization, and degree of trust depending on whether they had whether they had obtained information from specific sources (Table 4).

Respondents reported most often that they had obtained health and health care information from the following sources: physicians/health care providers (79% reported that they had obtained information), pharmacists (53% reported that they had obtained information), family members (48% reported that they had obtained information), and community functions or health fairs (46% reported that they had received information).

Respondents reported less often obtaining information from church, spiritual, or religious leaders (31% reported obtaining information), friends (29% reported obtaining information), employee assistance programs (26% reported obtaining information), co-workers (20% reported obtaining information), traditional healers (17% reported obtaining information), and telephone advice lines (8% reported obtaining information). Respondents who reported that they had obtained information from each of the sources also tended to report that they had used the source in the past year and trusted the information from that source. Not surprisingly, respondents who reported that they had not used each of the sources less often reported that they trusted information from that source.

Similar to the results reported in the earlier section on the descriptive statistics on HBV knowledge, screening/testing, and vaccination, health care providers (including physicians and pharmacists) also appeared to be sources of information that these respondents would trust. In the following section, multivariate analyses are presented to ascertain socio-demographic or HBV knowledge association with trust in health information sources.

Multivariate Logistic Regression: Factors Explaining HBV Screening and Vaccination

Logistic regression models were estimated for the binary dependent variables measuring self-reported HBV screening/testing and vaccination behavior to ascertain how important sources of information, and trust in those

sources, were when controlling for socio-demographic and health coverage characteristics, and HBV transmission knowledge. The dependent variables (whether respondents were screened for HBV and whether respondents were vaccinated for HBV) only included those respondents who had ever been told that they should be screened or vaccinated for HBV. In other words, those respondents who had never been told they should be screened or vaccinated for HBV (40%) or who had never heard of HBV (26%) prior to completing the survey were not included in this analysis. Though the resulting sample was smaller, it did provide the opportunity to assess the possible connections between screening/testing and vaccination self-reported behavior and other variables.

To construct the logistic regression models, chi-square tests were conducted of the dependent variables (respondent had been screened/tested for HBV, respondent had been vaccinated for HBV) using each set of variables (socio-demographic characteristics, health coverage, sources of health information, trust in health information sources, HBV transmission knowledge). Only those variables that were statistically significant at the $P < 0.05$ level or better were retained for additional analysis. Pairwise Pearson correlation coefficients were calculated to ensure that the independent variables were not highly correlated. Using this variable screening process, the variables associated with physicians as sources of health information and trust associated with this health source were not retained (i.e., neither of these variables were significant at least at the $P < 0.05$ level for either of the two dependent variables).

This suggested that while a very large proportion of respondents reported that they received health information from their physicians, and that they trusted this source, this had little explanatory power with respect to HBV screening/testing or vaccination for those respondents who had been informed that they should be screened or vaccinated for HBV. As the number of observations in each of the models was relatively small ($N = 63$ for the model for HBV screening/testing, and $N = 78$ for HBV vaccination), the results should be viewed as suggestive rather than conclusive.

Table 5 shows the results for a logistic regression model of HBV screening/testing for those respondents who had been informed that they should be screened for HBV. Two sets of variables were retained for the model after chi-square and Pearson correlation tests were conducted: socio-demographic and medical coverage characteristics, and information sources. Two variables were statistically significant at least at the $P < 0.05$ level in explaining the variation in having been screened/tested for HBV: being currently employed and getting health and health care information from friends. The results indicated that full-time employed respondents who have been informed that they should be screened/tested for HBV were over 6 times

Table 4 Health information sources and trust (ranked by sources used by respondents)

Information source	Reported getting information from this source	Reported NOT getting information from this source
Physician/health care provider (<i>N</i> = 275)	79% yes For respondents who answered “yes” 89% used source in past year 97% trusted information from this source	21% no For respondents who answered “no” 51% trusted information from this source
Pharmacists (<i>N</i> = 284)	53% yes For respondents who answered “yes” 90% used source in past year 97% trusted information from this source	47% no For respondents who answered “no” 31% trusted information from this source
Family members (<i>N</i> = 280)	48% yes For respondents who answered “yes” 89% used source in past year 83% trusted information from this source	52% no For respondents who answered “no” 25% trusted information from this source
Community functions or health fairs (<i>N</i> = 287)	46% yes For respondents who answered “yes” 84% used source in past year 92% trusted information from this source	54% no For respondents who answered “no” 24% trusted information from this source
Church, spiritual or religious leaders (<i>N</i> = 289)	31% yes For respondents who answered “yes” 83% used source in past year 94% trusted information from this source	69% no For respondents who answered “no” 18% trusted information from this source
Friends (<i>N</i> = 292)	29% yes For respondents who answered “yes” 87% used source in past year 91% trusted information from this source	71% no For respondents who answered “no” 13% trusted information from this source
Employee assistance programs (<i>N</i> = 288)	26% yes For respondents who answered “yes” 90% used source in past year 97% trusted information from this source	74% no For respondents who answered “no” 18% trusted information from this source
Co-workers (<i>N</i> = 290)	20% yes For respondents who answered “yes” 77% used source in past year 84% trusted information from this source	80% no For respondents who answered “no” 14% trusted information from this source
Traditional healers (<i>N</i> = 283)	17% yes For respondents who answered “yes” 69% used source in past year 85% trusted information from this source	83% no For respondents who answered “no” 16% trusted information from this source
Telephone advice lines (<i>N</i> = 288)	8% yes For respondents who answered “yes” 71% used source in past year 96% trusted information from this source	92% no For respondents who answered “no” 13% trusted information from this source

more likely to have been screened or tested for HBV compared to respondents who had been informed that they should be screened/tested for HBV but who did not report being full time workers (e.g., part time workers, retired, unemployed). In terms of health information sources, respondents who reported that they received health and health care information from their friends and who had been informed that they should be screened/tested for HBV

were over 7 times more likely to also report that they had been screened or tested for HBV compared to respondents who had been informed that they should be screened/tested for HBV, but who did not report that they had received information about health or health care from their friends.

Table 6 shows the results of the multivariate logistic regression model for the dependent variable measuring self-reports of vaccination for HBV (only including those

Table 5 Logistic regression results for Hepatitis B screening/testing ($N = 63$)

Variable (bolded variables are statistically significant at least at $P < 0.05$)	Odds ratio	SE	Z	$P > Z $	95% confidence interval
Demographics/medical coverage					
Has medicare coverage (1 = yes, 0 = no)	0.32	0.29	-1.27	0.20	0.06–1.86
Highest grade of school completed (1 = elementary school, 6 = post-graduate school)	1.59	0.53	1.39	0.16	0.83–3.07
Currently employed full time (1 = yes, 0 = no)	6.35	5.93	1.98	0.05	1.02–39.60
Currently retired (1 = yes, 0 = no)	7.42	10.19	1.46	0.15	0.50–109.47
Information sources					
Gets information about health and health care from friends (1 = yes, 0 = no)	7.67	7.98	1.96	0.05	1.00–58.92
Gets information about health and health care from the Internet (1 = yes, 0 = no)	1.75	1.63	0.59	0.55	0.28–10.94
Gets information about health and health care from Pacific Islander organizations (1 = yes, 0 = no)	4.06	3.87	1.47	0.14	0.63–26.24
Model goodness of fit measures					
LR chi2 ($df = 7$)	21.11				
Prob > chi2	0.01				
Pseudo R^2	0.33				
Log likelihood	-21.52				

respondents who reported that they had been informed that they should be vaccinated). The only demographic or medical coverage variable that was a significant predictor of whether respondents reported that they had been vaccinated for HBV was whether the respondent reported being covered by Medicare; those who reported being covered by Medicare were 0.02 times as likely as respondents who did not report that they were covered by Medicare to also report that they had been vaccinated for HBV.³

There is one HBV transmission knowledge question that was significant at least at the $P < 0.05$ level; responding that Hepatitis B could be transmitted by eating unclean food (an incorrect response) was associated with also reporting being vaccinated for HBV. In other words, contrary to most interventions that might presume that more and better knowledge leads to protective and health promoting behavior, this result suggested that not understanding how HBV is transmitted (i.e., confusing HBV with Hepatitis A) was related to higher likelihood of being vaccinated for HBV. Those who answered this question incorrectly were over 8 times more likely to report that they had been vaccinated for HBV compared to respondents who answered this question correctly.

³ This might first appear that age is related to vaccination behavior, but age was not statistically significant using an ANOVA test at the $P < 0.05$ level.

Similar to the model presented previously on self-reported HBV screening/testing behavior, being employed again appeared to be important in explaining the variation in self-reported vaccination for HBV, however, in this model, employment had a negative association. Obtaining information about health and health care from employee assistance programs was negatively associated with HBV vaccination for those respondents who had been informed that they should be vaccinated for HBV.

Summary and Implications

In this paper, results were presented of an analysis of a recent community needs assessment survey of a convenience sample of Pacific Islanders in Southern California. Because this was a convenience sample and, in addition, because the multivariate analysis used a small subsample of the total sample, the results must be viewed as suggestive rather than conclusive.

The findings indicated that though Pacific Islander respondents reported that physicians and pharmacists, i.e., health care providers, were the most trustworthy and commonly used source of health care information and advice, when multivariate analysis was conducted to explain the variation in self-reported HBV screening/testing and vaccination behavior, trust in and use of physicians for health care information was not statistically significant.

Table 6 Logistic regression results for Hepatitis B vaccination ($N = 78$)

Variable (bolded variables are statistically significant at least at $P < 0.05$)	Odds ratio	SE	Z	$P > Z $	95% confidence interval
Demographics/medical coverage					
Has medicare coverage (1 = yes, 0 = no)	0.02	0.02	-3.24	0.001	0.00–0.21
Highest grade of school completed (1 = elementary school, 6 = post-graduate school)	1.04	0.30	0.13	0.90	0.59–1.81
Currently employed part time (one part time position) (1 = yes, 0 = no)	0.29	0.25	-1.41	0.16	0.05–1.62
Currently retired (1 = yes, 0 = no)	4.04	5.46	1.03	0.30	0.29–57.03
Hepatitis B knowledge					
In your opinion, Hepatitis B can be transmitted by eating unclean food (1 = true, 0 = false)	8.34	7.66	2.31	0.02	1.38–50.46
Information sources					
Gets information about health and health care from the employee assistance program (1 = yes, 0 = no)	0.12	0.09	-2.76	0.01	0.03–0.54
Gets information about health and health care from social service provider or community health center (1 = yes, 0 = no)	0.71	0.53	-0.46	0.64	0.17–3.03
Model goodness of fit measures					
LR chi2 ($df = 7$)	35.32				
Prob > chi2	0.01				
Pseudo R^2	0.40				
Log likelihood	-26.74				

Instead, the factors that were important in explaining HBV screening/testing for respondents who had been told that they should be screened or tested for HBV included being currently employed and receiving health and health care information from friends. Being employed and receiving health and health care information from friends were both associated with much higher likelihoods of being screened or tested for HBV, compared to respondents who were not currently employed or who did not receive health information from friends. The factors that were important in explaining self-reported HBV vaccination behavior were different from those explaining the variation in HBV screening/testing. Not being covered by Medicare, having incorrect knowledge about HBV transmission (confusing HBV with Hepatitis A), and not receiving information from employee assistance programs were associated with self-reported HBV vaccination. These results were somewhat counterintuitive, as more and correct information is usually presumed to result in enhanced screening and health care access.

These findings suggested that though these respondents viewed physicians and pharmacists positively, and a large proportion reported that they obtained health care information from health care providers, that other factors (demographic, knowledge, and information source) were more important in explaining HBV screening and

vaccination behavior. One possible interpretation of these findings is that health recommendations for HBV screening and vaccination may need to come from physicians, who are highly trusted sources, but that additional motivations (information from friends) or opportunities for access to health care (being full time employed, presumably with health care benefits) may also be necessary to expand the number of Pacific Islanders who are screened and vaccinated for Hepatitis B. Additional research is needed to ascertain whether these findings hold for other Pacific Islander groups in California, nationally, and on the island jurisdictions.

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