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Disparities in 2020 Life Expectancy by Race and Ethnicity in Hawai'i

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Abstract

Life expectancy in Hawai'i is the longest among US states. However, Hawai'i is a multi-ethnic state, and significant disparities exist across racial and ethnic groups. From 1950 to 2010, disparities have been reflected in life expectancy, with a 10-year gap between the longest living racial and ethnic groups in Hawai'i (Japanese and Chinese) and Native Hawaiians. The current study estimated life expectancy in Hawai'i for 2020 across 7 racial and ethnic groups: Native Hawaiian, other Pacific Islanders, White, Filipino, Korean, Japanese, and Chinese. In 2020, life expectancy in Hawai'i was 81.9 years for the total population, 78.9 for males, and 85.2 for females. Disparities were observed across racial and ethnic groups, with life expectancy of 69.6 years for other Pacific Islanders, 77.4 years for Native Hawaiians, 81.8 years for Whites, 83.4 years for Filipinos, 84.3 years for Koreans, 84.9 years for Japanese, and 88.2 years for Chinese. The difference in life expectancy between sexes was 6.3 years, with variations ranging from 3.4 years among Chinese to 7.2 years among other Pacific Islanders. These findings highlight persistent disparities in life expectancy among Hawai'i's racial and ethnic groups, with much shorter life expectancy for Native Hawaiians and other Pacific Islanders compared to other groups. The results emphasize the need for targeted health interventions, enhanced access to health care, and culturally appropriate preventive measures to address these inequities.

Abbreviations and Acronyms

ACS = American Community Survey
SDoH = social determinants of health

Introduction

Among US states, Hawai'i has the most racially diverse population. Only 23% of the population is White, and about two thirds are Asian and/or Native Hawaiian and other Pacific Islander.¹ Native Hawaiians are the Indigenous people of Hawai'i, with ancestral ties to the original inhabitants of the Hawaiian islands. Other Pacific Islanders in Hawai'i represent a heterogeneous group of Indigenous peoples with cultural and geographic ties throughout the region of Oceania, many from the US-Affiliated Pacific Islands. In addition to Samoan, Tongan, Tahitian, and Chamorro populations, Micronesians –including Marshallese, Chuukese and Palauan – are among the largest subgroups with the other

Pacific Islander population.² Many of these Pacific Islanders migrate to Hawai'i to improve their access to education, work, health care, and public health services, which are limited in their islands.³ The state's history of immigration, largely tied to the import of plantation workers in the 1800s and early 1900s,⁴ has also led to relatively large proportions of distinct Asian cultural groups including Filipinos (~22.6%), Japanese (~16.1%), Chinese (~6.4%), and Koreans (~4.9%).⁵

Hawai'i has the longest life expectancy at birth of any state in the US, but life expectancy has traditionally varied across racial and ethnic groups.⁶ From 1950 to 2010, although life expectancy increased for all major racial and ethnic groups, a 10-year gap persisted between Native Hawaiians and the longest-living racial and ethnic groups in Hawai'i (Japanese in 1950-1970 estimates, and Chinese in 1980-2020 estimates).^{6,7} Previously, there have been limited health data on other Pacific Islander groups in the state.⁸ The most recent estimate from 2000 showed a life expectancy of 72.8 years for Samoan residents of Hawai'i, which was 1.5 years shorter than that of Native Hawaiians, and 6.2 years shorter than for Whites in 2000.⁷

Since the first reported US COVID-19 case on January 20, 2020, the US has experienced an unprecedented rise in mortality, leading to a decrease in US life expectancy.⁹ Despite Hawai'i having the lowest standardized COVID-19 death rate in the US, the pandemic likely had a negative impact on the state's life expectancy.¹⁰ This impact on life expectancy was expected given Hawai'i's higher proportion of persons ages ≥65 years,¹¹ existing racial and ethnic disparities in socioeconomic status,¹² and health disparities experienced by Hawai'i's rural communities.¹³ Disaggregated surveillance data revealed that other Pacific Islanders experienced the highest COVID-19 incidence and COVID-19-associated mortality among all racial and ethnic subgroups in Hawai'i, and that Native Hawaiians had higher rates than Whites and Asian subgroups.^{14,15}

This paper presents estimates of life expectancy at birth in Hawai'i for the year 2020 for the total, male, and female populations, and examines disparities across 7 major racial and ethnic groups in Hawai'i: Native Hawaiians, other Pacific Islanders, Whites, Filipinos, Koreans, Japanese, and Chinese.

Methods

Life expectancy is an accepted summary measure of population health. The abridged period life table method, proposed by Chiang in 1968,¹⁶ was used to calculate life expectancy by 5-year age intervals up to ≥ 90 years, with separate estimates for infants (<1 year) and young children (1–4 years). This abridged method was used in previous life tables series for Hawai'i in 1980, 1990, 2000, and 2010, as well as for US life tables prior to 1997.^{6,7}

To produce accurate life expectancy estimates by race and ethnicity, death record data were obtained from the Hawai'i Department of Health, Office of Health Status Monitoring for the years 2018, 2019, 2020, 2021, and 2022. Deaths by race/ethnicity, sex, and age group were averaged over the five years. Population data by race/ethnicity, sex, and age group were obtained from the American Community Survey (ACS) for the same period. Life expectancy for 2020 was estimated for the total, male, and female populations, and across the 7 largest racial and ethnic groups in the state: Native Hawaiian, other Pacific Islander, White, Filipino, Korean, Japanese, and Chinese.

The state of Hawai'i makes a concerted effort to capture and report race and ethnic information at a more granular level to help address community concerns and target interventions. To achieve this, Hawai'i defines its racial and ethnic categories as follows. If Hawaiian is 1 of the multiple ethnicities listed, Native Hawaiian is coded; if a non-White ethnicity is listed with a White ethnicity, the non-White ethnicity is coded; and if there is more than 1 non-White ethnicity listed, the first one listed is coded.¹⁷ The race and ethnicity variable in the ACS data were sorted alphabetically, and thus, individuals with multiple non-White ethnicities were proportionally weighted, with equal weights assigned to each group. Data were analyzed using R statistical software (version 4.3.3, R Foundation for Statistical Computing, Vienna, Austria).

This study was approved by the Institutional Review Board of the Hawai'i State Department of Health. Because the analysis involved unidentified data collected by national and local surveillance systems, it was considered non-human-subject research by the University of Hawai'i Human Research Protection Program.

Results

Based on 5-year average death records and population estimates, life expectancy at birth in Hawai'i for 2020 was 81.9 years for the total population ([Table 1](#)). This is nearly 5 years longer than the US life expectancy estimate of 77.0 years.¹⁸ Compared to the 2010 data for Hawai'i,⁵ the state's 2020 life expectancy estimate of 81.9 years represents a decline of 0.5 years. During the same 10 years, however, the US experienced a 1.7-year decline in life expectancy.^{18,19}

Life expectancy at birth varied by racial and ethnic group: 77.4 years for Native Hawaiians, 69.6 for other Pacific Islanders, 81.8 for Whites, 83.4 for Filipinos, 84.3 for Koreans, 84.9 for Japanese, and 88.2 for Chinese ([Figure 1](#)

and [Table 1](#)). Similarly, racial differences in 2020 life expectancy estimates are seen for the US as a whole, ranging from 67.1 years for American Indians and Alaska Natives to 83.6 years for Asian Americans.¹⁸

Changes in life expectancy between 2010 and 2020 varied by race and ethnicity in Hawai'i. For example, the Filipino group experienced a decline of 0.9 years in life expectancy, and the 2020 estimate for Filipinos was lowest among the 4 Asian subgroups. Life expectancy increased from 2010 by 0.8 years for Native Hawaiians, 1.2 years for Whites, 0.5 year for Chinese, and 0.2 year for Japanese.

Life expectancy also varied by sex, at 78.9 years for males and 85.2 years for females in Hawai'i in 2020 ([Table 1](#)). This compares to 74.2 years for males and 79.9 years for females in the US.¹⁸ By race/ethnicity ([Table 1](#) and [Figure 1](#)), life expectancies for males were 74.5 years for Native Hawaiians, 64.7 for other Pacific Islanders, 79.2 for Whites, 79.8 for Filipinos, 81.4 for Koreans, 81.9 for Japanese, and 86.1 for Chinese. For females, life expectancies were 80.5 for Native Hawaiians, 71.9 for other Pacific Islanders, 84.9 for Whites, 86.7 for Filipinos, 86.3 for Koreans, 87.6 for Japanese, and 89.5 for Chinese. The sex difference in life expectancy for the total population was 6.3 years, with variations across groups. Life expectancy estimates for females were longer than those for males in all groups, from 3.4 years longer for Chinese, 4.9 years for Koreans, 5.6 years for Whites, 5.7 years for Japanese, 6.9 for Filipinos, 6.1 for Native Hawaiians, and 7.2 for other Pacific Islanders.

Discussion

Compared to 2010, life expectancy for the total population in Hawai'i decreased by 0.5 years, likely due to the impact of COVID-19.^{8,10} Additionally, the 10-year life expectancy gap between Native Hawaiians and the longest-lived population remained unchanged, consistent with trends observed over the past 70 years ([Table 2](#)).^{6,7} The 2020 analysis also included an estimate for non-Hawaiian Pacific Islanders, and their estimate of 69.6 years suggested a 18.6-year gap between the longest living (Chinese) and shortest living (other Pacific Islander) racial and ethnic groups.

Life expectancy disparities are associated with differences in health status over the life course, and these differences are greatly influenced by social determinants of health (SDoH).²⁰ The US Centers for Disease Control and Prevention defines SDoH as nonmedical factors that influence health outcomes, which include individuals' living and working conditions and the economic, social, and political systems that govern life in their communities.²⁰ For example, unemployment, lower family income, food insecurity, low educational attainment, lack of private health insurance, and not being married or living with a partner are SDoH associated with premature death in the US.^{20–22}

Native Hawaiians and other Pacific Islanders in Hawai'i face disparities for a number of social determinants when compared to other populations. In Hawai'i, only 19% of Native Hawaiians, 13% of Micronesians, and 17% of Samoans (Pacific Islander groups for which data are available in

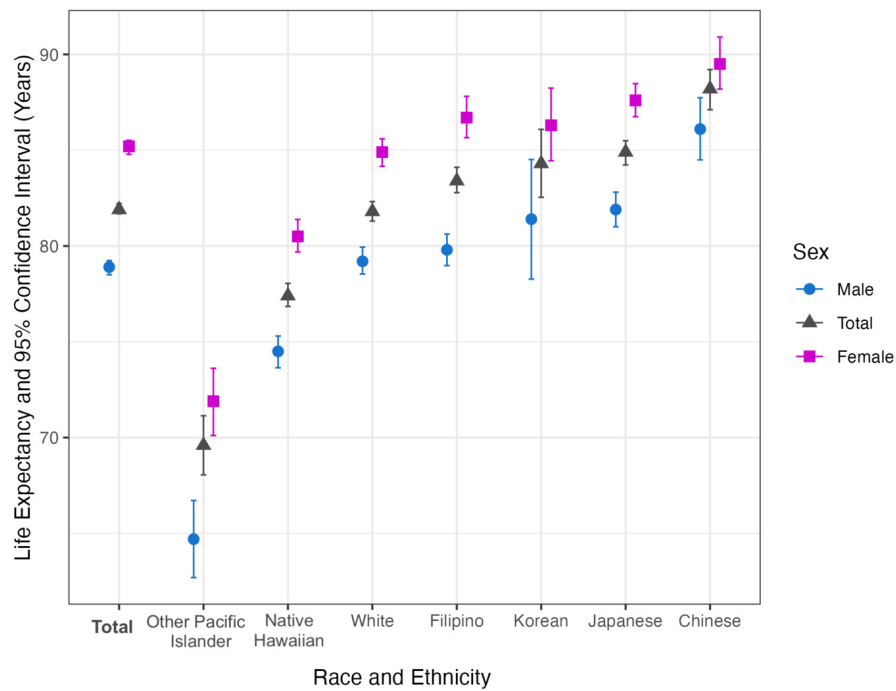


Figure 1. Life Expectancies at Birth in Hawai'i by Race and Ethnicity for 2020 and the 95% Confidence Intervals.

Table 1. Hawai'i 2020 Life Expectancy at Birth (Years) by Race and Ethnicity for the Total, Male and Female Populations, in Comparison To 2010 Life Expectancy.⁶

Race/ethnicity	Total		Male		Female		Sex Difference	
	2010	2020	2010	2020	2010	2020	2010	2020
Total Population	82.4	81.9 (0.14) ^b	79.2	78.9 (0.19)	85.6	85.2 (0.19)	6.4	6.3
Other Pacific Islander	NA ^a	69.6 (0.79)	NA	64.7 (1.03)	NA	71.9 (0.89)	NA	7.2
Native Hawaiian	76.6	77.4 (0.31)	73.9	74.5 (0.42)	79.4	80.5 (0.43)	5.5	6.1
White	80.6	81.8 (0.26)	78.3	79.2 (0.36)	83.4	84.9 (0.37)	5.1	5.6
Filipino	84.3	83.4 (0.34)	80.8	79.8 (0.42)	88.1	86.7 (0.55)	7.3	6.9
Korean	NA	84.3 (0.90)	NA	81.4 (1.59)	NA	86.3 (0.97)	NA	4.9
Japanese	84.7	84.9 (0.32)	81.2	81.9 (0.46)	88.0	87.6 (0.44)	6.8	5.7
Chinese	87.7	88.2 (0.53)	85.3	86.1 (0.83)	90.0	89.5 (0.69)	4.7	3.4

^a2010 data not available for other Pacific Islander

^bValue in the parenthesis are standard errors of 2020 life expectancy estimates.

Table 2. Hawai'i 1950 to 2020 Life Expectancy at Birth (Years) by Race And Ethnicity for the Total Populations.^{6,7}

	1950	1960	1970	1980	1990	2000	2010	2020
Total Population	69.5	72.4	74.2	77.9	78.9	80.5	82.4	81.9
Other Pacific Islander ^a	NA	NA	NA	NA	NA	NA	NA	69.6
Native Hawaiian	62.5	64.6	67.6	71.8	74.3	74.3	76.6	77.4
White	69.2	72.8	73.2	75.8	75.5	79.0	80.6	81.8
Filipino	69.1	71.5	72.6	79.3	78.9	80.9	84.3	83.4
Korean	NA*	NA	NA	NA	NA	81.4	NA	84.3
Japanese	72.6	75.7	77.4	80.9	82.1	82.8	84.7	84.9
Chinese	69.7	74.1	76.1	81.7	82.9	86.1	87.7	88.2

^aData not available for other Pacific Islander before 2020

Hawai'i) hold a baccalaureate degree, compared to 35% of the total state population.¹² The median family income for Native Hawaiians is estimated at \$93,000 per year, compared to \$58,100 for Micronesians, \$90,200 for Samoans, and \$103,600 for Hawai'i as a whole.¹² Non-Hawaiian Pacific Islanders report about 5.0 members per household, compared to 4.0 for Native Hawaiians and 3.0 for the general population.¹² Homeownership is lower among some Pacific Islander groups—15% for Micronesians and 28.8% for Samoans—compared to 57.4% for Native Hawaiians and 61% for the total state population.¹²

Housing insecurity in Hawai'i also varies across the 7 racial/ethnic subgroups examined in this study. Non-Hawaiian Pacific Islanders experienced the highest prevalence of housing insecurity, followed by Native Hawaiians and Filipinos, and these 3 groups reported significantly higher levels of housing insecurity compared to the 4 other subgroups.²³ Native Hawaiian and other Pacific Islanders also have the lowest prevalence of private health insurance.¹² Limited English proficiency affects only 2.1% of Native Hawaiians, but affects 9.3% of Samoans and 33% of Micronesians in Hawai'i.¹² Additionally, data from 2010 suggest that Native Hawaiians experience more adverse childhood events (74.9%) than the general population (57.8%) in the state.²⁴ These disparities can all contribute to lower life expectancy estimates observed among Native Hawaiians and other Pacific Islanders in Hawai'i.

Native Hawaiians and other Pacific Islanders (NHOPI) are aggregated in most US reports. However, this lumping of groups masks differences between them. As noted by the US Census, the NHOPI label encompasses more than 30 distinct cultural and language groups.²⁵ Yet their histories of colonization, displacement, and discrimination differ, as do their relationships with, and benefits within, the US. In Hawai'i, colonization led to militarization, widespread use of pesticides on plantations, uncontrolled development, racism, and other factors that have contributed to an increased risk of cancer, birth defects, infant mortality, and chronic diseases (such as asthma, diabetes, and cardiovascular disease) among Native Hawaiians.²⁶ Residents of the US-Affiliated Pacific Island jurisdictions are allowed to freely migrate to Hawai'i based on their political status (eg, American Samoa is a US territory) or due to military and trade agreements (eg, the Marshall Islands and the Federated States of Micronesia), and they often migrate for better opportunities.²⁷ Life expectancies in these island nations and territories remain lower than for the US, for example 70.3 years in Samoa, 65.0 years in the Marshall Islands, and 65.7 years in the Federated States of Micronesia in 2020.^{28, 29}

This report also demonstrates the importance of disaggregating Asian subgroups. Although life expectancy across all four Asian subgroups was higher than that of non-Asian groups (including Whites, Native Hawaiians, and other Pacific Islanders), Filipinos had the lowest life expectancy among the Asian subgroups and experienced the greatest decline (0.9 years) between 2010 and 2020. Compared to other Asian subgroups, Filipinos have a distinct colonial history with over 3 centuries of Spanish rule followed by

American colonization until 1946. The country also has an on-going relationship with the US involving military and trade agreements, all of which have shaped Filipino cultural, political, and social institutions while contributing to structural inequalities that continue to limit health opportunities.³⁰ In Hawai'i, Filipinos experience lower educational levels, income per capita, and English proficiency than the general population.¹² Additionally, Filipinos had the highest incidence of COVID-19 among Hawai'i's Asian subgroups.^{15,31}

The findings underscore the critical need for disaggregated racial and ethnic data to identify and address health disparities among Native Hawaiians, other Pacific Islanders, and Asian subgroups. Addressing the health inequities that influence life expectancy will require a comprehensive approach, from reducing economic, education, and housing disparities to enhancing access to quality and culturally considerate health care.

Limitations

The findings in this report are subject to at least 2 limitations. First, although the analysis is based on complete death counts, life expectancy estimates may be subject to inaccuracies due to potential measurement errors. These errors could arise from misreporting of age or race/ethnicity on death certificates or inaccuracies in data from the ACS or census records. Second, mortality rates might be influenced by demographic shifts, including changes in immigration and out-migration of people who are sicker or healthier than average. For example, research suggests that life expectancy in the US increased by 1.5 years due to immigration of healthy young people.³² These factors can complicate the interpretation of mortality trends and life expectancy estimates.³³

Conclusions

Although Hawai'i continues to lead the nation in overall life expectancy, the aggregated statewide estimate obscures the deep and persistent disparities across racial and ethnic groups. The 2020 life expectancy estimates reveal an 18.6-year gap between Chinese and non-Hawaiian Pacific Islanders, the largest disparity documented in the state. The next largest difference in life expectancy was 10.8 years between Chinese and Native Hawaiians—a gap that remained unchanged from 1980 to 2020—while the broader 10-year gap between Native Hawaiians and the longest-living group has persisted since 1950. Additionally, estimates suggest that life expectancy for other Pacific Islanders in Hawai'i is 7.8 years less than for Native Hawaiians. Despite improvements for some groups, Native Hawaiians and other Pacific Islanders continue to experience shorter lifespans, largely driven by long-standing social, economic, and structural inequities.

In Hawai'i, life expectancy gaps also continue between sexes, with men living fewer years than women. The sex gap was 6.1 years in 2000,⁶ 6.4 years in 2010,⁷ and 6.3 years in 2020. This is a larger sex gap than published for the US

as a whole.³⁴ While the overall difference between sexes has decreased by 0.1 year in the last decade, the most notable differences in 2020 exist between non-Hawaiian Pacific Islander females and males (7.2 years) and between Filipino females and males (6.9 years). These findings emphasize the critical need for disaggregated population data in Hawai‘i by race and ethnicity at the most detailed level possible, even when assessing sex differences. Findings also support the development and sustaining of culturally grounded interventions tailored to the specific health needs of each community. Addressing the root causes of disparities in SDoH, such as education, income, housing, and access to care, is essential to improving the well-being of these populations and all residents, while working to narrow and eliminate the life expectancy gap.

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Conflict of Interest Disclosures

None of the authors identify any conflict of interest.

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References

1. US Census Bureau. State Hawaii - Census Bureau Profile. Accessed August 4, 2025. <https://data.census.gov/profile/Hawaii?g=040XX00US15#race-and-ethnicity>
2. US Census Bureau. 2020 Census Detailed Demographic and Housing Characteristics File A. Accessed August 4, 2025. <https://www.census.gov/data/tables/2023/dec/2020-census-detailed-dhc-a.html>
3. Carlin M, Mendoza-Walters A, Ensign K. Half an ocean away: health in the US-affiliated Pacific Islands. *J Public Health Manag Pract JPHMP*. 2016;22(5):492-495. doi:10.1097/PHH.0000000000000467
4. McDermott J, Andrade N, eds. *People and Cultures of Hawai'i: The Evolution of Culture and Ethnicity*. University of Hawai'i Press; 2011. doi:10.21313/hawaii/9780824835804.001.0001
5. State of Hawai'i, Department of Business, Economic Development & Tourism, Research & Economic Analysis. 2023 State of Hawaii Data Book. Accessed August 4, 2025. <https://dbedt.hawaii.gov/economic/databook/db2023/>
6. Wu Y, Braun K, Horiuchi BY, Tottori CJ, Wilkens L. Life expectancies in Hawai'i: a multi-ethnic analysis of 2010 life tables. *Hawaii J Med Public Health*. 2017;76(1):9-14.
7. Park CB, Braun KL, Horiuchi BY, Tottori C, Alvin TO. Longevity disparities in multiethnic Hawaii: an analysis of 2000 life tables. *Public Health Rep*. 2009;124(4):579-584. doi:10.1177/003335490912400415
8. Quint J, Matagi C, Kaholokula JK. The Hawai'i NHPI data disaggregation imperative: preventing data genocide through statewide race and ethnicity standards. *Hawaii J Health Soc Welf*. 2023;82(10 Suppl 1):67-72.
9. Harris E. Life expectancy in US climbed after declines related to COVID-19. *JAMA*. 2024;331(1):15. doi:10.1001/jama.2023.24683
10. Bollyky TJ, Castro E, Aravkin AY, et al. Assessing COVID-19 pandemic policies and behaviours and their economic and educational trade-offs across US states from Jan 1, 2020, to July 31, 2022: an observational analysis. *The Lancet*. 2023;401(10385):1341-1360. doi:10.1016/S0140-6736(23)00461-0
11. US Census Bureau. Exploring age groups in the 2020 census. Accessed August 4, 2025. <https://www.census.gov/library/visualizations/interactive/exploring-age-groups-in-the-2020-census.html>
12. State of Hawai'i, Department of Business, Economic Development & Tourism, Research & Economic Analysis. Demographic, social, and economic characteristics of Hawai'i's race groups: 2017-2021. Accessed August 4, 2025. https://dbedt.hawaii.gov/economic/detailed-race-characteristics_acs2021/
13. Bond-Smith D, Bond-Smith S, Juarez R. Rural health disparities in Hawai'i. 2024. Accessed August 4, 2025. <https://uhero.hawaii.edu/wp-content/uploads/2024/08/RuralHealthDisparitiesInHawaii.pdf>
14. Hawai'i State Department of Health. *COVID-19 in Hawai'i: Addressing Health Equity in Diverse Populations*. Disease Outbreak Control Division Special Report; 2021. Accessed August 4, 2025. <https://www.shvs.org/health-equity/covid-19-in-hawaii-addressing-health-equity-in-diverse-populations/>
15. Quint JJ. Disaggregating Data to measure racial disparities in COVID-19 outcomes and guide community response — Hawaii, March 1, 2020–February 28, 2021. *MMWR Morb Mortal Wkly Rep*. 2021;70. doi:10.15585/mmwr.mm7037a1
16. Chiang CL. *Introduction to Stochastic Processes in Biostatistics*. 99th ed. Wiley; 1968.
17. Hawai'i Health Data Warehouse. Race-ethnicity documentation, 2022. Accessed August 4, 2025. https://hhdw.org/wp-content/uploads/2022/04/Race-Ethnicity_4.2.22.pdf
18. Arias E, Xu J. United States Life Tables, 2020. *Natl Vital Stat Rep Cent Dis Control Prev Natl Cent Health Stat Natl Vital Stat Syst*. 2022;71(1):1-64.
19. Arias E. United States life tables, 2010. *Natl Vital Stat Rep*. 2014;63(7):1-63.
20. US Centers for Disease Control and Prevention. Social determinants of health (SDOH). Accessed August 4, 2025. <https://www.cdc.gov/about/priorities/why-is-addressing-sdoh-important.html>

21. Bundy JD, Mills KT, He H, et al. Social determinants of health and premature death among adults in the USA from 1999 to 2018: a national cohort study. *Lancet Public Health*. 2023;8(6):e422-e431. doi:10.1016/S2468-2667(23)00081-6
22. Chelak K, Chakole S. The role of social determinants of health in promoting health equality: a narrative review. *Cureus*. 2023;15(1):e33425. doi:10.7759/cureus.33425
23. Hawai'i State Department of Health, Hawai'i Health Data Warehouse. Housing insecurity, past 12 months, 2021 and 2023. Accessed August 4, 2025. https://hhdw.org/report/query/result/brfss/SDOHNoPayBills/SDOHNoPayBillsAA11_.html
24. Ye D, Reyes-Salvail F. Adverse childhood experiences among Hawai'i adults: findings from the 2010 Behavioral Risk Factor Survey. *Hawaii J Med Public Health*. 2014;73(6):181-190.
25. US Census Bureau. Detailed look at Native Hawaiian and Other Pacific Islander groups, Chuukese and Papua New Guinean populations fastest growing Pacific Islander groups in 2020. Accessed August 4, 2025. <https://www.census.gov/library/stories/2023/09/2020-census-dhc-a-nhpi-population.html>
26. Kawakami KL, Muneoka S, Burrage RL, Tanoue L, Haitsuka K, Braun KL. The lives of Native Hawaiian elders and their experiences with healthcare: a qualitative analysis. *Front Public Health*. 2022;10:787215. doi:10.3389/fpubh.2022.787215
27. Hawai'i Journal of Health and Social Welfare special issue on health disparities in US affiliated Pacific Islanders: the voyage forward. *Hawaii J Health Soc Welf*. 2020;79(6 Suppl 2):3-5.
28. World Health Organization. Data (by country). Accessed August 4, 2025. <https://data.who.int/countries/>
29. World Bank Group. Life expectancy at birth, total (years). Accessed August 4, 2025. <https://data.worldbank.org/indicator/SP.DYN.LE00.IN>
30. Abinales PN. Philippines-US relations. In: *Oxford Research Encyclopedia of American History*. doi:10.1093/acrefore/9780199329175.001.0001/acrefore-9780199329175-e-404
31. Dela Cruz MRI, Glauberman GHR, Buenconsejo-Lum LE, et al. A report on the impact of the COVID-19 pandemic on the health and social welfare of the Filipino population in Hawai'i. *Hawaii J Health Soc Welf*. 2021;80(9 Suppl 1):71-77.
32. Hendi AS, Ho JY. Immigration and improvements in American life expectancy. *SSM - Popul Health*. 2021;15:100914. doi:10.1016/j.ssmph.2021.100914
33. State of Hawai'i, Department of Business, Economic Development & Tourism, Research & Economic Analysis. Population and economic projections for the state of Hawai'i to 2050. Accessed August 4, 2025. <https://dbedt.hawaii.gov/economic/economic-forecast/long-range-projections/>
34. Arias E, Tejada-Vera B, Kochanek KD, Ahmad FB. *Provisional Life Expectancy Estimates for 2021*. NVSS Vital Statistics Rapid Release; 2022. doi:10.15620/cdc:118999

Mobile COVID-19 Vaccination Clinics Reach Disadvantaged Populations and Increase Vaccination Rates

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Abstract

COVID-19 vaccines are a critical intervention for controlling the spread of COVID-19 and may be administered at fixed clinic locations or mobile clinics. This study compares the demographics of the populations vaccinated at fixed and mobile clinics to investigate whether mobile clinics vaccinate a different population from fixed clinics and to assess whether mobile clinics improve vaccination rate and success. A retrospective chart review was conducted for all COVID-19 vaccinations (N=325 988) administered by a major Hawai'i health care provider at its affiliated fixed and mobile clinics between January 2021 and May 2022. Data collected included location of vaccination, age, sex, primary race, health insurance provider, and billing zip code. Mobile clinics vaccinated younger patients on average ($P<.001$). Native Hawaiians and other Pacific Islanders (risk-adjusted odds ratio = 2.03, 95% CI=1.96, 2.11) as well as those with non-commercial health insurance (risk-adjusted odds ratio = 4.26, 95% CI = 4.02, 4.51) were most likely to be vaccinated at a mobile clinic rather than a fixed clinic, as compared to White patients. The differences between the patient populations vaccinated at fixed and mobile clinics suggest that mobile clinics may be a useful tool in expanding the reach of vaccination efforts to a more demographically diverse patient population.

Abbreviations and acronyms

AI/AN = American Indian/Alaska Native

aOR = adjusted odds ratio

COVID-19 = coronavirus disease 2019

HPH = Hawai'i Pacific Health

NHOPI = Native Hawaiian and other Pacific Islander

OR = odds ratio

rOR = risk-adjusted odds ratio

Introduction

Vaccination has been identified as a critical intervention in controlling the spread of coronavirus disease 2019 (COVID-19). Mobile clinics, which are specially equipped motor vehicles that deliver health care services directly to communities, are a well-established model of care both in Hawai'i and the continental US. There are an estimated 2000 mobile clinics serving approximately 7 million patients nationwide,^{1,2} providing a variety of health care services including vaccinations, infectious disease screening, chronic condition screening, women's health services, and

health education. In Hawai'i, various organizations have deployed mobile clinics, including the Hawai'i Houseless Outreach and Medical Education Project,³ the Keēwemaui-ola vehicle operated by Kaiser Permanente,⁴ and Project Vision Hawai'i,⁵ to bring primary care services directly to communities. These services include vaccinations, health screenings, wound care, well child visits, vision screenings, and dental exams.

Mobile clinics across the country frequently care for medically underserved populations. Because they travel directly to communities, they help to mitigate logistical and psychological barriers to care including lack of transportation, challenges with making appointments, long wait times for care, concerns about contracting COVID-19 in a public location, and intimidation by health care settings. Minority patients and those with low socioeconomic status are more likely to experience these barriers to care due to disproportionately limited internet, computer, and transportation access,^{6,7} as well as a distrust of health care institutions stemming from historic discrimination in medical settings. Therefore, mobile clinics are uniquely positioned to enhance health care access for these vulnerable populations. In the continental US, mobile COVID-19 vaccine clinics have been found to vaccinate high numbers of racial minorities^{6,8,9} and higher proportions of minorities compared to fixed clinics.^{9,10} Fixed clinics are defined as COVID-19 vaccination centers which do not move between sites, such as hospitals, doctors' offices, and mass vaccination centers.

Hawai'i, which is the only US state where non-Hispanic Whites do not make up a majority of the population,¹¹ has a unique demographic composition compared to other states, with much higher proportions of Asian, Native Hawaiian and other Pacific Islander (NHOPI), and multiracial individuals. In Hawai'i, patients received COVID-19 vaccines at either fixed clinics, including hospitals and mass vaccination centers, or at mobile clinics deployed by health care organizations. While the patient demographics served by mobile clinics, including mobile COVID-19 vaccine clinics, are well documented in the continental US, fewer data exist on mobile COVID-19 vaccinations in the uniquely diverse population of Hawai'i.

In light of the distinctive demographic makeup of the state and the well-established diversity of the mobile clinic patient population in other parts of the country, a comparison of fixed and mobile clinic vaccinations in Hawai'i may help to determine mobile clinic usefulness as a strategy for targeting particular patient demographics. Additionally, this comparison might inform the future use of mobile clinics.

ics for providing other health care services to those groups. Therefore, this study compares the demographics of the populations vaccinated for COVID-19 at fixed clinics and mobile clinics in order to determine whether mobile vaccine clinics reached a demographically distinct population from traditional, fixed clinics.

Methods

Development of mobile clinics

Hawai'i Pacific Health (HPH), a large health care system in Hawai'i, vaccinated patients against COVID-19 through a combination of fixed and mobile vaccine clinics. While HPH performed the majority of its vaccinations at fixed clinics, including medical centers, affiliated medical offices, and at the Pier 2 Cruise Terminal in Honolulu, HPH also deployed mobile vaccine clinics in approximately 130 locations beginning in May 2021 in order to increase access to the COVID-19 vaccine. These mobile clinics were operated onboard the "Vax Squad Buses," a set of retrofitted tour buses, which transported vaccines and medical personnel to schools, shopping centers, churches, and other community-based settings across the islands of O'ahu and Kaua'i. Mobile clinic locations were selected based on community need and logistical feasibility, with a focus on areas distant from mass vaccination centers.

Data collection

A retrospective chart review was performed for all COVID-19 vaccinations administered by HPH between January 2021 and May 2022. Vaccinations of HPH employees (N=18711) were excluded, yielding a total of 325 988 vaccinations. Data collected for each patient included the location of vaccination, age, sex, primary race, health insurance provider, and billing zip code. Health insurance provider was classified as commercial (insurance plans provided by private companies), Medicare/Medicaid, or military. Patients whose insurance coverage did not fall under these 3 categories, including patients without health insurance, were classified as "other." This study was determined to be exempt from Institutional Review Board review by the Hawai'i Pacific Health Research Institute.

Data stratification

Because COVID-19 vaccine eligibility was initially staggered based on factors such as patient occupation, age, and medical history, demographic comparisons between the populations vaccinated at fixed and mobile clinics were separated into 7 time periods. To devise the time periods, a vaccine eligibility timeline was created and partitioned based on the dates on which HPH began offering vaccinations to different groups. From January to March 2021, HPH extended eligibility to individuals aged 75 and older and first responders, followed by essential workers in February and early March 2021. Eligibility further expanded in early March 2021 to include individuals aged 70 and older and those with high-risk medical conditions. In mid-

March 2021, the focus shifted to individuals aged 65 and older, with further expansion to those aged 60 and older by late March and early April. By April 2021, vaccination was available to those aged 16 and older across both O'ahu and Kaua'i, eventually expanding to include those aged 12 and up and 5 and up throughout 2021 and 2022. Time period 7, which lasted from April 2021 to May 2022, was the only period during which both fixed and mobile vaccine clinics were operational and available to community members. Additionally, it was the longest time period of the 7 and provided the greatest number of vaccinations. Therefore, comparisons between patient demographics at fixed vs. mobile clinics were only made for time period 7. [Table 1](#) displays the dates and patient eligibility information for each time period.

Statistical analysis

Descriptive statistics were calculated to characterize the study population. T-test was used to compare mean ages between fixed and mobile clinic groups. Chi-square was used to test differences for categorical variables (age, sex, race, and insurance type). Multivariable logistic regression was used to calculate the likelihood of vaccination at a mobile clinic adjusting for various demographic factors. Statistical analyses were done using Stata 15.1 (College Station, TX).

Results

Demographic composition by vaccination site type

Mobile clinics (N=42 245) vaccinated proportionally younger patients compared to fixed clinics (N=137 098), with a mean (SD) age of 32.3 (24.1) years at mobile clinics compared to 36.8 (22.7) years at fixed clinics ($P<.001$). Mobile clinics also vaccinated a slightly higher percentage of male patients than fixed clinics (48.4% vs. 47.1%, $P<.001$). [Table 2](#) shows the age and sex demographics of the populations vaccinated at fixed and mobile clinics during time period 7.

The population vaccinated at mobile clinics had a significantly different racial composition than the population vaccinated at fixed clinics, with mobile clinics vaccinating higher percentages of NHOPI (19.3% vs. 13.3%, $P<.001$) and Black patients (1.5% vs. 1.1%, $P<.001$) and a lower percentage of White (16.4% vs. 21.3%, $P<.001$) and Asian patients (55.7% vs. 58.3%, $P<.0001$). [Figure 1](#) illustrates the primary race distribution of patients vaccinated at fixed and mobile clinics.

Mobile clinics vaccinated a higher percentage of patients with Medicaid/Medicare (31.5% vs. 28.4%, $P<.001$) and military insurance (6.4% vs. 1.9%, $P<.001$) and a lower percentage of patients with commercial insurance (57.7% vs. 66.8%, $P<.001$). [Figure 2](#) illustrates the health insurance type distribution of patients vaccinated at fixed and mobile clinics.

Table 1. Time Periods Used for Demographic Comparisons of COVID-19 Vaccine Administration

Time Period	Dates	Patient Eligibility	N
1	1/15/21-3/31/21	Age 75+ and first responders	25806
2	2/1/21-3/7/21	Essential workers	49826
3	3/8/21-3/14/21	Age 70+ and high-risk medical conditions	13037
4	3/15/21-3/28/21 3/15/21-3/21/21	Age 65+ (O'ahu) Age 65+ (Kaua'i)	25211
5	3/29/21-4/11/21 3/22/21-4/4/21	Age 60+ (O'ahu) Age 60+ (Kaua'i)	28886
6	4/12/21-4/18/21	Age 50+ (O'ahu)	11714
7	4/5/21-5/12/21 4/19/21-5/12/21 5/13/21-11/2/21 11/3/21-5/9/22	Age 16+ (O'ahu) Age 16+ (Kaua'i) Age 12+ Age 5+	179343

Table 2. Age and Sex Demographics by Vaccination Site During Time Period 7

Variable	Fixed (N=137098)	Mobile (N=42245)	P-value
Mean ± SD			
Age	36.8 ± 22.7	32.3 ± 24.1	<.001
Percent (n)			
Male	47.1% (64528)	48.4% (20459)	<.001
Female	52.9% (72517)	51.5% (21768)	
X	0.0% (53)	0.0% (18)	

X = patients designated neither male nor female

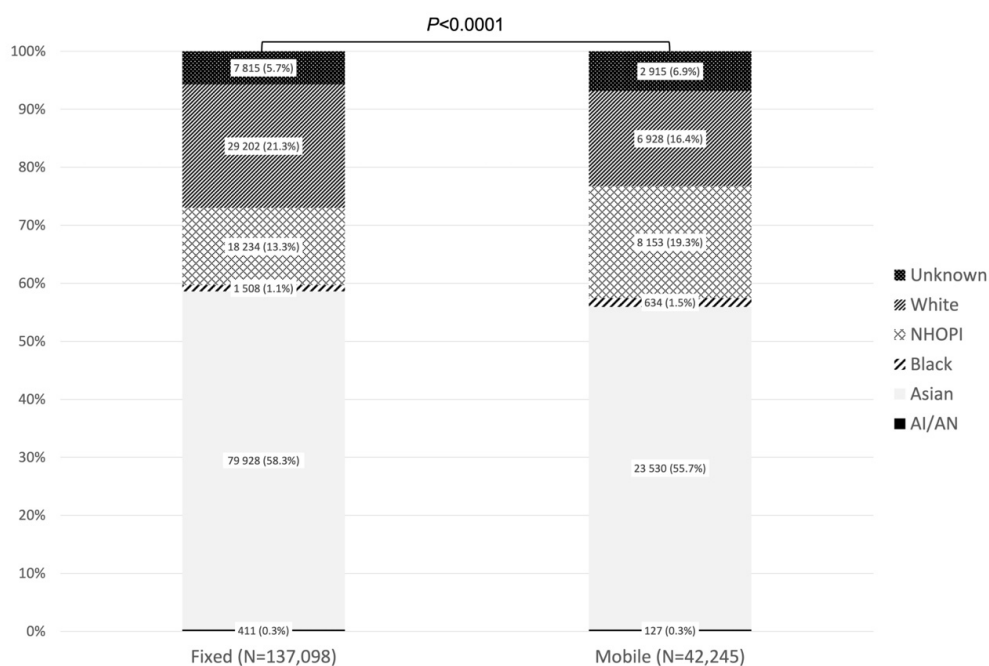


Figure 1. Primary Race Distributions of the Populations Vaccinated at Fixed and Mobile Clinics During Time Period 7

NHOPI = Native Hawaiian and other Pacific Islander, AI/AN = American Indian/Alaska Native

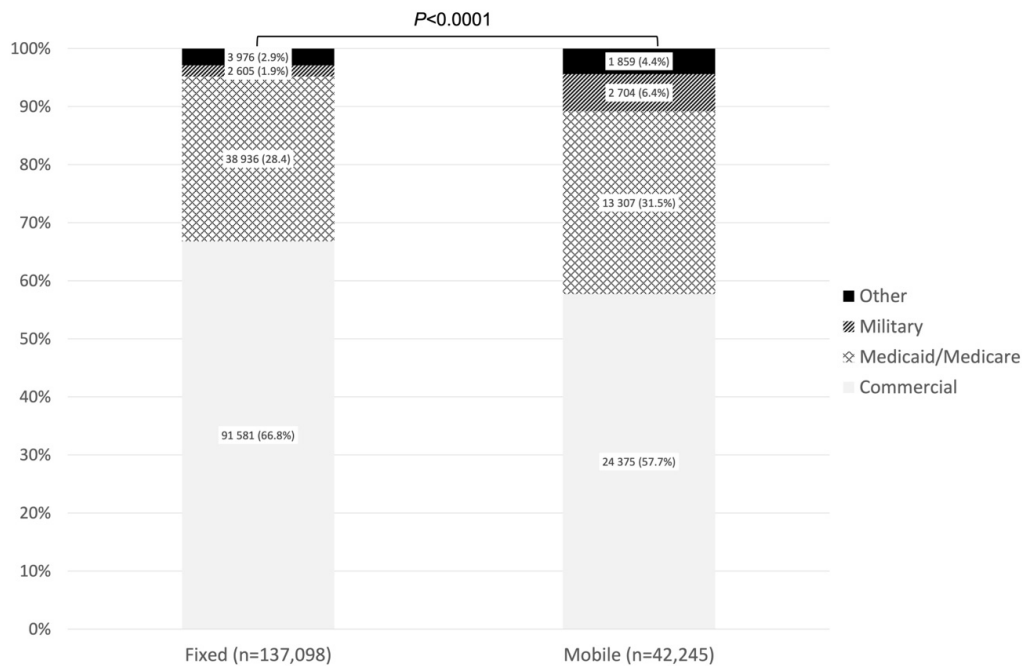


Figure 2. Health Insurance Type Distributions of the Populations Vaccinated at Fixed and Mobile Clinics During Time Period 7

NHOPI = Native Hawaiian and other Pacific Islander, AI/AN = American Indian/Alaska Native

Multivariable comparisons between vaccination site types

Table 3 shows the likelihood of individuals of a given race or health insurance type to visit a mobile clinic rather than a fixed clinic in comparison to a reference population (White and commercial insurance). After adjusting for race and insurance type, racial minorities, including American Indian/Alaska Native, Asian, Black, and NHOPI patients, were more likely to visit mobile clinics in comparison to White patients ($P<.05$). Among minority groups, NHOPI patients were the most likely group to visit mobile clinics, with a risk-adjusted odds ratio of 2.03 (95% CI=1.96, 2.11). Patients with non-commercial health insurance, including those with Medicaid/Medicare and military insurance, were more likely to visit mobile clinics in comparison to those with commercial insurance ($P<.05$). Patients with military insurance were the most likely to visit mobile clinics compared to the commercial insurance group, with a risk-adjusted odds ratio of 4.26 (4.02, 4.51).

Discussion

These findings regarding COVID-19 vaccination tendencies are consistent with studies done in the continental US which found that mobile health clinics, including mobile COVID-19 vaccine clinics, predominantly serve patients who are younger, belong to racial minorities, and are either uninsured or underinsured. However, it is the first to investigate the reach of mobile COVID-19 vaccine clinics within the distinctive demographic composition of Hawai'i and found that NHOPI patients were the most likely to visit mo-

bile clinics out of all the racial groups studied. This suggests that mobile clinics are especially effective in reaching the NHOPI population in Hawai'i, a community of particular concern given that NHOPI patients experience higher COVID-19 case rates and suffer poorer outcomes from COVID-19 in comparison to other racial and ethnic groups.¹² Mobile vaccine clinics may have been deployed near communities with higher concentrations of NHOPI residents, thereby improving geographic access. Additionally, mobile clinics may reduce logistical and cultural barriers to care that disproportionately affect NHOPI communities, such as transportation challenges or distrust of institutional health care settings.

In addition, the higher proportion of patients with Medicare, Medicaid, and military insurance seen at mobile clinics compared to those with commercial insurance suggests that mobile clinics may be particularly useful in reaching individuals with public insurance coverage. While insurance categories are not a uniform indicator of socioeconomic status, patients with public insurance may be more likely to face financial or logistical barriers to care.^{13, 14} As such, they may benefit significantly from the reduced barriers provided by mobile health care delivery, highlighting the potential of mobile clinics to improve access for these populations.

Overall, these results strongly suggest that mobile clinics in Hawai'i may be an effective tool in targeting specific populations, including racial minorities and those with public health insurance, for the purposes of vaccinations. This is particularly important in communities where access to traditional health care facilities is limited due to geographic, financial, or cultural barriers. Therefore, mobile

Table 3. Likelihood of Vaccination at a Mobile Location During Time Period 7

Variable		OR	95% CI	rOR*	95% CI
Race	White	Reference		Reference	
	AI/AN	1.39	(1.23, 1.72)	1.41	(1.14, 1.75)
	Asian	1.24	(1.20, 1.28)	1.37	(1.33, 1.42)
	Black	1.75	(1.59, 1.93)	1.44	(1.30, 1.59)
	NHOPI	1.88	(1.81, 1.95)	2.03	(1.96, 2.11)
	Unknown	1.56	(1.48, 1.64)	1.54	(1.47, 1.62)
Insurance Type	Commercial	Reference		Reference	
	Medicaid/Medicare	1.28	(1.25, 1.31)	1.28	(1.25, 1.31)
	Military	3.92	(3.70, 4.14)	4.26	(4.02, 4.51)
	Other	1.71	(1.61, 1.81)	1.71	(1.61, 1.81)

OR = odds ratio, rOR = risk-adjusted odds ratio, AI/AN = American Indian/Alaska Native, NHOPI = Native Hawaiian and Other Pacific Islander

*Adjusted for race and insurance type.

clinics may also be useful for reaching these groups with other health care interventions, such as biometric screenings or specialty care including hearing, vision, and dental services.

Limitations

Although there are inherent limitations to conducting a retrospective study with data collection from the electronic medical records, consistent recording at mobile and fixed vaccination sites potentially limited erroneous and missing information. The study did not control the analysis for variation in mobile site locations, which may have influenced patient demographics. Many of the sites, which the “Vax Squad Bus” visited, were schools and locations near US military bases on O‘ahu, which may have influenced the age and insurance type of patients visiting the mobile clinics held at those sites. Additionally, the electronic medical record only documents patient-reported primary race and does not include more detailed ethnicity information, meaning that it was not possible to make direct comparisons of multiracial patients, which make up 24% of the population of Hawai‘i,¹⁵ vaccinated at fixed and mobile clinics. Another potential limitation is that this study counted the total number of vaccines administered, not the number of individual patients vaccinated. Therefore, some patients may have been counted more than once if they received both their initial and booster doses during time period 7. Lastly, this study was limited to the patient population served by a single Hawai‘i health care provider, which is large, but not the only health care provider in the state

of Hawai‘i. Nonetheless, this study provides valuable data about the provision of COVID vaccinations in Hawai‘i.

Conclusion

The mobile clinic model may be an effective tool for targeting specific populations, including racial minorities and patients with public insurance, in Hawai‘i and the rest of the US with future important health care interventions including vaccinations, disease screenings, and other specialty services. This could potentially provide a resource to increase health equity for groups at increased risk for suboptimal medical care access and outcomes.

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Conflict of Interest and Disclosures

None of the authors identify any conflict of interest.

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References

1. Hill CF, Powers BW, Jain SH, Bennet J, Vavasis A, Oriol NE. Mobile health clinics in the era of reform. *Am J Manag Care*. 2014;20(3):261-264.
2. Malone NC, Williams MM, Smith Fawzi MC, et al. Mobile health clinics in the United States. *Int J Equity Health*. 2020;19(1):1-9. doi:[10.1186/S12939-020-1135-7](https://doi.org/10.1186/S12939-020-1135-7)
3. Hawaii HOME Project. Accessed April 6, 2025. <https://sites.google.com/view/hawaiihomeproject/about>
4. Mobile Health Vehicle in the Community. Accessed April 6, 2025. <https://kpinhawaii.org/mobilehealth>
5. Project Vision Hawaii. Accessed April 6, 2025. <https://www.projectvisionhawaii.org/about>
6. Abdul-Mutakabbir JC, Casey S, Jews V, et al. A three-tiered approach to address barriers to COVID-19 vaccine delivery in the Black community. *Lancet Glob Health*. 2021;9(6):e749-e750. doi:[10.1016/S2214-109X\(21\)00099-1](https://doi.org/10.1016/S2214-109X(21)00099-1)
7. Edgerley LP, El-Sayed YY, Druzin ML, Kiernan M, Daniels KI. Use of a community mobile health van to increase early access to prenatal care. *Matern Child Health J*. 2007;11(3):235-239. doi:[10.1007/S10995-006-0174-Z](https://doi.org/10.1007/S10995-006-0174-Z)
8. Leibowitz A, Livaditis L, Daftary G, Pelton-Cairns L, Regis C, Taveras E. Using mobile clinics to deliver care to difficult-to-reach populations: A COVID-19 practice we should keep. *Prev Med Rep*. 2021;24:101551. doi:[10.1016/J.PMEDR.2021.101551](https://doi.org/10.1016/J.PMEDR.2021.101551)
9. Gupta PS, Mohareb AM, Valdes C, et al. Expanding COVID-19 vaccine access to underserved populations through implementation of mobile vaccination units. *Prev Med (Baltim)*. 2022;163. doi:[10.1016/j.ypmed.2022.107226](https://doi.org/10.1016/j.ypmed.2022.107226)
10. Gavin RM, Countryman M, Musco J, Ricard R, Roberts A, Lees C. Reaching Diverse Communities during a Local Public Health COVID-19 Vaccination Response Through a Mobile Clinic Compared to Mass Vaccination Sites. *Journal of Public Health Management and Practice*. 2024;30(3):411-415. doi:[10.1097/PHH.0000000000001905](https://doi.org/10.1097/PHH.0000000000001905)
11. Kaneshiro B, Geling O, Gellert K, Millar L. The Challenges of Collecting Data on Race and Ethnicity in a Diverse, Multiethnic State. *Hawaii Med J*. 2011;70(8):168. Accessed August 29, 2022. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3158379/>
12. Keawe'aimoku Kaholokula J, Samoa RA, Miyamoto RES, Palafox N, Daniels SA. COVID-19 Special Column: COVID-19 Hits Native Hawaiian and Pacific Islander Communities the Hardest. 2020;79:143.
13. Alcalá HE, Roby DH, Grande DT, McKenna RM, Ortega AN. Insurance Type and Access to Health Care Providers and Appointments Under the Affordable Care Act. *Med Care*. 2018;56(2):186-192. doi:[10.1097/MLR.0000000000000855](https://doi.org/10.1097/MLR.0000000000000855)
14. Allen H, Gordon SH, Lee D, Bhanja A, Sommers BD. Comparison of Utilization, Costs, and Quality of Medicaid vs Subsidized Private Health Insurance for Low-Income Adults. *JAMA Netw Open*. 2021;4(1):E2032669. doi:[10.1001/JAMANETWORKOPEN.2020.32669](https://doi.org/10.1001/JAMANETWORKOPEN.2020.32669)
15. Krogstad J. Hawaii is home to the nation's largest share of multiracial Americans. 2015. Accessed January 1, 2024. <https://www.pewresearch.org/short-reads/2015/06/17/hawaii-is-home-to-the-nations-largest-share-of-multiracial-americans/#>

The Impacts of Incarceration on Health and Wellbeing in Hawai'i and Pathways to Decarceration

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A Brief History of Incarceration in Hawai'i

In pre-contact Hawai'i, the legal system reflected deeply held cultural values centered on respect, *aloha 'āina* (love of the land/nation), and *kuleana* (responsibility, privilege). One of the earliest and most profound examples of this is the *Kānāwai Māmalahoe* — the Law of the Splintered Paddle — issued by King Kamehameha I.¹ The *Kānāwai Māmalahoe* emerged from a personal lesson that Kamehameha learned during a military raid where his foot became trapped in a lava bed while attacking fisherman in a small village. In an effort to defend themselves and their families, one fisherman struck Kamehameha with a paddle, splintering it. In-stead of delivering a fatal blow, the fisherman chose mercy and let Kamehameha lay unconscious where his men res-cued him. Moved by this act of compassion, Kamehameha decreed, "Let every elderly person, woman, and child lie by the roadside in safety." Today, this law lives on in Article IX, Section 10 of the Hawai'i State Constitution, making Hawai'i unique as the only US state that embeds a traditional Indigenous law within its founding legal document.

Despite this foundation of protection and mercy, the current justice system is in dire need of revision. Presently, more than 5100 people in Hawai'i are incarcerated or detained in some form.² Notably, Native Hawaiian and Pacific Islanders, including Micronesians, remain overrepresented at all stages in Hawai'i's carceral system. Resulting in 39% of the incarcerated population being Native Hawaiian, even though they only make up only 24% of the state's population.³ While the majority of incarcerated individuals are male, women make up the fastest growing population segment of incarcerated individuals in Hawai'i.⁴

The history of incarceration in Hawai'i, as it is currently understood, is inextricably intertwined with colonization. Starting in the 1820s, missionaries brought with them a belief in sin and individual guilt, which was used to demonize cultural activities such as *hula* (dance), *lua* (traditional Hawaiian martial art), and religion.^{5,6} This, along with the military's influence starting in 1887 when the US gained exclusive control over Pearl Harbor, coalesced to shift behavior modification from a restorative model to a punitive

model.^{7,8} During this time, focus was placed on "preparing" youth by institutionalizing those that failed to assimilate in schools or youth whose parents were deemed unworthy under the *Parens Patriae* doctrine into Industrial schools such as Waiale'e Industrial School for Boys and Kailua Industrial School for Girls.⁹ These schools operated as boarding schools seeking to disconnect Native Hawaiians from their culture and lands.¹⁰

After the bombing of Pearl Harbor during World War II, Hawai'i expanded its carceral model to focus on other ethnicities such as the Japanese who were imprisoned at Honouliuli Internment Camp under suspicion of disloyalty to the US.¹¹ Mirroring trends in the continental US, in the 1970s Hawai'i's incarcerated population grew dramatically from 398 to more than 4000 people over a 50 year period.³ Patterns of separation and displacement continue in the present day where the State of Hawai'i transfers incarcerated individuals to private prisons on the US Continent due to lack of space, further disrupting connection to land, culture, and *'ohana* (family). This disconnection serves to further distance these individuals from the supports they need in order to appropriately heal and re-integrate into society upon release. The history and contemporary state of incarceration in Hawai'i have, thus, negatively impacted the people of Hawai'i, particularly Native Hawaiians.

Impacts of Incarceration on Health and Wellbeing in Hawai'i

There is now overwhelming evidence making clear that incarceration has negative consequences for health and wellbeing, and is a driver of health inequity.¹²⁻¹⁶ From physical and mental health, to social and economic wellbeing, incarceration has consistently been shown to negatively impact individuals, families and communities. Research has shown that incarceration worsens mental illness, increases risk of substance use disorders, increases the likelihood of suicide, and of infectious and noncommunicable diseases.¹² Moreover, health and mental health care in prison is often inadequate, particularly when it comes to transgender care, elder care, and transitional health care for people reentering society.^{12,14} Incarceration is associated with worse health outcomes for all people who are formerly incarcerated compared to those who have never been incarcerated.¹⁵

The negative correlation between health and incarceration is, in part, tied to the health inequalities present in communities most targeted by incarceration, which are then exacerbated by the conditions of incarceration and poor and inadequate care before, during, and after incarcer-

ation. In fact, nearly 40% of incarcerated individuals with chronic conditions did not seek medical care even when they needed it due to the high cost of prison health care relative to prison labor rates.^{17,18} Both incarceration itself, and its negative health consequences, are disproportionately experienced by Black and Indigenous communities specifically, and by communities of color and poor communities.^{14,16}

Hawai'i is no exception when it comes to the negative health consequences of incarceration and the role it plays in furthering health inequality. Jails and prisons in Hawai'i are far from the mythical paradise so many imagine when they think of Hawai'i, especially when it comes to health and wellbeing. Native Hawaiians are incarcerated at disproportionately high levels, and the preexisting health disparities prior to incarceration are generally worsened during and after incarceration.^{19,20} While more research is needed, existing studies have shown that incarceration in Hawai'i has negatively impacted mental health and suicide in particular,^{21,22} has provided especially inadequate health care for incarcerated elders,^{22,23} is detrimental to the relationships between incarcerated people and their families,²⁴ and has negative implications for education and employment post incarceration which have implications for health outcomes.²⁵

Current Context and Challenges in Hawai'i

Hawai'i, like many other places, faces various social, political, economic, and geographic challenges as it relates to issues of incarceration, health, wellbeing, and safety. Two current challenges are particularly relevant to discussions of decarceration and health. The first is the proposed construction of a new 1300 bed jail on the island of O'ahu, to replace the aging O'ahu Community Correctional Center (OCCC). The second is that because of overcrowding in the state prisons, Hawai'i houses about 1000 people to be incarcerated off island in the Saguaro Correctional Facility in Arizona, a private prison run by Core Civic.²¹ Together these challenges present openings for important discussions and choices about how to create lasting and equitable safety, health, and wellbeing for all people in Hawai'i, and Native Hawaiians in particular.

The OCCC is the largest jail in Hawai'i with 950 beds, largely for people who are detained pre-trial. The two most pressing issues with the OCCC are the jail's deteriorating conditions and overcrowding with more than 1000 currently detained or incarcerated at the facility. The State's proposed solution for these problems is the construction of a new jail, estimated to cost nearly one billion dollars. The majority of state elected officials including the Governor have offered support for this plan and some planning steps are already underway.²¹ Still, critics of the proposed jail argue that building a new and bigger jail won't address the root causes leading people to jail like poverty, homelessness, mental illness, and addiction, nor is it a good use of public investments towards the larger goal of public safety. Those opposed to the new jail assert that tax dollars should instead be invested into a continuum of care in-

cluding mental health and substance abuse treatment, employment training for living wage jobs, youth programs and supportive housing.²⁶

Since 1995, Hawai'i has been sending people incarcerated in the state prison system to the continental US to serve their sentences, largely in private prisons. What was meant to be a temporary measure is now a common practice in place for nearly 30 years. Proponents of this practice argue it is more cost effective than building a new prison on island.²⁷ However, critics argue that those incarcerated at Saguaro Correctional Center are 3000 miles from their families, making visits costly and challenging, and that the prison itself has received various complaints about the health and safety of the people incarcerated there.²⁸⁻³⁰ Critics of both the new jail and of sending people off island agree that decarceration coupled with investments in housing, health care, treatment and employment will bring more safety and better health for the people of Hawai'i.^{26, 27,31}

Decarcerating Hawai'i: Pathways to Safety, Health and Justice Beyond Incarceration

The current state of incarceration in Hawai'i—marked by overcrowding, aging facilities, and the ongoing practice of sending incarcerated individuals away from their *'āina*, homes, and families—presents an urgent and distressing reality. Within this crisis lies opportunities to improve the safety, health, and wellbeing of people in Hawai'i, with particular attention to ending the disparate treatment of Native Hawaiians and Pacific Islanders. Grounded in decades of research and advocacy efforts in Hawai'i, the authors offer a just and effective approach that legislators, practitioners, and advocates can take up to create a safer, healthier and more equitable Hawai'i.

At the heart of the debate is the issue of overcrowding. An alternative to construction of a new facility is investing in decarceration policies and practices, including diversion and restorative justice programs that could provide critical relief. Robust investments in diversion programs, restorative justice and violence interrupter programs, as well as policy reforms relating to sentencing, parole, probation and bail reform, would go a long way in reducing the number of people entering the system and the length of time they remain entangled in it.

Prevention and early intervention efforts should also be prioritized and integrated to prevent incarceration in the first place. Every year more than 15000 people are booked into Hawai'i's jails, many of them due to issues related to homelessness, mental illness, and substance use disorders.^{2,32} Investments in supportive housing, community-based mental health and substance use treatment, and youth development would go farther in creating more safety and health and preventing incarceration.

Finally, creating a just paradigm requires the state to confront the ongoing legacy of colonialism and punitive approaches to safety. Hawai'i has a long history of encouraging cultural practices that support restoration over retribution. Supporting community-led solutions such as

ho'opono(pono) (form of conflict resolution; general and familial) and training a healer in every *'ohana* offers a framework for transforming this vision into a reality. At this pivotal moment, we have the opportunity to invest in people over prisons. These recommendations offer a pathway for decarceration, community-based care, and investments in

self-determination and sovereignty to support the wellbeing of all Hawai'i residents.

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References

1. Hawai'i Legal Auxiliary. The law of the splintered paddle kânāwai māmalahoe. 1994. Accessed April 23, 2025. <http://www.hawaii.edu/uhelp/files/LawOfTheSplinteredPaddle.pdf>
2. Prison Policy Initiative. Hawaii profile 2024. Accessed April 21, 2025. <https://www.prisonpolicy.org/profiles/HI.html>
3. Office of Hawaiian Affairs. *The Disparate Treatment of Native Hawaiians in the Criminal Justice System*. OHA; 2010. https://www.oha.org/wp-content/uploads/2014/11/es_final_web_0.pdf
4. Vera Institute. Incarceration Trends in Hawaii. 2015. <https://verainstitute.files.svdcn.com/production/downloads/pdfdownloads/state-incarceration-trends-hawaii.pdf>
5. McCall M. Religion's role in the annexation of Hawai'i and Hawaiian cultural erasure. Native Hawaiian religion and its contrast with 1820s protestantism. *Horiz*. 2022;7:1-6.
6. Osorio EK. Struggle for Hawaiian cultural survival. Ballard Brief. 2021. <https://ballardbrief.byu.edu/issue-briefs/struggle-for-hawaiian-cultural-survival>
7. Trask HK. Settlers of color and "immigrant" hegemony: "locals" in Hawai'i. *Amerasia J*. 2000;26(2):1-26. doi:10.17953/amer.26.2.b31642r221215k7k
8. La Croix SJ, Grandy C. The political instability of reciprocal trade and the overthrow of the Hawaiian kingdom. *J Econ Hist*. 1997;57(1):161-189. doi:10.1017/S0022050700017964
9. Avondet C. Kawaiiloa as an Americanizing project. Na Lei Poina Blog 'Ole. <https://naleipoinaole.com/blog/kawaiiloa-as-an-americanizing-project>
10. Arvin M. Replacing Native Hawaiian kinship with social scientific care: Settler colonial transinstitutionalization of children in the Territory of Hawai'i. In: Warren A, Rodriguez JE, Casper ST, eds. *Empire, Colonialism, and the Human Sciences: Troubling Encounters in the Americas and Pacific*. Cambridge University Press; 2024:123-152. doi:10.1017/9781009398152.009
11. National Park Service. Honouliuli: Historical Overview. <https://www.nps.gov/hono/learn/historical-overview.htm>
12. Cloud DH, Garcia-Grossman IR, Armstrong A, Williams B. Public health and prisons: Priorities in the age of mass incarceration. *Annu Rev Public Health*. 2023;44:407-428. doi:10.1146/annurev-publhealth-071521-034016
13. Drucker E. *Plague of Prisons: The Epidemiology of Mass Incarceration in America*. New Press; 2014. doi:10.2307/jj.31732026
14. Kapadia F. Mass incarceration and health inequities: A public health of consequence. *Am J Public Health*. 2024;114(9):856-858. doi:10.2105/AJPH.2024.307780
15. Massoglia M, Remster B. Linkages between incarceration and health. *Public Health Rep*. 2019;134(1_suppl):8S-14S. doi:10.1177/0033354919826563
16. Wildeman C, Wang EA. Mass incarceration, public health, and widening inequality in the USA. *Lancet*. 2017;389(10077):1464-1474. doi:10.1016/S0140-6736(17)30259-3
17. Widra E. New research links medical copays to reduced healthcare access in prisons. <https://www.prisonpolicy.org/blog/2024/08/29/fees-limit-healthcare-access/#:~:text=Medical%20copays%20and%20fees%20block,or%20can%20even%20be%20cured>
18. Wilper AP, Woolhandler S, Boyd JW. The health and health care of US prisoners: results of a nationwide survey. *Am J Public Health*. 2009;99(4):666-672. doi:10.2105/AJPH.2008.144279
19. Ndugga N, Hill L, Artiga S. Key data on health and healthcare for Native Hawaiian or Pacific Islander people. <https://www.kff.org/racial-equity-and-health-policy/issue-brief/key-data-health-and-health-care-for-native-hawaiian-pacific-islander-people/>
20. West C. Native Hawaiians are overrepresented in prisons. Cultural education can help. <https://www.civilbeat.org/2023/05/native-hawaiians-are-overrepresented-in-prisons-cultural-education-could-help/>
21. Dayton K. Tough choices on Hawaii's prisons and jails lie ahead, official says. <https://www.civilbeat.org/2024/10/tough-choices-on-hawaiis-prisons-and-jails-lie-ahead-official-says/>

22. HCR 85 Task Force. Creating better outcomes, safer communities. https://www.courts.state.hi.us/wp-content/uploads/2018/12/HCR-85_task_force_final_report.pdf
23. Associated Press. Hawaii prisons struggle to deal with aging inmate population. <https://www.staradvertiser.com/2017/03/04/breaking-news/hawaii-prisons-struggle-to-deal-with-aging-inmate-population/>
24. Erum AJ. *Linked Lives: The Effects of Incarceration on Prisoner Families in Hawai'i*. University of Hawai'i at Manoa; 2020.
25. Bissen T. Trauma, healing, and justice: Native Hawaiian women in Hawaii's criminal justice system. In: George L, Norris AN, Deckert A, Tauri J, eds. *Neo-Colonial Injustice and the Mass Imprisonment of Indigenous Women*. Palgrave Studies in Race, Ethnicity, Indigeneity And Criminal Justice. Palgrave Macmillan; 2022. doi:10.1007/978-3-030-44567-6_10
26. Remagining Public Safety in Hawaii Coalition. Budget recommendations state of Hawaii 2025. https://www.acluhi.org/sites/default/files/field_documents/reimagining_public_safety_budget_recommendations_state_of_hawaii_2025_final_2025.3.13.pdf
27. Lowenthal B. We're failing our community when we banish prisoners to the mainland. <https://www.civilbeat.org/2023/12/ben-lowenthal-were-failing-our-community-when-we-banish-prisoners-to-the-mainland/>
28. ACLUHI. Prison policy initiative releases report emphasizing need for decarceration, not a new jail to replace Oahu community correctional center. <https://www.acluhi.org/en/press-releases/prison-policy-initiative-releases-report-emphasizing-need-decarceration-not-new-jail>
29. Thompson G. Prisoners in Hawaii are being sent to die in private prisons in Arizona. <https://www.vice.com/en/article/prisoners-in-hawaii-are-being-sent-to-die-in-private-prisons-in-arizona-v24n2/>
30. Yamada M. It's beyond time to finally address prison reform. <https://www.civilbeat.org/2020/12/its-beyond-time-to-finally-address-prison-reform>
31. Manolo-Camp AK. The invisible diaspora. <https://kawaiola.news/on-the-continent/the-invisible-diaspora/>
32. Prison Policy Initiative. https://www.prisonpolicy.org/scans/PPI_OCCC_Memo.pdf

Hawai'i Journal of Health & Social Welfare

General Recommendations on Data Presentation and Statistical Reporting (Biostatistical Guideline for HJH&SW)

[Adapted from Annals of Internal Medicine & American Journal of Public Health]

The following guidelines are developed based on many common errors we see in manuscripts submitted to HJH&SW. They are not meant to be all encompassing, or be restrictive to authors who feel that their data must be presented differently for legitimate reasons. We hope they are helpful to you; in turn, following these guidelines will reduce or eliminate the common errors we address with authors later in the publication process.

Percentages: Report percentages to one decimal place (eg, 26.7%) when sample size is ≥ 200 . For smaller samples (<200), do not use decimal places (eg, 27%, not 26.7%), to avoid the appearance of a level of precision that is not present.

Standard deviations (SD)/standard errors (SE): Please specify the measures used: using "mean (SD)" for data summary and description; to show sampling variability, consider reporting confidence intervals, rather than standard errors, when possible, to avoid confusion.

Population parameters versus sample statistics: Using Greek letters to represent population parameters and Roman letters to represent estimates of those parameters in tables and text. For example, when reporting regression analysis results, Greek symbol (β), or Beta (b) should only be used in the text when describing the equations or parameters being estimated, never in reference to the results based on sample data. Instead, one can use "b" or β for unstandardized regression parameter estimates, and "B" or β for standardized regression parameter estimates.

P values: Using *P* values to present statistical significance, the actual observed *P* value should be presented. For *P* values between .001 and .20, please report the value to the nearest thousandth (eg, $P = .123$). For *P* values greater than .20, please report the value to the nearest hundredth (eg, $P = .34$). If the observed *P* value is greater than .999, it should be expressed as " $P > .99$ ". For a *P* value less than .001, report as " $P < .001$ ". Under no circumstance should the symbol "NS" or "ns" (for not significant) be used in place of actual *P* values.

"Trend": Use the word trend when describing a test for trend or dose-response. Avoid using it to refer to *P* values near but not below .05. In such instances, simply report a difference and the confidence interval of the difference (if appropriate), with or without the *P* value.

One-sided tests: There are very rare circumstances where a "one sided" significance test is appropriate, eg, non-inferiority trials. Therefore, "two-sided" significance tests are the rule, not the exception. Do not report one-sided significance test unless it can be justified and presented in the experimental design section.

Statistical software: Specify in the statistical analysis section the statistical software used for analysis (version, manufacturer, and manufacturer's location), eg, SAS software, version 9.2 (SAS Institute Inc., Cary, NC).

Comparisons of interventions: Focus on between-group differences, with 95% confidence intervals of the differences, and not on within-group differences.

Post-hoc pairwise comparisons: It is important to first test the overall hypothesis. One should conduct *post-hoc* analysis if and only if the overall hypothesis is rejected.

Clinically meaningful estimates: Report results using meaningful metrics rather than reporting raw results. For example, instead of the log odds ratio from a logistic regression, authors should transform coefficients into the appropriate measure of effect size, eg, odds ratio. Avoid using an estimate, such as an odds ratio or relative risk, for a one unit change in the factor of interest when a 1-unit change lacks clinical meaning (age, mm Hg of blood pressure, or any other continuous or interval measurement with small units). Instead, reporting effort for a clinically meaningful change (eg, for every 10 years of increase of age, for an increase of one standard deviation (or interquartile range) of blood pressure), along with 95% confidence intervals.

Risk ratios: Describe the risk ratio accurately. For instance, an odds ratio of 3.94 indicates that the outcome is almost 4 times as likely to occur, compared with the reference group, and indicates a nearly 3-fold increase in risk, not a nearly 4-fold increase in risk.

Longitudinal data: Consider appropriate longitudinal data analyses if the outcome variables were measured at multiple time points, such as mixed-effects models or generalized estimating equation approaches, which can address the within-subject variability.

Sample size, response rate, attrition rate: Please clearly indicate in the methods section: the total number of participants, the time period of the study, response rate (if any), and attrition rate (if any).

Tables (general): Avoid the presentation of raw parameter estimates, if such parameters have no clear interpretation. For instance, the results from Cox proportional hazard models should be presented as the exponentiated parameter estimates, (ie, the hazard ratios) and their corresponding 95% confidence intervals, rather than the raw estimates. The inclusion of *P*-values in tables is unnecessary in the presence of 95% confidence intervals.

Descriptive tables: In tables that simply describe characteristics of 2 or more groups (eg, Table 1 of a clinical trial), report averages with standard deviations, not standard errors, when data are normally distributed. Report median (minimum, maximum) or median (25th, 75th percentile [interquartile range, or IQR]) when data are not normally distributed.

Figures (general): Avoid using pie charts; avoid using simple bar plots or histograms without measures of variability; provide raw data (numerators and denominators) in the margins of meta-analysis forest plots; provide numbers of subjects at risk at different times in survival plots.

Missing values: Always report the frequency of missing variables and how missing data was handled in the analysis. Consider adding a column to tables or a footnote that makes clear the amount of missing data.

Removal of data points: Unless fully justifiable, all subjects included in the study should be analyzed. Any exclusion of values or subjects should be reported and justified. When influential observations exist, it is suggested that the data is analyzed both with and without such influential observations, and the difference in results discussed.

Guidelines for Publication of Hawai'i Journal of Health & Social Welfare Supplements

The Hawai'i Journal of Health & Social Welfare (HJH&SW) partners with organizations, university divisions, and other research units to produce topic-specific issues of the journal known as supplements. Supplements must have educational value, be useful to HJH&SW readers, and contain data not previously published elsewhere. Each supplement must have a sponsor(s) who will work with the HJH&SW staff to coordinate all steps of the process. Please contact the editors at hjhswh@hawaii.edu for more information if you would like to pursue creating a supplement.

The following are general guidelines for publication of supplements:

1. Organizations, university divisions, and other research units considering publication of a sponsored supplement should consult with the HJH&SW editorial staff to make certain the educational objectives and value of the supplement are optimized during the planning process.
2. Supplements should treat broad topics in an impartial and unbiased manner. They must have educational value, be useful to HJH&SW readership, and contain data not previously published elsewhere.
3. Supplements must have a sponsor who will act as the guest editor of the supplement. The sponsor will be responsible for every step of the publication process including development of the theme/concept, peer review, editing, preliminary copy editing (ie, proof reading and first round of copy editing), and marketing of the publication. HJH&SW staff will only be involved in layout, final copy editing and reviewing final proofs. It is important that the sponsor is aware of all steps to publication. The sponsor will:
 - a. Be the point of contact with HJH&SW for all issues pertaining to the supplement.
 - b. Solicit and curate articles for the supplement.
 - c. Establish and oversee a peer review process that ensures the accuracy and validity of the articles.
 - d. Ensure that all articles adhere to the guidelines set forth in journal's Instructions to Authors page (<https://hawaiijournalhealth.org/authors.htm>), especially the instructions for manuscript preparation and the statistical guidelines.
 - e. Obtain a signed Copyright Transfer Agreement for each article from all authors.
 - f. Comply with all federal, state, and local laws, rules, and regulations that may be applicable in connection with the publication, including ensuring that no protected health information appears in any article.
 - g. Work with the editorial staff to create and adhere to a timeline for the publication of the supplement.
 - h. Communicate any issues or desired changes to the HJH&SW staff in a timely manner.

4. Upon commissioning a supplement, the sponsor will be asked to establish a timeline for the issue which the sponsor and the HJH&SW editor(s) will sign. The following activities will be agreed upon with journal publication to take place no later than 24 months after signing. Extensions past the 24 months will be subject to additional fees based on journal publication rates at that time:

- Final date to submit a list of all articles, with working titles and authors
- Final date for submitting Word documents for copy editing
- Final date for submitting Word documents for layout
- Final date to request changes to page proofs (Please note that changes to page proofs will be made only to fix any errors that were introduced during layout. Other editing changes will incur an additional fee of \$50 per page.)

5. The cost of publication of a HJH&SW supplement is \$6,000 for an 8-article edition with an introduction from the sponsor or guest editor. Additional articles can be purchased for \$500 each with a maximum of 12 articles per supplement. This cost covers one round of copy editing (up to 8 hours), layout, online publication with an accompanying press release, provision of electronic files, and indexing in PubMed Central, SCOPUS, and Embase. The layout editor will email an invoice for 50% of the supplement to the designated editor for payment upon signature of the contract. The remaining will be due at the time of publication. Checks may be made out to University Health Partners.

6. The sponsor may decide to include advertisements in the supplement in order to defray costs. Please consult with the HJH&SW advertising representative Michael Roth at 808-595-4124 or email rothcomm@gmail.com for assistance.

7. Supplement issues are posted on the HJH&SW website (<https://hawaiijournalhealth.org>) as a full-text PDF (both of the whole supplement as well as each article). An announcement of its availability will be made via a press release and through the HJH&SW email distribution list. Full-text versions of the articles will also be available on PubMed Central.

8. It is the responsibility of the sponsor to manage all editorial, marketing, sales, and distribution functions. If you need assistance, please contact the journal production editor. We may be able to help for an additional fee.

9. The editorial board reserves the right of final review and approval of all supplement contents. The HJH&SW will maintain the copyright of all journal contents.

Revised 3/21/23



Hawai‘i Journal of Health & Social Welfare (HJH&SW)

Style Guide for the Use of Native Hawaiian Words and Diacritical Markings

The HJH&SW encourages authors to use the appropriate diacritical markings (the ‘okina and the kahakō) for all Hawaiian words. We recommend verifying words with the Hawaiian Language Dictionary (<http://www.wehewehe.org/>) or with the University of Hawai‘i Hawaiian Language Online (<http://www.hawaii.edu/site/info/diacritics.php>).

Authors should also note that Hawaiian refers to people of Native Hawaiian descent. People who live in Hawai‘i are referred to as Hawai‘i residents.

Hawaiian words that are not proper nouns (such as *keiki* and *kūpuna*) should be written in italics throughout the manuscript, and a definition should be provided in parentheses the first time the word is used in the manuscript. Authors are encouraged to use the Hawaiian Keyboard for ‘okinas and kahakō markings. To facilitate the layout process the ‘okina should be inserted as ‘ which is the U+02BB, Modifier Letter Turned Comma mark.

Examples of Hawaiian words that may appear in the HJH&SW:

<i>‘āina</i>	<i>Mānoa</i>
<i>ali‘i</i>	<i>Māori</i>
<i>Hawai‘i</i>	<i>Moloka‘i</i>
<i>kūpuna</i>	<i>O‘ahu</i>
<i>Kaua‘i</i>	<i>‘ohana</i>
<i>Lāna‘i</i>	<i>Wai‘anae</i>



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