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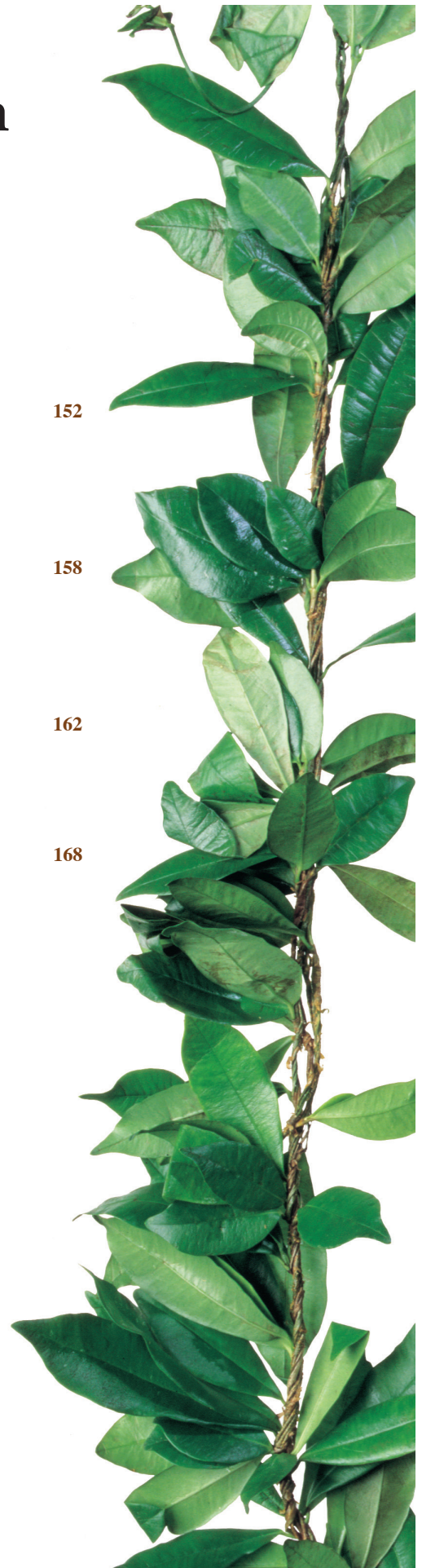
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# Hawai'i Journal of Health & Social Welfare

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# Impact of a Fast Pass on Emergency Department Wait Times for Oncology Patients with Febrile Neutropenia

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## Abstract

This pilot study examined differences in wait times for oncology patients who presented to the emergency department, with or without a Fast Pass, for febrile neutropenia (FN). Inadequate circulating neutrophils create a health risk for FN patients. An increased number of patients are receiving chemotherapy in an outpatient setting and may experience delays when seeking treatment in the emergency department. These delays in treatment may be due to overcrowding, patients who require life-saving medical interventions, and inconsistencies in recognizing febrile neutropenia, where fever may be the only presenting sign. The purpose of this study was to measure the impact on wait times, increasing possible risk of bacterial or viral exposure in the emergency department waiting room, for patients with a potential diagnosis of FN who presented their "Fast Pass" from the hospital cancer center's program upon arrival. Electronic medical records were reviewed over a period of 21 months, comparing wait times in the ED for oncology patients with potential FN before and after implementation of the Fast Pass program at an urban medical center in Hawai'i. Of the 1300 oncology patient chart reviews conducted, 6 patients met the study-defined inclusion criteria pre-Fast Pass and 10 met the study-defined inclusion criteria post-Fast Pass. Influence of the use of a Fast Pass on patient wait times was tested using a multivariate regression adjusted for ED patient volume. There were no differences in overall wait times pre- and post-Fast Pass.

## Keywords

oncologic emergency, febrile neutropenia, emergency department, exposure to infection, fast pass

## Abbreviations and Acronyms

ED = emergency department  
EMR = electronic medical record  
FN = febrile neutropenia  
IQR = interquartile range  
IV = intravenous  
NCCN = National Comprehensive Cancer Network  
RIRC = Research and Institutional Review Committee  
RN = registered nurse

## Introduction

Neutropenia is one of the most common dose-limiting toxicities for patients receiving chemotherapy. Chemotherapy depletes infection-fighting resources, specifically neutrophils, and infection may be masked by the absence of the normal febrile response.<sup>1</sup> Fever related to neutropenia or febrile neutropenia

(FN) is an oncologic emergency and a major reason for hospitalization of oncology patients. FN is defined by the presence of fever in a patient who has an inadequate number of circulating neutrophils to fight infection or an absolute neutrophil count lower than 500/mcL.<sup>2,3</sup> In patients with neutropenia, fever may be the only sign of infection.<sup>4</sup>

FN occurs more frequently in patients who have been previously treated with chemotherapy and have prior history of significant neutropenia.<sup>3</sup> The mortality rate of patients who experience FN ranges from 50% to 75% in the inpatient setting and up to 11% in the outpatient setting.<sup>5,6</sup> Oncology patients often experience delays in treatment due to emergency department (ED) overcrowding and can be overlooked when other patients require life-saving medical interventions. They may also experience inconsistencies in ED staff's recognition of the signs and symptoms of FN.<sup>7</sup> These patients should not sit in a waiting room for a prolonged period because they lack the adequate immune defenses to fight off even minor infections to which they could be exposed. The purpose of this study was to measure the impact on wait times for patients with a potential diagnosis of FN who presented their "Fast Pass" from the hospital cancer center's program upon arrival.

## Background

Out of every 1000 cancer patients in the United States, 7.83 are hospitalized for neutropenic fever.<sup>8</sup> Data from the 2012 National Inpatient Sample and Kids' Inpatient database revealed that 91 560 adults were hospitalized for cancer related neutropenia and a total cost of cancer related neutropenia hospitalizations was \$2.3 billion for adults. The mean length of stay was 9.6 days and a hospital cost of \$24 770 per stay.<sup>9</sup> Certain factors increase a patient's risk for developing FN: over 60 years old, female sex, comorbidities, inadequate immune systems or low albumin levels, aggressive or metastatic cancers, and lymphoma or other bone marrow diseases.<sup>3</sup> FN puts cancer patients at significant risk for life threatening infections and complications such as high economic burden, reduced quality of life, and treatment-related death due to dose reduction and delays in treatment which could result in compromised clinical outcome. All patients receiving myelosuppressive chemotherapy are at risk for developing FN, which may quickly lead to sepsis, septic shock, and death.

The lack of an adequate tool to help with quick identification of FN in the ED and the need for continuity of care for the oncology patient across all departments led to the development of this cancer center's Fast Pass program. The program consists of a wallet-sized alert card documenting pertinent information that was given to each new oncology patient receiving chemotherapy to be presented on admission to the ED should the need arise.

Previous studies involving an alert type card for FN have been limited and have had mixed results dependent on the study's outcome goals. In a study done at the South West London Cancer Network, an alert card has been in use for 2 years.<sup>10</sup> The alert card was implemented due to the need to have neutropenic patients receive treatment in a timely manner as well as educate staff and increase awareness of the necessity to treat these patients who presented to their Accident and Emergency Department promptly.<sup>10</sup> This study used a patient satisfaction survey that was initiated 6 months after the start of the alert card, and showed an increase in patient satisfaction and staff awareness of the susceptibility of these patients. At Peel Regional Cancer Center in Canada, there was a failure to recognize FN patients during triage despite implementation of their Fever Alert Card.<sup>11</sup> In 2016, The Cleveland Clinic Cancer Center recognized the need for timely treatment of cancer patients who had neutropenic fever at any point of entry to the hospital. The center implemented an FN pathway that included a chemotherapy neutropenic fever alert wallet card and magnet.<sup>7</sup> ED wait times were not measured in these 3 studies.

Among hospitals that performed studies looking at oncology patient outcomes with a neutropenic alert card, lack of accurate identification of FN symptoms was a common factor. Patient and staff education regarding FN (signs and symptoms), awareness/purpose of the alert card, high staff turnover, and need for ongoing educational sessions were identified as challenges.<sup>10</sup> Emergency department staff were not familiar with symptoms specific to FN, its classification as an oncologic emergency, and necessity for quick intervention to decrease mortality and morbidity.<sup>10,11</sup> Review of the literature showed specific wait times from ED registration to rooming were not measured for oncology patients who presented to the ED with FN and a fever card and/or fast pass but rather from time to antibiotics as well as triage to physician initial assessment.<sup>1</sup> Findings from other studies without a fever card and/or fast pass, suggested that delays in treatment for patients who presented to the ED with FN, led to an increase in mortality and/or prolonged hospitalizations. Therefore, this was the first study conducted to identify differences in wait times for oncology patients, presenting to the ED with FN, with or without a Fast Pass, specifically focusing on the multiple time points from registration to rooming, isolating the patient away from exposure to pathogens.

## **2019 Fast Pass Program at an Outpatient Cancer Center in Hawai'i**

The outpatient cancer center is located in an acute care 535-bed urban medical center in Hawai'i. It provides cancer treatment on an outpatient basis to approximately 12 000 patients a year. The cancer center's Fast Pass program was initially conceived by an organizational cancer committee at the medical center. Leadership approved the program in September 2018, with a projected rollout for summer 2019. The Fast Pass program was created to fulfill a standard from the Commission on Cancer for 2018. The program rollout was spearheaded by a team of cancer center oncology nurses led by the authors. In July 2019, staff education and training for the new Fast Pass program was provided to cancer center and ED clinical staff. The cancer center implemented this program to support consistency of care between the outpatient and ED settings. The Fast Pass was a wallet-sized card documenting pertinent information about the oncology patient. Patients receiving chemotherapy treatment were each given a Fast Pass as a routine part of their treatment experience and instructed in its use. The pass lists the patient's name, current intravenous (IV) chemotherapy regimen, name and contact information of oncologist, diagnosis, allergies, presence/absence of a vascular access device.

Designed for use at the medical center's ED, the cancer center's chemotherapy Fast Pass provided a brief explanation about potential indications for which the patient was presenting to the ED and would need prompt medical attention. When an oncology patient presented to the ED with a fever, they were instructed to present their Fast Pass card at check-in to alert the ED staff that they were a cancer center patient on active chemotherapy treatment, were at high risk for developing an infection due to neutropenia, and needed to be isolated as soon as possible. To measure the impact of the Fast Pass program, the following research question was developed: What is the difference in the wait times for oncology patients who presented to the ED for possible FN with or without the Fast Pass?

## **Methods**

This pilot study consisted of a retrospective electronic medical record (EMR) review of oncology patients on active IV chemotherapy who visited the Hawai'i urban medical center's ED, with possible FN between December 1, 2017 to March 31, 2020 (**Table 1**). Study approval (RA-2019-038) was received from the medical center's Research and Institutional Review Committee (RIRC).

The first phase of the study measured oncology patients without a Fast Pass with possible FN who visited the ED from December 1, 2017 to December 31, 2018 (13 months). The second phase of the study measured oncology patients with a Fast Pass with possible FN who visited the ED from August 1, 2019 to March 31, 2020 (8 months). The Fast Pass was implemented on Au-

gust 1, 2019. The second phase of the study was shortened due to time constraints with authors' participation in the medical center's grant funded 24 month Nursing Research Fellowship and RIRC approved timeline.

### Sample

Data from cases presenting with possible FN at the ED were retrospectively collected from the EMR with the intention to obtain a sample size of up to 10 cases in each of the 2 pilot phases, to reach the goal of 20 patients. The recruitment goals were based on pre-study estimates of patient volume. The patients who met criteria for each phase encountered during the EMR review were selected. The sample population was selected based on the date the patient presented to the ED with FN. In **Table 1**, the 2 groups were cross referenced for presenting diagnosis based on eligibility criteria and an active IV chemotherapy treatment plan in the EMR.

### Data Collection

Using the hospital EMR system, a report was generated filtering for only oncology patients with active outpatient chemotherapy treatment plans for the specified time frame of the pilot study. The authors reviewed each EMR to ensure that the patient had visited the ED with possible FN during the stated phases. Data was entered into a spreadsheet that consisted of various time stamps, measured in minutes, during the ED intake process.

### Statistical Analysis

Patient characteristics including sex, age (categorized into 10-year groupings) and ethnicity were summarized using frequency and percentage. Differences between the Phase I (pre-Fast Pass) and Phase II (post-Fast Pass) samples were compared using Fisher's exact test. ED characteristics including total ED patient volume over a 24-hour period and patients' wait times were summarized using mean and standard deviation (SD) as well as median and interquartile range (IQR), and difference

Inclusion Criteria	Exclusion Criteria
Oncology patients 18 years of age or greater	Oncology patients on oral chemotherapy
Oncology patients on active IV chemotherapy treatment	Oncology patients who visited the ED with a potential diagnosis other than FN
Oncology patients who presented to an urban acute care hospital ED in Hawai'i	Oncology patients who developed FN as an inpatient
Oncology patients who visited the ED with a fever greater than 100.4 F, absolute neutrophil count of less than 0.50, and having received IV chemotherapy treatment within 7-14 days	Oncology patients who were directly admitted from the outpatient clinic, thus bypassing the ED.

IV= intravenous, ED=emergency department, FN=febrile neutropenia

before and after the implementation of the Fast Pass program were tested using Mann-Whitney test. Three phases of the visit were considered for patients' wait time: from registration to room, from triage RN to room, and from registration to triage RN. The period of time from registration to room represents patients' overall wait time. Three separate multivariable linear regression models were fitted including whether the patient used the Fast Pass and the total ED volume as predictors of patients' wait time in minutes at 3 phases of the visit. All analyses were performed using R software version 3.6.3 (R Foundation for Statistical Computing, Vienna, Austria) and *P*-value of <.05 was considered significant.

### Results

Of the 1300 EMRs reviewed during Phase I, 6 met inclusion criteria. However, 1 patient was registered, bypassed the triage RN, and placed directly into a room. Out of 1421 EMRs reviewed for Phase II, 10 patients met criteria with 1 patient visiting the ED on 2 separate occasions. The team was only able to obtain 6 patients in Phase I due to the time constraints of the Nursing Research Fellowship program and to meet the approved timeline of the IRB.

Of the 16 ED total visits for FN in both phases, 69% (11 visits), were by Asian males, and 69% (11 patients) were 60 years or older, as indicated in **Table 2**. There were no significant differences between pre- and post- Fast Pass program in terms of the patients' characteristics, ED patient volume, or overall wait time (**Tables 2 and 3**).

Variable	Pre-Fast Pass (n=6) No. (%)	Post-Fast Pass (n=10) No. (%)	<i>P</i> -value <sup>a</sup>
<b>Sex</b>			
Male	4 (67%)	7 (70%)	>.99
Female	2 (33%)	3 (30%)	
<b>Age (years)</b>			
18-30	1 (17%)	1 (10%)	.41
30-39	0 (0%)	1 (10%)	
40-49	1 (17%)	0 (0%)	
50-59	1 (17%)	0 (0%)	
≥60	3 (50%)	8 (80%)	
<b>Ethnicity</b>			
White	0 (0%)	3 (30%)	.33
Asian	5 (83%)	6 (60%)	
Native Hawaiian/Pacific Islander	1 (17%)	1 (10%)	

<sup>a</sup> *P*-value based on Fisher's exact test.

**Table 3. Summary Statistics of Emergency Department (ED) Characteristics and Bivariate Associations with Febrile Neutropenia Fast Pass Pilot Study**

Variable	Pre-Fast Pass (n=6)	Post-Fast Pass (n=10)	P-value <sup>a</sup>
<b>ED Volume</b>			
Mean + SD	188.8 ± 12.0	188.2 ± 12.6	>.99
Median (IQR)	184.5 (184.0, 195.5)	185.5 (178.8, 199.2)	
<b>Wait Time in Minutes</b>			
<b>Registration to Room (Total Wait)</b>			
Mean + SD	22.8 ± 20.7	25.6 ± 19.3	.79
Median (IQR)	16.0 (13.5, 24.5)	18.5 (11.8, 35.5)	
<b>Registration to Triage RN</b>			
Mean + SD	4.0 ± 6.2	9.6 ± 6.3	.075
Median (IQR)	1.0 (1.0, 2.0)	10.0 (4.3, 13.5)	
<b>Triage RN to Room</b>			
Mean + SD	11.0 ± 5.4	16.0 ± 15.9	.76
Median (IQR)	12.0 (11.0, 14.0)	9.0 (6.5, 23.5)	

ED=emergency department, IQR= interquartile range, RN=registered nurse, SD=standard deviation

<sup>a</sup> P-value based on Mann-Whitney test.

**Table 4. Multivariable Linear Regressions Results Modeling for Patient Wait Times in Minutes for Febrile Neutropenia Fast Pass Pilot Study**

	Wait time in minutes	95% CI	P-value
<b>Registration to Room</b>			
Post-Fast Pass (ref: Pre-Fast Pass)	3.07	-18.85 – 24.98	.77
ED Volume	.48	-.44 – 1.40	.28
<b>Registration to Triage RN</b>			
Post-Fast Pass (ref: Pre-Fast Pass)	6.18	.88 – 11.48	.03
ED Volume	.36	.15 – .57	.003
<b>Triage RN to Room</b>			
Post-Fast Pass (ref: Pre-Fast Pass)	5.37	-11.11 – 21.84	.49
ED Volume	.23	-.42 – .88	.46

ED=emergency department, RN=registered nurse

The first multivariable linear regression model using patients' wait time from registration to room as the outcome variable did not show a significant difference by pre- and post- Fast Pass program and by ED volume. The regression model for the wait time from registration to triage RN indicated that patients in Phase II spent an average of 6.18 minutes longer before seeing the triage RN than did patients in Phase I after adjusting for the total ED volume ( $P=.026$ , estimated coefficient = 6.18, 95% Confidence Interval (CI) = 0.88, 11.48) (Table 4). Regardless of patients' use of a Fast Pass, total ED volume was also a significant predictor of wait time from registration to triage RN ( $P=.003$ , estimated coefficient= 0.36, 95% CI = 0.15, 0.57). These results suggest that every additional patient in the ED increased patients' wait time by 0.36 minutes. The wait time from triage RN to room was not statistically different by the use of a Fast Pass or ED volume.

## Discussion

The authors did not find a significant difference in the overall wait time from registration to room, nor from Triage RN to room. Instead, longer wait times were discovered after the implementation of the Fast Pass in the Phase II group. Registration to triage RN was the only group noted to have a significant difference in wait time for patients with potential FN pre- and post-Fast Pass. A 6.18 minute average increase in wait times was found between Phase I and Phase II. Considering the degree of vulnerability of patients with FN, and the potentially high level of risk of infection in an ED waiting room, the difference is clinically important as any exposure to pathogens could lead to infection from which these patients might never recover in the worst case, or at least cause a delay in chemotherapy treatment. In this study, the wait time from registration to Triage RN increased by 0.36 minutes for each additional patient who sought medical help from the ED. Since ED patient volume was also significant in the wait time from registration to Triage RN, this difference could be due to ED over-capacity resulting in increased wait times in the waiting area and/or inability to transfer patients due to lack of hospital beds. There continues to be a lack of accurate identification/education of FN symptoms during triage, some of which may be related to increased staff turnover in the ED.<sup>10,11</sup> Long wait times could have been due to an increased number of patients seeking care during the flu season as Phase I and II were both conducted during peak flu season. High ED staff turnover, resulting in inconsistent education and/or the ability to recognize FN/Fast Pass may have also affected wait times. High ED patient volume and/or the inavailability of hospital rooms possibly contributed to longer wait times, but there was no way for the researchers to control for the impact of hospital in-patient room capacity. To satisfy the IRB approved timeline for the research study, the team was only able to obtain 6 patients in Phase I and was unable to extend the pre Fast Pass data collection timeframe in order to obtain 10 patients.

## Limitations

Possible factors that may have affected the results include a small sample size, use of a single facility, time constraints and exclusion of the inpatient oncology population. The small sample size did not provide an adequate statistical measurement to show a significant increase or decrease in wait times for oncology patients who presented to the ED with and without a Fast Pass. Use of a single facility limited the ability to capture all the oncology patients who visited the ED for FN. Since this study was conducted in participation with the facility's Nursing Research Fellowship, adherence to a predetermined timeline was necessary. The study strictly focused on the outpatient oncology population, creating a smaller sample base. Based on data from the current study, an estimated 807 visits in each Fast Pass phase would have been needed to determine the difference in the overall wait time from registration to room, assuming a 2-sided significance level of .05 and 80% power. This study established the groundwork for future studies involving oncology patients in the outpatient setting, FN, a Fast Pass, and impact on ED wait times using a single facility.

## Implications for Practice and System-wide Change

To promote staff adherence to the Fast Pass Program, address high staff turnover, and training efficiency, a Self-Learning Module or designation of an ED "super-user"/unit champion for the Fast Pass Program is recommended. The urgency and timely management of neutropenic fever and the importance of presenting to the ED at the first sign of a fever needs to be emphasized to the patients and families. Use of a multi-disciplinary approach, creating a standard order set, process checklist, and documentation guidelines for patients who present to the ED with neutropenic fever has been shown to avoid delays in treatment.<sup>4</sup> Feedback of current Fast Pass card holders via a survey would give insight as to whether they felt that the Fast Pass was effective. A prolonged Phase II data collection period could also be conducted to provide a better representation of adequate Fast Pass card usage and impact. Supplemental educational sessions to the medical center's ED could ensure that these patients get the care they need in a timely manner, decreasing their risk of infection, and increasing their chances for survival. To provide a better representation of oncology patients with FN who present to the ED the study should include sister facilities that have similar facilities. Future studies should look at focusing on the specific delays in wait times, the factors that cause the delays, and interventions geared towards minimizing them, as studies have shown that shorter delays in treatment times led to decrease in length of stay for oncology patients who presented to the ED with FN.

## Conclusion

The purpose of this study was to measure the impact on wait time, a possible indication of contagion exposure in the ED waiting room, for patients with a presentation consistent with FN who presented their 'Fast Pass' from the hospital cancer center's program upon arrival. Although there were no significant differences in overall wait times for patients in Phase I or Phase II, ED staff need to be aware that FN is an oncologic emergency and that these patients need to be seen or roomed faster due to their increased risk of infection, especially with the emergence of COVID-19. The lack of a significant difference in wait times for both phases could be related to ED patient volumes on the days that the patients presented to the ED, adequate amount of staff nurses on duty at that time, and/or patient's physical presentation at time of entry to ED. The Fast Pass is still in use today and is provided to all new incoming patients during their chemotherapy teaching session. For ease of use, the card is filled out by the teaching nurse and scanned into the EMR as another identifier, if the patient is unable to present the physical card. Anecdotal feedback provided by the physicians and staff expressed the Fast Pass as a valuable tool that provides a sense of security for the patient, as well as an action plan when presenting to the ED. It also serves as a beneficial teaching tool when educating patients on the side effects of their chemotherapy treatment.

## Conflict of Interest

None of the authors identify a conflict of interest.

## Disclosures

The findings and conclusions of this study do not necessarily represent the views of The Queen's Medical Center or the National Institutes of Health.

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# Describing the Medical Needs of Hawai'i's Houseless Population During COVID at Free Student Run Outpatient Clinics (Hawai'i HOME Project)

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## Abstract

Hawai'i experiences some of the highest rates of houselessness per capita in the country. COVID-19 has exacerbated these disparities and made it difficult for these individuals to seek medical care. Hawai'i's Houseless Outreach in Medical Education (HOME) clinic is the largest student run free clinic in the state, which provides medical services to this patient population. This article reports the demographics, medical needs, and services provided to patients of Hawai'i's HOME clinic during the era of COVID-19. From September 2020 to 2021, the HOME clinic saw 1198 unique visits with 526 distinct patients. The most common chief complaints included wound care (42.4%), pain (26.9%), and skin complaints (15.7%). A large portion of the population suffered from comorbidities including elevated blood pressure (66%), a formal reported history of hypertension (30.6%), diabetes (11.6%), and psychiatric concerns including schizophrenia (5.2%) and generalized anxiety (5.1%). Additionally, a large portion of patients (57.2%) were substance users including 17.8% of patients endorsing use of alcohol, 48.5% tobacco and 12.5% marijuana. The most common services provided were dispensation of medication (58.7%), wound cleaning/dressing changes (30.7%), and alcohol or other drug cessation counseling (25.2%). This study emphasizes that the houseless are a diverse population with complex, evolving medical needs and a high prevalence of chronic diseases and comorbidities.

## Keywords

Houseless health, demographic, Hawai'i's Houseless, Student-Run Clinic, Health access

## Introduction

The state of Hawai'i is in a houselessness crisis.<sup>1</sup> In 2020, 46 out of every 10 000 citizens of Hawai'i experienced houselessness, with the fourth highest rate (56.7%) of unsheltered houseless individuals in the nation. Hawai'i also ranked among the top 5 in houselessness in unaccompanied youth, veterans, and chronically houseless individuals from 2017 to 2020.<sup>1-4</sup>

COVID-19 has exacerbated the houselessness crisis.<sup>5,6</sup> Although the pandemic limited the ability to perform annual surveys to estimate the number of people experiencing houselessness in the early days of the pandemic, financial strain is a known driver of this issue and Hawai'i's tourism-based economy was stressed by the lack of travel.<sup>7</sup> Even as the number of houseless individuals has presumably grown, contact restrictions and protocols have

forced many shelters to close or severely limit their capacity.<sup>8</sup> Ultimately, it has been difficult for houseless individuals to navigate the temporary isolation and housing centers that have arisen during the pandemic.

Houseless individuals often have a complex array of medical conditions, including wounds, hypertension, diabetes, psychiatric illness and chronic infections.<sup>3,9-12</sup> Yet they often struggle with reduced access to medical care, which can lead to a progressive deterioration of their condition(s). Moreover, a large proportion of the houseless population in Hawai'i are Native Hawaiian and Pacific Islander, who are already significantly overrepresented in lower socio-economic groups and suffer from higher prevalence of chronic medical conditions. Thus, houselessness can exacerbate preexisting health and wellness disparities.<sup>12,13</sup> Despite this, little has been documented regarding the specific medical conditions and needs of the houseless population, especially during COVID-19.

Hawai'i's Houseless Outreach in Medical Education (HOME) clinic, founded in 2005, is the only academic, student run, free health care clinic serving Hawai'i's diverse houseless populations. The HOME Clinic's mission is to improve the quality of and access to health care for Hawai'i's houseless, while serving as an academic hub for medical students to gain valuable clinical experience and develop an awareness of the complex health care needs of the houseless population. The HOME Clinic provides a wide variety of medical services as well as behavioral health, social services, and vision care. Since its inauguration, the clinic has expanded rapidly and has current or previous locations in Honolulu, Kailua, Kahalu'u, Kalaeloa, Hale'iwa, Waikiki, Wai'anae, and Waimanalo.<sup>14</sup> The HOME clinic provides open access to care for all houseless individuals regardless of insurance status across the island of O'ahu.

This project aimed to characterize the demographics, medical needs, and services provided to patients of Hawai'i's HOME clinic from September 2020 - 2021. These data were collected to improve care provisions and gain a better understanding of the unique needs of the houseless population in Hawai'i which may inform their interactions with the broader health care system.

## Methods

This project was a descriptive retrospective medical record review conducted at the Hawai'i HOME project that explored the demographics, medical needs and outpatient services provided to this unique population. All patients seen at a HOME clinic site with an accessible medical record between September 1, 2020 and September 1, 2021 were eligible for inclusion. The primary exclusion criteria was lack of medical record due to clinic policy or practice. Patients who only received COVID testing, COVID or influenza vaccination, or a tuberculosis skin test were excluded because records of these types of visits were not entered into the medical record system. Due to clinical protocols at the time of data collection (which have since been relaxed), patients with COVID or with known exposure were not seen at the HOME clinics and thus were not included in this study. In addition, any patient deemed by the attending physician to have an emergent medical need prior to intake was referred to an emergency department and thus did not have a medical record and was excluded.

All data were housed in HOME's electronic medical record system and collected as part of routine clinical care. Study personnel with experience and familiarity with clinic flow reviewed the medical charts to extract patient data from chart reviews performed at the clinic, which was then reviewed and verified by clinic site managers. Data were analyzed using descriptive statistics, with 2-tailed Welch T-tests or Analysis of Variation tests of comparison for groups of two or more, respectively. Values are presented as either percentages or averages±standard deviation. All analysis was conducted using R statistical software 2022 (R Foundation for Statistical Computing, Vienna, Austria). This study was approved by the University of Hawai'i's Institutional Review Board for data collection and analysis (IRB#: 2019-00823).

## Results

The HOME project had 1198 unique visits in the time frame, with 526 distinct patients. The median patient visited the clinic twice, with 65.3% visiting more than once and a maximum of 29 visits for an individual patient (**Table 1**).

The average patient age was 53±14.2 years and 7.17% were male. The St. Augustine location in Waikiki was the busiest clinic, followed by the Provisional Outdoor Screening and Triage (POST) clinic in the encampment in Ke'ehi Lagoon Beach Park. Patients generally followed up to the same clinic at which they initially presented, but 12.8% visited more than 1 site.

Most patients presented with acute complaints (71.9%), while some sought only to follow up from previous visits (16.1%) or to refill their medication (12.0%). The most common reasons for acute visits were wound care (42.4%), non-wound-related pain (26.9%), non-wound skin complaint (15.7%), request for

Patient Variables	Number or Percentage of Patients
Patients	526
Unique Visits	1198
Patients With Multiple Visits, %	65.3
Patients Who Visited Multiple Sites, %	12.8
Age, Mean ± SD	53 ± 14.2
Male, %	7.17
<b>Medical History, %</b>	
Hypertension	30.6
Heart failure	3.2
Diabetes	11.6
Kidney Failure	3.9
Schizophrenia	5.2
Generalized Anxiety Disorder	5.1
Post-Traumatic Stress Disorder	2.4
Depression	10.3
<b>Substance Use (Recent or current), %</b>	
Any	57.2
Alcohol	17.8
Tobacco	48.5
Marijuana	12.5
Methamphetamines	9.4

Patient Variables	Number or Percentage of Patients
Unique Visits	1198
<b>Reason for Visit, %</b>	
Acute Complaint	71.9
Follow Up Visit	16.1
Medication Refill	12
<b>Presenting Concern (Acute Visit, multiple Presenting Concerns allowed), %</b>	
Wound Care	42.4
Non-Wound-Related Pain	26.9
Non-Wound Skin Condition	15.7
Request for Vaccination	10.2
Eye-Related Condition	8.1
Psychiatric Condition	3.4
GYN Condition	3.1
Help Navigating the Healthcare System	1.7
Drug/Alcohol Withdrawal or Cessation	0.4
<b>Presenting Concern (Follow Up Visit, multiple Presenting Concerns allowed), %</b>	
Wound Care	68.1
Multiple New or Chronic Conditions	8.9

vaccinations and/or TB test in addition to their follow up care (10.2%), eye related complaint (8.1%), psychiatric complaint (3.4%), gynecological related complaint (3.1%) help navigating the health care system (1.7%), and assistance with drug or alcohol withdrawal or cessation (0.4%). The most common reason for follow up was for wound care (68.1%). Some of the patients (8.9%) presented with multiple new or chronic complaints (**Table 2**).

HOME Project patients were medically complex, with 66.3% patients presenting with elevated blood pressure above 130/80 mmHg (despite only 30.6% of patients reporting a prior history of hypertension). Clinic notes referenced a history of heart failure in 3.2% of patients, diabetes (11.6%), kidney disease (3.9%), schizophrenia (5.2%), generalized anxiety (5.1%), post-traumatic stress disorder (2.4%), 10.3% made reference to depression or major depressive disorder, and 6.4% were flagged for risk of depression after scoring at least a 5 out of 9 on a Patient Health Questionnaire – 9 (*data not shown*). There was a high prevalence of substance use in our population (57.2%) including recent or current use of alcohol (17.8%), tobacco (48.5%), marijuana (12.5%), and methamphetamines (9.4%).

The most commonly provided care was dispensing of medication (58.7%), wound care (30.7%) and alcohol or other drug cessation counseling (25.2%). Medications provided included those for pain (30.2% of prescriptions), antibiotics (21.9%), antihypertensives (16.0%), antidepressants (8.3%), antipsychotics (5.9%), anticonvulsants (5.9%), proton-pump inhibitors or H2 blockers (5.3%), asthma inhalers (3.6%), lipid lowering medications (2.4%) and diabetic medications (0.5%). However, medications may have uses other than their general drug class. For instance, bupropion is commonly prescribed as an antidepressant, but also has use as an aide for smoking cessation, and some anticonvulsants and antidepressants are also indicated for neuropathic pain. To add to this complexity, a fair number of patients were prescribed these drugs for multiple indications (eg, depression and smoking cessation).

## Discussion

Hawai'i HOME Project serves a diverse population of houseless individuals who may otherwise not receive care. Many of these 526 patients are chronically ill and medically complex, with an array of comorbidities including trauma, hypertension, diabetes, substance abuse, depression and other psychiatric illnesses. These complex issues provide opportunity for medical students to practice their care and learn about the socioeconomic origins and accelerants of disease.

Despite the barriers to their access and multiplicity of their health care needs, the HOME population was fairly reliable in terms of receiving follow-up care at clinic. With 65% of patients returning for at least a second visit, HOME potentially has the opportunity to establish the type of longitudinal care necessary

to address chronic needs. Even though the vast majority of HOME patients (72%) present with acute complaints, nearly all also had multiple chronic needs. There are several potential barriers to improvement of care via the HOME clinic for this patient population. First, patients present at their convenience and without formal appointments. When combined with constantly shifting staff and the fact that 13% of patients visit multiple sites, these factors strain HOME's ability to develop comprehensive care plans. Moreover, being houseless makes it difficult for patients to change behavior in accordance with standard advice such as practicing good hygiene, adequate diet, regular exercise, and consistent use of medications (which are often lost, sold, or stolen).<sup>15</sup> A tailored wellness strategy built on a shared understanding of the goals of care and patients' social situations is essential to ensure success.

HOME Project's operation did not appear to be significantly affected by COVID-19 based on the authors observations working at these clinics, however more data collection is required for further analysis. Although there were some changes to clinic locations, many patients live in permanent encampments or shelters that provide a more stable living location and thus facilitated clinical follow-up. Additional changes included a widespread focus and adoption of telemedicine, which was an asset especially for psychiatric services. These initiatives, coordinated with the UTelehealth program at the University of Hawai'i, allowed HOME to expand on former capacity to provide these specialty services. Although some established consult services such as ophthalmology, dermatology and obstetrics and gynecology will likely need to remain in-person, the success of telehealth efforts may reduce the barriers to offering additional specialty services such as cardiology or endocrinology, which could bolster efforts to provide high-quality preventative and chronic care.

This project reinforces the notion that Hawai'i's houseless community is both uniquely vulnerable to and unable to adequately treat wounds. Wound care and hygiene were established to be the primary reasons for seeking for outpatient care. Moreover, recent national health reviews suggest that that systemic infection (often secondary to cellulitis, concurrent with sepsis and triggering decompensated heart failure) is the most common medical reason for houseless patient admission.<sup>16-17</sup> By providing care as a free, student run clinic funded on public grants and private donations, the HOME Project provides a cost-effective method to address the non-emergent medical needs of Hawai'i's houseless population, especially wound care. As a non-profit, this clinic improves access to services for underserved communities that might otherwise refrain from pursuing care until their condition necessitated a costly visit to the emergency department. Further research can be done to fully describe the propensity of houseless patients to visit the emergency department and tailor care to minimize the number of potentially preventable hospitalizations.

This project was subject to several limitations. First, these data were initially collected as documentation of clinical care by medical student trainees. While they were overseen by attending physicians, their examination and note taking skills were in the developmental stages and some important details may have been neglected or inappropriately notated. This is compounded by the novelty of HOME's electronic medical record system at the start of this project's time frame, the lack of standardized documentation, and students' and providers' unfamiliarity with the system. In addition, the complexity of these patients, acuity of some of their complaints, and limited clinic resources (including time) sometimes favored a bias towards the urgent, addressable need. In such cases, the full intricacy of the patient's medical condition may not always have been reflected in the chart. Finally, the HOME population comprises only around 17% of the chronically homeless population in Hawai'i.<sup>2</sup> It is likely that compared to other homeless individuals, HOME patients actively sought care and thus introduce a bias of potentially being relatively more healthy, self-reliant, and knowledgeable about the health care system than the average patient within their demographics as they were able to find the clinics. While these results cannot necessarily describe the entirety of the health care needs of the homeless population, HOME's frequent clinics and multiple sites offer a good approximation of the care possible in an outpatient setting.

The homeless are a diverse population with complex, evolving medical needs and a high prevalence of chronic diseases and comorbidities. While this study has summarized some of these needs and the care provided at student-run free health clinics, more work needs to be done to build on these findings to optimize patient care and student education.

\*Brendan K. Seto BA and Dylan S. Singh BS are co-first authors

### Conflict of Interest

None of the authors identify a conflict of interest.

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# A Patient Interview-Based Needs Assessment and Evaluation of Experiences with Periviable Pregnancies

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## Abstract

Given the complex ethical and emotional nature of births during the periviable period for both health care providers and families, this investigation sought to identify strategies for improved counseling of pregnant patients facing preterm birth at the cusp of viability at a tertiary care center in Hawai'i. As part of a larger quality improvement project on periviability counseling, 10 patients were interviewed during either individual or small focus groups using a progression of hypothetical scenarios. Interviews were analyzed independently by 3 investigators to identify themes of patient experience and potential areas for improvement when counseling patients who are carrying periviable pregnancies. Several common themes emerged from the interviews. Patients expressed the desire for more information throughout the process delivered in a jargon-free manner with unified messaging from the medical teams, and emotional support. These findings add to a limited body of literature which addresses patient perceptions of interactions with health care providers in the face of uncertainty, particularly in a Pacific Islander population. The authors recommend increasing provider training and developing a more structured process to counsel pregnant women facing periviable pregnancy loss to improve the patient experience.

## Keywords

periviable pregnancies, periviable births, obstetrics, minority health, Native Hawaiian, patient experience

## Introduction

Periviable birth refers to preterm births that occur near the lower limit of neonatal viability and is broadly defined as birth from 20 0/7 to 25 6/7 weeks gestation.<sup>1</sup> In the face of multiple uncertainties during this critical time in a pregnancy, the pressure for both parents to make uncomfortable decisions under tragic circumstances presents significant biopsychosocial risks to the pregnant patient. Parents of high-risk neonates have reported higher rates of depression, anxiety, and post-traumatic stress disorder in short-term and longitudinal studies.<sup>2,3</sup>

Survival at this gestational age is uncertain, even with technological advancements in the Neonatal Intensive Care Unit (NICU). Even among neonates who survive the NICU, a previous study finds that 15% die in the postneonatal period due to complications related to low birth weight, infection, and issues of underdevelopment such as lung hypoplasia.<sup>4</sup> Thus,

prior to delivery, parents at risk for giving birth to a neonate at the cusp of viability are commonly given the responsibility of making difficult decisions on behalf of their fetus both before and after birth. Options may include resuscitative measures aimed at maximizing the chance of survival, or comfort care using palliative care principles.

The counseling of patients facing periviable birth is extremely challenging due to the complexity of the medical information that needs to be conveyed, ethical considerations, and the emotional distress faced by the family. Medical providers typically use shared decision-making principles to counsel patients, but non-directive counseling is particularly precarious when making life and death decisions. While past studies have identified key themes of effective patient care in periviable deliveries,<sup>5,6</sup> their findings emphasize positive aspects of patient experience, rather than constructive feedback necessitating reflection and revision of current physician practices. Additionally, descriptions of patient attitudes when experiencing periviable birth in Hawai'i are extremely limited. Cultural competency is critical to patients in Hawai'i,<sup>7</sup> and relies on understanding the experiences of patients specific to this population.

Thus, the purpose of this investigation was to qualitatively analyze interviews from patients who had experienced a periviable birth in Hawai'i to identify areas for improvement for the medical teams providing periviability care and counseling to hospitalized pregnant patients facing similar challenges.

## Methods

Semi-structured interviews were conducted in either individual or small (2 or 3 people) focus group formats from 2018 to 2020 as part of a quality improvement project on periviability care. Patients and their partners who had undergone a periviable birth at Kapi'olani Medical Center for Women and Children (Honolulu, Hawai'i) between (22w0d-24w6d) were initially identified by electronic medical record review of gestational age at delivery and approached for participation by a study investigator. Once the initial list was exhausted, additional participants were identified and recruited individually by study investigators. One additional participant who had delivered in

New York was also recruited for her expertise on this topic. It was decided to include a participant with experience outside of Hawai'i as the broader perspective could facilitate the goal of developing improved processes. Consent, verbal followed by written, was obtained by a study investigator. Participants submitted a written deidentified survey on their demographic information including religious affiliation, highest level of education, employment, and insurance type. Religion was queried as a known parent factor in decisions around periviable care.<sup>8</sup> Other demographic data, including education level and medical insurance type, were collected to provide a general characterization of the cohort. However, this study did not have sufficient power to detect differences between participant demographics and responses. Interviews were audio recorded and manually transcribed by study investigators. Transcripts were independently analyzed by 3 study investigators and reviewed collaboratively to identify key constructive themes in participant feedback. This study was approved by the Western IRB (#1180858).

Interview prompts were presented with a progression of hypothetical scenarios involving a hypothetical patient, Jane, who was anticipating a periviable birth. Following descriptions of Jane's periviable delivery experience and interactions with the medical team, participants were presented with open-ended questions and asked to comment on Jane's experience—namely her concerns and decision-making process in encountering ethical challenges. This format was selected to probe the full range of the periviability patient experience by presenting hypothetical interactions with a medical team at multiple stages of childbirth process. Additionally, having participants respond on behalf of a hypothetical patient, rather than having to directly divulge their personal experiences, was intended to maximize participant comfort and candor in sharing their feelings. Thus, the interview format aimed at eliciting highly constructive feedback around questions and physician interactions in the context of periviable birthing practices in a modern maternity hospital.

## Results

A total of 10 people (8 patients and 2 partners) were interviewed in 6 sessions, including focus groups of either 2 (n=2) or 3 (n=1) participants, and 3 individual interviews. Demographic information is described in **Table 1**. In each session, participants were presented with 5 hypothetical scenarios. These results are organized in accordance with those scenarios, with prompts and common response themes summarized in **Table 2**.

**Scenario 1:** *Jane is 23 weeks (not quite 6 months) pregnant. She's having contractions and the doctors tell her that she is in preterm labor and she may give birth. What are some of Jane's biggest worries and what questions might Jane have for the doctors?*

The most frequently articulated questions across the 6 focus groups concerned the infant survival rate at Jane's gestational age (focus groups 1, 2, 3, 4, 6), the cause of Jane's preterm labor (1, 2, 3, 5), and the steps that might be taken to delay delivery (2, 3, 5, 6). Other concerns included long-term health considerations for the infant post-delivery (1, 6), implications of the anticipated delivery on Jane's health (1, 2), and financial considerations around medical expenses, including a long-term stay in the NICU (1, 4). Respondents also articulated feelings of "shock" (1, 3).

After sharing initial responses to this scenario, respondents in each focus group reflected on their own periviable situations as elicited by the stage of Jane's experience (this response pattern would repeat for the following prompts). Multiple women commented that they were initially unaware that what they were experiencing represented labor symptoms. The respondent from focus group 6 recalled "having weird pains" and being uninformed that she was in active labor. The first and third respondents from focus group 1 recalled similar experiences,

Demographic	N (%)
<b>How religious or spiritual are you?</b>	
Very religious or spiritual	2 (20%)
Somewhat religious or spiritual	5 (50%)
Not very religious or spiritual	1 (10%)
Not at all religious or spiritual	1 (10%)
Not answered	1 (10%)
<b>What is your religious affiliation, if any?</b>	
Christian	4 (40%)
Jewish	1 (10%)
Buddhist	1 (10%)
No religion	3 (30%)
Not answered	1 (10%)
<b>Highest education level completed</b>	
Less than high school	1 (10%)
Associate's degree or technical certificate	2 (20%)
Bachelor's degree	3 (30%)
Master's degree or higher	4 (40%)
<b>What is your current employment status</b>	
Not employed	1 (10%)
Full time (30 or more hours a week)	9 (90%)
<b>Insurance type</b>	
Medicaid	1 (10%)
Private	7 (70%)
Tricare	1 (10%)
Not answered	1 (10%)

Table 2. Periviable Pregnancy Study Interview Prompts and Common Themes Discussed among Participants	
Prompt	Response Themes
<i>Jane is 23 weeks (not quite 6 months) pregnant. She's having contractions and the doctors tell her that she is in preterm labor and she may give birth. What are some of Jane's biggest worries and what questions might Jane have for the doctors?</i>	Seeking further information <ul style="list-style-type: none"> <li>- What is the cause of this preterm labor?</li> <li>- What are the next steps of care?</li> </ul> Child's short-term outcomes <ul style="list-style-type: none"> <li>- What is my child's chance of survival, based on their gestational age?</li> </ul> Child's long-term outcomes <ul style="list-style-type: none"> <li>- How long will they have to stay in the NICU?</li> <li>- What will their quality of life be like?</li> </ul>
<i>Jane's doctors tell her that if she delivers the baby, she's going to have the choice of either "full resuscitation" or "comfort care." In addition to what has already been said, what kind of information would help Jane to decide between these options?</i>	Considerations for child <ul style="list-style-type: none"> <li>- Potential pain associated with resuscitation</li> <li>- Anticipated quality of life</li> </ul> Considerations for caregiver <ul style="list-style-type: none"> <li>- Impact on caregiver lifestyle</li> </ul>
<i>Jane's doctors want to prepare her for when she sees her baby after being born. What information would help to prepare Jane?</i>	Information regarding infant's appearance <ul style="list-style-type: none"> <li>- Visual representations</li> <li>- Verbal or written descriptions</li> </ul> Information regarding NICU environment
<i>Jane has difficult decisions to make about what medical procedures she may or not want for her baby and for herself (like a C-section, for example). What do you think are the most important factors for Jane in guiding her decisions?</i>	Considerations for child <ul style="list-style-type: none"> <li>- Survival of child</li> <li>- Short and long-term health of child</li> </ul>
<i>Jane's obstetrician wants to give her information. The neonatologists also want to give her information. What can the doctors do to help Jane to best understand all of the information and choices she has?</i>	Greater consistency of information preferred <ul style="list-style-type: none"> <li>- Minimize visits with individual providers</li> </ul> Greater volume of information preferred <ul style="list-style-type: none"> <li>- Medical records</li> <li>- Informational handouts</li> </ul>

having mistaken their symptoms for gas pains and a bladder infection, respectively. The third respondent from focus group 1 described the experience of being “rushed” to a hospital, stating she “didn’t even have time to [think]” about the questions raised by Scenario 1, and that she “was in shock” when told by EMS of her active labor status.

This respondent went on to describe interactions with a physician upon being admitted to the hospital: “The doctor was talking and he was kind of monotone too and he was kind of droning on so I was just like, I don’t even know what’s happening.” The respondent from focus group 6 reported that “the doctors were all talking amongst themselves for a long time.” She then noted, “I was not told anything until right before the babies were about to come out”, and the second respondent from focus group 2 referenced phrases from exchanges between physicians (“let’s give her magnesium sulfate” and “is it too late for Decadron?”), and followed with “I know what they all mean now, but not then.”

**Scenario 2:** *Jane’s doctors tell her that if she delivers the baby, she’s going to have the choice of either “full resuscitation” or “comfort care.” In addition to what has already been said, what kind of information would help Jane to decide between these options?*

Focus groups 1, 2, 3, 5, and 6 stated that information regarding projected quality of life for the child would be pivotal when

considering the option of full resuscitation. The first respondent in focus group 5 inquired, “what does it mean to take care [of] someone that you really have to push to exist?”, and added that implications for caregiver lifestyles, in the case of full resuscitation, should be considered as well.

The respondent from focus group 4 ascribed the choice of comfort care during his wife’s delivery to their knowledge of survival rates in preterm infants. The respondent from focus group 3 mentioned that descriptions of preterm infants, namely their appearances and movements, helped her to avoid panicking while she watched her child undergo comfort care: “I was terrified to see [the baby jerking], so that was hard for me... I remember being panicked when my baby was bleeding out of their nose.” The second respondent from focus group 3 reflected: “I thought about my kids first. Then after, I thought about how I would feel making the decision... Whether I would regret it or accept [it] or be at peace... you have to make sure that you’re 100% sure because you probably can’t change your mind once the decision is made.”

When describing the bedside manner of physicians who explained their choice between full resuscitation or comfort care, the first and third respondents from focus group 1 used the words “aberrant” and “monotone, careless, robotic”, respectively. The first respondent described feeling “infuriated” and the third said “It was so frustrating... It’s just the way that he communicated. Like that will always stay with me.”



**Scenario 3:** *Jane's doctors want to prepare her for when she sees her baby after being born. What information would help to prepare Jane?*

This scenario caused respondents to identify 2 categories of preparation. These included preparation for the infant's appearance, and for the NICU environment.

The first respondent from group 1 recommended a "photograph or description of what the baby may look like, depending on what [the physician's] assessment is of [what] the patient can handle seeing or hearing", and mentioned she had looked up pictures on the internet of preterm infants in order to mentally and emotionally prepare for her infant's appearance. The respondent from group 4 recommended visual representations, such as using various fruit to illustrate preterm infant size. In contrast, the first respondent in group 2 stated that preparatory pictures of preterm infants "would have been too much."

Expressed preferences around preparation for the NICU experience differed as well, with the first respondent from group 2 saying a tour would have exacerbated her preexisting fears, while the second respondent in group 1 indicated that a NICU tour might have assuaged subsequent stress by allowing her to prepare for the lack of privacy afforded to parents in the NICU, where "everyone is in this one room, in aisles, and all the babies are lined up" beforehand. The first respondent from group 5 attempted to familiarize herself with the NICU environment by watching videos on the internet, but emphasized the difficulty of "seeing [her child] on the ventilator and [...] not being able to hold [her] for that golden period". She expressed that seeing a video of NICU babies beforehand would have eased the difficulty of her initial NICU experience.

Emotionally charged language appeared in all focus groups when addressing this scenario. In focus group 4, the respondent used the word "fear", and the second and third respondents from focus group 1 used the word "scary". The first respondent from focus group 1 described feeling overwhelmed, "like [her] brain [...] [was] on overload" despite working in medical settings previously. The second respondent from focus group 2 described the NICU as initially "jarring" but added, "I think in the moment, I just saw my babies... There's something about seeing someone else's baby, like, you see sick. But when you see your own baby like that, you see hope." The second respondent from focus group 5 described being unhappy "because she's so small and [...] I didn't want [a periviable birth] to happen, she came early." The third respondent from focus group 1 also described "a little bit of disappointment" at the restrictions of interacting with her infant in the isolette.

**Scenario 4:** *Jane has difficult decisions to make about what medical procedures she may or not want for her baby and for herself (like a C-section, for example). What do you think are the most important factors for Jane in guiding her decisions?*

Groups 1, 2, and 3 agreed that their primary, if not sole, concern would be the survival and health of their child. When asked explicitly about effects to future pregnancies, respondents in groups 1 and 2 agreed that this would not be a significant consideration. The respondent in focus group 4, whose wife was counseled on the option of Cesarean delivery, indicated that this choice was interpreted as being contingent on her pain tolerance.

The third respondent in focus group 1 expressed a desire to understand the details of the procedure and its necessitating circumstance more thoroughly: "in layman terms explain the steps of the C-section and why they specifically need to go that route. Like you're saying it's concerning. What is concerning? Is it like heart rate [related]?" This respondent, along with the first respondent in focus group 1, reported that they felt that they had no input in the Cesarean decision-making process.

**Scenario 5:** *Jane's obstetrician wants to give her information. The neonatologists also want to give her information. What can the doctors do to help Jane to best understand all of the information and choices she has?*

Respondents in groups 1 and 2, on the basis of their periviable birth experiences, requested a greater degree of collaboration between physician providers so as to minimize inconsistencies in information being delivered. The first respondent from group 1 recommended "less individuals coming in in rapid succession and more of a team approach" to "eliminate contradictory or unclear information if everyone is in the room at one time" whereas the first respondent from group 2 recommended physicians meet to synchronize their approach before meeting the patient separately. As she put it, "having too many of the doctors gets a little intimidating [...] so you don't know what to ask" and, assuming provider meetings occur separately, "you can have another chance to ask the questions you may have missed in the first conversation".

When discussing their preferred medium for information, groups 3, 5, and 6 mentioned physical records of their stay, such as discharge notes, medication records, or handouts to aid with medical decision-making. Respondents universally expressed a preference for more information over less information, and referenced the importance of "choice." Although 7/10 subjects in Hawai'i self-reported to be religious or somewhat religious, "choice" and "quality of life" were listed as more important considerations.

## Discussion

This report adds to the limited literature on patient experiences when facing periviable birth and complex perinatal counseling. Patient considerations when processing their experience surrounding a periviable birth, deliberating options for medical procedures, and contemplating resuscitation versus comfort care, were overwhelmingly impacted by considerations of likelihood

of survival and quality of life for the infant. These findings are consistent with previous studies<sup>9</sup> and current periviability counseling guidelines. A 2006 pilot study assessed guidelines formulated by a group of maternal-fetal medicine specialists at a US medical center, and found that discussing rates of infant mortality, morbidity, and long-term neurodevelopmental outcomes with women at risk for perivable birth led to effective education and satisfaction as surveyed 3 days post-counseling.<sup>10</sup>

Notably, this study emphasizes the importance of the structure of the medical teams and communication styles from the patient perspective. The subjects were concerned about the perception that providers were discussing their status and treatment options amongst themselves, using medical jargon that depersonalized the situation. They also recalled that communicating information to them in what was perceived as an aberrant, monotone, or robotic manner only served to exacerbate their distress. Shock, confusion, and fear were recurrent emotional themes reported by study participants. Participants described a desire for medical team members to narrate their approach; ie. explain why they were administering certain medications, recommending a given procedure, or expecting a particular outcome. Participants also noted that the medical team did not address the cause of their preterm labor. Almost all participants either directly expressed or suggested a desire to understand why they were experiencing a perivable birth. This concern is consistent with a feeling of maternal guilt or shame that was identified in a 2021 study on the periviability decision-making process.<sup>11</sup> That study concluded by recommending that medical team members address patients with empathy, and provide reassurance that they are not to blame for the circumstances of their perivable birth.<sup>11,12</sup> In the current study, multiple participants reported being completely unaware that their symptoms were signs of preterm labor or impending birth, even as they were being evaluated for a pregnancy complication. The authors recommend increased training of health care providers to communicate bad news to patients facing perivable pregnancy loss. Using cancer care as an analogy, the SPIKES mnemonic is useful as a guide for periviability counseling (Setting, Perception, Invitation, Knowledge, Empathy, Strategy).<sup>13</sup> Practicing provider communication skills in delivering bad news and counseling in complex medical situations such as a perivable pregnancy may better mediate the shock of the situation and improve the patient experience.

With regard to medical team structure, several participants felt their initial confusion was compounded by conflicting information being given by multiple providers. Participants agreed that seeing team members separately intensified confusion and frustration with the medical providers. The lack of coherence in the communication results in lack of trust in the health care system. This finding comports with perivable care recommendations as published by the American College of Obstetrics & Gynecology (ACOG): “Ideally, counseling by the obstetric and neonatology teams will occur simultaneously or will occur in such a way that each team keeps the other informed of the content of their

discussions. These efforts will help to optimize coordination so as to avoid the provision of conflicting information to the patient and her family.”<sup>11</sup>

This study builds upon severely limited information around periviability counseling, and is the first such study featuring patients from Hawai‘i. It provides insight into the patient’s emotional experience throughout different phases of a perivable birth and neonatal care in the hospital setting, and agrees with preexisting literature on patient considerations in the decision-making process. Limitations include a small sample size and selection bias, insofar as participants opting into the study may have had an experience differing from those who did not, and limited representation of community demographics.

This study highlights areas for improvement in periviability counseling and supports the importance of patient concerns about neonatal survival rates and quality of life, as well as the need for empathetic counseling and ongoing, clear communication throughout the experience. The authors recommend that obstetricians and neonatologists counsel the patient in a joint session so that communication of the relevant information is cohesive and consistent with hospital policy. Implementation of a structured counseling rubric by the medical team can promote a more effective, patient-centered, and empathetic approach to periviability care.

## Conflict of Interest

None of the authors identify a conflict of interest.

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## Public Health Communication to Build Equity: 10 Best Practice Pandemic Insights and Examples from Hawai‘i

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### Abbreviations

CHW = community health workers  
HDOH = Hawai‘i Department of Health  
NH = Native Hawaiian  
PI = Pacific Islander

### Introduction

Access to clear, accurate, timely, and relevant health information is vital to ensure individuals have the knowledge needed to address immediate concerns, understand and mitigate risk, and make informed decisions during a public health emergency and over the lifespan. COVID-19 highlighted the importance of effective public health communication to address health inequities. While Hawai‘i reported relatively low numbers of cases and deaths compared to other states, deep inequalities were seen in the impact of COVID-19 across subpopulations. Native Hawaiians (NHs), Pacific Islanders (PIs), and Filipinos were disproportionately affected, with higher rates of hospitalization and death compared to other racial and ethnic groups.<sup>1,2</sup> Other disproportionately impacted groups included those who did not speak English, older adults, and those in rural communities.

Critical gaps in health communication and innovative solutions emerged during COVID-19. Community trust played an important role in achieving solutions amidst the rapidly changing landscape of scientific evidence, best-practice recommendations, health policy, and the information glut of the “infodemic.”<sup>3,4</sup> Linguistically-appropriate and culturally-relevant health communication is needed to share information, support health literacy, and avoid exacerbating inequities.<sup>5,6</sup>

This commentary provides practical guidance to support health equity by highlighting effective health communication examples with a community-oriented focus in Hawai‘i. Insights are presented as 10 practical recommendations, with examples that highlight various methods to tailor public health communication. A summary table is also presented (**Table 1**).

### Recommendations

**1) “It Depends”-Best Communication Strategies Will Vary.** To build engagement, trust, and relevance in public health communication, it is necessary to communicate with individuals and communities in their preferred venues, methods, and languages with recognition of their cultures, histories, concerns, and needs. Implementation is not always obvious and may vary by factors, including location, age, technological access, and culture. Individuals from communities that are being reached should be engaged in designing communication strategies, have leadership roles in information dissemination planning and implementation, and be engaged in the assessment of communication successes and challenges in light of what may be changing context, guidance, and community concerns.

*Example:* FilCom CARES’ dedicated, mostly unpaid volunteers worked to increase awareness through community engagement and outreach during COVID-19. FilCom CARES leveraged the large presence of radio listeners and social media users in the Filipino community by sharing COVID-19 information on a 2-hour radiothon and a Facebook Live with 12 000 engagements. Overall, approximately 800 000 people were reached through FilCom CARES’ outreach efforts.<sup>7,8</sup>

Table 1. Health Equity Health Communication Examples in Hawai'i During the COVID-19 Pandemic			
	Lesson	Highlight Example	Reference
1	"It Depends" - Best Communication Strategies Will Vary	FilCom CARES Various Communication Strategies	<a href="https://www.filcomcares.org/">https://www.filcomcares.org/</a>
2	Build and Leverage Social Capital	Going door-to-door to build trust as model for reaching vulnerable and underserved populations	<a href="https://pubmed.ncbi.nlm.nih.gov/37153114/">https://pubmed.ncbi.nlm.nih.gov/37153114/</a>
3	Engage Influential Figures in the Networks	The Micronesian Ministers and Leaders Uut formed in collaboration with Kōkua Kalihi Valley Comprehensive Family Services	<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8538110/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8538110/</a>
4	Infuse Public Health Norming in Social Media	The Next Gen Hawai'i social media project in collaboration with Hawai'i's Native Hawaiian & Pacific Islander COVID-19 Response, Recovery, and Resilience Team	<a href="https://pubmed.ncbi.nlm.nih.gov/35821668/">https://pubmed.ncbi.nlm.nih.gov/35821668/</a> <a href="https://www.instagram.com/hawaiinextgen/?hl=en">https://www.instagram.com/hawaiinextgen/?hl=en</a>
5	Use Intergenerational Communication Strategies	Our Kuleana, Made with Pashyn	<a href="https://vimeo.com/showcase/8961431">https://vimeo.com/showcase/8961431</a>
6	Amplify and Support Grassroots Communication	The Hawai'i Native Hawaiian Pacific Islander COVID-19 Response, Recovery, and Resilience Team (NHPI 3R Team) framed by Indigenous Pacific based cultural values, protocols, and practices.	<a href="https://www.nhpicovidhawaii.net/">https://www.nhpicovidhawaii.net/</a> <a href="https://pubmed.ncbi.nlm.nih.gov/34704069/">https://pubmed.ncbi.nlm.nih.gov/34704069/</a>
7	Communities Should be at the Table	NH PI Contract Tracers at the Hawai'i Department of Health	<a href="https://www.hawaii.edu/news/2020/12/09/contact-tracers-aid-pi-community/">https://www.hawaii.edu/news/2020/12/09/contact-tracers-aid-pi-community/</a>
8	"Together We Are Stronger"	We Are Oceania's mission and COVID engagement	<a href="https://www.weareoceania.org">https://www.weareoceania.org</a> <a href="https://hawaiicovid19.com/wp-content/uploads/2021/03/COVID-19-Race-Ethnicity-Equity-Report.pdf">https://hawaiicovid19.com/wp-content/uploads/2021/03/COVID-19-Race-Ethnicity-Equity-Report.pdf</a>
9	Invest in Communication for the Future	Community Health Workers activity in the pandemic	<a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8538113/#R18">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8538113/#R18</a>
10	MultiSector Responses Are Needed	Kūpuna Collective's Engagement across sectors to support needs	<a href="https://www.hiphi.org/kupuna/">https://www.hiphi.org/kupuna/</a> <a href="https://www.civilbeat.org/2023/04/how-pandemic-desperation-inspired-an-elderly-innovation-incubator-in-hawaii/">https://www.civilbeat.org/2023/04/how-pandemic-desperation-inspired-an-elderly-innovation-incubator-in-hawaii/</a>

**2) Build and Leverage Social Capital.** The process of building relationships, trust, and social capital requires patience, active listening, and genuine understanding of community needs and aspirations. This entails going beyond short-term fixes and focusing on sustainable solutions that empower individuals, engage families, and foster community resilience. Organizations that adopt this approach invest in the immediate needs of the community as well as long-term development of strengths, trust, and social networks. This builds an opportunity for effective health communication channels for routine matters and public health emergencies.

*Example:* Based on early efforts to utilize volunteers for successful food drives, a dynamic collaboration between Project Vision, Honolulu Bible Church, and Palolo Valley Homes emerged during COVID-19 to increase vaccine information, vaccine distribution, and compliance with public health recommendations.<sup>9</sup>

**3) Engage Influential Figures in the Networks.** It is important to find the right leverage point within networks to share health information. This may vary by circumstance and factors such as culture, location, health condition, and age group — another reason it is essential to know priority communities well. For instance, the World Health Organization highlights the impor-

tance of engaging elders, religious leaders, and other influential community members to achieve a holistic and integrated health communication approach, including health emergency responses.<sup>10</sup>

*Example:* Spurred to action by community need during COVID-19, the Micronesian Ministers and Leaders Uut formed in collaboration with Kōkua Kalihi Valley Comprehensive Family Services.<sup>11</sup> Ministers and elders from Micronesian communities met weekly with other community members and stakeholders. Representatives from legal, educational, medical, and social services were invited to discuss questions with community leaders who would voice their concerns.

**4) Infuse Public Health Norming in Social Media.** Social media has become a critical space for public health information.<sup>12</sup> Social media platforms can provide misinformation but also present opportunities to build engagement and trust by allowing the dissemination of accurate information and promotion of social norm campaigns (eg, making vaccine intent desirable, appealing, and normative) through personalized health communications.<sup>13,14</sup> In a recent study of Hawai'i respondents, aged 18-35 years, the majority (99.7%) used digital or social media to find health information, and NH and Filipino respondents were more likely to use Facebook or Instagram as health informa-

tion sources.<sup>15</sup> Because misleading health information can be deliberately added to the digital information ecosystem, it is critical to build strong social norms around critical appraisal of health information.<sup>16</sup>

*Example:* The Next Gen Hawai‘i social media project aimed to promote accessible and reliable information for NH, PI, and Filipino communities and build social norms for health.<sup>6</sup> The Next Gen project strategically amplified voices of Hawai‘i’s NHs, PIs, and Filipinos by having public health ambassadors share messages, including COVID-19 updates, resources, and general health information in Chuukese, Chamorro, Marshallese, Samoan, Hawaiian, Ilocano, Tagalog, and other Pacific-basin languages. When creating social media content, Next Gen ambassadors emphasized the importance of collective perspectives, personal stories, and relevant historical and experiential contexts.

**5) Use Intergenerational Communication Strategies.** Compared to many other groups in Hawai‘i, NH, PI, and Filipino populations are more likely to live in intergenerational homes.<sup>17</sup> Cross-generational engagement can be leveraged for a strengths-based, trust-building approach in health communication. As noted in a recent study, “*‘Ohana (family) and friends were seen as the medicine for pandemic isolation.*”<sup>18</sup> Respondents in this study referenced ‘ohana when commenting on health care, education, housing, food, and ‘āina (land), which suggests that ‘ohana serves as a backbone connecting these issues.<sup>18</sup> In educational settings, schools were important for health messaging due to health information trickling into the family network and within communities.<sup>19-20</sup> Intergenerational relationships were also a focal strength of the Next Gen Hawai‘i social media project, engaging youth as part of intergenerational family systems.<sup>6</sup>

*Example:* In “Our Kuleana, Made with Pashyn,” presented by Papa Ola Lōkahi, a 30-minute comedy special was hosted by Pashyn Santos, a Hawaiian actress, comedian, and Internet personality who used a humorous, variety show format to build vaccination awareness with an explicit intergenerational aim.<sup>21-22</sup> The special included current and historical facts and was designed for families to enjoy and watch together to support conversations and understanding, including combating misinformation in an engaging and sensitive way.<sup>22</sup>

**6) Amplify and Support Grassroots Communication.** Communities should not be obliged to engage in public health crisis communication because their needs, culture, and language are being ignored. The overall system should address these needs as a core responsibility. Communities should be supported when they engage in grassroots efforts. Many impactful health communication strategies and solutions arise from grassroots organizations. Investing funds in community organizations may reap dividends in trust and engagement. Opportunities to invest in health communication are sustainable and avoid making heavy and unexpected demands on communities in crisis situations.

*Example:* The Hawai‘i Native Hawaiian Pacific Islander COVID-19 Response, Recovery, and Resilience Team (NHPI 3R Team)<sup>23</sup> was formed with Indigenous Pacific core values as the foundation for examining policy, testing, contract tracing, isolation, communications, social supports, resources, data, and research in Hawai‘i.<sup>19</sup> This group created its own health information and amplified the work of many groups and continues to share valuable best practices for related topics, including Medicaid redetermination following the end of the Public Health Emergency.

**7) Communities Should Be at The Table.** Having communities at the table as equal partners throughout the discovery, planning, and implementation of health communications encourages information sharing, trust, and engagement. As articulated with urgency in a COVID-19 commentary: “*The state response must broaden immediately to engage Pacific Island communities as equal partners, provide for truly collective and just approaches to health care and support needs, and channel resources to community organizations and stakeholder groups in a way that allows them to take leadership in COVID prevention and care.*”<sup>24</sup> Not only does this provide a means to engage communities broadly, it also gives community leaders autonomy in decision-making processes and leverages social capital within the community.

*Example:* Due to community demand, the Hawai‘i Department of Health (HDOH) PI and NH outreach and contact tracing team was created with perspectives grounded in NH and PI cultures and implemented by contract tracers from these communities. The team provided culturally appropriate in-person and online educational outreach in native languages for NHs, Chuukese, Kosraeans, Marshallese, Pohnpeians, Samoans, and Tongans and performed contact tracing duties in Samoan, Marshallese, Chuukese, Yapese, and Filipino languages.<sup>25</sup> The group confirmed the importance of engaging in-person strategies to reach and build trust with individuals who were not online due to access or preference. Done with care, the efforts were crucial to reach NH and PI communities with information and access to vaccines, quarantine, resources for basic needs, and other relevant public health communications.

**8) “Together We are Stronger.”**<sup>26</sup> The Marshallese saying *Kakur wot wor* means “We are stronger together”. As shared in a publication, “*Everyone is holding each other up as we try to get through this pandemic.*”<sup>27</sup> Collaboration between government agencies, community organizations, and trusted partners builds cross-sector relationships and trust, which can pivot to address varied public health emergencies. Several collaborations that originally formed in response to COVID-19 now mobilize to address other pertinent community issues, and many have come to see these collaborative organizations as indispensable within their community.

*Example:* The We Are Oceania non-profit organization supported Micronesians during COVID-19 through several grassroots efforts. For instance, in collaboration with HDOH, We Are Oceania provided helplines to assist with health communication. The helplines were facilitated by specialists fluent in Micronesian callers' native languages and helped to answer COVID-19-related questions and provided assistance with applications for access to HDOH isolation facilities.<sup>9</sup>

**9) Invest in Communication for the Future.** Systems-level solutions take time and funds that may not have direct outcomes but can reap long-term rewards, including workforce investments, health literacy, and enhanced relationships. As noted in the article describing effective responses from the Micronesian community, “[*Marshallese Community Organization of Hawai‘i’s*] emphasis on nurturing relationships as friends, not just colleagues, illustrates its cultural values and exemplifies moving past harmful narratives and biases that have perpetuated discrimination.”<sup>11</sup>

*Example:* Community health workers (CHW) engaged deeply in the Hawai‘i COVID-19 response by developing culturally appropriate resource materials and verbally sharing information across many languages.<sup>28</sup> CHWs expanded partnerships and helped community agencies reach and engage communities with adequate COVID-19 health education. A recent publication describes CHWs' unique role as trusted members of communities and organizations: “*They disseminate critical information from federal, state, and local agencies to the communities they serve. The creation of trusting work relationships and partnerships between CHWs and organizations can enhance public health initiatives that necessitate access and trust with communities.*”<sup>28</sup>

**10) Multisectoral Responses Are Needed.** Factors that contribute to health inequalities include poverty, lack of access to health care, structural racism, and historical injustice. Addressing fundamental causes of these inequities with policy and systems change is paramount to achieving lasting health equity. As noted in a recent article: “*Pandemic responses that focus only on the health sector are inadequate to address the multiple factors driving transmission in these communities. Instead, effective responses must be multisectoral, engaging community leaders, social service agencies, and social science researchers from within the community to develop effective communications and service strategies.*”<sup>24</sup>

*Example:* The Kūpuna Collective was formed during COVID-19 as “*a collaborative network of partners who elevate critical issues, mobilize community assets, and drive innovative solutions that support and empower kūpuna (elders).*”<sup>29</sup> This cross-sector collaboration aimed to maximize kūpuna health, independence, and engagement. It fostered richer conversations and ideas across sectors, with diverse perspectives around how to support community needs and fund solutions.<sup>30</sup> At the center was kūpuna agency for providing relevant resolutions across

sectors.<sup>30</sup> Kūpuna are vital parts of communities and have unique strengths and experience to engage in health promotion.<sup>30</sup>

## Conclusions

This article provides 10 recommendations with practical examples for effective health communication to support health equity in Hawai‘i. These examples highlight strategies that also made practical decisions to create circumstances that would make individuals open and able to receive health information. For instance, community testing and vaccination events were mindful of the intricacies of family life. Dinners were provided at events, which often took place after work hours and were intertwined with community entities. Access for multi-linguistic communities also were included, which is critical.<sup>31-32</sup>

The goal for messaging during a crisis is to be first, accurate, credible, and respectful to vulnerable populations, while showing empathy and promoting action.<sup>32</sup> Effective and equitable public health communication, especially amidst the uncertainty of a pandemic or another public health emergency, is a demanding task.<sup>33</sup> Timely communication is critical. Plain language is also crucial to enhance health literacy.<sup>34</sup> This article synthesizes insights and best practices to build on community strengths and inform health communications in Hawai‘i, for other populations in the Pacific, and beyond. These recommendations can be used in conjunction with evidence and guidance in public health communication from local, national, and international perspectives.<sup>35-38</sup>

## Conflict of Interest

None of the authors identify a conflict of interest.

## Disclosures

MT and TS founded Next Gen Hawai‘i in collaboration with and with support from Papa Ola Lōkahi, the NHPI 3R team, Hawai‘i DOH, and the Office of Public Health Studies. KKB and MT are part of the NHPI 3R team.

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# 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  $\geq 200$ . 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 ( $\beta$ ), 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  $\beta$  for unstandardized regression parameter estimates, and “B” or  $\beta$  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.



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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.

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

'āina	Kaua'i	O'ahu
Hawai'i	Lāna'i	'ohana
kūpuna	Mānoa	Wai'anae

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