COVID-19 INFORMATION SEEKING BEHAVIORS OF UNIVERSITY OF HAWAI‘I AT MĀNOA UNDERGRADUATES: INFORMATION CHANNELS, SOURCES, AND CONSUMPTION
Jessica Gasiorek PhD; Amy S. Ebisu Hubbard PhD; Soo Yun Shin PhD

A QUALITATIVE STUDY ON PREVENTING GESTATIONAL DIABETES IN NATIVE HAWAIIAN AND PACIFIC ISLANDER ADOLESCENT FEMALES: PERSPECTIVES FROM AN EXPERT PANEL OF HEALTH CARE PROVIDERS
Sarah A. Stotz PhD, MS, RDN, CDCES; Kelly R. Moore MD, FAAP; Denise Charron-Prochownik PhD, CPNP, FAAN; Andrea Fischl PhD, MPH; Kim Spencer; Marjorie K.L.M. Mau MD, MS, MACP, FRCP

SPOTLIGHT ON NURSING
Transforming the Future of Health Care Today with Interprofessional Education
Lorrie Wong PhD, RN, CHSE-A; Robin Arndt MSW, LSW; Alan R. Katz MD, MPH; Joanne R. Loos PhD; Kamal Masaki MD; Sheri Tokumaru PhamD; Katherine Finn Davis PhD, RN, APRN, CPNP, FAAN

INSIGHTS IN PUBLIC HEALTH
Trends and Patterns of Hepatitis B Associated Deaths in Hawai‘i, 2000 - 2020
Nichole Rahberg MS; Fenfang Li PhD; Risa Goto BS; Thaddeus Pham BS
The aim of the Hawai‘i Journal of Health & Social Welfare is to advance knowledge about health and social welfare, with a focus on the diverse peoples and unique environments of Hawai‘i and the Pacific region.

In 1941, a journal then called The Hawai‘i Medical Journal was founded by the Hawai‘i Medical Association (HMA). The HMA had been incorporated in 1856 under the Hawaiian monarchy. In 2008, a separate journal called the Hawai‘i Journal of Public Health was established by a collaborative effort between the Hawai‘i State Department of Health and the University of Hawai‘i at Mānoa Office of Public Health Studies. In 2012, these two journals merged to form the Hawai‘i Journal of Medicine & Public Health, and this journal continued to be supported by the Hawai‘i State Department of Health and the John A. Burns School of Medicine.

In 2018, the number of partners providing financial backing for the journal expanded, and to reflect this expansion the name of the journal was changed in 2019 to the Hawai‘i Journal of Health & Social Welfare. The lead academic partners are now the six units of the University of Hawai‘i College of Health Sciences and Social Welfare, including the John A. Burns School of Medicine, UH Public Health, the Thompson School of Social Work & Public Health, the Nancy Atmospera-Walch School of Nursing, the UH Cancer Center, and the Daniel K. Inouye College of Pharmacy. Other partners are the Hawai‘i State Department of Health and the UH Office of the Vice Chancellor for Research. The journal is fiscally managed by University Health Partners of Hawai‘i.

The Hawai‘i Journal of Health & Social Welfare is a monthly peer-reviewed journal. Full-text articles are available on PubMed Central. The HJH&SW cannot be held responsible for opinions expressed in papers, discussion, communications, or advertisements. The right is reserved to reject editorial and advertising materials that are submitted. Print subscriptions are available for an annual fee of $250. Please contact the journal for information about subscriptions for locations outside of the US. ©Copyright 2023 by University Health Partners of Hawai‘i (UHP Hawai‘i).

The HJH&SW is financially supported by the academic units within the UH College of Health Sciences and Social Welfare, the UH Office of the Vice Chancellor for Research, the Hawai‘i State Department of Health, and by advertising. However, the journal’s editorial board maintains editorial independence from these entities for the acceptance and publication of research articles. All editorial decisions regarding the selection and editing of research articles are made by the members of the journal’s editorial board. The decisions of the editorial board are not influenced by nor subject to the approval of these entities.

The aim of the columns of the HJH&SW is to provide a space for the entities that financially support the HJH&SW to disseminate information regarding their research, programs, goals, or current issues facing their respective fields. Columns are edited by the HJH&SW contributing editors, who are employees of the agencies that support the HJH&SW.

The aim of the Hawai‘i Journal Watch is to highlight recent research of the entities that financially support the HJH&SW. The research articles that are covered in the Hawai‘i Journal Watch are selected by the HJH&SW and by researchers in the units that support the HJH&SW. The researchers whose articles are covered in the Hawai‘i Journal Watch are given the opportunity to fact check the news brief.

Co-Editors:
S. Kalani Brady MD, MPH
Tonya Lowery St. John PhD, MPH

Editor Emeritus:
Norman Goldstein MD

Associate Editors:
Lance K. Ching PhD, MPH
Kathleen Connolly PhD
Daniel Hu PharmD
Karen Rowan DNP
Ekamol Tantisattamo MD, MPH
Ashley B. Yamanaka PhD, MPH

Copy Editor:
Satoru Izutsu PhD

Assistant Editors:
Gayle J. Early PhD, APRN
Jessica S. Kous MD
Jannet Lee-Jayaram MD
Tricia Mabellos DrPH
Sarah Momilani Marshall PhD, MSW
Stephanie Pyskir MD, MPH
Katie Sherwood MSW
Kara Wong Ramsey MD

Contributing Editors:
Kathleen Connolly PhD, John A. Burns School of Medicine
Sophia Lau PhD, MSW, Thompson School of Social Work & Public Health
Shane Morita MD, PhD, UH Cancer Center
Nichole J. Fukuda MS, Hawai‘i State Department of Health
Jarred Prudencio PharmD, Daniel K. Inouye College of Pharmacy
Holly B. Fontenot PhD, Nancy Atmospera-Walch School of Nursing
Mapuana Antonio DrPH, UH Public Health

Journal Production Editor:
Drake Chinen BA, AAS

Graduate Research Assistant:
Jordan M. Marshall

Executive Leadership Committee:
Clementina D. Ceria-Ulep PhD, RN, Nancy Atmospera-Walch School of Nursing
Jerris R. Hedges MD, MS, MMM, John A. Burns School of Medicine
Loic Le Marchand MD, PhD, UH Cancer Center
Lola H. Irvin ME, Hawai‘i State Department of Health
Velma Kameoka PhD, UH Office of the Vice Chancellor for Research
Miriam A. Mobley Smith PharmD, FASHP, Daniel K. Inouye College of Pharmacy
Tetine L. Sentell PhD, Thompson School of Social Work & Public Health
Eric Hurwitz DC, PhD, UH Public Health

Editorial Board:
Mapuana Antonio DrPH, S. Kalani Brady MD, MPH, Drake Chinen BA
Lance K. Ching PhD, MPH, Kathleen Connolly PhD, Gayle J. Early PhD, APRN
Holly B. Fontenot PhD, Nichole J. Fukuda MS, Daniel Hu PharmD
Satoru Izutsu PhD, Jessica S. Kous MD, Sophia Lau PhD, MSW
Jannet Lee-Jayaram MD, Tonya Lowery St. John PhD, MPH
Tricia Mabellos DrPH, Jordan M. Marshall
Sarah Momilani Marshall PhD, MSW, Shane Morita MD, PhD
Jarred Prudencio PharmD, Stephanie Pyskir MD, MPH, Kristine Qureshi PhD
Karen Rowan DNP, Tetine L. Sentell PhD, Katie Sherwood MSW, Ekamol Tantisattamo MD, MPH, Kara Wong Ramsey MD

Statistical Consulting:
Biostatistics & Data Management Core, JABSOM, University of Hawai‘i (http://biostat.jabsom.hawaii.edu)

Advertising Representative:
Roth Communications; 2040 Alewa Drive, Honolulu, HI 96817
Phone (808) 595-4124

Journal Contact Information:
Mailing Address: Hawai‘i Journal of Health & Social Welfare
95-1027 Ainamakua Dr., #114
Mililani, HI 96789
Website: http://hawaiijournalhealth.org/
Email: hjhsw@hawaii.edu
COVID-19 Information Seeking Behaviors of University of Hawai‘i at Mānoa Undergraduates: Information Channels, Sources, and Consumption

Jessica Gasiorek PhD; Amy S. Ebesu Hubbard PhD; Soo Yun Shin PhD

Abstract

This study explored how undergraduate students at the University of Hawai‘i at Mānoa sought and consumed information about the virus that causes COVID-19. This study also examined student perceptions of the severity of and their susceptibility to the virus and their main concerns about it. Four hundred fifty-six students completed online surveys between October and early December of 2020 and 2021. Students reported low to moderate levels of information seeking across four domains: (1) knowledge about COVID-19 and its symptoms; (2) preventing the spread of the virus; (3) the current state of the pandemic in Hawai‘i; and (4) the likely future of the pandemic in Hawai‘i. Overall, websites, television, and Instagram were the top 3 channels used by students to seek information for these domains. Students reported primarily paying attention to information from government and news organizations as sources. However, students’ preferred channels and sources varied with the type of information they sought. Students also reported believing that COVID-19 is severe and that they are susceptible to being infected with it. The more time students reported seeking information, the greater their perceptions of COVID-19’s severity across all domains. Students’ primary concerns about COVID-19 centered on state regulations/policies, vaccines, tourism/travel, the economy, and pandemic/post-pandemic life. These findings can help public health practitioners in Hawai‘i determine how best to reach an undergraduate student population with information related to COVID-19.

Keywords

University of Hawai‘i, undergraduates, information seeking, communication channel, communication source, COVID-19

Abbreviations and Acronyms

CDC = Centers for Disease Control and Prevention
COVID-19 = SARS-CoV-2, the virus that causes COVID-19
HDOH = Hawai‘i Department of Health
UHM = University of Hawai‘i at Mānoa
WHO = World Health Organization

Introduction

The novelty of both SARS-CoV-2, the virus that causes COVID-19, and the dynamics of a global pandemic has raised many questions, such as how to recognize COVID-19, how to prevent its spread, and what the future holds. Scholarship in health communication suggests that this uncertainty leads people to seek information. This can include reading the news, watching television, searching online, and talking to health professionals, friends, or family. This study investigated information-seeking about COVID-19 by college students at the University of Hawai‘i at Mānoa (UHM). Understanding where these students get their information from is important, as it can help public health practitioners determine how best to reach this population.

According to the State of Hawai‘i’s Department of Health (HDOH), individuals aged 18-29 make up 24% of COVID-19 cases in Hawai‘i, which is greater than their share of the state population. Given this, it is important to understand where (ie, through what channel) and from what sources college students are getting information about COVID-19; how they perceive COVID-19 (ie, its severity and their susceptibility); and to identify their main concerns or questions related to COVID-19. Recognizing that there are different domains of knowledge and perceptions related to COVID-19, this study explored information-seeking behavior in 4 areas: (1) basic knowledge about the virus and symptoms; (2) how to prevent the spread of COVID-19; (3) the current state of the pandemic in Hawai‘i; and (4) the likely future of the pandemic in Hawai‘i.

Specifically, this study examined how often UHM undergraduates sought and consumed information about COVID-19 across these domains; the communication channels they used most often; and the communication sources they paid the most attention to when seeking information about COVID-19. It also investigated UHM undergraduates’ perceptions of the severity of and their vulnerability to COVID-19, and if their perceptions of severity and vulnerability varied with information consumption. Additionally, this study sought to identify the main questions UHM undergraduate students have about COVID-19. Finally, given the evolving nature of the COVID-19 pandemic, it examined whether these information seeking patterns, perceptions, and questions related to COVID-19 changed between fall 2020 and fall 2021.

Methods

During the fall semesters of 2020 and, between October and early December, a convenience sample of 456 undergraduate students at UHM currently living in Hawai‘i completed an online survey about their information seeking behavior related to COVID-19 in exchange for course credit or extra credit. The survey took approximately 15 minutes to complete (Median = 14.5 minutes in 2020, Median = 14.0 minutes in 2021). This study was approved by the University of Hawai‘i Institutional Review Board (#2020-00800).
Instrumentation

**Self-reported information seeking.** Participants were asked to report their perception of how much time in the last week they had spent looking for and consuming (ie, reading, watching, and/or listening to) information about (1) what COVID-19 is and its symptoms, (2) how to prevent the spread of COVID-19, (3) the current state of the COVID-19 pandemic in Hawai’i, and (4) the future of the COVID-19 pandemic in Hawai’i, respectively. Responses were on a 7-point scale (1 = none, 7 = a great deal).

**Information channel.** Participants were asked to select all channels they used to seek information for each topic area. The communication channels provided as answer options were: television, radio, print newspapers, print magazines, telephone, email, text chat and message (eg, SMS, WhatsApp, Line), video chat (eg, Skype, FaceTime, Zoom), face-to-face (in person), website (except social media), Facebook, Instagram, Twitter, YouTube, other, and none. Participants selecting “other” provided their own answers.

**Information source.** Participants were asked to select the information source they paid most attention to when they sought information about the 4 topic areas. The communication source options were: news organizations (local, national, or international), government organizations, the World Health Organization (WHO), specialized organizations covering COVID-19 issues, UHM’s COVID-19 news updates and resources, universities and research institutions other than UHM, colleagues/coworkers, friends, family, professors, medical personnel, politicians, celebrities, social media influencers, other, and none. Participants selecting “other” provided their own answers.

Students also indicated how often they looked at numbers or statistics related to COVID-19 in Hawai’i (eg, number of new cases per day, number of hospitalizations, or positivity rate), with seven ordinal response options (never, once a month or less, several times a month, once a week, several times a week, once a day, and several times a day).

**Susceptibility and severity.** To assess perceptions of COVID-19, students rated their agreement with the statements, “I believe that the COVID-19 is severe” and “It is possible that I may get infected with COVID-19” on a 7-point scale (1 = strongly disagree, 7 = strongly agree).

**Questions and concerns.** To explore their concerns and questions, participants were asked to respond to the open-ended item, “What are the main questions, issues or concerns related to COVID-19 that you are concerned about?”

All items were developed by the authors for this study, guided by previous research on information-seeking. 3-5,8

Data Analysis

IBM SPSS Statistics version 28.0.0.0 (IBM Corporation: Armonk, NY) was used to manage data and conduct statistical analyses (ie, descriptive statistics, correlations, and t-tests) on quantitative data. Data from Likert-type scales were treated as continuous, as is standard practice in social scientific communication research. Open-ended responses on concerns related to COVID-19 were qualitatively analyzed for themes by the first and second authors.

**Results**

Participants were 288 students in 2020 and 168 students in 2021. Their average age was approximately 20 years old (2020: mean (SD) = 19.97 (3.04) and 2021: 20.86 (5.19)), and a majority identified as women (54% in 2020 and 69% in 2021). Most participants reported their ethnicity as White, Filipino, Japanese and/or Chinese; see Table 1 for a detailed breakdown of ethnic identification, as well as complete participant demographics. Across all domains, self-reported information seeking time was higher in 2020 than in 2021 according to independent sample t-tests. Within each year, students reported spending more time seeking information about the current (2020: mean (SD) = 3.35 (1.73) and 2021: 2.96 (1.94) on a 7-point scale) and future state (2020: 3.28 (1.80) and 2021: 2.84 (1.71) on a 7-point scale) of the pandemic than about symptoms (2020: 2.84 (1.58) and 2021: 2.39 (1.43) on a 7-point scale) or prevention (2020: 2.78 (1.61) and 2021: 2.28 (1.40) on a 7-point scale), according to post-hoc tests following a repeated measures analysis of variance for each year. (Data not shown. Detailed statistics for all comparisons reported in this section are available from the authors by request.)

Participants’ reported use of different information channels is presented in Table 2. Across all domains and in both years, websites (excluding social media), television, and Instagram were the most frequently used channels (ranging from 30% to 73%). YouTube was also a relatively frequent channel for information about symptoms and prevention in both 2020 and 2021 (ranging from 24% to 29%); however, YouTube was not used as frequently for information seeking about the present and future state of the pandemic (ranging from 7% to 14%).

The sources participants reported paying most attention to are presented in Table 3. In 2020 and 2021, a plurality of students ranging from 39% to 54% reported paying most attention to government organizations (such as the CDC or HDOH) when seeking information about symptoms and preventing the spread of COVID-19. However, when seeking information about the current state of the pandemic, a plurality of students reported looking to news organizations (local, national, or international). Responses differed between years for information related to the future of the pandemic: in 2020, 2 in 5 students (41%) reported looking most to news organizations, while in 2021, almost 2
in 5 students (38%) reported looking to government organizations. In 2020, a majority of students (53%) reported looking at numbers or statistics related to COVID-19 in Hawai‘i once a week or more. However, in 2021, only 38% reported doing so.

Students reported perceiving COVID-19 to be severe (mean (SD) = 5.68 (1.58) in 2020 and 5.50 (1.57) in 2021) and that they were susceptible to getting infected (mean (SD) = 5.22 (1.70) in 2020 and 5.36 (1.55) in 2021, both on a 7-point scale). These perceptions did not differ between years according to independent sample t-tests. In 2020, there were positive correlations between perceived severity of COVID-19 and amount of time participants reported spending seeking information in the last week about symptoms (Pearson’s r = .227, P < .001), prevention (r = .224, P < .001), current state of the pandemic (r = .261, P < .001), and the future of the pandemic (r = .216, P < .001). There were also positive correlations between participants’ perceived susceptibility to COVID-19 and the amount of time they reported spending seeking information in the last week about the current state (r = .118, P = .046) and future (r = .173, P = .003) of the pandemic in Hawai‘i.

In 2021, there were similar positive correlations between perceived severity of COVID-19 and the amount of time participants reported spending seeking information in the last week about symptoms (r = .234, P < .001), prevention (r = .237, P < .003), current state of the pandemic (r = .251, P = .001), and the future of the pandemic (r = .260, P < .001). However, in 2021, there were no significant correlations between perceived susceptibility and the amount of time participants reported spending seeking information related to COVID-19 in the last week.

### Table 1. UHM Student Participant Demographic Characteristics for 2020 and 2021 Data Collection Periods

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>2020 (N = 288)</th>
<th>2021 (N = 168)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>54%</td>
<td>69%</td>
</tr>
<tr>
<td>Men</td>
<td>44%</td>
<td>29%</td>
</tr>
<tr>
<td>Outside binary or prefer not to answer</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td><strong>Age in Years</strong></td>
<td>19.97 (3.04)</td>
<td>20.86 (5.19)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>36%</td>
<td>40%</td>
</tr>
<tr>
<td>Filipino</td>
<td>29%</td>
<td>23%</td>
</tr>
<tr>
<td>Japanese</td>
<td>27%</td>
<td>27%</td>
</tr>
<tr>
<td>Chinese</td>
<td>23%</td>
<td>24%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>10%</td>
<td>11%</td>
</tr>
<tr>
<td>Korean</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Pacific Islander (non-Hawaiian)</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>2%</td>
<td>6%</td>
</tr>
<tr>
<td>American Indian or Alaska Native</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Other ethnicity</td>
<td>7%</td>
<td>9%</td>
</tr>
<tr>
<td><strong>Class Standing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First year student</td>
<td>44%</td>
<td>35%</td>
</tr>
<tr>
<td>Second year</td>
<td>19%</td>
<td>23%</td>
</tr>
<tr>
<td>Third year</td>
<td>19%</td>
<td>21%</td>
</tr>
<tr>
<td>Fourth year</td>
<td>14%</td>
<td>17%</td>
</tr>
<tr>
<td>Beyond fourth year</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Number of academic majors represented</td>
<td>57</td>
<td>46</td>
</tr>
<tr>
<td>Know someone who contracted Covid-19</td>
<td>73%</td>
<td>82%</td>
</tr>
</tbody>
</table>

Note: Age information is presented as M (SD). Number of academic majors is presented as a frequency (number of majors). In fall 2020, no single major represented more than 8% of the sample; in fall 2021, no single major represented more than 14% of the sample.
A total of 320 students provided questions and concerns about the COVID-19 pandemic. Their responses addressed a range of topics (see Table 4). In both 2020 and 2021, people expressed questions and concerns about the state of Hawai’i’s regulations and policies (e.g., what was and was not allowed). Vaccines were also a frequent topic of interest in both years. In fall 2020, questions focused on the timeline for availability and vaccine safety; in fall 2021, vaccine-related questions also addressed policies and mandates. Across both years, participants expressed concerns about when the pandemic would “end” and what life will look like post-pandemic. A closely related theme was when UHM would be able to return to fully in-person classes and activities. Tourism and concerns about when/whether travel was safe for Hawai’i residents was another common theme; alongside this were also concerns about the state’s economy and job market. Some questions pertained to factual information that is currently available (e.g., number of positive cases of COVID-19); other questions pertained to the unknown information about the COVID-19 virus (e.g., whether there would be more variants in the future). Participants also asked questions about finding quality information and public messaging efforts and expressed concern for the pandemic’s risks to people’s mental and physical health. Finally, in fall 2021, questions about government overreach, as well as general skepticism about the pandemic, emerged as a theme.

Table 2. Information Channels that UHM Students Reported Using to Seek Information by Domain for 2020 and 2021 Data Collection Periods

<table>
<thead>
<tr>
<th>Domain*</th>
<th>Symptoms</th>
<th></th>
<th>Prevention</th>
<th></th>
<th>Current State</th>
<th></th>
<th>Future</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Websites (except social media)</td>
<td>73%</td>
<td>72%</td>
<td>69%</td>
<td>67%</td>
<td>62%</td>
<td>64%</td>
<td>57%</td>
<td>55%</td>
</tr>
<tr>
<td>Television</td>
<td>53%</td>
<td>51%</td>
<td>52%</td>
<td>42%</td>
<td>51%</td>
<td>41%</td>
<td>48%</td>
<td>35%</td>
</tr>
<tr>
<td>Instagram</td>
<td>43%</td>
<td>43%</td>
<td>44%</td>
<td>37%</td>
<td>38%</td>
<td>38%</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>YouTube</td>
<td>24%</td>
<td>29%</td>
<td>26%</td>
<td>24%</td>
<td>14%</td>
<td>7%</td>
<td>14%</td>
<td>11%</td>
</tr>
<tr>
<td>Twitter</td>
<td>24%</td>
<td>19%</td>
<td>16%</td>
<td>14%</td>
<td>12%</td>
<td>13%</td>
<td>12%</td>
<td>8%</td>
</tr>
<tr>
<td>Face-to-face (in person)</td>
<td>19%</td>
<td>30%</td>
<td>16%</td>
<td>22%</td>
<td>13%</td>
<td>24%</td>
<td>13%</td>
<td>15%</td>
</tr>
<tr>
<td>Email</td>
<td>15%</td>
<td>19%</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td>13%</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Text chat and messaging</td>
<td>15%</td>
<td>19%</td>
<td>10%</td>
<td>11%</td>
<td>8%</td>
<td>14%</td>
<td>5%</td>
<td>7%</td>
</tr>
<tr>
<td>Radio</td>
<td>10%</td>
<td>8%</td>
<td>10%</td>
<td>7%</td>
<td>12%</td>
<td>14%</td>
<td>8%</td>
<td>8%</td>
</tr>
<tr>
<td>Facebook</td>
<td>10%</td>
<td>12%</td>
<td>10%</td>
<td>7%</td>
<td>9%</td>
<td>7%</td>
<td>8%</td>
<td>6%</td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
<td>8%</td>
<td>6%</td>
<td>5%</td>
<td>6%</td>
<td>5%</td>
<td>4%</td>
<td>2%</td>
</tr>
<tr>
<td>Print newspapers</td>
<td>8%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
<td>9%</td>
<td>8%</td>
<td>8%</td>
<td>5%</td>
</tr>
<tr>
<td>Video chat</td>
<td>8%</td>
<td>8%</td>
<td>5%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Telephone</td>
<td>7%</td>
<td>10%</td>
<td>4%</td>
<td>6%</td>
<td>4%</td>
<td>5%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Print magazines</td>
<td>3%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>None of these</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>1%</td>
<td>4%</td>
<td>6%</td>
<td>9%</td>
</tr>
</tbody>
</table>

* “Symptoms” refers to what COVID-19 is and its symptoms; “Prevention” refers to how to prevent the spread of COVID-19; “Current State” refers to the current state of the COVID-19 pandemic in Hawai’i; and “Future” refers to the future of the COVID-19 pandemic in Hawai’i.
Table 3. Information Source that UHM Students Reported Paying Most Attention to When Seeking Information by Domain for 2020 and 2021 Data Collection Periods

<table>
<thead>
<tr>
<th>Source</th>
<th>Symptoms</th>
<th>Prevention</th>
<th>Current State</th>
<th>Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government organizations (eg, CDC, HDOH)</td>
<td>40%</td>
<td>41%</td>
<td>39%</td>
<td>54%</td>
</tr>
<tr>
<td>News organizations (local, national, international)</td>
<td>23%</td>
<td>17%</td>
<td>18%</td>
<td>9%</td>
</tr>
<tr>
<td>WHO</td>
<td>15%</td>
<td>13%</td>
<td>16%</td>
<td>11%</td>
</tr>
<tr>
<td>Medical personnel</td>
<td>9%</td>
<td>9%</td>
<td>10%</td>
<td>11%</td>
</tr>
<tr>
<td>Family</td>
<td>5%</td>
<td>10%</td>
<td>4%</td>
<td>5%</td>
</tr>
<tr>
<td>UHM's COVID-19 news updates and resources</td>
<td>3%</td>
<td>7%</td>
<td>3%</td>
<td>5%</td>
</tr>
<tr>
<td>Friends</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Universities and research institutions other than UHM</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Politicians</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Social media influencers</td>
<td>0%</td>
<td>1%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Specialized organizations covering COVID-19 issues</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Professors</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Colleagues/co-workers</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
</tr>
<tr>
<td>Other (fill in below)</td>
<td>0%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>None of these</td>
<td>1%</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Symptoms* refers to what COVID-19 is and its symptoms; *Prevention* refers to how to prevent the spread of COVID-19; *Current State* refers to the current state of the COVID-19 pandemic in Hawai’i; and *Future* refers to the future of the COVID-19 pandemic in Hawai’i.

Table 4. Topics and Percentages of Responses Addressing Topics in UHM Students’ Questions, Issues, and Concerns about COVID-19 for 2020 and 2021 Data Collection Periods

<table>
<thead>
<tr>
<th>Topic</th>
<th>2020</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>State regulations &amp; policies</td>
<td>23%</td>
<td>20%</td>
</tr>
<tr>
<td>Vaccines</td>
<td>21%</td>
<td>16%</td>
</tr>
<tr>
<td>Availability &amp; safety</td>
<td>18%</td>
<td>8%</td>
</tr>
<tr>
<td>Policies &amp; mandates</td>
<td>3%</td>
<td>8%</td>
</tr>
<tr>
<td>Tourism &amp; travel</td>
<td>15%</td>
<td>7%</td>
</tr>
<tr>
<td>Future of the pandemic</td>
<td>13%</td>
<td>24%</td>
</tr>
<tr>
<td>Economy &amp; jobs</td>
<td>10%</td>
<td>5%</td>
</tr>
<tr>
<td>Questions about information currently available</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>Questions about the COVID-19 virus</td>
<td>6%</td>
<td>8%</td>
</tr>
<tr>
<td>Returning to UHM</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Information quality &amp; messaging</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td>Anxiety about risk &amp; health</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Government overreach/skepticism</td>
<td>1%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Note: A total of 320 participants provided valid responses to the open-ended prompt (n = 179 in 2020 and n = 141 in 2021). Thirty participants provided more than one question, issue, or concern. All topics mentioned in a given response were coded, so percentages add up to more than 100%.
Discussion

This study explored how UHM college students sought information related to COVID-19 in 4 domains: (a) knowledge about the virus and symptoms; (b) prevention of the spread of COVID-19; (c) the current state of the pandemic in Hawai‘i; and (d) the likely future of the pandemic in Hawai‘i. It examined and compared survey responses at 2 time points: in fall 2020, which was approximately 7-8 months into the pandemic in Hawai‘i, and fall 2021, which was approximately 19 to 20 months into the pandemic in Hawai‘i. Overall, responses were fairly similar across these 2 time points, with a few exceptions.

Frequency of Information-Seeking

At both time points and in all domains, UHM college students reported low to moderate levels of seeking information related to COVID-19. They consistently reported seeking information about the current state and likely future of COVID-19 in Hawai‘i more frequently than they did information about symptoms and prevention of COVID-19. To the extent that the current and future state of the pandemic are more dynamic, it makes sense that these topics would prompt more active efforts to seek information. It is also notable that students reported seeking information more in fall 2020 than in fall 2021 on all topics, potentially suggesting they may have been acclimating to uncertainty surrounding the virus, were burning out on COVID-19 related news, or believed they have sufficient information.

Channels and Sources

Websites, television, and Instagram were the top 3 channels used by UHM students to seek information about COVID-19, its symptoms, how to prevent it, and the current and future state of the pandemic in Hawai‘i. This suggests that university or public health officials who are interested in reaching college students should make information available via these channels. Of social media outlets, Instagram was by far the most popular, indicating that social media targeting college students should focus on this platform. YouTube was also a relatively popular channel for seeking information related to symptoms and prevention of COVID-19. This suggests that YouTube videos may be a useful way to disseminate more stable, factual information about COVID-19 to college students, but is not necessarily a good means to publicize more dynamic information about its current state. These findings contrast somewhat with COVID-19 related studies of college students in the midwestern US3 (who reported going primarily to official public health-related sources) and the Phillipines8 (who reported mass media, particularly television, as their most preferred channel) in terms of sources of information preferred and sought. The preferences students in Hawai‘i expressed in this study also differ some from those reported in a comparison between information sources used by respondents in nationwide surveys in the US and China, who primarily sought information from television, social media, and news. They also diverged somewhat from information sources used during the SARS epidemic and H1N1 pandemic for Canadians, who looked primarily to traditional mass media (newspaper, television, and radio) for information. This highlights the importance of understanding the local information-seeking preferences of target populations, as they can differ by location and time period.

Overall, UHM students reported primarily paying attention to information about COVID-19 from government and news organizations. Not surprisingly, similar to channel use, students’ preferred sources varied with the type of information they sought. For relatively stable information about symptoms and prevention, a plurality of students looked to government organizations. In contrast, for more dynamic information about the current and future state of the pandemic, a plurality looked to news organizations. This suggests that those seeking to reach college students should consider partnering or working with news and government organizations, for example via press releases with new or important information, as college students report attending to information from these sources.

Perceptions of Severity and Susceptibility

On average, UHM students perceived that COVID-19 was severe, and that they were susceptible to being infected with it. Interestingly, despite the change in availability of vaccines during this time period, from no vaccines available to the general public in 2020 to vaccines being widely available in 2021, subjective ratings of susceptibility did not change significantly from fall 2020 to fall 2021. In fall 2021, 88% of participants reported being fully vaccinated; according to UHM policies for the semester, students taking in-person classes had to be either fully vaccinated or be tested weekly.9

Perceptions of severity were related to self-reported amount of time spent seeking information; the more time students spent seeking information about COVID-19 across all domains, the more severe they believed the virus to be. This finding is consistent with several other studies that have examined perceived severity and information-seeking in this population.10 One possible explanation is that much of the information students are likely to encounter is likely to emphasize the seriousness and severity of COVID-19. It is also possible that students who believe that COVID-19 is severe are more concerned about recognizing symptoms, preventing the spread of the virus, and being aware of the current state of the pandemic, leading to greater information seeking.10

Students’ Concerns about COVID-19

Finally, it appears that students’ primary concerns relate to Hawai‘i’s COVID-19 policies, vaccines (and associated regulations), travel and associated issues of infection risk, the state’s economic recovery, and when and how the pandemic will
change or end. This suggests that that if university officials, public health officials, or other entities that wish to reach college students can address these concerns – or tie other messages they wish to disseminate to these concerns – they are likely to find an interested audience.

Limitations and Future Directions

This study had limitations that should be considered when interpreting its findings. First, it employed a convenience sample of students from a single university (UHM) on O’ahu. Although students came from a variety of majors and backgrounds, these students’ responses may not be generalizable to UHM as a whole, or to students from other colleges or universities in the state (or elsewhere). Students who chose to participate in a study on information seeking related to COVID-19 may also be more interested in issues related to the pandemic than students who did not choose to participate; as such, these results may overestimate the prevalence of information seeking. This study also relied on students’ self-report of their information seeking behaviors, which may not be objectively accurate. Questions about severity and susceptibility also did not assess students’ sense of their own personal risk of serious disease, but rather asked about COVID-19 in general. Individuals’ behaviors are likely to follow their sense of personal risk more closely than an abstracted sense of risk; thus, correlations between severity and information-seeking might have been higher if personal risk were assessed. Further research can focus on other elements of the health belief model14 (eg, perceptions of benefits, barriers, and self-efficacy) to extend this research to adoption of health behaviors. Finally, the COVID-19 pandemic has been a highly dynamic and evolving experience; like much research on this topic, this study can only provide a “snapshot” of behaviors and beliefs at specific points in time. As the local situation changes – for instance, as new variants emerge, or cases surge or decline – so may the information seeking behaviors investigated here.

Conclusion

These limitations notwithstanding, this study provides insights into how college students in the State of Hawai‘i have been seeking information during the COVID-19 pandemic. Its findings suggest that those interested in effectively reaching college students in Hawai‘i should consider disseminating messages via conventional websites, television, and Instagram, and should engage with local government and news organizations to do so. They might also seek to connect their messaging to issues that college students report caring about: vaccines, travel, the state’s economic recovery, and how the pandemic will evolve as Hawai‘i looks to the future.

Conflict of Interest

None of the authors identify any conflict of interest.

Disclosure Statement

Jessica Gasiorek and Amy S. Ebisu Hubbard are faculty in the Communicology program in the School of Communication and Information in the College of Social Sciences at the University of Hawai‘i at Mānoa. Soo Yun Shin was faculty in the Department of Communicology during data collection, but is now faculty at Seoul National University. None of the authors reported any financial disclosure.

Authors’ Affiliations:
- Communicology Program, School of Communication and Information, University of Hawai‘i at Mānoa, Honolulu, HI (JG, ASEH)
- Department of Communication, Seoul National University, Seoul, Republic of Korea (SYS)

Corresponding Author:
Jessica Gasiorek PhD, 2560 Campus Road, George Hall 326, Honolulu, HI 96822; Email: gasiorek@hawaii.edu

References
A Qualitative Study on Preventing Gestational Diabetes in Native Hawaiian and Pacific Islander Adolescent Females: Perspectives from an Expert Panel of Health Care Providers

Sarah A. Stotz PhD, MS, RDN, CDCES; Kelly R. Moore MD, FAAP; Denise Charron-Prochownik PhD, CPNP, FAAN; Andrea Fischl PhD, MPH; Kim Spencer; Marjorie K.L.M. Mau MD, MS, MACP, FRCP

Abstract

The authors examined perspectives of health care providers (HCPs) who serve Native Hawaiian and Pacific Islander (NH/PI) adolescents to inform the adaptation of an existing American Indian and Alaska Native-specific gestational diabetes mellitus (GDM) risk reduction and preconception counseling program entitled Stopping GDM, for NH/PI adolescents. Hawai‘i-based HCPs (n=14) who care for NH/PI adolescent females volunteered for this expert panel focus group study. These HCP participants served as an expert panel specific to their experiences in providing primary care and reproductive health care/family planning, and their perspectives regarding GDM risk reduction for NH adolescents. Several key themes emerged from these expert panel focus groups: (1) importance of multi-generational family involvement and support; (2) need to address the social determinants of health; (3) strengths-based strategies and recommendations to engage adolescents in a preconception counseling and GDM risk-reduction education program. Findings will inform the adaptation of Stopping GDM into a more holistic, multi-level, strengths-based, culturally tailored GDM risk reduction intervention that fosters empowerment and builds on the resilience of NH/PI communities.

Keywords

Native Hawaiian, adolescent health, gestational diabetes mellitus, qualitative

Abbreviations and Acronyms

AI/AN = American Indian and Alaska Native
GDM = gestational diabetes mellitus
HCP = health care providers
NH = Native Hawaiian
NH/PI = Native Hawaiian and Pacific Islander
T2D = type 2 diabetes

Background

Gestational diabetes mellitus (GDM) is the most common medical complication of pregnancy, affecting 7–18% of all US pregnancies.1 Defined as the onset of glucose intolerance during pregnancy, GDM is associated with significant lifelong health risks for both mother and offspring. During pregnancy, mothers are at increased risk for maternal hypertensive disorders such as pre-eclampsia, and risks to the baby include macrosomia, birth injury, and metabolic disturbances. In addition, GDM increases the likelihood for both mother and baby of developing overt type 2 diabetes (T2D) during their lifetimes.1 Risk factors for GDM include high pre-pregnancy weight, obesity, weight gain in young adulthood, a history of GDM or hypertension, and a family history of T2D.1 Race is also a risk factor for GDM, with a higher prevalence of GDM among Native Hawaiians and Pacific Islanders (NH/PI) than their White counterparts, and subsequently higher rates of pregnancy-related complications among NH/PI.2 In a study examining pregnancy outcomes in Hawai‘i, GDM was diagnosed in 12.1% of NH/PI women versus 7.4% among White women.3 Despite this increased risk, few evidence-based interventions target GDM risk reduction among Native Hawaiian (NH) adolescents. Raising awareness and receiving preconception counseling early in life to reduce risk for GDM, by adopting a healthy lifestyle and maintaining a healthy weight prior to a woman’s first pregnancy, could help to prevent GDM and help break the intergenerational cycle of diabetes in NH families and communities.4 Researchers at the University of Pittsburgh developed the American Diabetes Association-endorsed preconception counseling program, READY-Girls, which is a validated preconception counseling program originally developed for White adolescents with type 1 diabetes.5–6 READY-Girls has since been adapted to include girls with T2D and made culturally relevant for other ethnic and racial groups.7–9 For each culturally-tailored version, it was imperative to obtain scientific knowledge and clinical experience on adolescent health and diabetes complication prevention from an expert panel of health care providers (HCP) who care for that particular cultural population.10 Panels of HCP experts representing perspectives on type 1 and 2 diabetes, adolescents, preconception counseling, and reproductive health were convened: 1 focus group for Latina adolescents (n=8),7 and another focus group for African American adolescents (n=9).10

Supported by this cultural adaptation experience and the literature, READY-Girls’ developers understood the importance of culturally adapting this program as essential to the program’s acceptability by a new priority community, preventing GDM among American Indians.11 Thus, the READY-Girls researchers sought similar expert advice from HCPs (n=16) who care for American Indian adolescents at risk for GDM.12 These HCP focus groups contributed to the development of Stopping GDM,13 a culturally based GDM risk reduction program for American Indian adolescents, modeled after READY-Girls. A key difference between READY-Girls and Stopping GDM is that the latter focuses on American Indian adolescents.
who do not have pre-existing diabetes but are at increased risk for GDM while READY-Girls is designed specifically for adolescent girls with existing type 1 and 2 diabetes. This approach, of seeking input from the HCPs who provide care for the priority community, has shown to provide valuable information on the facilitators and barriers to adopting recommended health behaviors and improves HCP engagement. As informed by the aforementioned HCP needs assessments, and as a first step in culturally adapting Stopping GDM for NH/PI adolescent females at risk for GDM, the purpose of this study was to summarize scientific knowledge and clinical experience from a HCP expert panel who serve NH/PI adolescents with elevated GDM risk.

Methods

Theoretical Framework

This study was guided by the Theoretical Framework of Healthcare Intervention Acceptability, which supports the importance of exploring the attitudes/perceptions of key persons to preemptively assess how healthcare interventions may or may not work within any given community. Constructs from the Theoretical Framework of Healthcare Intervention Acceptability were used to frame the moderator guide and analysis.

Study Procedure

The research team conducted remote teleconference focus group interviews with HCPs who live in Hawai‘i and who care for NH/PI adolescent females. Focus groups were conducted via teleconference using Zoom 2021 (Zoom Video Communications, San Jose, CA) in April and May 2020 and all were moderated by the first author of this paper. A total of 14 HCPs participated in these focus groups. There were 6 focus groups in all, with 2-3 participants in each group, and the mean length of the focus groups was 59.8 minutes (range = 46-76 minutes). Researchers used a semi-structured moderator guide with probes to facilitate the focus groups. The moderator guide was developed in collaboration with NH HCPs including 2 co-authors on this manuscript and can be found in Table 1. All participants were invited to complete an online questionnaire in Qualtrics 2020 (Qualtrics, Provo, UT) prior to their focus group interview to collect demographic information. Institutional review board approval was secured from the University of Pittsburgh Institutional Review Board (MOD20020029-001) prior to human subjects research commencing, and the protocol was determined exempt, so an information sheet was used in lieu of a signed informed consent document.

The focus group sample included 14 HCPs who have an active clinical practice in Hawai‘i and who serve predominantly NH/PI patients. Researchers began recruitment using convenience sampling methods, and augmented this method with both snowball and purposive maximum variation sampling to ensure they recruited a variety of HCPs. The first round of recruitment (convenience sampling) included personal email invitations and word-of-mouth based on the networks of 2 co-authors. The individuals then provided recommendations for additional relevant HCP interviewees. This diverse mixture of HCPs included physicians (eg, OB/GYN, pediatricians), nurses, dietitians, and diabetes educators from a variety of settings including federally qualified health care centers and large inpatient hospitals. Further details on the HCPs can be found in Table 2. Of note, only 13 HCPs completed the survey but 14 participated in the focus group interviews.

Data Analysis

All focus group interviews were recorded and transcribed verbatim by a professional transcription company. Transcriptions were reviewed for accuracy by a NH physician scientist and the first author who has doctorate-level training and expertise in qualitative methods. Transcriptions were de-identified using pseudonyms prior to analysis. Two researchers, both of whom have extensive training in qualitative data collection and analysis, independently coded all transcripts. The researchers developed

| Table 1. Moderator Guide Questions and Probes used for Semi-structured Focus Groups |
|--------------------------------------|--------------------------------------|
| **Moderator Guide Question** | **Probes** |
| Tell me about your role in caring for Native Hawaiian teenage girls. | length of time, type of provider, setting |
| Tell me about any experience you have talking about gestational diabetes with Native Hawaiian teenage girls. | weight management, nutrition, risk/susceptibility |
| What is it like to find education materials and resources that are meaningful and tailored for your Native Hawaiian patients? | challenges with culturally relevant, favorite resources (and why), how resources are adapted |
| Tell me about any successful wellness or health programs you’ve seen well attended by Native Hawaiian teenage girls. | topic of program, recruitment, logistics, best-practices |
| Sometimes it’s hard to get the word out to people in the community about new programs or research opportunities. What do you think is the best way to get the word out and engagement with health or research programs? | social media, word of mouth, incentives, peer champions |
| What resources would help you as a provider regarding GDM risk reduction, preconception counseling, reproductive/sexual health and/or family planning with your Native Hawaiian patients? | time, materials, ancillary staff support |
a codebook using Atlas.ti software Mac Version 8.1.1 (Scientific Software Development GmbH, Berlin, Germany) to digitize the coding process and met (via Zoom) bi-monthly to discuss codes, categories, representative quotations, and overarching themes using the constant-comparison method for qualitative data analysis. The first codebook included deductive codes (a priori) as informed by the moderator guide, research questions, published literature, and theoretical framework. After analyzing the first 2 transcripts independently with the deductive codebook, the same 2 researchers who coded added definitions of new inductive codes and did a second round of coding on the same first 2 transcripts by adding inductive codes (ie, transcripts were independently double-coded). After coding of all transcripts was complete, researchers met to collapse redundant codes (eg, codes “family history T2D” and “genetic diabetes” were collapsed to reduce redundancy to “GDM risk-family history”). Codes were next grouped into categories, for example “influences on food at home” and “multigenerational” were grouped together with “family” as the root category. From these categories, the key themes were constructed in collaboration with all authors on this manuscript. The research team calculated descriptive statistics to summarize the responses from the self-administered surveys using Microsoft Excel for Office 365 version 2019 (Microsoft Corp., Redmond, WA). Of note, only 13 of the 14 HCP participants completed the survey (Table 2).

### Results

More than 60% of the participants (n=8) were HCPs who had been in practice for more than a decade (11-20+ years). Slightly more than half of the HCPs (n=7) care primarily for a NH patient population (more than 50-75% of patients are NH/PIs). The racial breakdown of the respondents reflects the multi-racial demographics of Hawai‘i, with almost half (46%) (n=6) of this sample identified as NH themselves. Findings from this qualitative analysis reveal 3 major themes as detailed next.

#### Theme 1: Immediate and extended family (eg, siblings, aunts/uncles, grandparents) should be involved and supportive of making healthy lifestyle behavior changes to increase the likelihood the intervention would have positive behavioral impact. Participants shared the importance of including their immediate and extended family to support healthy behaviors among adolescents. They emphasized the expansive diversity of NH families and how family is often defined as broader than the western concept of a nuclear family. One participant shared:

And a lot of times they live in a big, extended family with not just mom and dad but maybe grandma, grandpa, brother, sisters in their families, too. So I think having the message that this is a good thing for everybody and not just for you, so that everybody’s... focused on being supportive or trying to make some changes.

Many participants pointed out that most adolescents do not make the household decisions, such as what foods to purchase or what meals to prepare. But participants explained that even beyond these pragmatic considerations, ‘ohana, or family, is central to NH culture and is a powerful influence on values and behavior. Participants also suggested beyond extended family, wider community support (eg, schools, neighborhoods, community organizations) should be solicited to better support the adolescent girls’ healthy behavior choices.

### Table 2. Characteristics of Health Care Providers Who Participated in Focus Groups (n=13)

<table>
<thead>
<tr>
<th>Demographic Survey Responses n (%)</th>
<th>Age (in years)</th>
<th>Gender</th>
<th>Race*</th>
<th>Professional Degree</th>
<th>Years in Practice</th>
<th>Percentage of Patients who are NH/PI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (in years)</td>
<td>n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31-40</td>
<td>4 (31)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>6 (46)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-60</td>
<td>2 (15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61 and older</td>
<td>1 (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>n (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>13 (100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>2 (15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>5 (38)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filipino</td>
<td>2 (15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian</td>
<td>1 (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japanese</td>
<td>5 (38)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korean</td>
<td>1 (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native Hawaiian</td>
<td>6 (46)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portuguese</td>
<td>3 (23)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Degree</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD</td>
<td>9 (69)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RN</td>
<td>2 (15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RDN</td>
<td>2 (15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years in Practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-5</td>
<td>4 (31)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-10</td>
<td>1 (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-15</td>
<td>3 (23)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-20</td>
<td>3 (23)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 20</td>
<td>2 (15)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of Patients who are NH/PI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 25%</td>
<td>1 (8)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-50%</td>
<td>5 (38)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-75%</td>
<td>7 (54)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 75%</td>
<td>0 (0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Adds up to more than 100% because participants were allowed to identify more than one
Theme 2: Interventions need to directly seek ways to improve the social determinants of health linked to healthful nutrition and physical activity (e.g., food insecurity, access to healthful food, and neighborhood safety for safe physical activity). Beyond individual behavior change and individual/family-level education, almost all HCP participants mentioned influences of health at the community and environmental level. Most HCPs were familiar with the concepts of social determinants of health and used this language in their responses to moderator guided questions related to their experiences with NH girls and healthy weight management. Participants discussed lack of access to healthful foods and safe places to engage in physical activity as part of the built environment, a particularly daunting barrier to healthful behavior – especially in contrast to the more well-off communities in Hawai’i. One HCP who was NH herself shared:

I feel like Hawai’i is a perfect example of your social determinants of health. (…) People are outdoors, you can go to certain neighborhoods and there will be gyms, there will be sidewalks, parks, there will be really beautiful outdoor spaces, there will be clean beaches (…) you’re always going to see people jogging outside, or doing yoga out in the park and everything. So there are certain neighborhoods that are going to be like that and they have Whole Foods and they have farmers market[s] and they have healthy food choices and then there are other neighborhoods where you don’t have any of that. You don’t have sidewalks (…) not a lot of parks, gorgeous beaches but some of them aren’t really the safest places to be. Then you’ve got the 7-Elevens and the liquor stores going all along that stretch of highway. (…) I mean every block will have one, there’ll be a mini market kind of thing. So I think for young people, it just depends on where you’re growing up also, where you are.

Participants emphasized that individual or family-based education will only go so far to lead to behavior change when seemingly unsurmountable barriers such as lack of physical or financial resources exist.

Theme 3: Successful programs by-design need to integrate culturally relevant and strengths-based engagement strategies specific to NH adolescents and their families. This includes, for example, verbal education and communication opposed to written materials, and healthy eating education based on traditional Native Hawaiian foods. As prompted by the moderator guide questions which focused on strategies to engage this priority audience in health education, health care, and research, participants shared their own experiences with challenges and facilitators to program engagement. First, they discussed methods of providing education and suggested written information may not resonate culturally with the priority audience. One HCP shared:

Traditionally, Hawaiians have been very verbal in terms of their communication. Originally Hawaiian was not a written language… A lot of us in the community, we really [honor] the value of a Talk Story Session where you sit down and chat with someone…that might be a more effective way of having some sort of communication, face-to-face. Whether it’s on the phone or in person, rather than just passively reading a written pamphlet.

HCPs suggested that culturally tailoring health education programs, specifically those involving something as personal as food preference, needs to consider what life is truly like at home and what foods are typically consumed. One participant shared:

I feel like an obstacle is the obesity problem here and trying to get them to switch to foods that are for their diabetes but yet still being culturally sensitive to what their habits are. So I’ve seen dietitians tell patients well, how about quinoa, have you tried that? And they’re like “well, I don’t eat quinoa. She doesn’t understand what my life is like.”

This participant continued to share how healthy traditional foods should be emphasized:

I mentioned some earlier projects that promote working the land and growing and eating kalo. That’s our staple food, traditionally. A lot of my patients would love to eat more of that rather than the rice in the plate lunch, but it’s becoming more scarce. It’s really expensive nowadays. It’s not really something that you can grow in your backyard, especially for someone that doesn’t have a yard, who lives in housing or whatnot. But back in the day, our diet was just plants and even fish was eaten on rare occasions. Meat was eaten on even more rare occasions and culturally and traditionally, way back in the day, pre-contact, our diet consisted mainly of plants.

Further expanding on how to engage adolescents, participants discussed use of social media both for recruitment, preconception counseling, and health education. They recommended leveraging communication platforms and technology that are popular with adolescent girls. Participants recognized how quickly social media changes, and that right now, video technology, including TikTok, is very popular among adolescents. Participants shared that some HCPs have capitalized on this trend for their own health education messages.

Finally, participants emphasized the importance of including family and community to recruit, retain, and engage adolescent females. Participants suggested recruitment should focus on the mothers and grandmothers of at-risk for GDM adolescent females. In particular, mothers and grandmothers who had previous personal experience with living with GDM or T2D, would be especially effective. They suggested that adolescents often don’t consider themselves at risk for future diseases or health problems, but may be more motivated if their own adult female family member personalizes this risk. Participants also said that adolescent girls would be motivated to hear that they can reduce the risk of diabetes in their whole community, by decreasing their own risk of GDM. This concept could empower girls to feel a sense of responsibility and connection to the future of their wider community. One participant shared:

…Having the whole family be involved in something (…) it’s about the wellbeing of the whole community and the health of the community and the future of their own lineage and legacy and such.
Discussion

These themes can serve as a first step in guiding cultural tailoring of a GDM risk reduction and preconception counseling program for NH adolescents. Seeking the opinions of HCPs who serve members of the priority audience is an important step in developing healthcare-based education programs. Other studies have used the same strategy and included HCPs who care for the priority audience. Examples include studies focusing on Latina adolescents,\textsuperscript{7} African American adolescents,\textsuperscript{10} American Indian adolescents,\textsuperscript{12} pregnant women with GDM who experience low income,\textsuperscript{14} and children for outdoor physical activity “prescriptions.”\textsuperscript{22} The Theoretical Framework of Healthcare Intervention Acceptability suggests healthcare interventions should be informed by multiple key stakeholders, including HCPs, across design, evaluation, and implementation phases.\textsuperscript{16}

Based on the demographics of the respondents, the authors feel confident the HCPs included in this sample have professional expertise in serving NH/PI patients and, in many cases, personal cultural context expertise as a NH person.

The key themes which emerged from these findings are distinct yet interwoven, and theoretically supported. The first theme focuses on the importance of including extended family to support making healthy lifestyle behavior changes and ties in with the third theme of strategies to increase recruitment and engagement. The Expanded Health Belief Model, which supports READY-Girls\textsuperscript{23} and Stopping GDM,\textsuperscript{11} suggests that increasing perceived risk is a key factor in promoting behavior change.\textsuperscript{24} By including adult females who may have personal experience with GDM or T2D during their pregnancy, perceived risk may be elevated and better leveraged to increase engagement.\textsuperscript{24} In addition, participants suggested for an effective GDM risk reduction program, educators should be adult NH/PI women, from the same communities as the adolescents, who have had personal experience with GDM. Further, as supported by the literature, cultural tailoring of health education programs can increase engagement and facilitate knowledge more easily translated into behavior change. This is especially true with communities who are family-centric, Indigenous, and for interventions focusing on minors.\textsuperscript{25–27} Minors do not have the same sovereignty over their food choices as they are traditionally not the primary food purchasers, and parental role models are exceedingly important in modeling healthy food and nutrition choices.\textsuperscript{28} Participants in this study stressed how important it is to consider family beyond a western concept of a nuclear family and articulated that the frequency of multi-generational families living together, or in close proximity, is very common in NH/PI culture. This future NH/PI-focused GDM risk reduction program will consider the application of the Ancestral Knowledge System conceptual framework, which values and focuses on family and community and storytelling as a keyway of knowing.\textsuperscript{29} Participants in this study highlighted concepts from the Ancestral Knowledge System as important elements for recruitment, retention, engagement, and cultural-relevance of an effective and sustainable GDM risk reduction intervention program.

These HCPs also emphasized the impact of social determinants of health as they pertain to the community and environment in which these adolescent females live. They focused on the need to actively address social determinants of health associated with GDM risk reduction such as food insecurity and neighborhood safety for physical activity. Social determinants influence the ability to access healthful food for weight management\textsuperscript{10} and the health of a pregnancy.\textsuperscript{14,31} Food insecurity has been shown to increase risk for GDM\textsuperscript{26} and lack of access to safe outdoor spaces is detrimental impacts on children’s physical activity levels.\textsuperscript{33} Participants especially highlighted the vast disparity between the wealthy and low-income communities and emphasized that Hawai‘i may be the “perfect example of social determinants of health” – given the remarkable differences in access to healthful food and beautiful natural spaces for physical activity (eg, beaches) in wealthy communities vs. the food deserts, and lack of a built environment that supports healthy behavior in lower income communities. Participants shared the importance of considering environmental and community-level barriers to healthful GDM risk reduction behaviors, and again, the importance of including the wider community in a comprehensive GDM risk reduction program to support the NH adolescent females. Similarly, American Indian-serving HCPs (n=16) also noted the importance of considering the socioeconomic context when considering GDM risk reduction programs for AI/AN adolescent females at disparate risk for GDM. They suggested such a program needs to consider economic and social factors as well as trauma that may impact the lives of the priority audience.\textsuperscript{12}

Finally, participants suggested culturally relevant and strengths-based approaches to health promotion are particularly important to ensure engagement among the priority audience of NH adolescents and their families. As supported by the literature and specific to diabetes prevention and health promotion among Indigenous communities, a strengths-based approach assumes solutions to health disparities often lie within the community and privileges the power and wisdom of the community to identify feasible and appropriate solutions.\textsuperscript{34} Participants in this study provided examples of how traditional food and physical activity are healthful cultural strengths of NH/PI communities.

Expert panels are an important component when developing culturally relevant healthcare programs. The sample of HCPs in this focus group (n=14) was similar in size to in previous HCP needs assessment studies on the topic of diabetes and adolescent reproductive health.\textsuperscript{7,10,12} Qualitative literature suggests that adequate sample sizes for interview-based qualitative studies vary widely.\textsuperscript{35} Because of redundant occurring codes and categories with the last several interviews, the authors feel confident that saturation was reached with this sample. A key strength is that almost half (46\%) of the participants were themselves NH and
thus provided an insider’s perspective of the myriad of social determinants that exist among any NH communities. A study limitation is that no social worker or case manager profession- als were interviewed and given that 1 key theme focused on social determinants of health, these professionals may have had unique perspectives to expand on this topic.

The themes presented in this paper will guide the next steps in culturally adapting and expanding an existing GDM risk reduction program, Stopping GDM, for another US-based Indigenous population, Native Hawaiians and Pacific Islanders. These themes will guide qualitative interview questions for subsequent needs assessment interviews with additional stakeholders such as NH/PI women with history of GDM, NH/PI adolescent girls at risk for GDM, their adult caregivers, and other multi-level key shareholders related to social determinants of health (eg, food retail leadership). Together, cross cutting themes from all aforementioned key informants will inform the cultural adaptation of Stopping GDM for the unique needs of NH/PI adolescent females. Like Stopping GDM, the newly adapted program for Native Hawaiians will be offered at no cost after program evaluation.

Conflict of Interest
None of the authors identify a conflict of interest.

Disclosure Statement
Dr. Moore was a paid consultant for Novo Nordisk, Inc, in 2021.

Acknowledgements
The project described was supported by the National Institutes of Health through Grant Number UL1TR001857 (PI: Charron-Prochownik). We thank our participants for their time and insight and Dr. Jane Kadahiro for her assistance with recruitment.

Authors’ Affiliations:
- Centers for American Indian and Alaska Native Health, Colorado School of Public Health, University of Colorado Anschutz Medical Campus, Aurora, CO (SAS, KRM)
- Department of Health Promotion and Development, School of Nursing, University of Pittsburgh, Pittsburgh, PA (AF, DC-P)

Corresponding Author:
Sarah A. Stotz PhD, MS, RDN, CDCESS; Email: Sarah.stotz@cuanschutz.edu

References
Spotlight on Nursing

Transforming the Future of Health Care Today with Interprofessional Education

Lorrie Wong PhD, RN, CHSE-A; Robin Arndt MSW, LSW; Alan R. Katz MD, MPH; Joanne R. Loos PhD; Kamal Masaki MD; Sheri Tokumaru PharmD; Katherine Finn Davis PhD, RN, APRN, CPNP, FAAN

Surfing the HIPE Line is a recurring column produced by the HIPE working group. The column will rotate among the Nancy Atmospera-Walch School of Nursing (NAWSON), the John A. Burns School of Medicine (JABSOM), the Office of Public Health Studies, the Myron B. Thompson School of Social Work, and the Daniel K. Inouye College of Pharmacy.

Acronyms

CHS = University of Hawai‘i Council of Health Sciences
HIPE = Hawai‘i Interprofessional Education workgroup
HMSA = Hawai‘i Medical Service Association
HPAC = Health Professional Accreditors Collaborative
IPE = Interprofessional Education
IPEC = Interprofessional Education Collaborative
JABSOM = John A. Burns School of Medicine
NAWSON = Nancy Atmospera-Walch School of Nursing
UHM = University of Hawai‘i at Mānoa

It is imperative for health care professionals from various fields to work together to advance the health of patients and populations. The formation of collaborative practice teams “is a key step in moving health systems from fragmentation to a position of strength (p. 10).” ¹ Therefore, health care educators have been charged with implementing interprofessional education (IPE) and practice into their curriculum. Competency in IPE is a requirement for nearly all health professional students endorsed by Health Professional Accreditors Collaborative (HPAC) and supported by accrediting bodies.²

The Foundation

In 2014, answering the call for IPE, the leadership of the University of Hawai‘i Council of Health Sciences (CHS) indicated interest in actively expanding cross-school collaboration. At the time, faculty and students within the health-related schools engaged informally and/or for limited projects. The Deans/Directors of the CHS strongly supported more collaborative efforts for IPE to grow as a priority. They designated a workgroup of 12 faculty members, which included faculty from University of Hawai‘i at Mānoa Nancy Atmospera-Walch School of Nursing (NAWSON), the UHM John A. Burns School of Medicine (JABSOM), the UHM Office of Public Health Studies, the UHM Thompson School of Social Work & Public Health, and University of Hawai‘i at Hilo Daniel K. Inouye College of Pharmacy. This workgroup was named the Hawai‘i Interprofessional Education workgroup (HIPE).

HIPE’s mission was to prepare all health professional students to collaborate in providing a safe, effective, and sustainable patient/consumer-centered and community/population-oriented health care system. Achieving this mission meant designing curriculum to help students achieve core competencies set forth by the Josiah Macy Foundation (2011) and the Interprofessional Education Collaborative (IPEC).³ The 4 competency domains included: (1) values and ethics, (2) roles, responsibilities, and leadership within the interprofessional team, (3) interprofessional communications, and (4) interprofessional teamwork and team-based care. The competencies were updated in 2016,⁴ and HIPE evolved to incorporate those updates.

Defining IPE

What IPE is: IPE “occurs when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes (p. 10).” ¹¹ IPE prepares students for interprofessional collaborative practice, where health professionals work together to effectively deliver patient-centered care and improve population health in an affordable and efficient manner, resulting in stronger health systems and improved outcomes.¹

What IPE is not: The act of learning to communicate with other professions alone does not encompass IPE. The following list encompasses common acts associated with professional education,⁶ but each of these items on their own does not qualify as IPE:
Simply sharing electronic health records;
• Working in sole profession teams;
• Hearing a talk about another profession;
• Reporting at interdisciplinary meetings;
• Co-location without intentional collaboration;
• Decision-making without client/patient input.

Through the Years

HIPE has evolved since its inception and is now implementing clinical training experiences, simulation exercises, and online training for all health profession learners, including residents and students. HIPE has administered several continuing education sessions and produced a curriculum integration plan with a listing of IPE activities. All HIPE activities incorporate pre- and post-test assessments to support continuous quality improvement.

Prior to 2020, limited funds were available to support IPE efforts, with the majority of work performed as volunteer efforts by faculty and staff. In 2021, recognizing the essential nature of IPE, the Hawai’i Medical Service Association (HMSA) Foundation awarded $1 million to the UHM NAWSION to build an infrastructure to support statewide expansion and establish an endowed HMSA Distinguished Professorship for IPE. This grant recognizes past successes and supports future development of IPE. Under the leadership of the endowed HMSA Distinguished Professor, Dr. Lorrie Wong (NAWSION), HIPE has begun to utilize the 5-year gift to advance initiatives and to develop an IPE infrastructure that supports and coordinates innovative experiential team-based learning experiences.

The number of students participating in HIPE activities has grown exponentially over time. Table 1 summarizes the impact of HIPE from academic year (AY) 2017-2018 to AY 2021-2022 with numbers of IPE simulation sessions, student encounters, and professions represented.

### Table 1. Hawai’i Interprofessional Education Impact Over Past 5 Years

<table>
<thead>
<tr>
<th>Activity</th>
<th>Academic Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPE Simulation Sessions</td>
<td>54</td>
</tr>
<tr>
<td>Student Encounters</td>
<td>621</td>
</tr>
<tr>
<td>Professions Represented</td>
<td>10</td>
</tr>
</tbody>
</table>

Moving Forward

During the Coronavirus-19 (COVID-19) pandemic, HIPE adapted to evolving COVID-19 protocols by providing online IPE simulations. During this period, telehealth rose to the forefront as a priority initiative for health care providers, students, and community members. In AY 2020-2021, HIPE partnered with the Hawai’i Department of Health Telegenetics and the Pacific Basin Telehealth Resource Center to produce Telehealth Interprofessional Education online educational modules. Faculty from UHM Schools of Social Work, Public Health, Nursing, and Athletic Training, along with University of Hawai’i at Hilo College of Pharmacy, provided individual modules on telehealth concepts, practical applications, and legal and ethical implications unique to their professions.

Looking ahead, HIPE plans to accomplish several initiatives over the next several years:

- Incorporate (1) trauma-informed care, (2) palliative care/hospice, (3) child/youth events, and (4) geriatric events into its yearly activities; and (5) continue exploring opportunities for clinical practicum IPE sites.
- Develop a statewide network of IPE partners that coordinates innovative experiential learning supporting the team-based practice model to improve health outcomes for the state, recognizing that additional funding will be required.
- Update the HIPE strategic action plan to support the directions and initiatives of the State of Hawai’i, the HPAC, and IPEC.
- Explore legislative opportunities to develop a funding stream to support a statewide infrastructure for IPE through a fee from practicing clinicians.
- Continue to focus on the development of IPE clinical collaborative practice activities.

Conclusion

With continued university and community funding and support, HIPE has provided substantial IPE for health care providers and students to develop interprofessional collaboration skills and optimize the care of patients and health care status of our community. Continuous quality improvement efforts allow HIPE to meet the needs of the ever-changing health care environment, address population health issues, incorporate technological advances, and reflect evolving professional and educational standards. Future work could include broadening IPE to include synergistic professions such as law, engineering, and computer and environmental science to help prepare our health care workforce to be exceptionally equipped to take on the evolving challenges of tomorrow.
References


6. Mills DA. Designing Effective Learning Experiences. Presented at: Interprofessional Education Collaborative Fall 2015 Interprofessional Education Institute; October 8, 2015; Herndon, VA.
**Introduction**

Every 10 years the US Department of Health and Human Services’ (HHS) Office of Disease Prevention and Health Promotion updates Healthy People, a national public health initiative that sets measurable priorities based on feedback from subject matter experts, health organizations, and the public. For Healthy People 2030, there are 3 objectives related to the hepatitis B virus (HBV):

- Reduce the rate of acute hepatitis B infections
- Increase the proportion of people who know they have chronic hepatitis B
- Reduce the rate of deaths with hepatitis B as a cause
  - Target: 0.16 deaths with hepatitis B as the underlying or contributing cause of death per 100 000 population (age adjusted to the year 2000 standard population)

HBV infections are a public health concern because they can lead to liver cirrhosis, fibrosis, cancer, and death. HBV infections disproportionately affect people who inject drugs, Asian and Pacific Islanders (APIs), and non-Hispanic Blacks, making these infections a health equity concern. In the US, Asian Americans account for more than 50% of HBV infection cases, even though they make up only 6% of the population. This is partly due to approximately 70% of Asian Americans identifying as immigrants born outside of the US, mostly from countries in Asia with moderate to high HBV infection prevalence. There is high prevalence among Pacific Islanders in the US as well. Additionally, some children born in the US to immigrant parents may not have received an HBV vaccine at birth. More than half of the residents in the state of Hawai‘i identified as Asian or Pacific Islander descent in the 2020 Census.

A cross-sectional study of API uninsured patients born outside the US conducted at a large federally qualified health center in Honolulu found the prevalence of chronic HBV infection to be 5.7% as compared to the national hepatitis B prevalence of 4.3%. Incidence rates of acute HBV infection have steadily declined over the last 10 years in Hawai‘i with a 43.2% reduction in rates between the periods of 2010-2014 (0.37 per 100 000 population) and 2015-2019 (0.21 per 100 000 population).

Overall, the current surveillance infrastructure limits the Hawai‘i State Department of Health’s (HDOH’s) ability to determine incidence, prevalence, and mortality rates related to HBV infection. This poses a significant public health issue in terms of appropriate resource allocation and program development to address this preventable disease. Limited surveillance of chronic HBV is a national concern because estimates from the Centers for Disease Control and Prevention (CDC) show that approximately two-thirds of those infected with HBV are unaware of their status. Notably, Hep Free 2030: The Hawai‘i Hepatitis Elimination Strategy 2020-2030 lists “Surveillance Infrastructure” as one of the strategic directions for eliminating viral hepatitis in Hawai‘i by 2030. As such, HDOH convened subject matter experts in epidemiology, data analytics, and viral hepatitis prevention, and linkage programming to develop a report that would identify current and historical trends in hepatitis B and liver cancer mortality in Hawai‘i. This article presents findings from the report on hepatitis B-associated deaths.

**Methods**

Hepatitis B-associated death data was gathered from the CDC WONDER Multiple Cause of Death 1999–2020 online database. All 50 US states and the District of Columbia provide data from death certificates filed at their vital records offices. Nonresident deaths (e.g., nonresident aliens, nationals living abroad, residents of US territories) and fetal deaths are excluded. Cause of death is defined as one of the multiple causes of death and is based on International Classification of Diseases, 10th Revision (ICD-10) codes. Hepatitis B-associated death was defined by the presence of any of the following ICD-10 codes in any of the fields of the death certificate: B16, B17.0, B18.0, B18.1. Rates are age-adjusted rates per 100 000 with US population 2000 as the standard population. According to CDC WONDER data suppression rules, data are suppressed if the total number of
deaths is less than 10, and rates are not reported and indicated as “unreliable rate” if the total number of deaths is less than 20 for each year.\textsuperscript{13}

A 3-year moving average rate was calculated to minimize annual fluctuations and allow analysis for the underlying trend.\textsuperscript{15} The 3-year moving average rates were also calculated for selected patient characteristics, such as age and race, when numbers were large enough to produce reliable rates.

**Results**

**Table 1** reports the annual number of hepatitis B-associated deaths and corresponding rates between Hawai‘i and the US from 2000 to 2020. The total number of hepatitis B-associated deaths in Hawai‘i during this time period ranged from 13 to 28. Based on the non-suppressed rates available (for approximately half of the years examined), rates in Hawai‘i were 2.4 to 3.3 times the national rate. As of 2019, the Hawai‘i hepatitis B-associated mortality rate (1.17 per 100 000) was almost 3 times the rate of the US (0.42 per 100 000).

**Table 2** reports 3-year total number and moving average rates of hepatitis B-associated deaths among Hawai‘i residents during 2000-2020, comparing all residents to residents aged ≥45 years. The 3-year total number of deaths ranged from 44 to 76 statewide. Although persons aged ≥45 years accounted for 36.9% to 43.5% of the general population, they had a disproportionately higher percentage of hepatitis B-associated deaths, ranging from 84.1% to 95.3%. Data for hepatitis B-associated deaths among all other age groups was not reported because the total numbers of deaths were less than 20 for each of the 3-year periods, and rates were therefore suppressed.

Trends among persons aged ≥45 years followed the statewide mortality trend, but at a higher rate than the overall rates, for each of the 3-year periods (see **Figure 1**). Rates for persons aged ≥45 years were 2.2 to 2.6 times the rate of the statewide average. During the most recent time period, 2018-2020, the rate for persons aged ≥45 years were 2.5 times the rate of the statewide average.
Table 2. Three-Year Total Number and Moving Average Rates\(^a\) of Deaths with HBV Infection Listed as a Cause of Death\(^b\) Among Hawai‘i Residents, 2000-2020, Statewide and Among Persons Aged ≥45 Years\(^c\)

<table>
<thead>
<tr>
<th>Year</th>
<th>All residents</th>
<th>Persons aged ≥45 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Deaths</td>
<td>Population</td>
</tr>
<tr>
<td>2000-2002</td>
<td>44</td>
<td>3,677,098</td>
</tr>
<tr>
<td>2001-2003</td>
<td>46</td>
<td>3,716,715</td>
</tr>
<tr>
<td>2002-2004</td>
<td>54</td>
<td>3,764,336</td>
</tr>
<tr>
<td>2003-2005</td>
<td>60</td>
<td>3,817,452</td>
</tr>
<tr>
<td>2004-2006</td>
<td>68</td>
<td>3,876,029</td>
</tr>
<tr>
<td>2005-2007</td>
<td>65</td>
<td>3,918,135</td>
</tr>
<tr>
<td>2006-2008</td>
<td>63</td>
<td>3,957,619</td>
</tr>
<tr>
<td>2007-2009</td>
<td>60</td>
<td>3,994,605</td>
</tr>
<tr>
<td>2008-2010</td>
<td>57</td>
<td>4,039,231</td>
</tr>
<tr>
<td>2009-2011</td>
<td>58</td>
<td>4,081,828</td>
</tr>
<tr>
<td>2010-2012</td>
<td>64</td>
<td>4,127,424</td>
</tr>
<tr>
<td>2011-2013</td>
<td>71</td>
<td>4,171,177</td>
</tr>
<tr>
<td>2012-2014</td>
<td>76</td>
<td>4,215,928</td>
</tr>
<tr>
<td>2013-2015</td>
<td>61</td>
<td>4,255,218</td>
</tr>
<tr>
<td>2014-2016</td>
<td>64</td>
<td>4,279,721</td>
</tr>
<tr>
<td>2015-2017</td>
<td>54</td>
<td>4,287,698</td>
</tr>
<tr>
<td>2016-2018</td>
<td>55</td>
<td>4,276,586</td>
</tr>
<tr>
<td>2017-2019</td>
<td>50</td>
<td>4,263,901</td>
</tr>
<tr>
<td>2018-2020</td>
<td>53</td>
<td>4,243,369</td>
</tr>
</tbody>
</table>

\(^a\) Rates are age-adjusted per 100,000 population with US 2000 population as the standard population.

\(^b\) Cause of death is defined as one of the multiple causes of death and is based on the International Classification of Diseases, 10th Rev. (ICD-10) codes B16, B17.0, B18.0, B18.1 (hepatitis B).

\(^c\) Data adapted from Centers for Disease Control and Prevention\(^{\text{13}}\)

\(^d\) Percent from the total population for persons aged ≥45 was calculated by dividing the population total for persons aged ≥45 years over the population total for all residents in Hawai‘i for the same 3-year period.

\(^e\) Percent from the total death for persons aged ≥45 years was calculated by dividing the total number of deaths among persons aged ≥45 years over the total number of deaths among all residents in Hawai‘i for the same 3-year period.

Figure 1. Three-year Moving Average Rate of Hepatitis B Associated Death among Hawai‘i Residents, 2000-2020, All Residents vs Persons Aged ≥45 Years
Table 3 reports 3-year total number and moving average rates of hepatitis B-associated deaths among Hawai‘i residents during 2000-2020, comparing all residents to non-Hispanic API residents. Although non-Hispanic API residents accounted for 60.1% to 65.3% of the general population, they had a disproportionately higher percentage of hepatitis B-associated deaths, ranging from 75% to 87% across the 21-year study period. Data for hepatitis B-associated deaths among all other racial/ethnic groups were not reported because the total numbers of deaths were less than 20 for each of the 3-year periods, and rates were suppressed.

Trends among non-Hispanic API residents followed the statewide mortality trend, but at a higher rate for each of the 3-year periods (see Figure 2). Although rates have fluctuated over the last 2 decades, they appear to currently trend downward. Rates for non-Hispanic API residents were 1.2 to 1.4 times the rates of the state average. The most recent time period, 2018-2020, saw a rate for non-Hispanic API residents at 1.2 times the statewide average.

<table>
<thead>
<tr>
<th>Year</th>
<th>All racial/ethnic groups</th>
<th>Non-Hispanic Asian or Pacific Islander</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Deaths</td>
<td>Population</td>
</tr>
<tr>
<td>2000-2002</td>
<td>44</td>
<td>3 677 098</td>
</tr>
<tr>
<td>2001-2003</td>
<td>46</td>
<td>3 716 715</td>
</tr>
<tr>
<td>2002-2004</td>
<td>54</td>
<td>3 764 336</td>
</tr>
<tr>
<td>2003-2005</td>
<td>60</td>
<td>3 817 452</td>
</tr>
<tr>
<td>2004-2006</td>
<td>68</td>
<td>3 876 029</td>
</tr>
<tr>
<td>2005-2007</td>
<td>65</td>
<td>3 918 135</td>
</tr>
<tr>
<td>2006-2008</td>
<td>63</td>
<td>3 957 619</td>
</tr>
<tr>
<td>2007-2009</td>
<td>60</td>
<td>3 994 605</td>
</tr>
<tr>
<td>2008-2010</td>
<td>57</td>
<td>4 039 231</td>
</tr>
<tr>
<td>2009-2011</td>
<td>58</td>
<td>4 061 828</td>
</tr>
<tr>
<td>2010-2012</td>
<td>64</td>
<td>4 127 424</td>
</tr>
<tr>
<td>2011-2013</td>
<td>71</td>
<td>4 171 177</td>
</tr>
<tr>
<td>2012-2014</td>
<td>76</td>
<td>4 215 928</td>
</tr>
<tr>
<td>2013-2015</td>
<td>61</td>
<td>4 255 218</td>
</tr>
<tr>
<td>2014-2016</td>
<td>64</td>
<td>4 279 721</td>
</tr>
<tr>
<td>2015-2017</td>
<td>54</td>
<td>4 287 698</td>
</tr>
<tr>
<td>2016-2018</td>
<td>55</td>
<td>4 276 586</td>
</tr>
<tr>
<td>2017-2019</td>
<td>50</td>
<td>4 263 901</td>
</tr>
<tr>
<td>2018-2020</td>
<td>53</td>
<td>4 243 369</td>
</tr>
</tbody>
</table>

a Rates are age-adjusted per 100 000 population with US 2000 population as the standard population.  
b Cause of death is defined as one of the multiple causes of death and is based on the International Classification of Diseases, 10th Rev. (ICD-10) codes B16, B17.0, B18.0, B18.1 (hepatitis B).  
c Data adapted from Centers for Disease Control and Prevention.  
d Percent from the total population for non-Hispanic API residents was calculated by dividing the population for non-Hispanic API residents over the population total for all residents in Hawai‘i for the same 3-year period.  
e Percent from the total death for non-Hispanic API residents was calculated by dividing the total number of deaths among non-Hispanic API residents over the total number of deaths among all residents in Hawai‘i for the same 3-year period.
Discussion

HBV infection is associated with premature death, elevated rates of death from all causes, and elevated rates of death from liver-associated causes, including hepatocellular carcinoma (liver cancer). Between 2000 and 2020, the total annual number of hepatitis B-associated deaths ranged from 13 to 28 in Hawai‘i. The age-adjusted three-year moving average rates of hepatitis B-associated deaths increased gradually from 2000-2002 (1.16) to 2012-2014 (1.54), followed by a gradual decrease to 0.99 during 2018-2020.

When examined by selected population characteristics, similar trends were observed among persons aged ≥45 years and non-Hispanic API residents, but mortality rates remained consistently higher during each of the 3-year periods. Rates of hepatitis B-associated deaths for persons aged ≥45 years were 2.2 to 2.6 times the rates of the state average, while rates for non-Hispanic API residents were 1.2 to 1.4 times the rate of the statewide average. During the most recent time period (2018-2020), the rate for persons aged ≥45 years were 2.5 times the rate of the state average, and the rate for non-Hispanic API residents was 1.2 times the rate of the state average.

This analysis indicates that these groups are disproportionately represented among hepatitis B-associated deaths compared to the general population of Hawai‘i. Persons aged ≥45 years accounted for less than half of the general population but made up 84.1% to 95.3% of all hepatitis B-associated deaths. Similarly, non-Hispanic API residents accounted for 60.1% to 65.3% of the general population but made up 75% to 87% of all hepatitis B-associated deaths.

Hawai‘i has the highest hepatitis B-associated death rate nationwide. In 2019, the rate for Hawai‘i (1.17 per 100,000) was almost 3 times the national rate (0.42 per 100,000). This might be partially explained by the fact that Hawai‘i has a higher percentage of non-Hispanic API residents (60.1% to 65.3%) compared to the general US (6.9%), since API communities experience the highest hepatitis B-associated death rates nationally. In 2019, at the national level, the rate of hepatitis B-associated deaths for API persons was 2.1, approximately 7.5 times the national rate among non-Hispanic White persons.

A limitation of using death certificate data to characterize hepatitis B-associated deaths is underreporting of HBV infection as the underlying or contributing cause of death. A recent study reported that only 19% of chronic hepatitis B decedents and 40% of those who died of liver disease had hepatitis B reported on their death certificates. Hence, mortality rates reported here for Hawai‘i and at the national level could have substantially underestimated the mortality burden of hepatitis B. In addition, without access to individual death records, the authors were unable to identify other disparities and associations. Using CDC WONDER limits the depth of analysis possible for various racial groups. Only the years 2018 – 2020 were allowed for disaggregation between Asians and Pacific Islanders; although there was a multi-race option, Native Hawaiian could not be disaggregated from Pacific Islander categories. Finally, this report is limited to associations and cannot be used to determine causality.

Despite higher rates of hepatitis B-associated deaths in Hawai‘i when compared to the national rate, there has been progress in reducing hepatitis B-associated deaths both among the general
population and among non-Hispanic API residents statewide. Among non-Hispanic API residents, the age-adjusted hepatitis B-associated mortality rates decreased from 1.83 during 2012-2014 to 1.22 during 2018-2020, which is below the CDC’s Division of Viral Hepatitis 2025 Strategic Plan goal of 1.84 per 100,000 population for API persons.14 Statewide, the age-adjusted hepatitis B-associated mortality rates decreased from 1.54 from 2012-2014 to 0.99 from 2018-2020. Nevertheless, to continue this progress, a 62.6% reduction from the 2018-2020 rate will be needed for Hawai‘i to meet the CDC’s national 2025 goal of 0.37 deaths per 100,000 population. Furthermore, to meet the Healthy People 2030 goal of 0.16 per 100,000, an 83.8% reduction from the 2018-2020 rate is needed. Promoting screening and appropriate vaccination among all unvaccinated adults for hepatitis B should be a public health priority to achieve hepatitis B elimination in Hawai‘i, in alignment with local strategies like Hep Free 2030.12 In addition, enhancing surveillance infrastructure within HDOH will improve understanding of communities in need for resource allocation and targeted programming.

The complete hepatitis B and liver cancer mortality report will soon be available on the Harm Reduction Services Branch webpage at the Hawai‘i State Department of Health’s website (https://health.hawaii.gov/harmreduction/).

Authors’ Affiliations:
- Hawai‘i State Department of Health, Communicable Disease and Public Health Division, Honolulu, HI (FL)
- Hawai‘i State Department of Health, Harm Reduction Services Branch, Honolulu, HI; and Hep Free Hawai‘i, Honolulu, HI (TP)
- Hawai‘i State Department of Health, Office of Planning, Policy and Program Development, Honolulu, HI (NR)
- Independent, Honolulu, HI (RG)

References
Hawaiʻi Journal of Health & Social Welfare (HJH&SW)

Guidelines for Publication of HJH&SW Supplements

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

The following are general guidelines for publication of supplements:

1. Organizations, university divisions, and other research units considering publication of a sponsored supplement should consult with the HJH&SW editorial staff to make certain the educational objectives and value of the supplement are optimized during the planning process.

2. Supplements should treat broad topics in an impartial and unbiased manner. They must have educational value, be useful to HJH&SW readership, and contain data not previously published elsewhere.

3. Supplements must have a sponsor who will act as the guest editor of the supplement. The sponsor will be responsible for every step of the publication process including development of the theme/concept, peer review, editing, preliminary copy editing (ie, proof reading and first round of copy editing), and marketing of the publication. HJH&SW staff will only be involved in layout, final copy editing and reviewing final proofs. It is important that the sponsor is aware of all steps to publication. The sponsor will:

   a. Be the point of contact with HJH&SW for all issues pertaining to the supplement.
   b. Solicit and curate articles for the supplement.
   c. Establish and oversee a peer review process that ensures the accuracy and validity of the articles.
   d. Ensure that all articles adhere to the guidelines set forth in journal’s Instructions to Authors page, especially the instructions for manuscript preparation and the statistical guidelines.
   e. Obtain a signed Copyright Transfer Agreement for each article from all authors.
   f. Comply with all federal, state, and local laws, rules, and regulations that may be applicable in connection with the publication, including ensuring that no protected health information appears in any article.
   g. Work with the editorial staff to create and adhere to a timeline for the publication of the supplement.
   h. Communicate any issues or desired changes to the HJH&SW staff in a timely manner.

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

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

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

6. The sponsor may decide to include advertisements in the supplement in order to defray costs. Please consult with the HJH&SW advertising representative Michael Roth at 808-595-4124 or email rothcomm@gmail.com for assistance.
7. Supplement issues are posted on the HJH&SW website (http://www.hawaiijournalhealth.org) as a full-text PDF (both of the whole supplement as well as each article). An announcement of its availability will be made via a press release and through the HJH&SW email distribution list. Full-text versions of the articles will also be available on PubMed Central.

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

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

---

**Sample Workflow and Timeline for a Supplement**

1. The sponsor contacts the HJH&SW editors (hjhsw@hawaii.edu) to discuss the supplement topic, estimated timeline, length and cost. HJH&SW staff will review the journal requirements for articles and share our review process with the sponsor. **Time frame: 2 weeks**

2. The sponsor will complete the draft contract and pay a non-refundable deposit of $2500 or half the contract value. **Time frame: 3 days**

3. The sponsor will solicit articles for the supplement. **Time frame: 3-6 months**

   Articles must comply with:
   - Instructions for Manuscript Preparation and Submission of Research Articles
   - Instructions for Manuscript Preparation and Submission of Columns
   - HJH&SW Statistical Guidelines
   - HJH&SW Style Guide for Native Hawaiian Words and Phrases
   - AMA Manual of Style. A free summary can be found [here](http://www.hawaiijournalhealth.org).

4. The sponsor will oversee the article selection, peer review, and editing process. We recommend that time be allowed for at least two rounds of reviews for each article. **Time frame: 3-6 months**

   - Ensure that each article includes Institutional Review Board (IRB) review and approval, and a statement disclosing any conflicts of interest.
   - Obtain a Copyright Transfer Agreement signed by all authors for each article.

5. Optional: During this time, the sponsor can solicit advertisements for the supplement to help defray costs for publication and/or printing. To initiate this process, the sponsor will work the HJH&SW advertising representative Michael Roth at 808-595-4124 or rothcomm@gmail.com.

6. The sponsor or their designee will conduct a final review of each article to ensure adherence to HJH&SW guidelines and AMA style. **Time frame: 2 weeks**

7. For each article, the sponsor will submit the final Word document and Copyright Transfer Agreement to the HJH&SW journal production editor. The journal production editor will send the articles to the copy editor for final journal style review. Copyediting will be 8 hours per edition plus 1 hour per article for additional articles purchased. Any additional hours will be billed at $100 per hour. **Time frame: 2 weeks**

8. The sponsor will submit the final articles to the layout editor for formatting. **Time frame: 1 month**

   Acting in the role of guest editor, the sponsor will include a column introducing the supplement. **IMPORTANT:** All articles submitted for layout should be in their finalized form. Page proofs will be returned to the sponsor for their review and approval, but changes will only be made to fix any errors that were introduced during the layout process. Any editing or changes to the text or figures after the initial copy layout will incur a fee of $50 per page.

9. The sponsor will review the electronic copy from the layout editor and submit any final corrections. **Time frame: 5 working days**

10. The layout editor will make the final corrections and provide a finished electronic copy of the supplement to the sponsoring editors to allow time for printing.

11. The managing editor will work with the sponsor to draft a press release. Sponsors should contact the managing editor at least 30 days prior to the date of publication to plan and script the press release. Sponsors are encouraged to submit 1-2 photos to accompany the press release. Note that obtaining signed photo releases is the responsibility of the sponsor.

12. The supplement will be published online along with the press release. An electronic copy will be sent to our subscribers and circulation lists, and the edition will be forwarded to the National Library of Medicine for indexing and made available for no cost access to the public.

**Revised 2/6/20**
Over 75 Years of Dedication to Hawai‘i’s Physicians

The Board of Directors at Physicians Exchange of Honolulu invite you to experience the only service designed by and for Physicians in Hawai‘i.

President: Garret Yoshimi
Vice President: Robert Marvit, M.D.
Secretary: Kimberly Koide Iwao, Esq.
Treasurer: Richard Philpott, Esq.
Directors: Linda Chiu, M.D.
Jon Graham, M.D.
Myron Shirasu, M.D.
Amy Tamashiro, M.D.
David Young, M.D.
Executive Director: Rose Hamura

- Professional 24 Hour Live Answering Service
- Relaying of secured messages to cell phones
- Calls Confirmed, Documented and Stored for 7 Years
- HIPAA Compliant
- Affordable Rates
- Paperless Messaging
- Receptionist Services
- Subsidiary of Honolulu County Medical Society
- Discount for Hawai‘i Medical Association members

“Discover the difference of a professional answering service. Call today for more information.”

Physicians Exchange of Honolulu, Inc.
1360 S. Beretania Street, #301
Honolulu, HI 96814

(808) 524-2575

Visit the Journal Website at: https://hawaiijournalhealth.org
or contact us at: hjhsw@hawaii.edu
Does it matter who owns my malpractice insurance company?

Yes.

As a reciprocal exchange, MIEC is entirely owned by the policyholders we protect. With no external shareholders to satisfy, this ownership model allows us to return profits to whom they rightfully belong—MIEC policyholders. We do not inflate our surplus or tie up profits in nonguaranteed deferred retirement plans, we give it back. Over the last 45 years we have put more than $446 million back in the pockets of our policyholders. To learn more about the benefits of being an MIEC policyholder, or to apply, visit miec.com or call 800.227.4527.