

Hawai'i Emergency Management Agency (HI-EMA)
State Emergency Support Function #8 (SESF #8)
Statewide Telemedicine Needs Assessment
Full Report



September 24, 2020

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Executive Summary

Introduction

In May 2020, in response to the COVID-19 pandemic, a statewide telemedicine needs assessment was conducted by the Hawai'i Emergency Management Agency (HI-EMA) State Emergency Support Function #8 (SESF #8), which oversees the state's response for medical care and public health.

Purpose

The purpose of the needs assessment survey was to assess current telemedicine capacity across the state of Hawai'i, determine readiness to increase that capacity, identify gaps for planning purposes, and measure telemedicine utilization pre- and post-COVID-19 public health emergency.

Methodology

This survey was sent statewide to healthcare facilities, practices, associations, and organizations by the SESF #8 Statewide Telemedicine Needs Assessment core team. Recipients were encouraged to forward the survey to other facilities and practices as well. Questions included the facility demographic information (e.g., primary care service area[s]); types of telemedicine services and whether they previously provided these services ("Pre-COVID"), currently provide these services ("Current"), desired to provide these services ("Desired"), or not applicable ("N/A") at the time of survey completion; the number of items of telemedicine equipment and peripheral devices the facility or practice had for telemedicine; quality of internet connectivity; type of telemedicine software and Electronic Health Record (EHR) systems utilized; and issues and barriers faced by providers and/or patients. The survey was open from May 3, 2020 to May 26, 2020. For context, at the beginning of this time period, Hawai'i Governor David Ige was beginning to implement his phased approach to re-opening the economy after the Stay-at-Home Order. Throughout the month of May, there were very few new cases reported daily (ranging between 0-2 new cases per day on the island of O'ahu). "Stay-at-Home" was shifted to "Safer-at-Home." On May 26, the last day of the survey, there were three days with zero cases reported. At that point, Hawai'i was on its way to re-opening further and Governor Ige was planning to announce the end of the inter-island travel quarantine.

Responding organizations

There were 102 unique respondents who completed the HI-EMA SESF #8 Statewide Telemedicine Needs Assessment. The respondents came from the following counties: 44 from Hawai'i County, 37 from Honolulu County, 15 from Maui County, and 4 from Kaua'i County. There were 2 respondents that claimed multiple counties/statewide.

The types of facilities or practices represented by the survey included the following: Federally-Qualified Health Center (FQHCs), Hospital (private), Hospital (public), Hospital-based clinic, Independent provider, Native Hawaiian Health Care System, Rural health clinic, and Other (which included long-term care facilities and employed group practices). The Department of Defense (DoD) facility was included under Hospital (public).

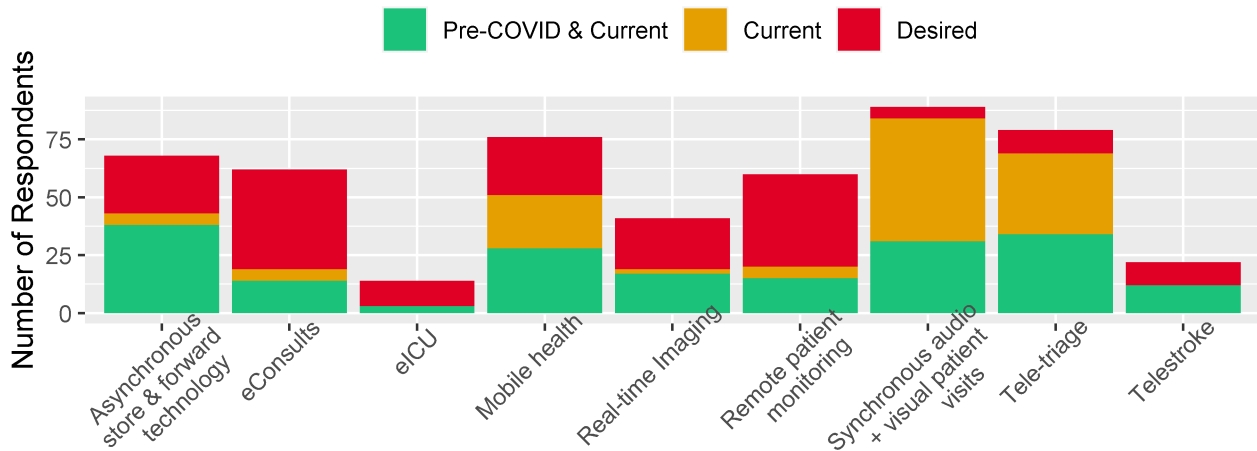
Telemedicine services provided and desired

- **Synchronous audio + visual patient visits (92 respondents):** 58% of respondents started providing these services during COVID-19; 34% continued to provide these services from pre-COVID to Current; 5% desired to provide these services; and 3% selected “N/A.”
 - Based on submitted responses, the most common type of real-time audiovisual visits (i.e., synchronous visits) offered, in order, were routine office/outpatient visits, surgery or discharge follow-up visits, and acute care-related services.
 - *Acute care-related services (79 respondents):* 44% started providing these services during COVID-19; 22% continued to provide these services from pre-COVID to Current; 13% desired to provide these services; and 22% selected “N/A.”
 - *Routine office/outpatient visits (84 respondents):* 56% started providing these services during COVID-19; 26% continued to provide these services from pre-COVID to Current; 10% desired to provide these services; and 8% selected “N/A.” Routine office/outpatient visits were the service that had the greatest increase in respondents that started to provide these services during the COVID-19 pandemic.
 - *Behavioral/mental health services and/or counseling (78 respondents):* 29% started providing these services during COVID-19; 29% continued to provide these services from pre-COVID to Current; 15% desired to provide these services; and 26% selected “N/A.”
 - *Prenatal Care (62 respondents):* 19% started providing these services during COVID-19; 6% continued to provide these services from pre-COVID to Current; 8% desired to provide these services; and 66% (41 respondents) selected “N/A.”
 - *Imaging (i.e., Store & Forward) (70 respondents):* 11% started providing these services during COVID-19; 33% continued to provide these services from pre-COVID to Current; 20% desired to provide these services; and 36% selected “N/A.”
 - *Follow-up (i.e., from surgery, discharge) (80 respondents):* 48% started providing these services during COVID-19; 19% continued to provide these services from pre-COVID to Current; 19% desired to provide these services; and 15% selected “N/A.”
 - *Rehabilitation (i.e., speech language pathology, PT, OT) (64 respondents):* 12% started providing these services during COVID-19; 9% continued to provide these services from pre-COVID to Current; 20% desired to provide these services; and 58% selected “N/A.”
 - *Family meetings or care coordination meetings (75 respondents):* 29% started providing these services during COVID-19; 20% continued to provide these services from pre-COVID to Current; 31% desired to provide these services; and 20% selected “N/A.”
 - *Home-based care (69 respondents):* 10% started providing these services during COVID-19; 17% continued to provide these services from pre-COVID to Current; 22% desired to provide these services; and 51% selected “N/A.”
- **Asynchronous store and forward technology (81 respondents):** 6% of respondents started providing these services during COVID-19; 47% continued to provide these services from pre-COVID to Current; 31% desired to provide these services; and 16% selected “N/A.”
- **Remote patient monitoring (80 respondents):** 6% of respondents started providing these services during COVID-19; 19% continued to provide these services from pre-COVID to Current; 50% desired to provide these services; and 25% selected “N/A.”
- **Mobile health (87 respondents):** 26% of respondents started providing these services during COVID-19; 32% continued to provide these services from pre-COVID to Current; 29% desired to provide these services; and 13% selected “N/A.”

- **eConsults (78 respondents):** 6% of respondents started providing these services during COVID-19; 18% continued to provide these services from pre-COVID to Current; 55% desired to provide these services; and 21% selected “N/A.”
- **Tele-triage (83 respondents):** 42% of respondents started providing these services during COVID-19; 41% continued to provide these services from pre-COVID to Current; 12% desired to provide these services; and 5% selected “N/A.”
 - After synchronous audiovisual visits, tele-triage had the second-highest increase of respondents who started to provide this telemedicine service during the COVID-19 pandemic.
- **eICU (65 respondents):** No respondents started providing these services during COVID-19; 5% of respondents continued to provide these services from pre-COVID to Current; 17% desired to provide these services; and 78% (52 respondents) selected “N/A.”
- **Telestroke (66 respondents):** No respondents started providing these services during COVID-19; 18% of respondents continued to provide these services from pre-COVID to Current; 15% desired to provide these services; and 67% (44 respondents) selected “N/A.”
- **Real-time imaging (71 respondents):** 3% of respondents started providing these services during COVID-19; 24% continued to provide these services from pre-COVID to Current; 31% desired to provide these services; and 42% (30 respondents) selected “N/A.”

Figure 1 shows the overall frequency of respondents that provided certain telemedicine services pre-COVID (continuing to current), current (beginning during COVID), and desired (desired service). Many technologies were adopted only during the COVID crisis and many facilities reported certain services as being desired.

Figure 1: Telemedicine Services Offered



The responses to telemedicine services offered are also shown below (Figures 2-4) by county for counties with at least 10 responses (complete breakdown by all county groups can be found in the detailed report section).

Figure 2: Telemedicine Services Offered - Honolulu County

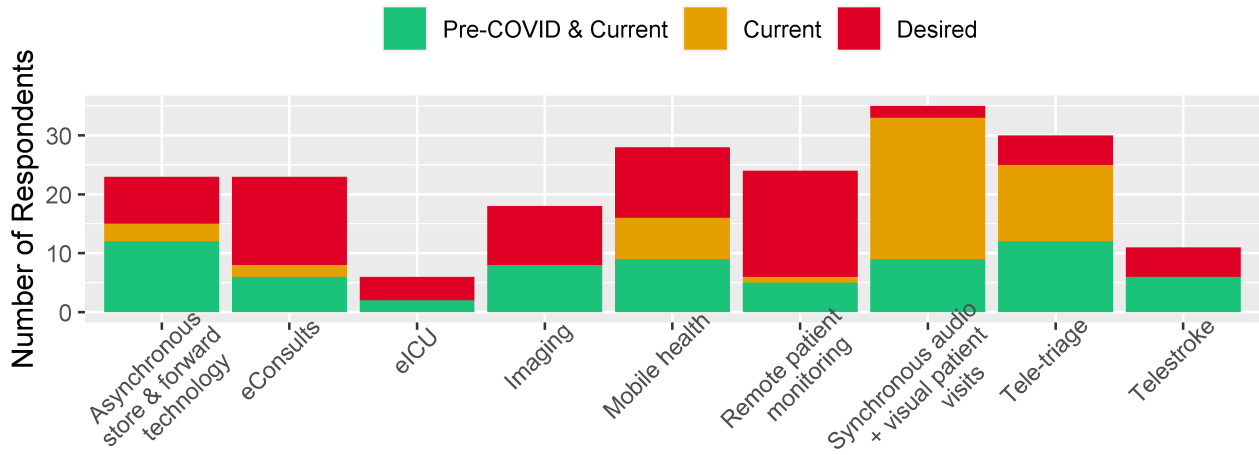


Figure 3: Telemedicine Services Offered - Hawai'i County

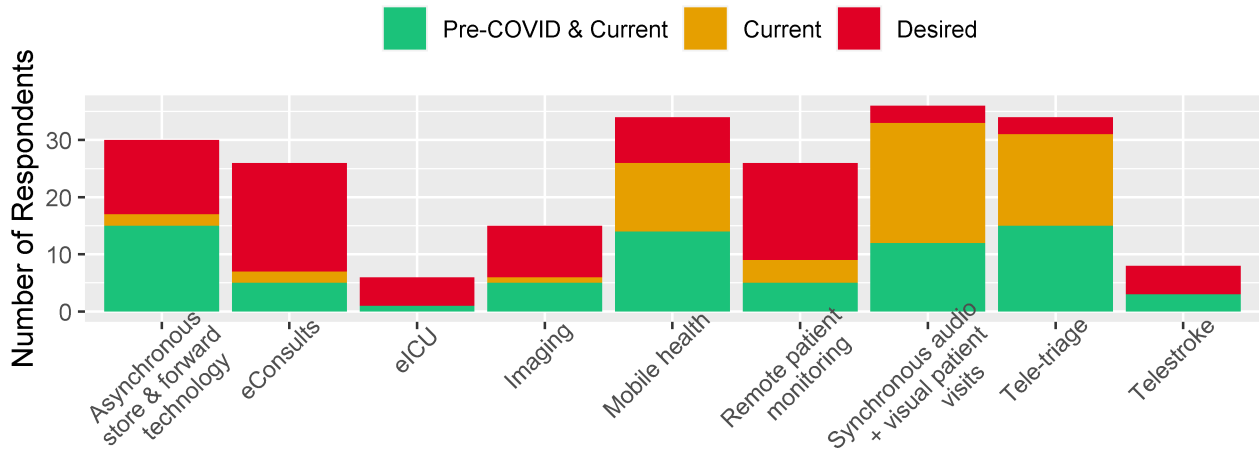
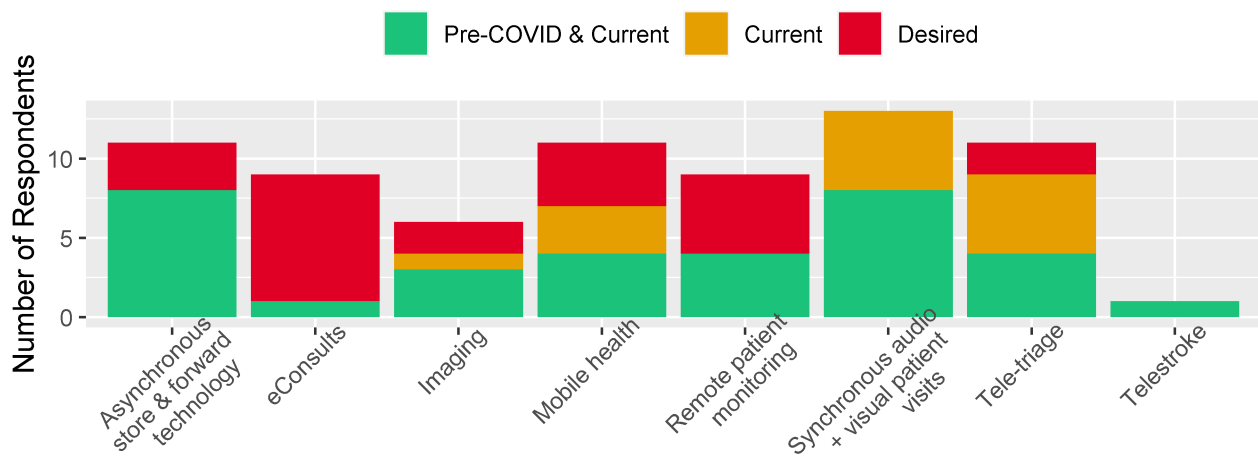


Figure 4: Telemedicine Services Offered - Maui County



The responses to telemedicine services offered are also shown below (Figures 5-7) by facility group for groups with at least 10 responses (complete breakdown by all facility groups can be found in the detailed report section).

Figure 5: Telemedicine Services Offered - FQHCs

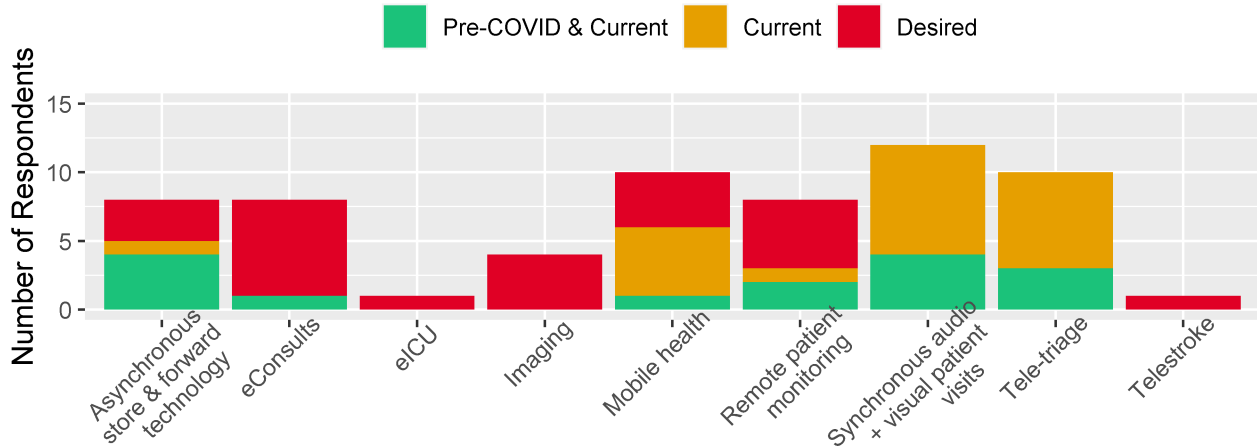


Figure 6: Telemedicine Services Offered - Independent Providers

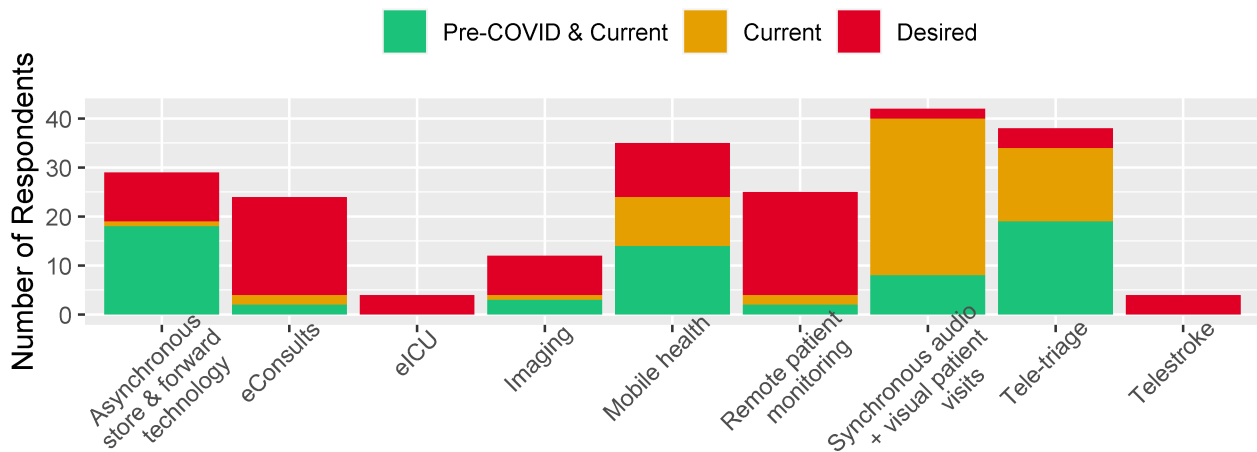
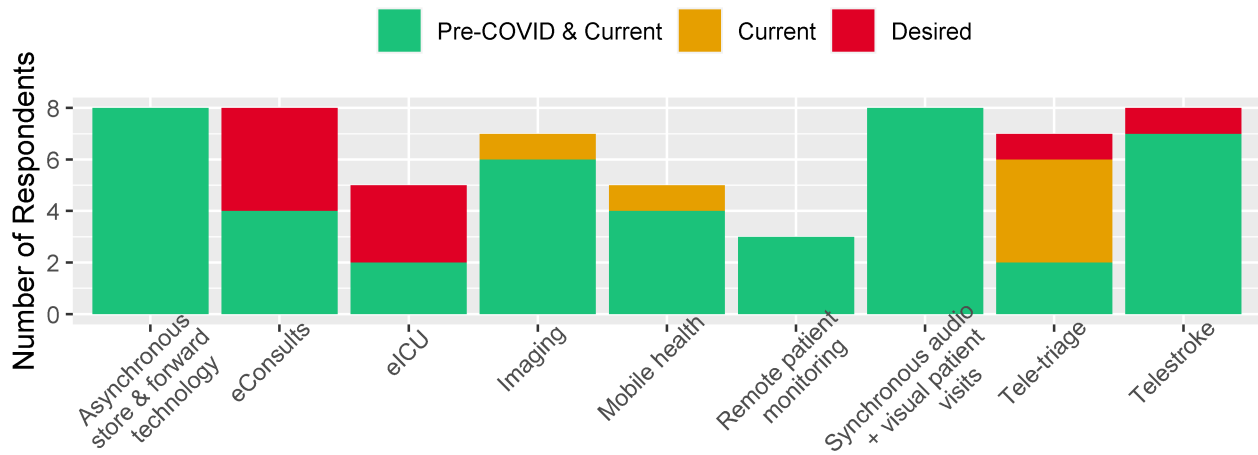
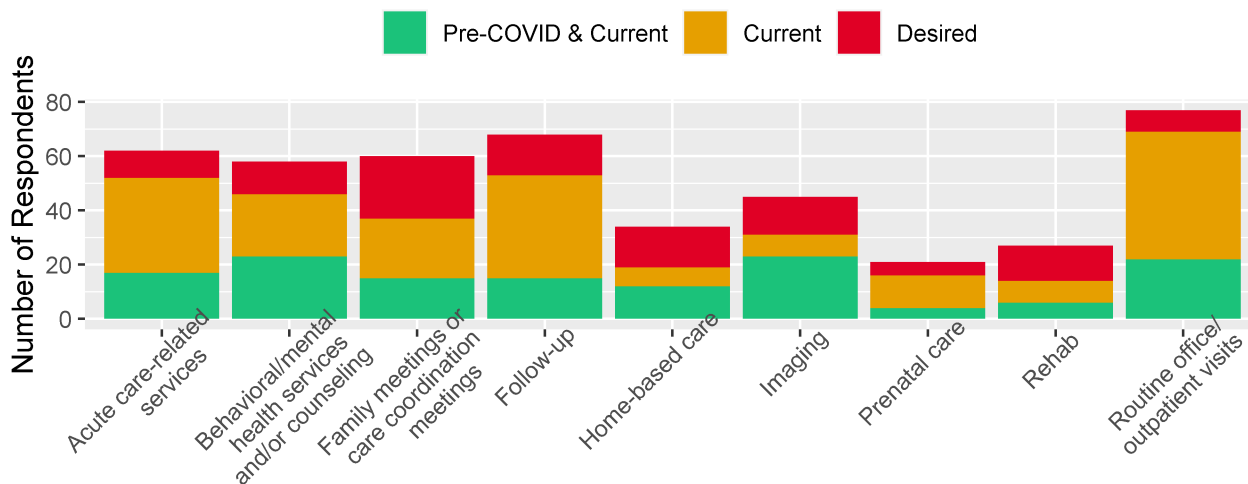


Figure 7: Telemedicine Services Offered - Hospitals (Private and Public)



Responses for specific types of synchronous audio + visual patient visit services for all facilities across all counties are shown below (Figure 8). Many of the respondents that indicated they had synchronous audio + visual patient visit services adopted them during the COVID crisis.

Figure 8: Synchronous Audio + Visual Patient Visits Responses



Equipment

- **Telemedicine Carts (82 Respondents):** In terms of number of carts, 60% of respondents selected “0,” 23% selected “1-10,” 2% selected “>10,” and 15% selected “N/A.” Of the 49 respondents that indicated that their facility/practice had zero telemedicine carts (60%), 32 (65%) were independent providers.
- **Computers (non-carts) for video conferencing (91 Respondents):** In terms of number of computers, 9% of respondents selected “0,” 64% selected “1-10,” 26% selected “>10,” and 1% selected “N/A.”
- **Tablets (91 Respondents):** In terms of number of tablets, 32% of respondents selected “0,” 49% selected “1-10,” 18% selected “>10,” and 1% selected “N/A.”
- **Mobile devices (91 Respondents):** In terms of number of mobile devices, 15% of respondents selected “0,” 64% selected “1-10,” 15% selected “>10,” and 5% selected “N/A.”

Peripheral Devices

- The majority of respondents indicated that their facility/practice did not have any of the peripheral devices listed on the survey (i.e., selected “0”).

Barriers

- The barriers for starting and expanding telemedicine services (ordered by highest to lowest responses) were internet connectivity challenges (61 respondents), training for staff (52 respondents), funding for equipment/devices (51 respondents), workflow challenges to accommodate telemedicine (44 respondents), and licensure issues (9 respondents).
- The barriers for acquiring equipment and devices were too expensive (45 respondents), too overwhelmed with other facility/staff needs (28 respondents), unsure how to acquire (25 respondents), and have not decided on a vendor (16 respondents).
- The training needs identified by respondents were training for patients on telemedicine (65 respondents), training for staff on telemedicine (52 respondents), billing/reimbursement for telemedicine services (46

respondents), coordinating telemedicine services (45 respondents), establishing a proper workflow (40 respondents), selecting or purchasing equipment (40 respondents), legal parameters (37 respondents), storage, management, and sharing data (24 respondents), and none (8 respondents).

- The top issues reported that patients are experiencing in using telemedicine include that patients are not “tech savvy” (76 respondents), patients do not have an appropriate device for telemedicine (75 respondents), patients prefer to use telephone (61 respondents), patients are hearing- or sight-impaired (37 respondents), and patients are insisting on in-person visits (35 respondents).

Internet Connectivity

- 59 of the 87 respondents (68%) stated that the internet connection in their facility/practice was excellent or above average.
- 71 of the 93 respondents (76%) reported hearing about poor internet connection in the community (i.e., at patients’ and/or staff’s houses).

Software Platforms & Services Providers

- The most frequently used video-conferencing platforms included Zoom (38 respondents), doxy.me (36 respondents), FaceTime (31 respondents), HMSA OnlineCare (24 respondents), and Skype (17 respondents).
- The most commonly used EHR platforms were Epic (16 respondents), Elation (14 respondents), eClinicalWorks (13 respondents), Cerner (7 respondents), Athenahealth (6 respondents), and GE Centricity (4 respondents). There were 30 respondents that selected “Other.”
- Spectrum/Charter (39%) and Hawaiian Telcom (35%) were the two largest internet providers identified by respondents.
- Verizon (25%) was the largest wireless provider identified by respondents; however, the majority of the respondents (34%) did not know their wireless provider.

Conclusion

This survey is the only known statewide telemedicine needs assessment in the state of Hawai‘i. The results suggest that many facilities and practices across the state of Hawai‘i started providing telemedicine services during the COVID-19 pandemic, but also that many facilities and practices desired to provide more telemedicine services and experienced barriers to expansion. The rapid increase in telemedicine is likely due to the need for physical distancing and decreased travel due to COVID-19, including decreased inter-island travel for health care in Hawai‘i, and likely also due to the lifting of federal and state statutory/regulatory barriers during the COVID-19 public health emergency. Over time, increased and sustained investments in telemedicine services (including through insurance reimbursements and provider support), patient engagement (including through expanding patient support staff to do telemedicine), equipment (including through federal, state, and local sources), broadband, licensure, and more will further enable telemedicine to thrive and expand across the state of Hawai‘i. Further studies are encouraged to assess telemedicine use over time in Hawai‘i. An upcoming follow-up survey on provider and patient satisfaction with telehealth will be administered, shedding more light on the use of telemedicine in Hawai‘i and gaps that the community can work together to address, in partnership with policymakers and leaders.

Detailed Report

Background

In May 2020, in response to the COVID-19 pandemic, a statewide telemedicine needs assessment was conducted by the Hawai'i Emergency Management Agency (HI-EMA) State Emergency Support Function #8 (SESF #8), which oversees the state's response for medical care and public health. The HI-EMA SESF #8 Telehealth core team includes the following individuals:

- Aimee Grace, MD, MPH, FAAP – Telehealth component lead for SESF #8 and Director of the Office of Strategic Health Initiatives for the University of Hawai'i (UH) System
- Breanna Morrison, PhD – Biostatistician, Biostatistics Core Facility, Department of Quantitative Health Sciences, UH Mānoa John A. Burns School of Medicine; Assistance with survey analysis
- Sunja Kim, MPH – Policy Analyst, UH System Office of Strategic Health Initiatives; Assistance with survey design, data collection, and data analysis
- Christina Higa, PhD – Co-Director, UH Pacific Basin Telehealth Resource Center; Assistance with survey design and analysis
- Lee Buenconsejo-Lum, MD, FAAFP – Professor, UH Mānoa John A. Burns School of Medicine; Assistance with survey design and analysis
- John Chen, PhD – Professor and Director of Biostatistics Core Facility, Department of Quantitative Health Sciences, UH Mānoa John A. Burns School of Medicine; Assistance with survey analysis
- Brian Wu, MD – Data Lead, HI-EMA SESF #8; Assistance with survey design and analysis
- Deborah Birkmire-Peters, PhD – Co-Director, UH Pacific Basin Telehealth Resource Center; Assistance with survey design and analysis
- Thomas Lee, PhD – Forecasting Lead, HI-EMA SESF #8; Assistance with survey design and analysis
- Men-Jean Lee, MD – Chief of Maternal-Fetal Medicine, Department of Obstetrics and Gynecology, UH Mānoa John A. Burns School of Medicine; Assistance with survey design

Purpose

The purpose of the needs assessment survey was to assess current telemedicine capacity across Hawai'i, determine readiness to increase that capacity, identify gaps for planning purposes, and measure telemedicine utilization pre- and post-COVID-19 public health emergency.

Methodology

The SESF #8 Statewide Telemedicine Needs Assessment core team designed a survey using SurveyMonkey to assess the magnitude of telemedicine expansion due to COVID-19 and the potential gaps in telemedicine utilization. The survey instrument included 28 multiple-choice and open-ended questions. Questions included the facility demographic information (e.g., primary care service area[s]); types of telemedicine services and whether they previously provided these services (“Pre-COVID”), currently provide these services (“Current”), desired to provide these services (“Desired”), or not applicable (“N/A”) at the time of survey completion; the number of items of telemedicine equipment and peripheral devices the facility or practice had for telemedicine; quality of internet connectivity; type of telemedicine software and Electronic Health Record (EHR) systems utilized; and issues and barriers faced by providers and/or patients. This survey was sent statewide to healthcare facilities, practices, associations, and organizations by the core team. Recipients were encouraged to forward the survey to other facilities and practices as well.

The survey was open from May 3, 2020 to May 26, 2020. For context, at the beginning of this time period, Hawai'i Governor David Ige was beginning to implement his phased approach to re-opening the economy after the Stay-at-Home Order. Throughout the month of May, there were very few new cases reported

daily (ranging between 0-2 new cases per day on the island of O‘ahu). “Stay-at-Home” was shifted to “Safer-at-Home.” On May 26, the last day of the survey, there were three days with zero cases reported. At that point, Hawai‘i was on its way to re-opening further and Governor Ige was planning to announce the end of the inter-island travel quarantine.

Survey data were managed and analyzed using R package. To assign proper categories for certain variables, some data recoding was conducted by the SESF #8 Core Team based on logic and reasonable assumptions. For example, respondents that selected “Pre-COVID” were assumed to be both “Pre-COVID” and “Current” as we did not expect that these facilities/practices stopped their services during COVID-19. Those who chose both “Current” and “Desired” were considered to currently have the services even if they perhaps desired some more of them.

In the graphs below, if respondents chose “N/A” as an answer, they were represented by a blank space in the graph rather than a color; however they *were* included in respondent numbers since they did respond. Additionally, figures in the following sections show the percentage of the telemedicine services offered based on their recoded time-designation status (see Methodology above): “Pre-COVID & Current” (defined as providing the service before COVID-19), “Current” (defined as started providing the service as of the time of survey completion), “Desired” (defined as desire to provide the service) and “N/A.”

Survey Respondents

There were 102 unique respondents that completed the survey, after the investigators manually removed 18 placeholder responses or duplicated submissions. The respondents came from the following counties: 44 from Hawai‘i County, 37 from Honolulu County, 15 from Maui County, and 4 from Kaua‘i County (Table 1). There were 2 respondents that claimed multiple counties/statewide. There were 27 respondents that indicated that they were affiliated with an Accountable Care Organization (ACO) and 57 respondents indicated that they were not part of an ACO.

Table 1 summarizes the number of respondents by facility type and county. The types of facilities represented by the survey included the following: Federally-Qualified Health Center (FQHC), Hospital (private), Hospital (public), Hospital-based clinic, Independent provider, Native Hawaiian Health Care System, Rural health clinic, and Other (which included long-term care facilities and employed group practices). The Department of Defense (DoD) hospital was included under Hospital (public). The respondents chose the facility type they felt best represented their facility or practice; however, in cases where the answer was easily identifiable as incorrect (i.e., public knowledge that a certain hospital is private instead of public), those facility types were changed to the appropriate type. Additionally, if respondents checked multiple facility types, they were assigned to the facility type that would represent them best (for instance, many hospitals checked multiple types but were assigned as primarily a hospital). Some facility types may be over-represented as, for example, there were sometimes multiple responses from within a certain type of facility (i.e., FQHC).

Table 1: Number of Respondents by Facility Type and County

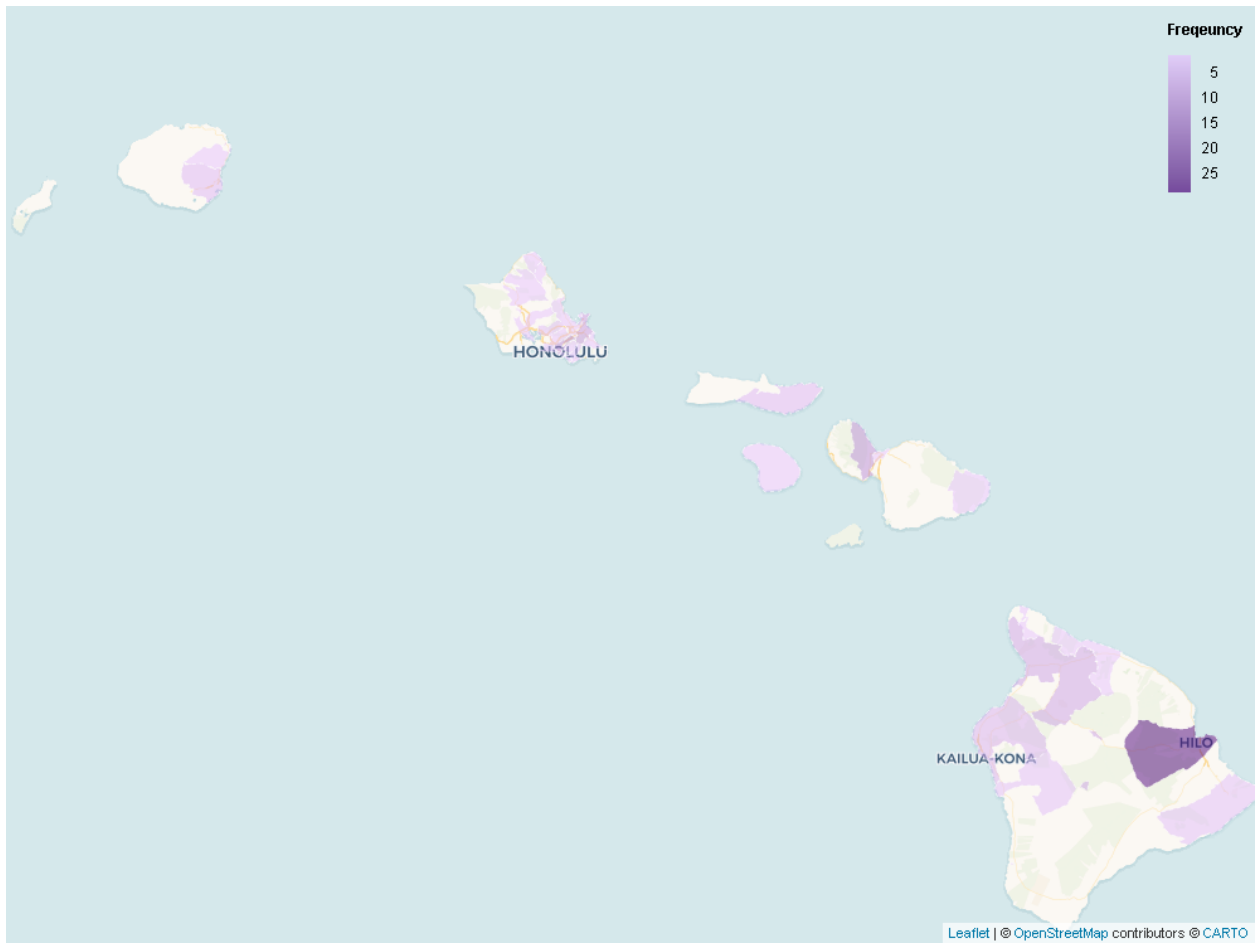
	Hawai'i County	Honolulu County	Kaua'i County	Maui County	Multiple or Statewide	Total by Facility
FQHC	4	4	0	4	0	12
Hospital-based clinic	1	6	0	1	0	8
Hospital (private)	1	4	0	2	1	8
Hospital (public)	2	1	1	0	0	4
Independent provider	30	16	0	3	0	49
Native Hawaiian Health Care Systems	1	1	1	2	0	5
Other	0	4	2	3	1	10
Rural health clinic	5	1	0	0	0	6
Total by County	44	37	4	15	2	102

As a reference, the total number of facilities and practices in Hawai'i in certain categories are:

- 14 FQHCs
- 5 Native Hawaiian Care Systems
- 13 rural health clinics
- 7 public hospitals
- 15 private hospitals

When comparing our response numbers (Table 1) to these total facility types in Hawai'i, the survey was indeed able to reach a significant number of facilities and practices in Hawai'i.

Figure 9: Map of Response Frequency by Zipcode



Telemedicine Services Offered

Survey question #10 asked: “Which telemedicine services does your facility or practice offer? Please check ‘Pre-COVID’ if your facility or practice offered these services before COVID; please check ‘Current’ if your facility or practice currently offers these services; and please check ‘Desired’ if your facility or practice desires to provide these services.” The question then had specific sub-questions focused on a variety of telemedicine services (i.e., synchronous audio + visual patient visits; asynchronous store and forward technology; remote patient monitoring; mobile health; eConsults; tele-triage; eICU; telestroke; and real-time imaging).

Synchronous audio + visual patient visits (92 respondents)

“Synchronous audio + visual patient visits” was defined in the survey as “real-time audio-visual visits between patient and provider.”

During the COVID-19 pandemic, 58% of the 92 respondents indicated that they started to provide synchronous audio + visual patient visits, 34% continued to provide these services from pre-COVID to Current, 5% reported that they desired to provide synchronous audio + visual patient visits, and 3% selected “N/A.”

Of all of the types of telemedicine services queried in question #10, synchronous audio + visual patient visits was the answer with the highest percentage increase of respondents who began offering these services during COVID-19.

As mentioned above, 5% of respondents reported that they desired to provide synchronous audio + visual patient visits; in particular, independent providers, rural health clinics, and Native Hawaiian Health Systems were included in this group (Figure 10). This need was seen in Hawai’i and Honolulu counties but most respondents in those counties indicated that already provided these services (Figure 11).

Figure 10: Synchronous Audio + Visual Patient Visits by Facility, n = 92

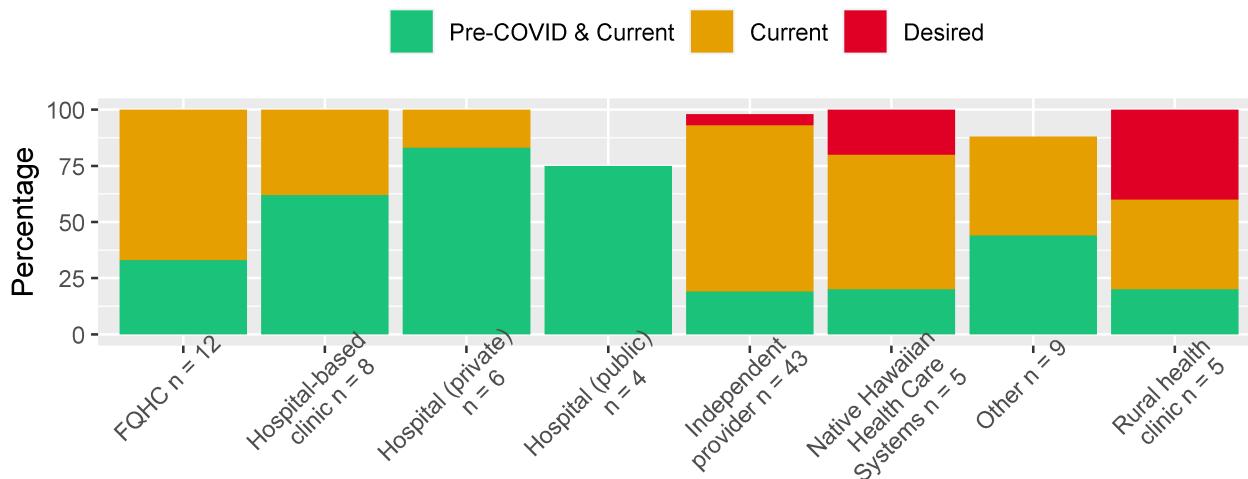
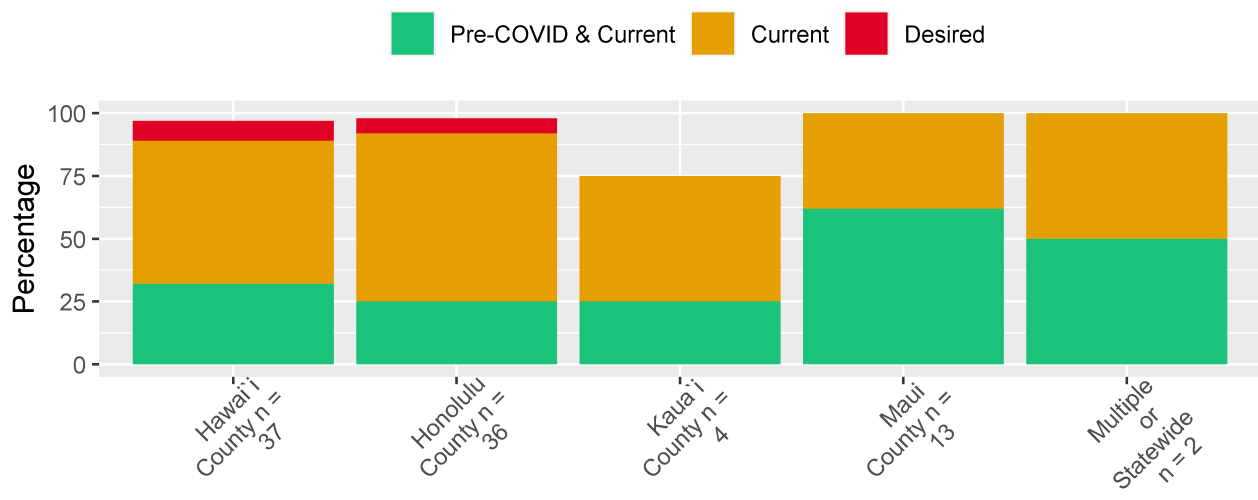


Figure 11: Synchronous Audio + Visual Patient Visits by County, n = 92



Asynchronous store and forward technology (81 respondents)

“Asynchronous store and forward technology” was defined in the survey as “*electronic transmission of medical information, such as digital images, X-rays, patient data, documents, and prerecorded videos, to a provider to evaluate the case or render a service.*”

Figures 12 and 13 present the percentage of respondents providing asynchronous store and forward technology services by facility type and county, respectively. Since COVID-19, 6% of respondents started to provide services using asynchronous store and forward technology, 47% continued to provide these services from pre-COVID to Current, 31% desired to provide these services, and 16% selected “N/A.”

Figure 12: Asynchronous Store and Forward Technology by Facility, n = 81

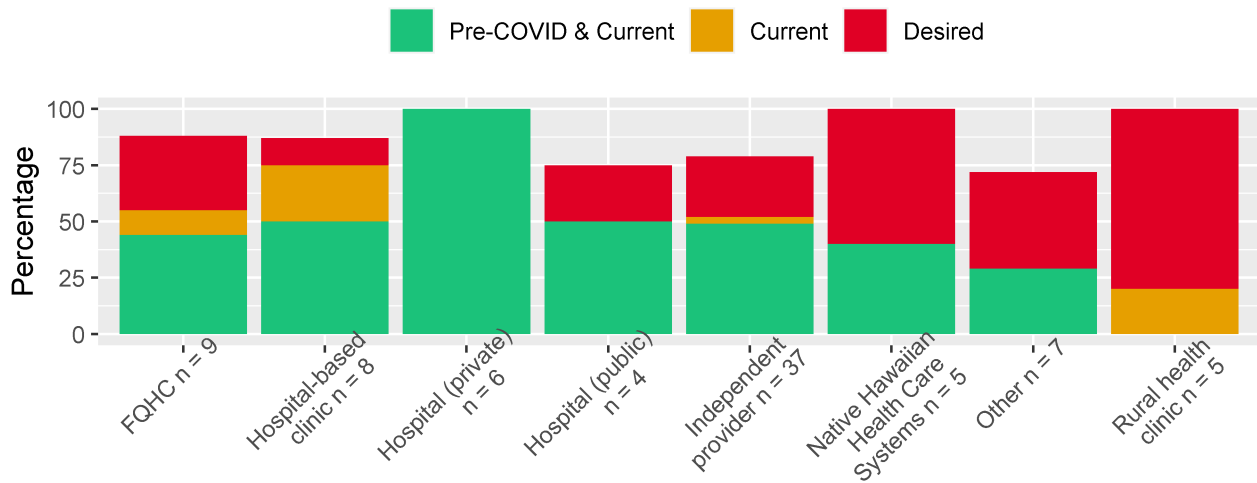
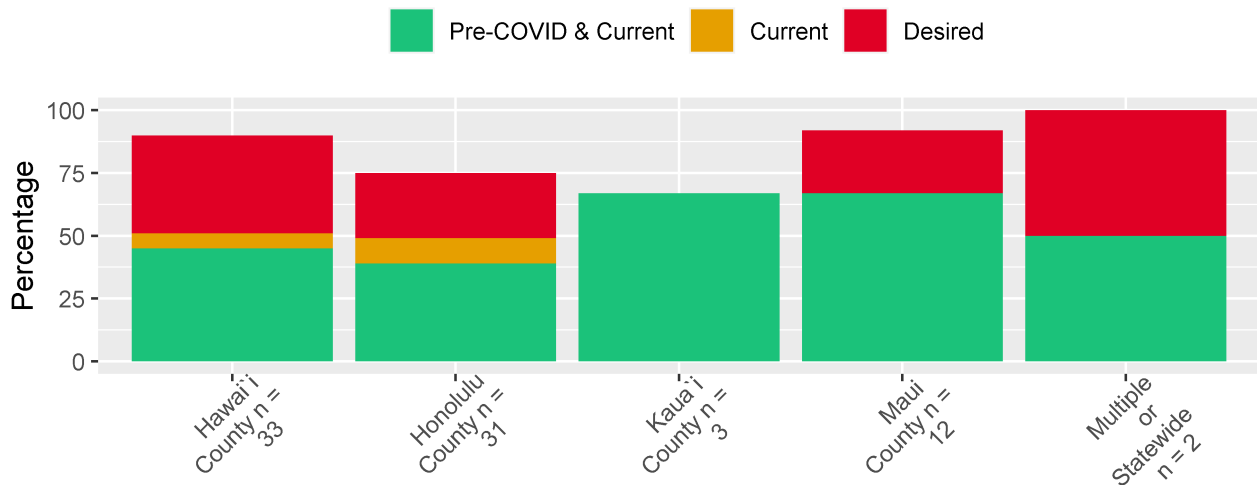


Figure 13: Asynchronous Store and Forward Technology by County, n = 81



Remote patient monitoring (80 respondents)

“Remote patient monitoring” was defined in the survey as using “connected electronic tools to record personal health and medical data in one location for review by a provider in another location.”

Figures 14 and 15 present the percentage of respondents providing remote patient monitoring services by facility type and county, respectively. Of the respondents, 6% started providing these remote patient monitoring services during COVID-19, 19% continued to provide these services from pre-COVID to Current, 50% desired to provide these services, and 25% selected “N/A.”

Out of all of the telemedicine services, remote patient monitoring was the second-most desired telemedicine service (after eConsults), with 50% of respondents selecting that they “desired” to provide these services; indeed, this was particularly true among independent providers (60%), FQHCs (50%), and Native Hawaiian Health Care Systems (60%).

Further details on the number of peripheral devices that facilities/practices had available (many of which could be used for remote patient monitoring) can be found later in this report (Figures 55-68). Across the board, the majority of respondents indicated that their facility/practice had none of the listed peripheral devices, which may have affected the high rates of respondents desiring remote patient monitoring.

Figure 14: Remote Patient Monitoring by Facility, n = 80

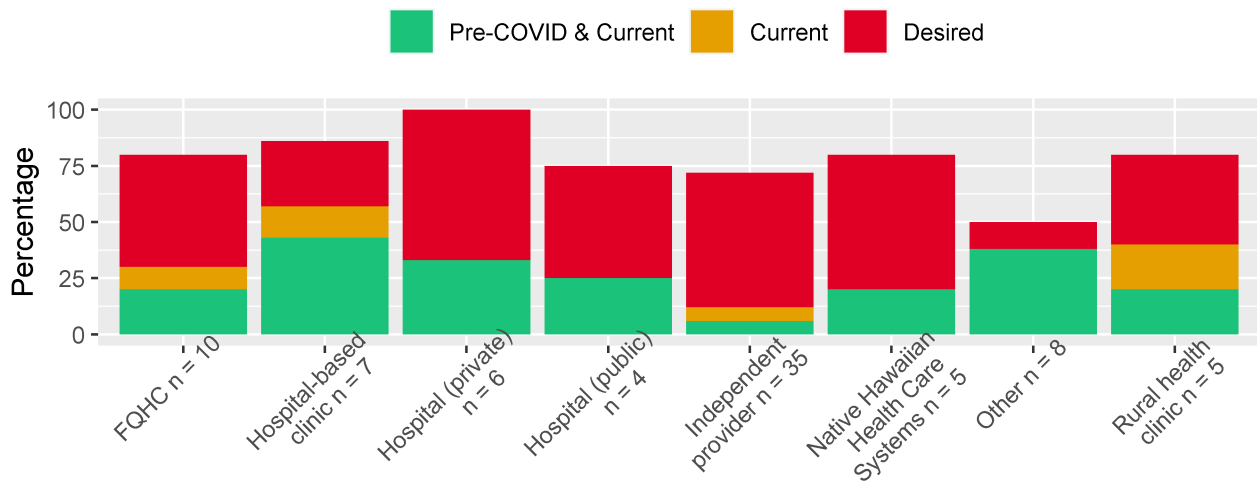
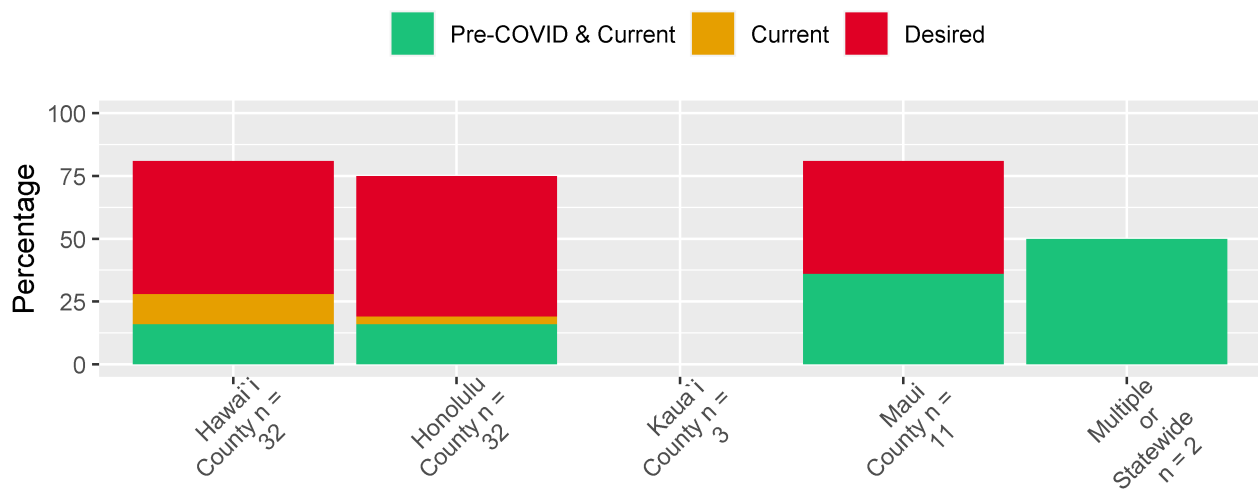


Figure 15: Remote Patient Monitoring by County, n = 80



Mobile health (87 respondents)

“Mobile health” was defined in the survey as providing *“healthcare and public health information through mobile devices like cell phones/tablets.”*

Figures 16 and 17 present the percentage of respondents providing mobile health services by facility type and county, respectively. Of the respondents, 26% started providing these services during COVID-19, 32% continued to provide these services from pre-COVID to Current, 29% desired to provide these services, and 13% selected “N/A.”

Figure 16: Mobile Health by Facility, n = 87

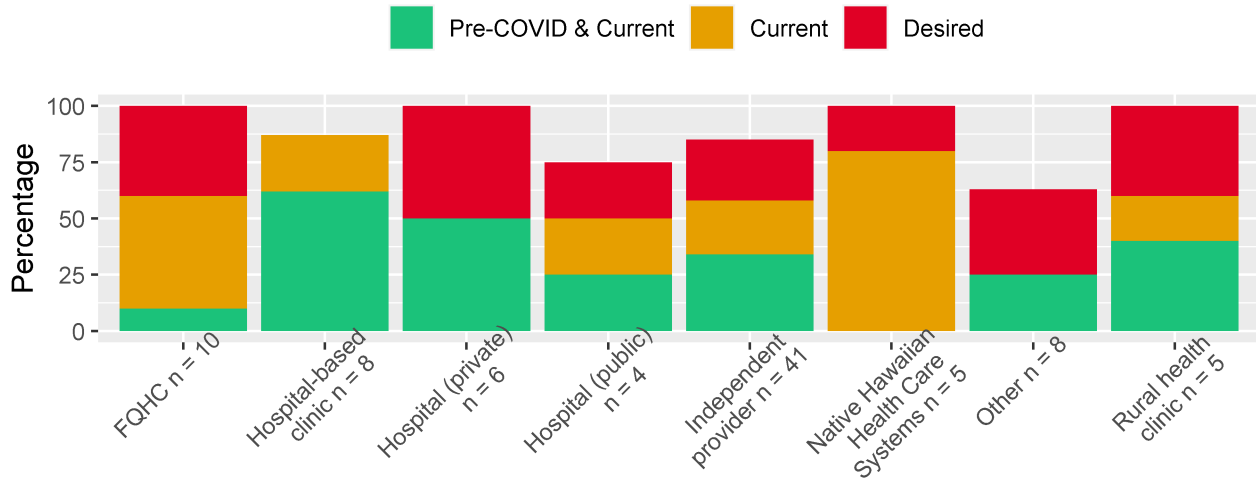
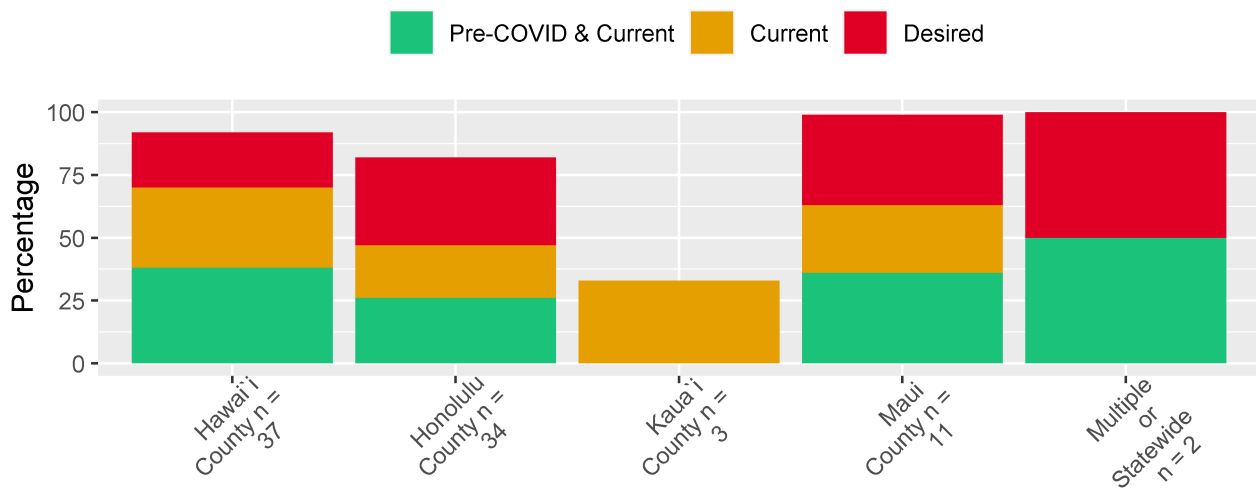


Figure 17: Mobile Health by County, n = 87



eConsults (78 respondents)

“eConsults” was defined in the survey as services that “enable PCPs to consult remotely with specialists through store and forward telehealth.”

Figures 18 and 19 present the percentage of respondents providing eConsults by facility type and county, respectively. Of the respondents, 6% started to provide these services during COVID-19, 18% continued to provide these services from pre-COVID to Current, 55% desired eConsults, and 21% selected “N/A.”

Out of all of the services in the survey, eConsults was the most desired telemedicine service by the respondents (55%). Most of the facility types expressed their desire for eConsults; particularly FQHCs, independent providers, Native Hawaiian Health Care Systems, and rural health clinics (Figure 18). In Figure 19, Maui County respondents showed high levels of interest in eConsults.

Figure 18: eConsults by Facility, n = 78

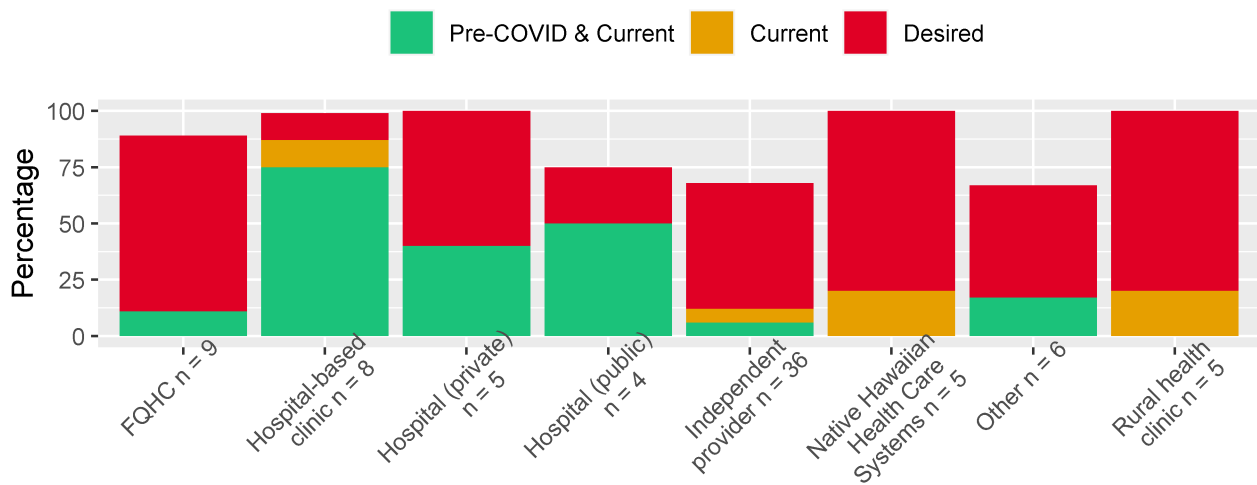
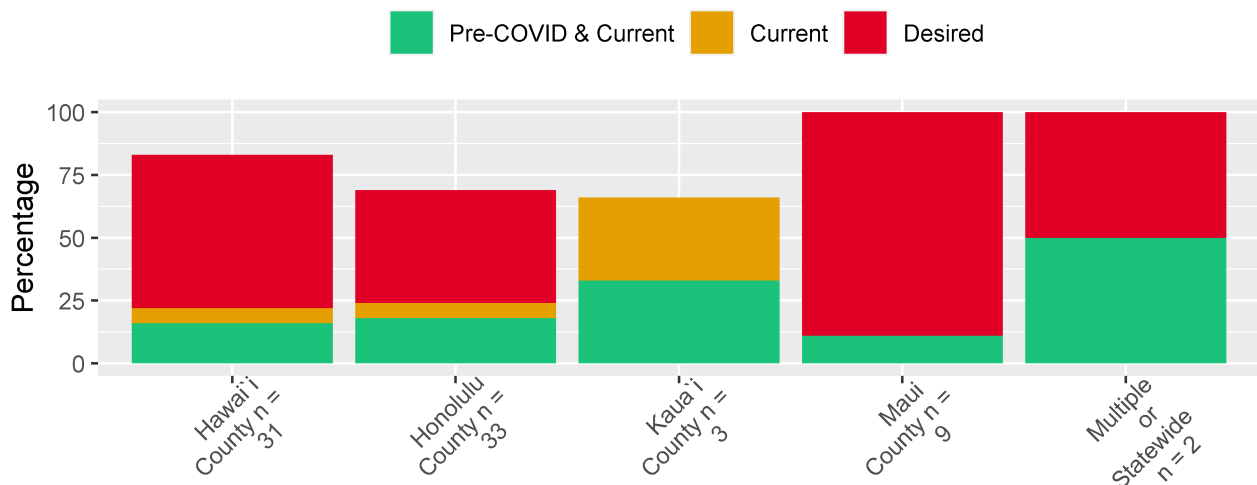


Figure 19: eConsults by County, n = 78



Tele-triage (83 respondents)

“Tele-triage” was defined in the survey as “telephone or virtual contact with patient to determine urgency and necessary care level and to give advice or refer the patient.”

Figures 20 and 21 present the percentage of respondents providing tele-triage services by facility type and county, respectively. Of the respondents, 42% started providing these services during COVID-19, 41% continued to provide these services from pre-COVID to Current, 12% desired to provide these services, and 5% selected “N/A.” After synchronous audio + visual visits, tele-triage was the answer with the second highest percentage increase of respondents who began offering these services during COVID-19. This increase was seen across the different facility types (Figure 20) and counties (Figure 21).

Figure 20: Tele-triage by Facility, n = 83

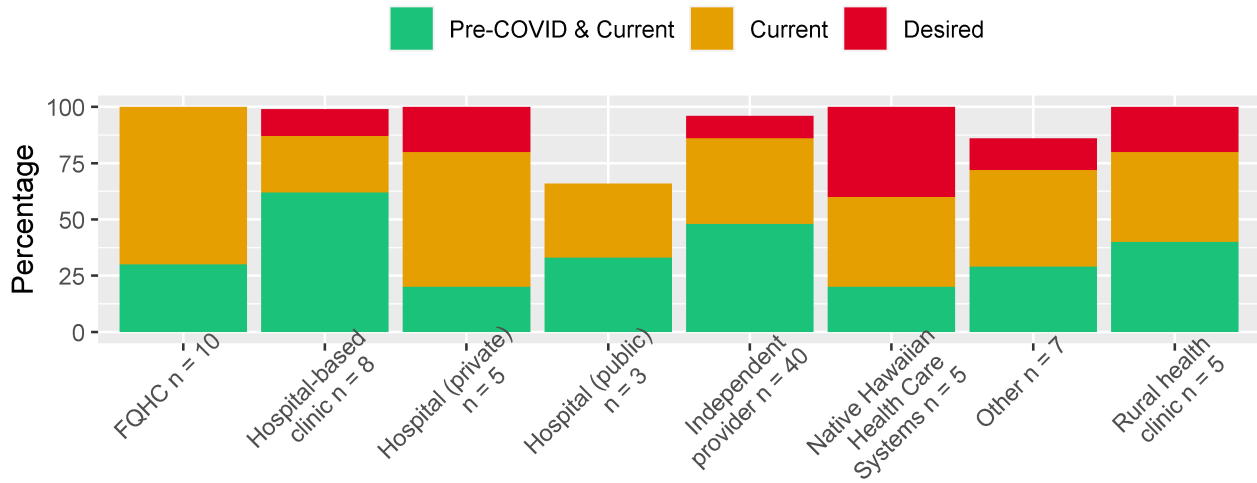
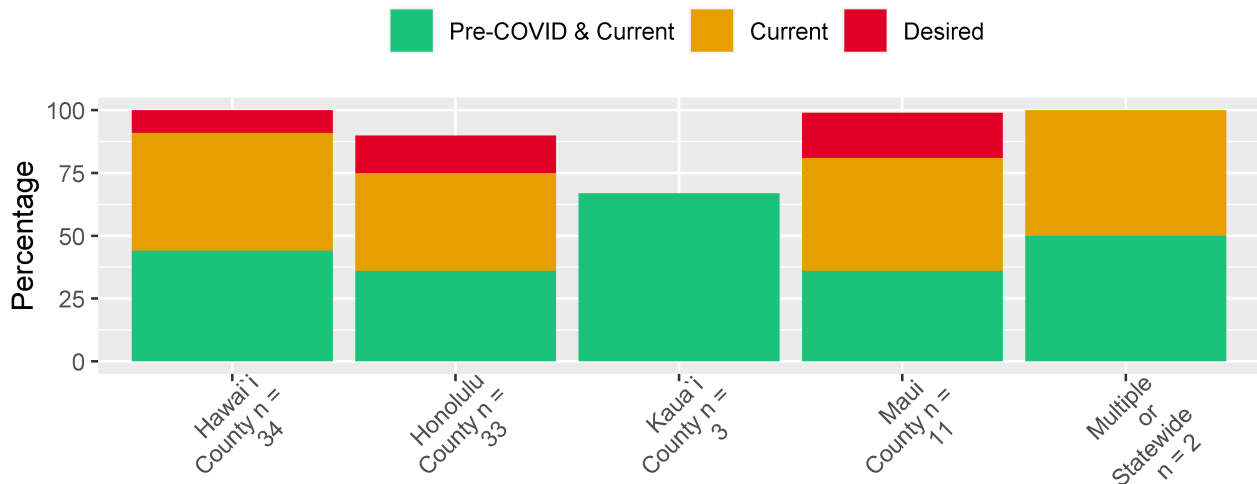


Figure 21: Tele-triage by County, n = 83



eICU (65 respondents)

“eICU” was defined in the survey as “a centralized, hub-and-spoke telemedicine ICU network where an intensivist-led team is responsible for ICU beds remotely.”

Figures 22 and 23 present the percentage of respondents providing eICU services by facility type and county, respectively. No respondents indicated that they started providing eICU services during COVID-19. Of the respondents, 5% continued to provide these services from pre-COVID to Current, 17% desired to provide these services, and 78% selected “N/A.” The high percentage of “N/A” responses (78%) may be due to the fact that ICU services are only generally provided at certain facility types (Figure 22 by facility type and Figure 23 by county).

Figure 22: eICU by Facility, n = 65

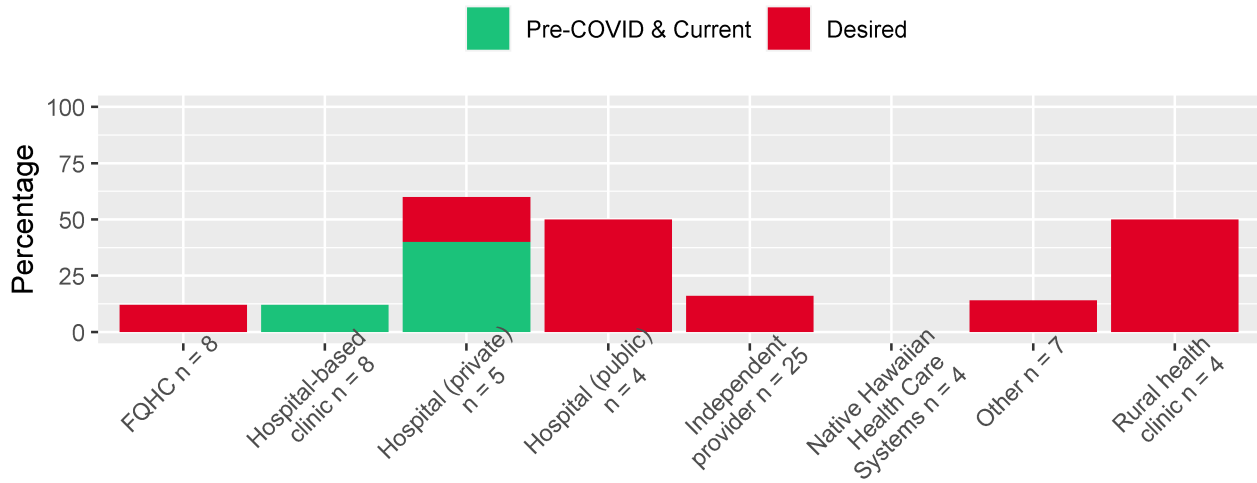
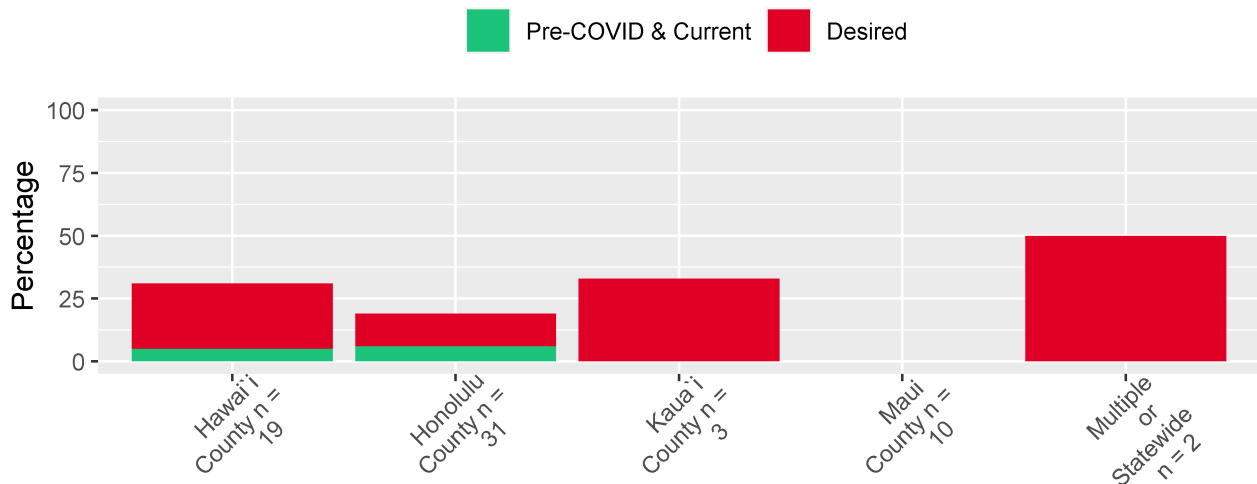


Figure 23: eICU by County, n = 65



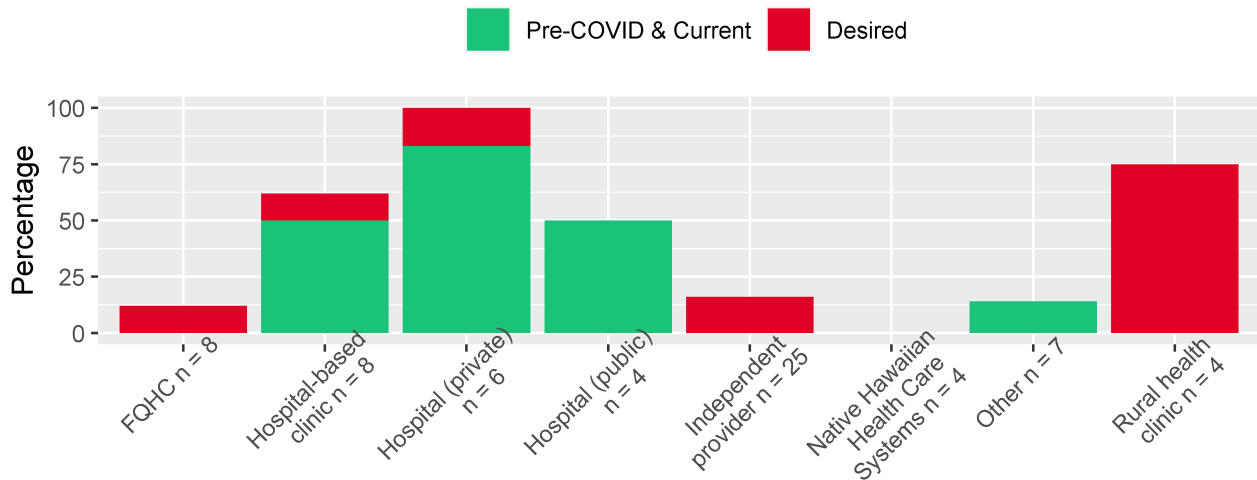
Telestroke (66 respondents)

“Telestroke” was defined in the survey as *“a hub-and-spoke telemedicine stroke network with a 24/7 on-call neurologist to evaluate stroke patients and make recommendations.”*

Figures 24 and 25 present the percentage of respondents providing telestroke services by facility type and county, respectively. Similar to eICU, no respondents indicated that they started providing telestroke services during COVID-19. Of the respondents, 18% continued to provide these services from pre-COVID to Current, 15% desired to provide these services, and 67% selected “N/A.”

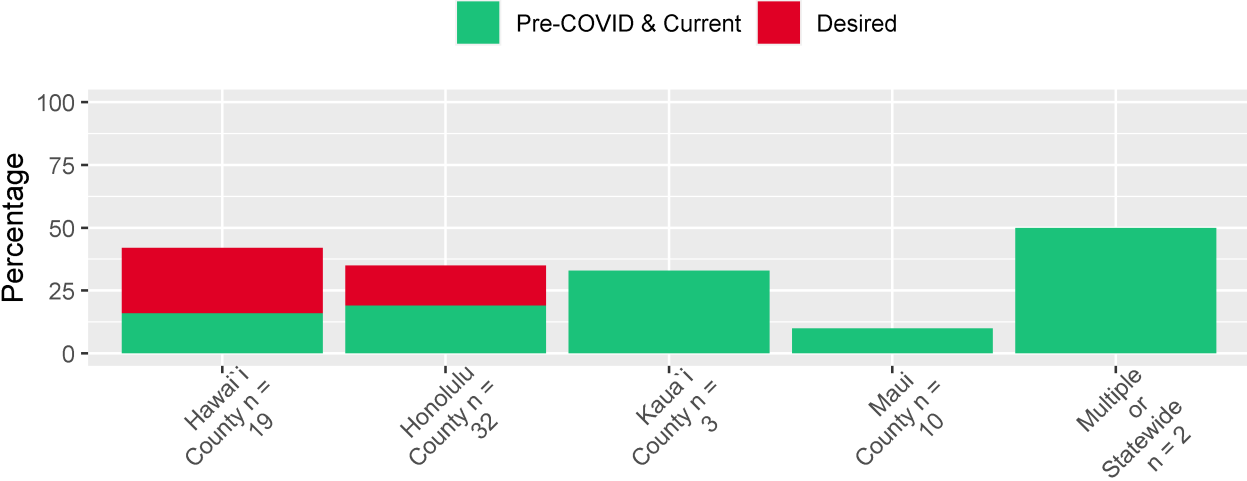
In Hawai‘i, Queen’s Medical Center Punchbowl serves as the “hub” for the Hawai‘i Telestroke Program.¹ This program allows hospitals to increase their capacity to care for stroke patients through telemedicine, and includes eight statewide “spoke” sites: Moloka‘i General Hospital, Wahiawā General Hospital, Hilo Medical Center, Queen’s Medical Center West O‘ahu, Kona Community Hospital, North Hawai‘i Community Hospital, Maui Memorial Medical Center, and Kahuku Hospital. Since this Hawai‘i Telestroke Program is only affiliated with certain facility types, this may explain the high percentage of respondents selecting “N/A.”

Figure 24: Telestroke by Facility, n = 66



¹<https://health.hawaii.gov/nt/stroke/hawaii-tele-stroke/>

Figure 25: Telestroke by County, n = 66



Real-time imaging (71 respondents)

“Real-time imaging” was defined in the survey as a “*real-time interactive imaging*” service.

Figures 26 and 27 present the percentage of respondents providing remote patient monitoring services by facility type and county, respectively. Real-time imaging had a small percentage of respondents (3%) providing these services during COVID-19, while 24% continued to provide these services from pre-COVID to Current, 31% desired to provide these services (many of which were FQHCs or independent providers), and 42% selected “N/A.”

Figure 26: Real-Time Imaging by Facility, n = 71

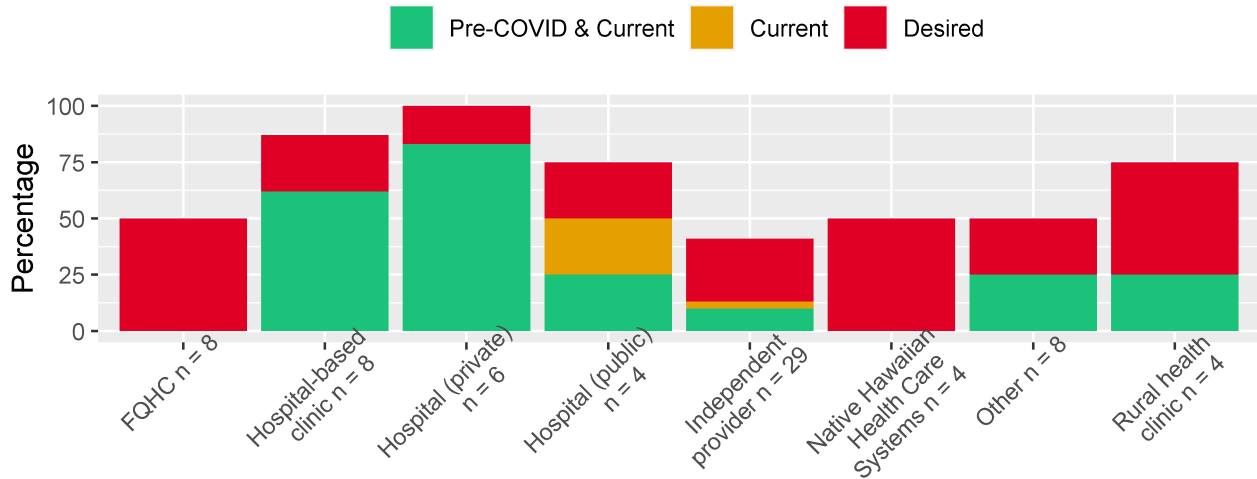
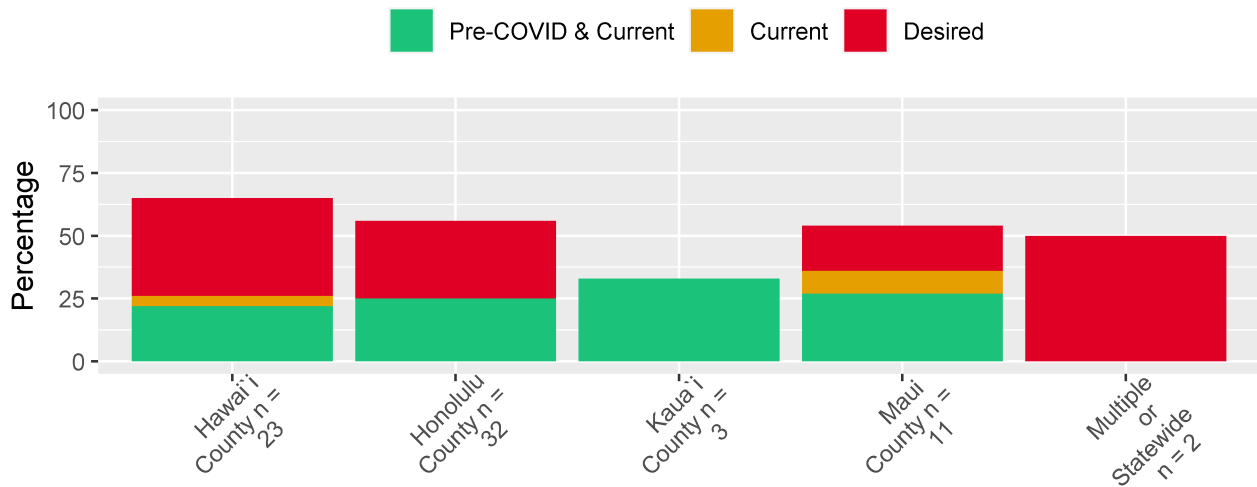


Figure 27: Real-Time Imaging by County, n = 71

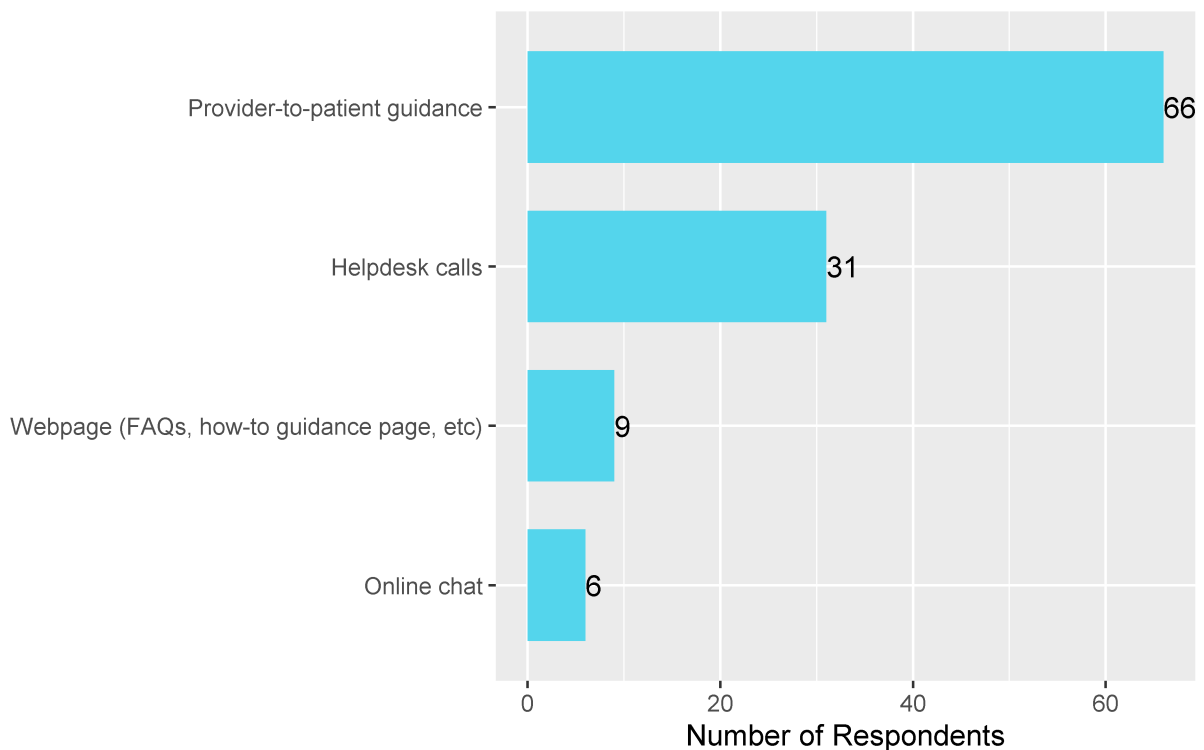


Technical Support Services

This survey also collected information regarding the types of technical support services that were available to patients. Survey question #24 asked: *“How does your facility or practice provide technical support for telemedicine services for patients? Please select all that apply: helpdesk calls, webpage (FAQs, how-to guidance page, etc), online chat, provider-to-patient guidance, or other (please specify).”* This question was presented with checkbox options; thus, respondents could select multiple responses and/or provide open-ended responses.

Figure 28 below shows that provider-to-patient guidance was the most frequently selected out of all of the options. In the open-ended section for this question (e.g., “Other - please specify”), 5 respondents stated that they provided their support/guidance by phone calls to their patients.

Figure 28: List of Provided Technical Support Offered by the Respondents’ Facility/Practice



Synchronous Audio+Visual Services

Survey question #11 asked: “Which types of synchronous audio + visual patient visit services does your facility or practice provide?” The question then had specific sub-questions focused on a variety of synchronous audio + visual services (i.e., acute care-related services; routine office/outpatient visits; behavioral/mental health services and/or counseling; prenatal care; imaging; follow-up; rehab; family meetings or care coordination meetings; and home-based care).

Based on submitted responses, the most common types of synchronous audiovisual visits (i.e. real-time visits) respondents offered (pre-COVID or current), in order, were routine office/outpatient visits, surgery or discharge follow-up visits, and acute care-related services.

Acute care-related services (79 respondents)

For the option of “Acute care-related services (i.e., urgent or emergency care)”, 44% of respondents began providing acute care-related services during COVID-19, 22% continued to provide these services from pre-COVID to Current, 13% of respondents desired acute care-related services, and 22% selected “N/A” (Figure 29 by facility type and Figure 30 by county).

Figure 29: Acute Care-Related Services by Facility, n = 79

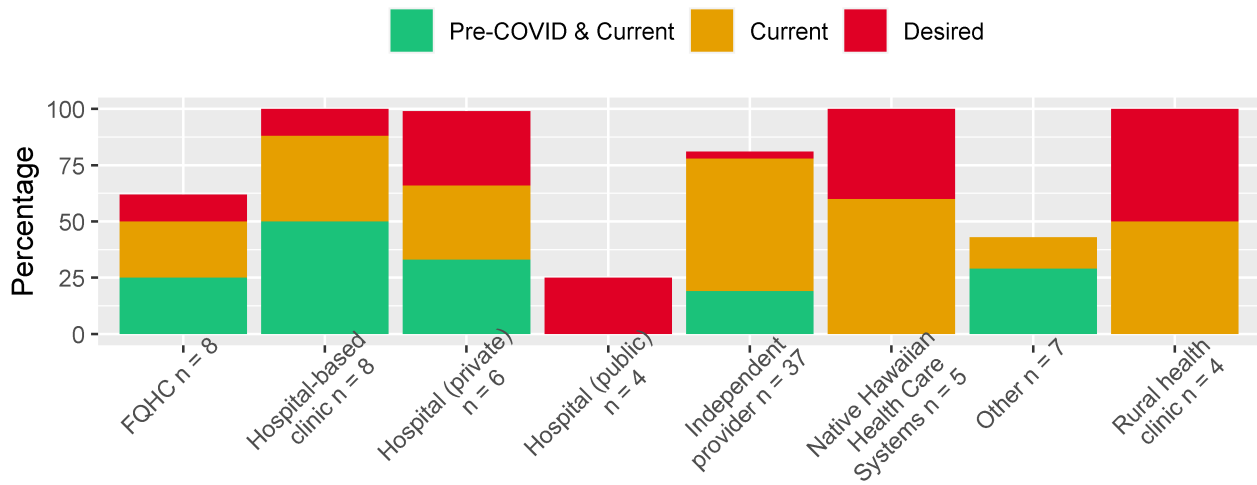
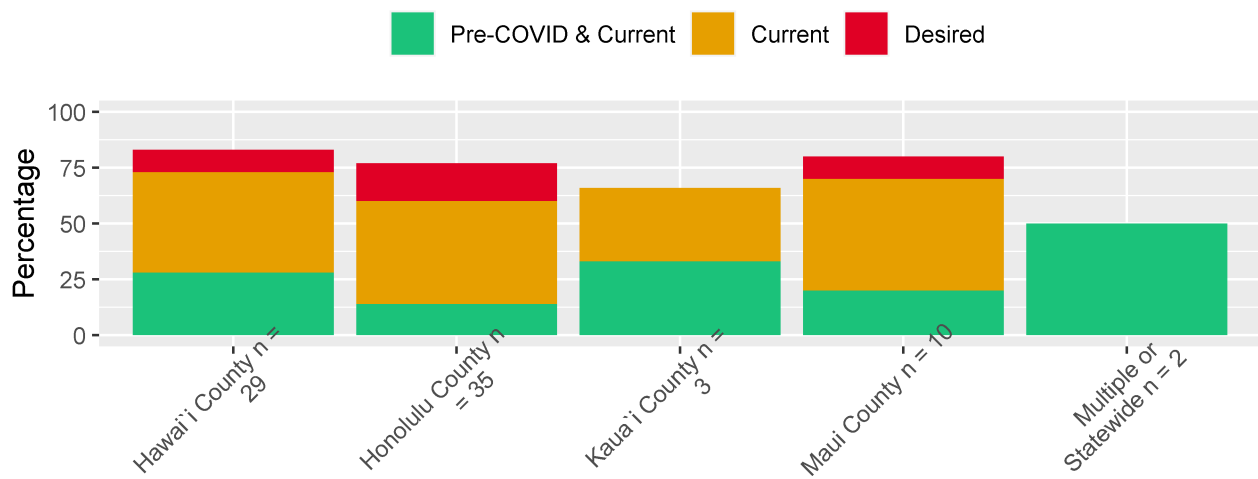


Figure 30: Acute Care-Related Services by County, n = 79



Routine office/outpatient visits (84 respondents)

For the option of “*Routine office/outpatient visits (primary care)*”, 56% of respondents started providing these services during COVID-19, 26% continued to provide these services from pre-COVID to Current, 10% desired to provide these services, and 8% of respondents selected “N/A.” Of all the types of synchronous audio + visual patient services queried in question #11, routine office/outpatient visits was the answer with the highest percentage increase of respondents that began offering these services during COVID-19, and these increases can be seen for all facility types and counties across the board.

Included in the 10% of respondents that indicated they desired to provide routine office/outpatient visits via telemedicine were primarily public hospitals, independent providers, Native Hawaiian Health Care Systems, and rural health clinics (Figure 31 by facility type and Figure 32 by county).

Figure 31: Routine Office/Outpatient Visits (Primary Care) by Facility, n = 84

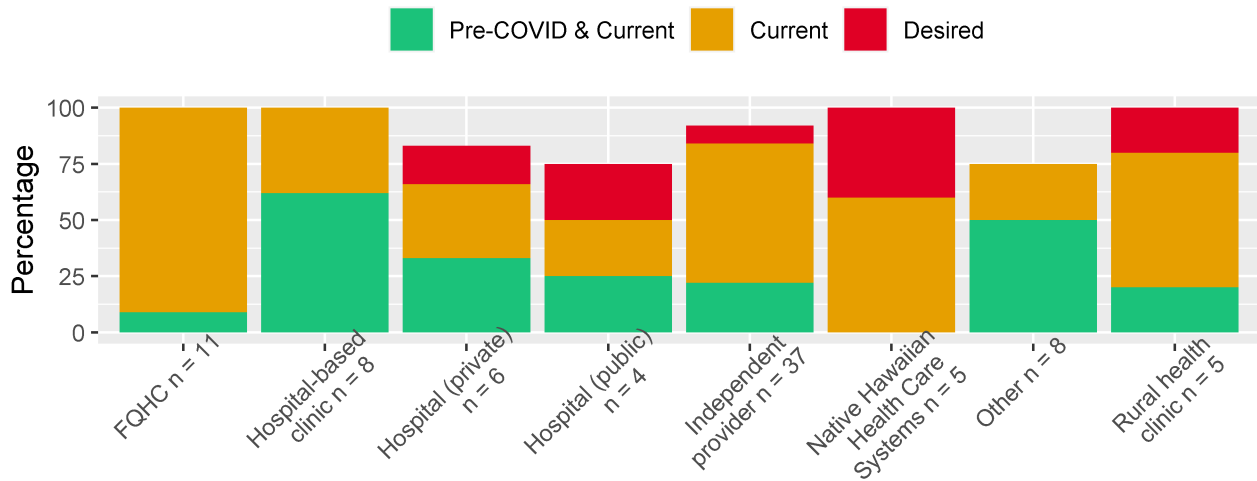
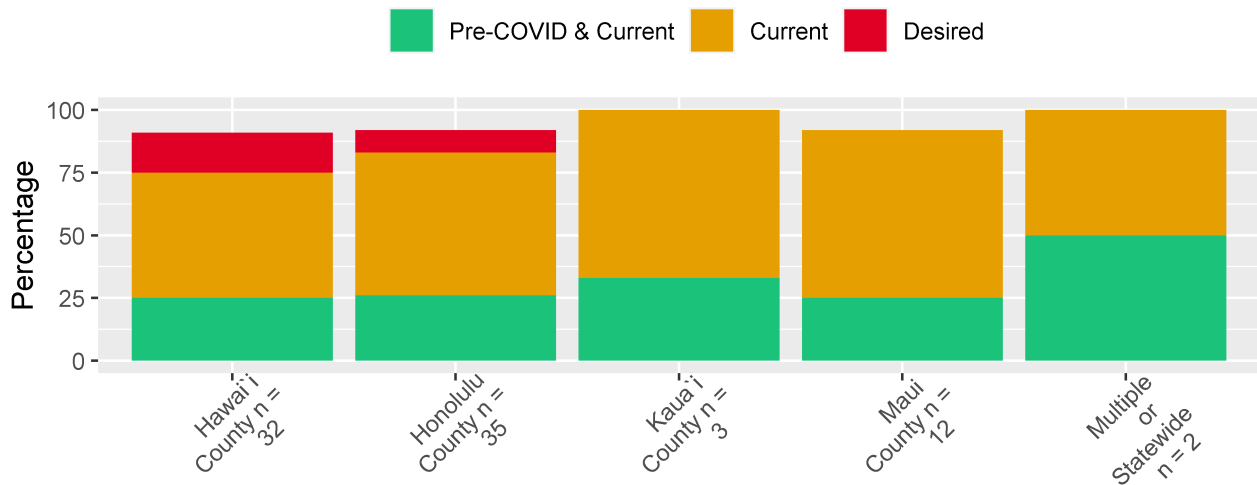


Figure 32: Routine Office/Outpatient Visits (Primary Care) by County, n = 84



Behavioral/mental health services and/or counseling (78 respondents)

For the option of “Behavioral/mental health services and/or counseling”, 29% of respondents started providing these services during COVID-19, 29% continued to provide these services from pre-COVID to Current, 15% desired to provide these services, and 26% selected “N/A” (Figure 33 by facility type and Figure 34 by county).

There was a large uptake in the provision of behavioral/mental health services and/or counseling during COVID-19 by FQHCs, Native Hawaiian Health Care Systems, and rural health clinics.

Figure 33: Behavioral/Mental Health Services and/or Counseling by Facility, n = 78

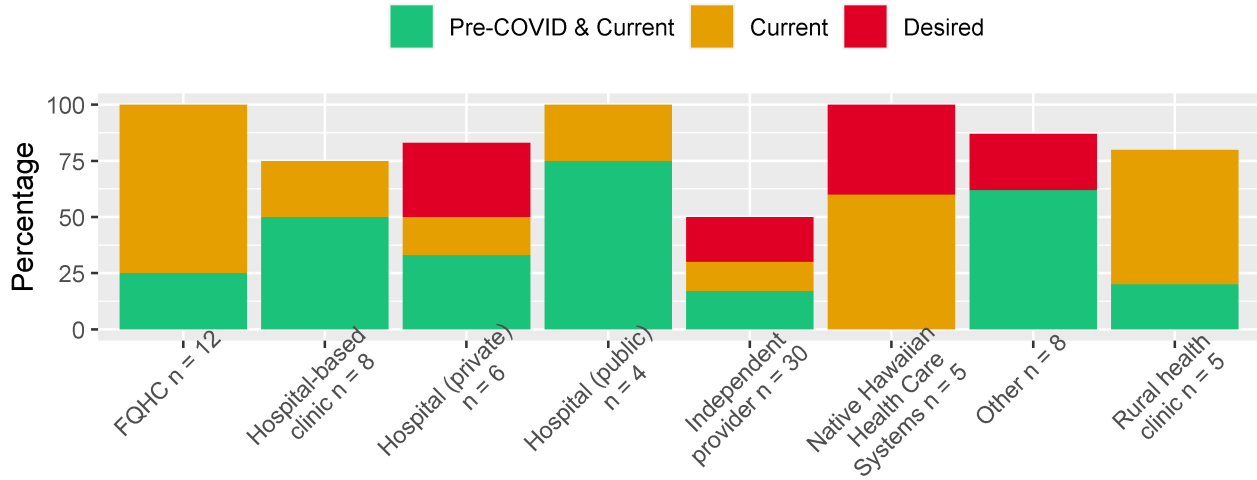
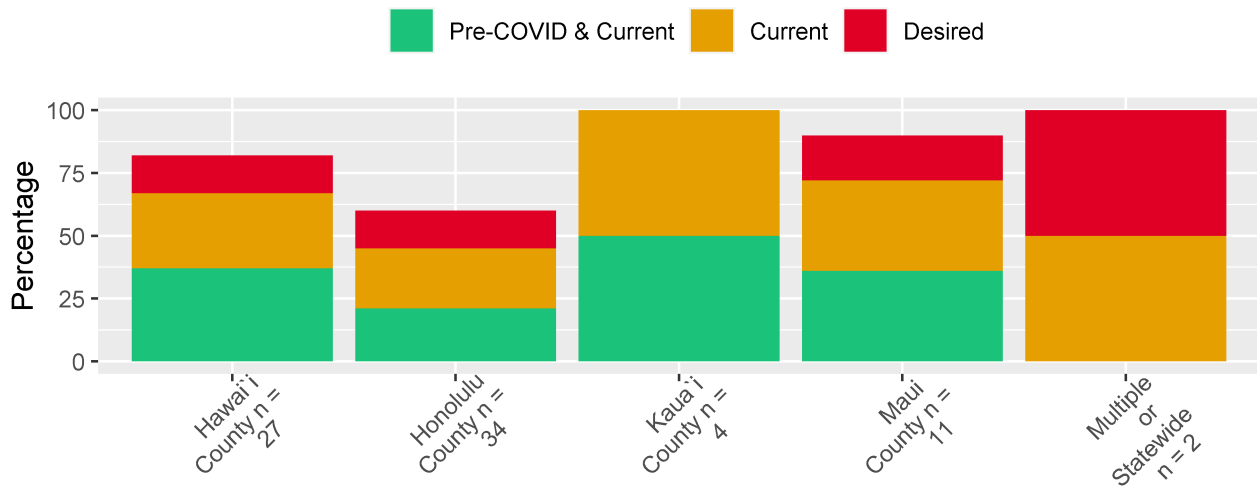


Figure 34: Behavioral/Mental Health Services and/or Counseling by County, n = 78



Prenatal Care (62 respondents)

For the option of “Prenatal care”, 19% of respondents started providing these services during COVID-19, 6% continued to provide these services from pre-COVID to Current, 8% desired to provide these services, and 66% selected “N/A” (Figure 35 by facility type and Figure 36 by county). Prenatal care telemedicine services were particularly desired in Hawai'i County.

Figure 35: Prenatal Care by Facility, n = 62

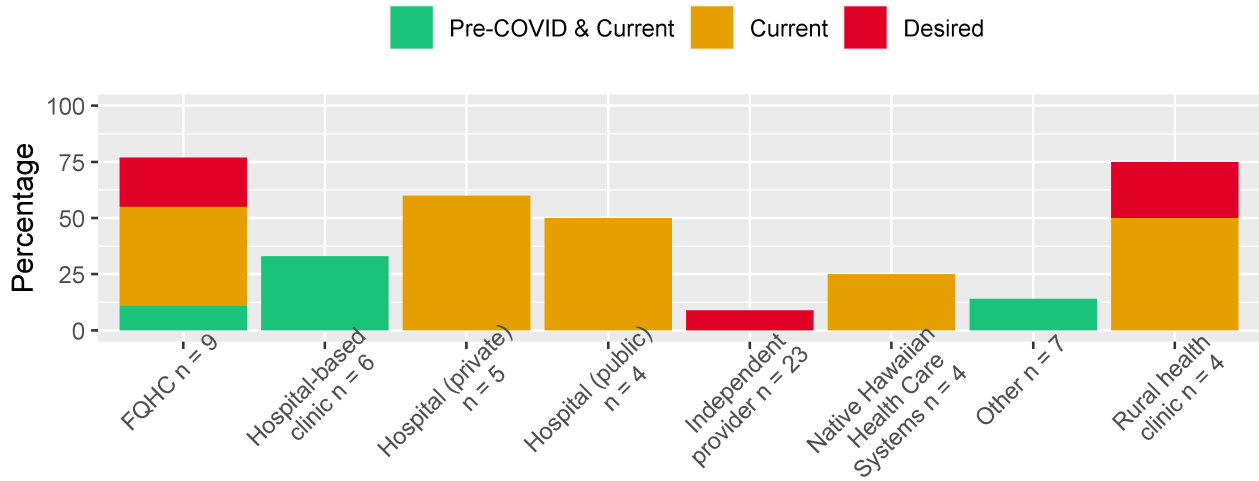
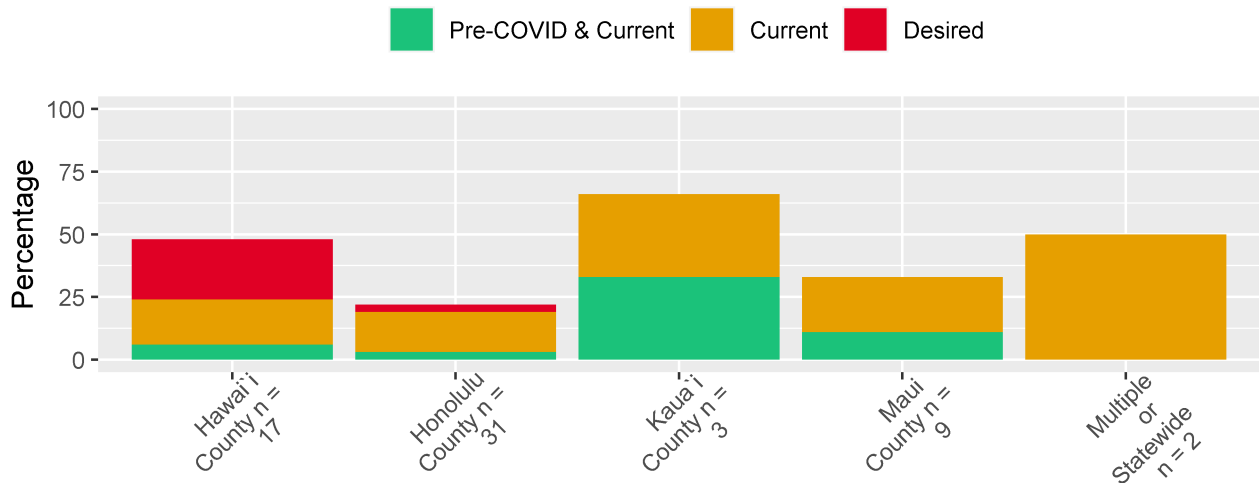


Figure 36: Prenatal Care by County, n = 62



Imaging (i.e., Store & Forward) (70 respondents)

For the option of “Imaging (i.e., store and forward)”, 11% of respondents started providing these services during COVID-19, 33% continued to provide these services from pre-COVID to Current, 20% desired to provide these services, and 36% selected “N/A” (Figure 37 by facility type and Figure 38 by county).

Figure 37: Imaging (i.e., Store and Forward) by Facility, n = 70

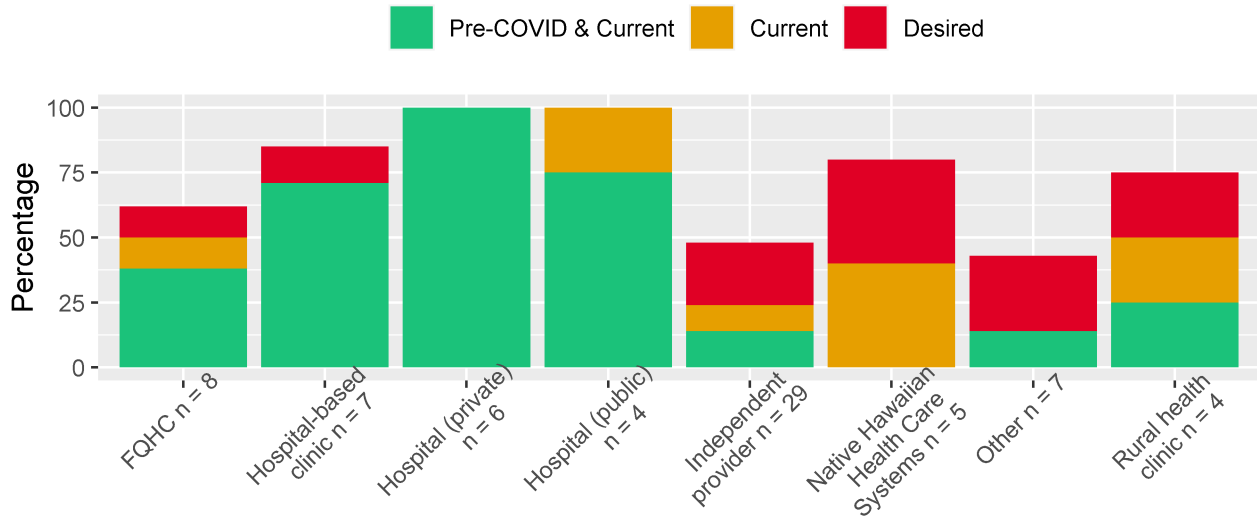
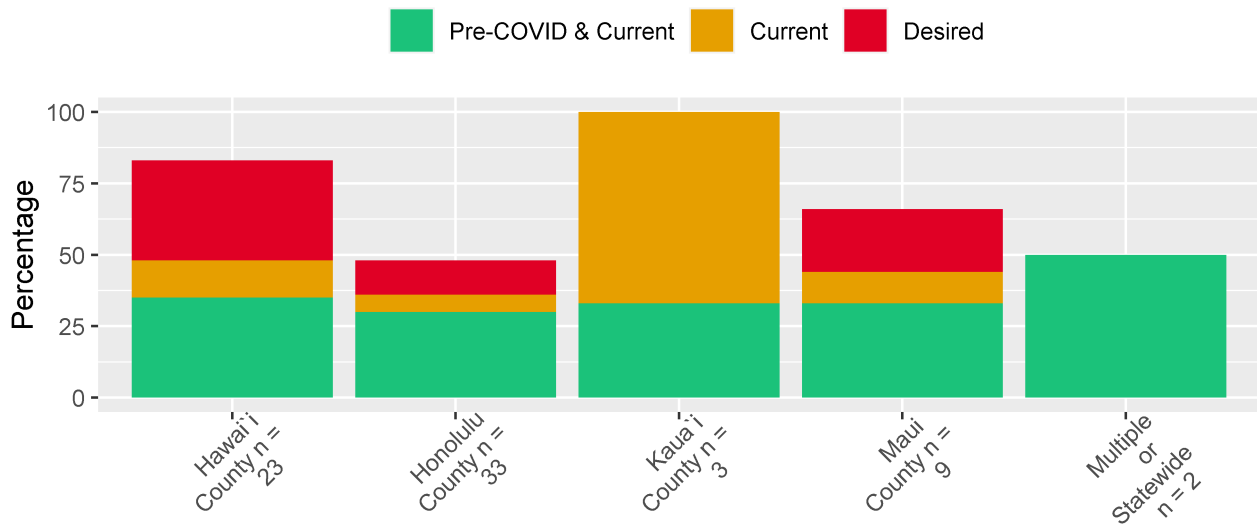


Figure 38: Imaging (i.e., Store and Forward) by County, n = 70



Follow-up (i.e., from surgery, discharge) (80 respondents)

For the option of “Follow-up (i.e., from surgery, discharge)”, 48% of respondents started providing these services during COVID-19, 19% continued to provide these services from pre-COVID to Current, 19% desired to provide these services, and 15% selected “N/A” (Figure 39 by facility type and Figure 40 by county). After routine office/outpatient visits, follow-up visits (i.e., from surgery, discharge) was the answer with the second-highest percentage increase of respondents who began offering these services during COVID-19. These follow-up telemedicine visits were particularly desired by FQHCs, rural health clinics, and Native Hawaiian Health Care Systems and in Hawai‘i and Maui counties.

Figure 39: Follow-up (i.e., from Surgery, Discharge) by Facility, n = 80

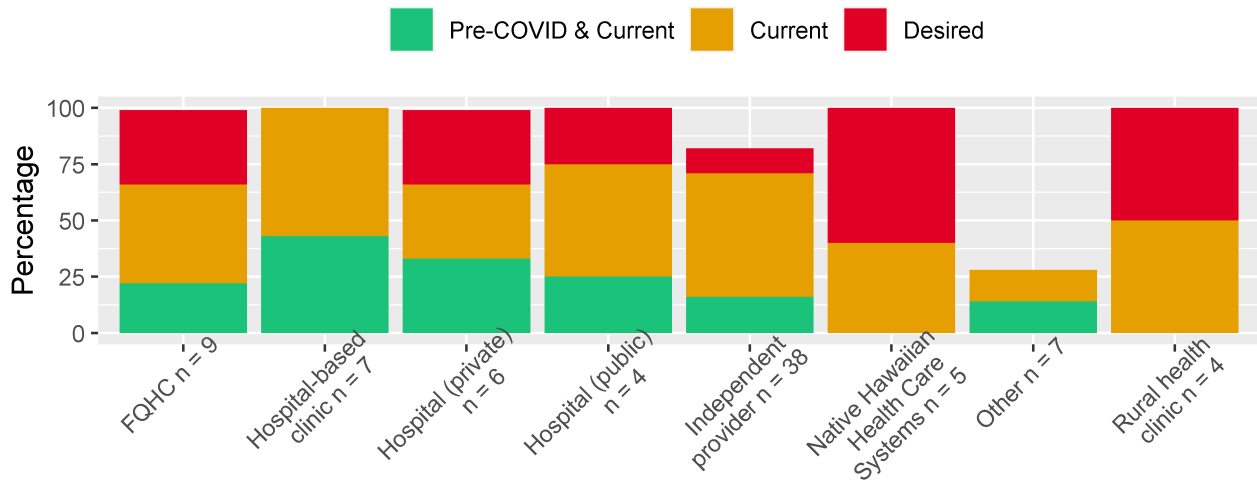
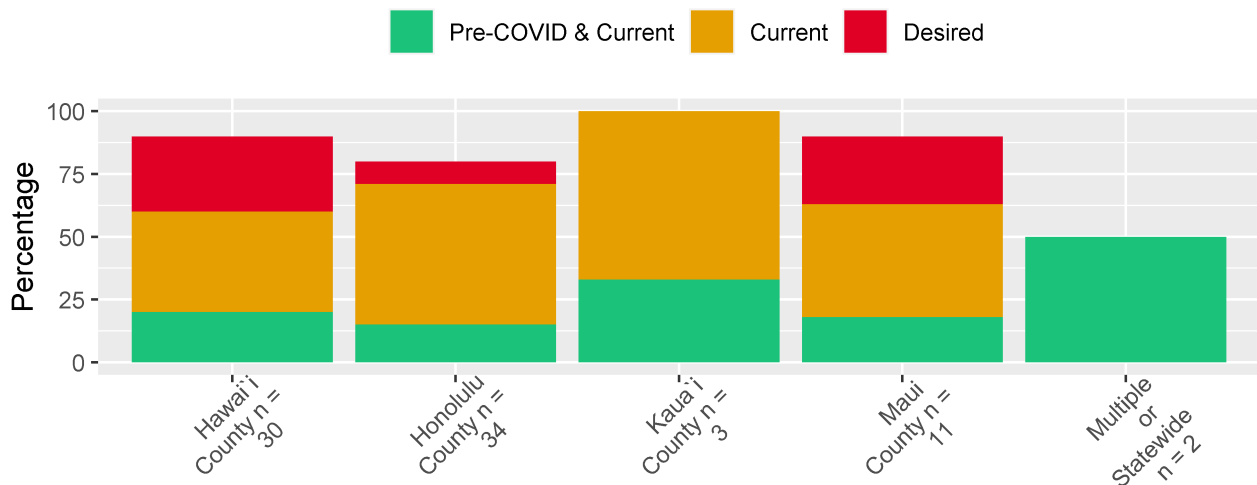


Figure 40: Follow-up (i.e., from Surgery, Discharge) by County, n = 80



Rehabilitation (i.e., speech language pathology, PT, OT) (64 respondents)

For the option of “Rehab (i.e., speech language pathology, PT, OT)”, 12% of respondents started providing these services during COVID-19, 9% continued to provide these services from pre-COVID to Current, 20% desired to provide these services, and 58% selected “N/A.” These services were desired across many facility types (Figure 41) and all counties (Figure 42).

Figure 41: Rehab (i.e., Speech Language Pathology, PT, OT) by Facility, n = 64

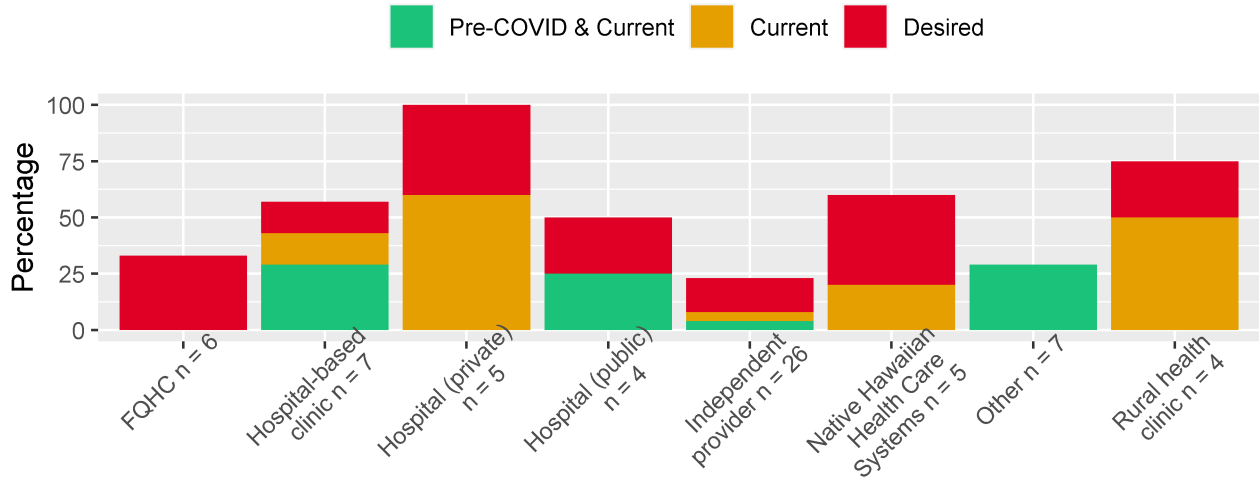
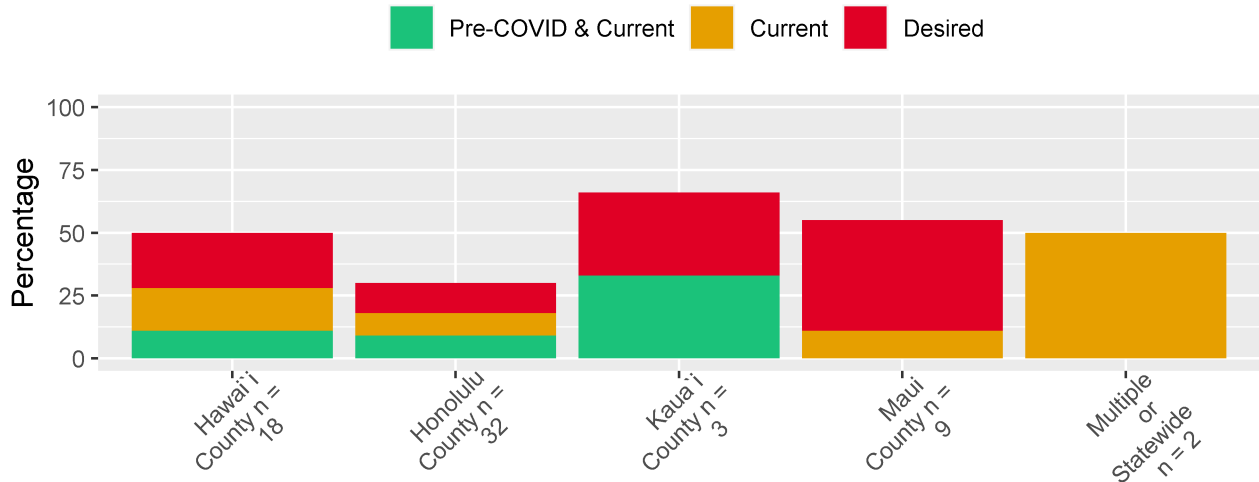


Figure 42: Rehab (i.e., Speech Language Pathology, PT, OT) by County, n = 64



Family meetings or care coordination meetings (75 respondents)

For the option of “Family meetings or care coordination meetings”, 29% of respondents started providing these services during COVID-19, 20% continued to provide these services from pre-COVID to Current, 31% desired to provide these services, and 20% selected “N/A.” These services were desired across most facility types (Figure 43) and counties (Figure 44).

Figure 43: Family Meetings or Care Coordination Meetings by Facility, n = 75

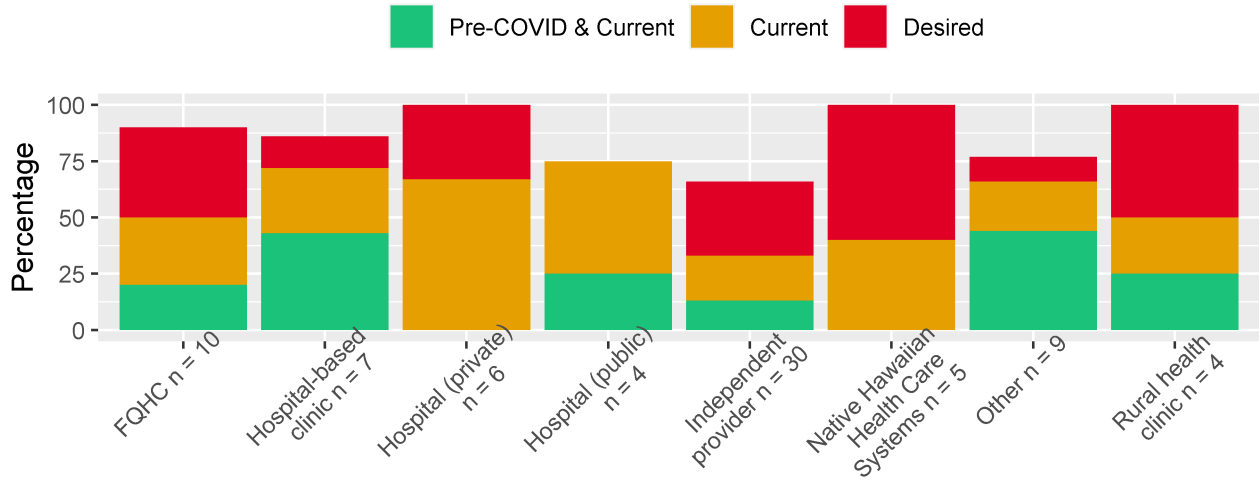
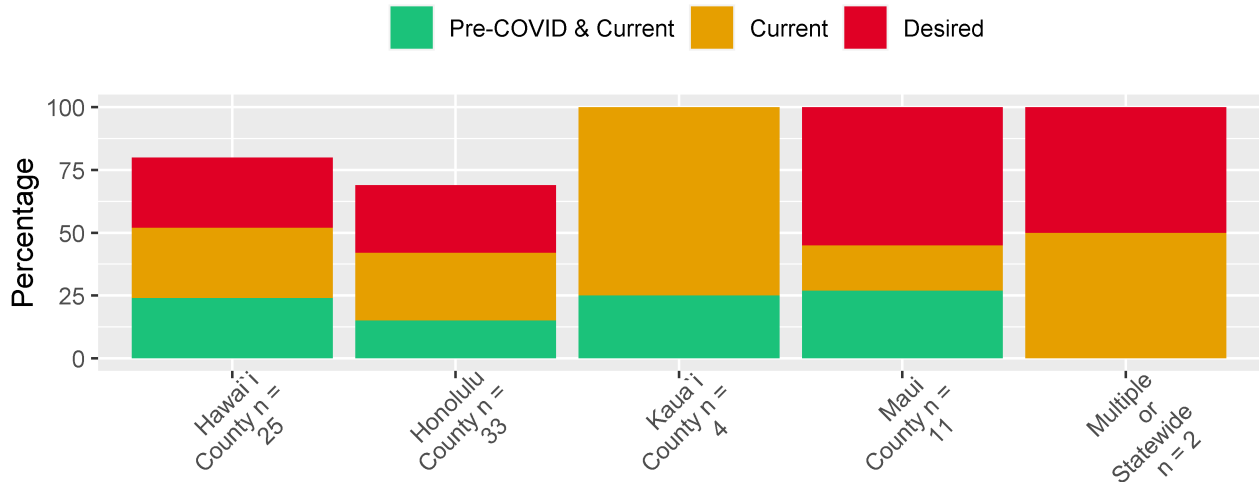


Figure 44: Family Meetings or Care Coordination Meetings by County, n = 75



Home-based care (69 respondents)

For the option of “Home-based care (i.e., nursing care, rehabilitation services)”, 10% of respondents started providing these services during COVID-19, 17% continued to provide these services from pre-COVID to Current, 22% desired to provide these services, and 51% selected “N/A.” Home-based care services were desired across most facility types (Figure 45) and counties (Figure 46).

Figure 45: Home-Based Care by Facility, n = 69

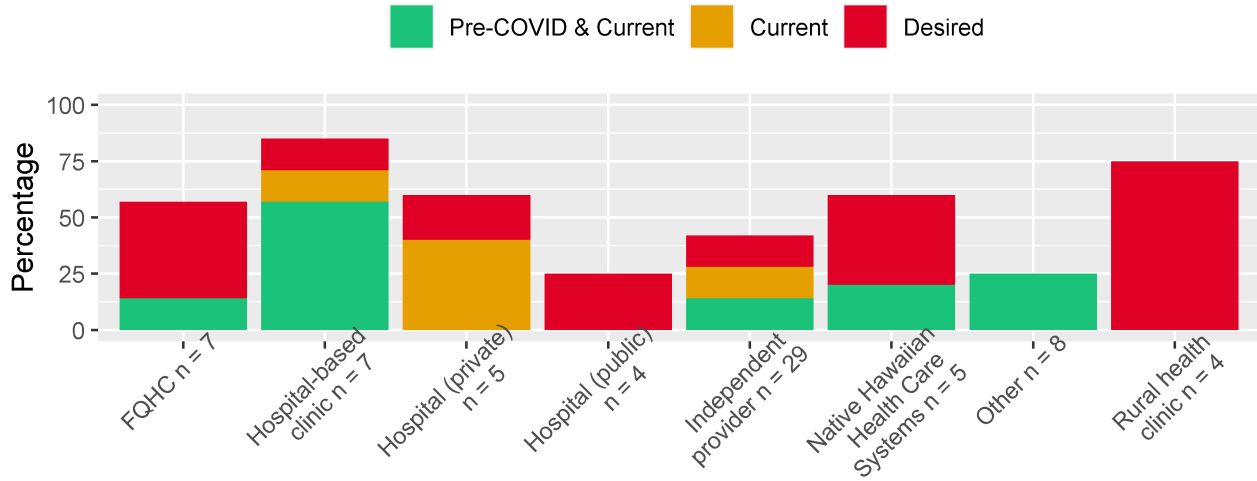
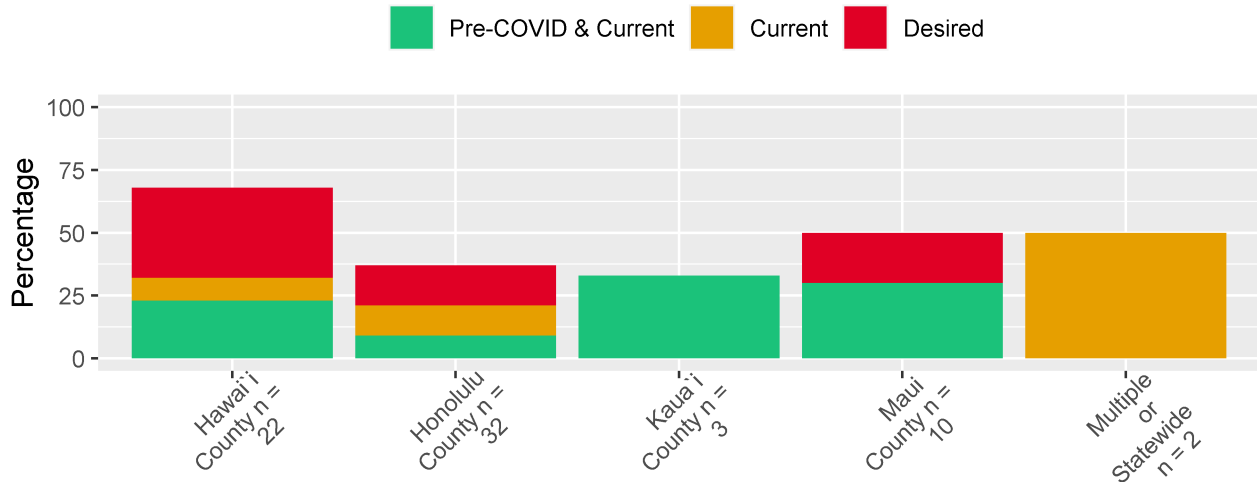


Figure 46: Home-Based Care by County, n = 69



Equipment

Survey question #13 asked: “Please select the *ESTIMATED* number of items (#) of equipment that your facility or practice currently has available for telemedicine. Please input ‘N/A’ if unknown.” Respondents could only select one of four options: “0,” “1-10,” “<10,” or “N/A.” The list of equipment included telemedicine carts, computers, tablets, and mobile devices. This question also provided a separate area for respondents to include additional details. The figures below show the percentage of respondents’ answers by facility type and county.

Telemedicine Carts (82 respondents)

In terms of number of telemedicine carts, 60% of respondents selected “0,” 23% selected “1-10,” 2% selected “>10,” and 15% selected “N/A” (Figures 47 and 48 by facility type and county, respectively). Of the 49 respondents that indicated that their facility/practice had zero telemedicine carts (60%), 32 (65%) were independent providers. In general, hospitals had higher numbers of carts than other facility types.

Figure 47: Telemedicine Carts by Facility, n = 82

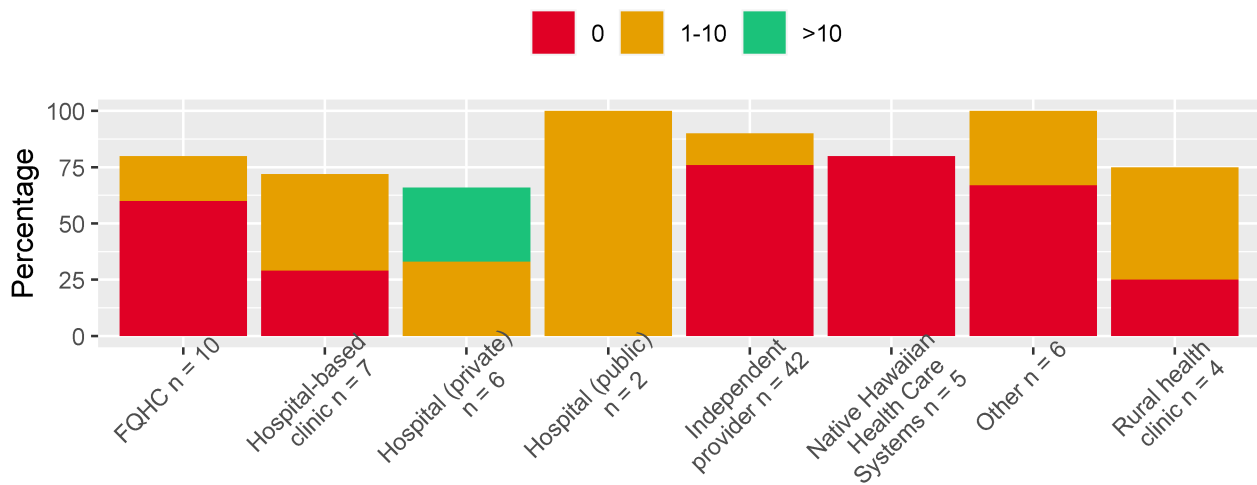
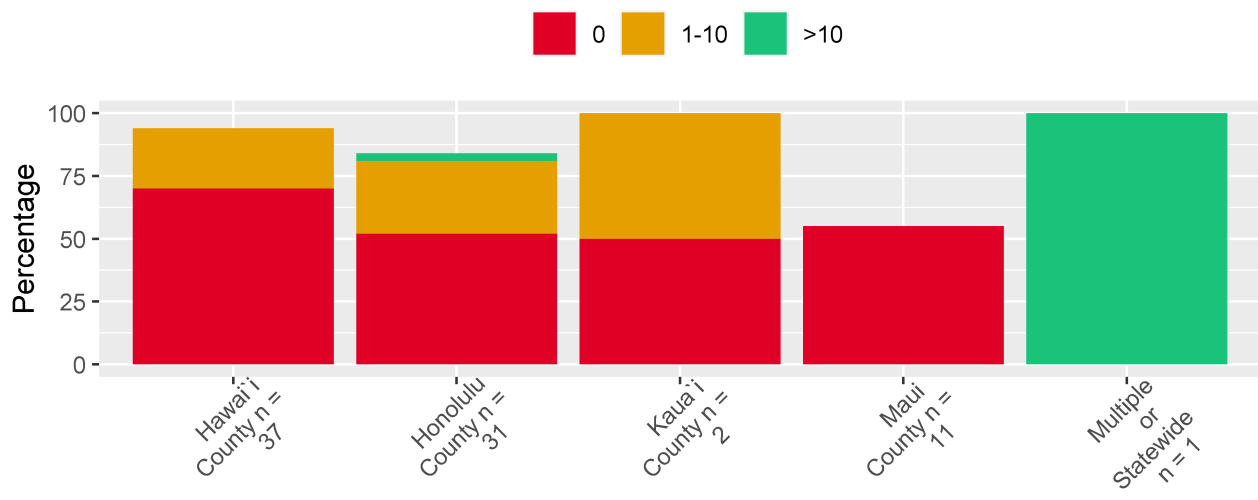


Figure 48: Telemedicine Carts by County, n = 82



Computers (non-carts) for video conferencing (91 respondents)

In terms of number of computers (non-carts) for video conferencing, 9% of respondents selected “0,” 64% selected “1-10,” 26% selected “>10,” and 1% selected “N/A” (Figure 49 by facility and Figure 50 by county). Computers for video conferencing were quite widespread across facility types and counties.

Figure 49: Computers (Non-Carts) for Video Conferencing by Facility, n = 91

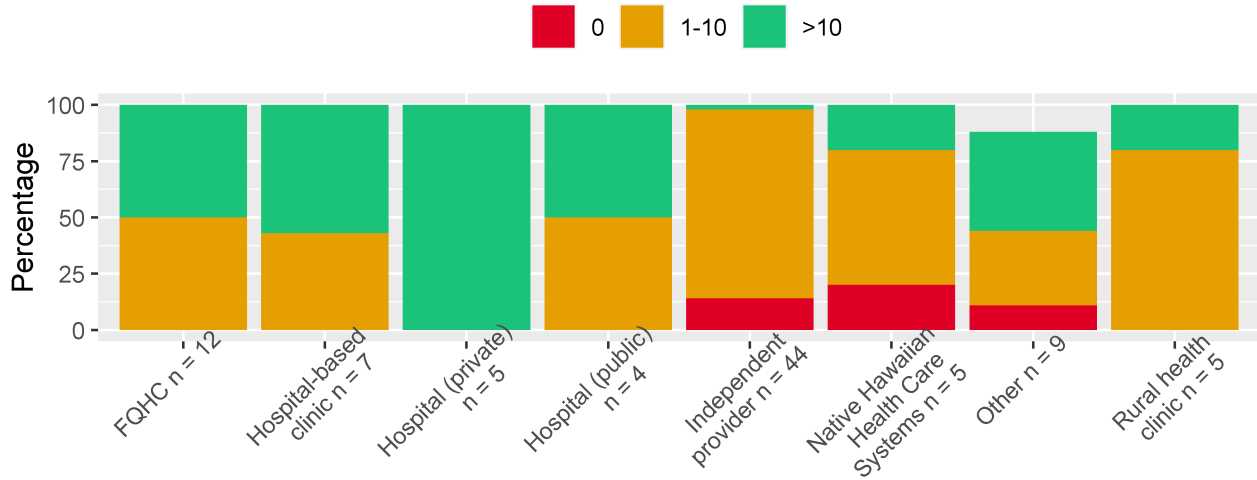
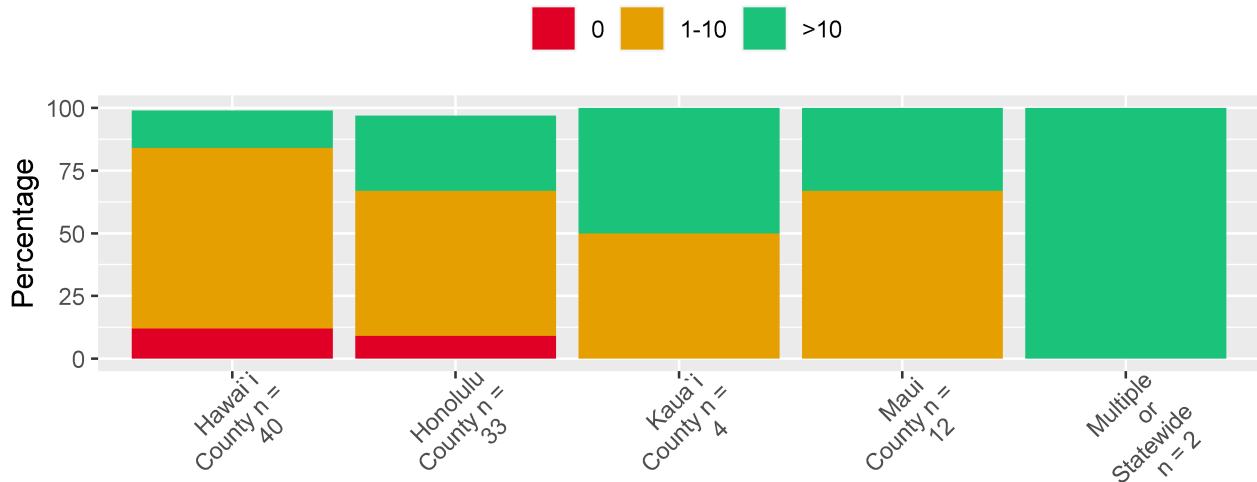


Figure 50: Computers (Non-Carts) for Video Conferencing by County, n = 91



Tablets (91 respondents)

In terms of number of tablets, 32% of respondents selected “0,” 49% selected “1-10,” 18% selected “>10,” and 1% selected “N/A.” Tablets were desired across many facility types (Figure 51) and counties (Figure 52).

Figure 51: Tablets (e.g., iPads) for Video Conferencing by Facility, n = 91

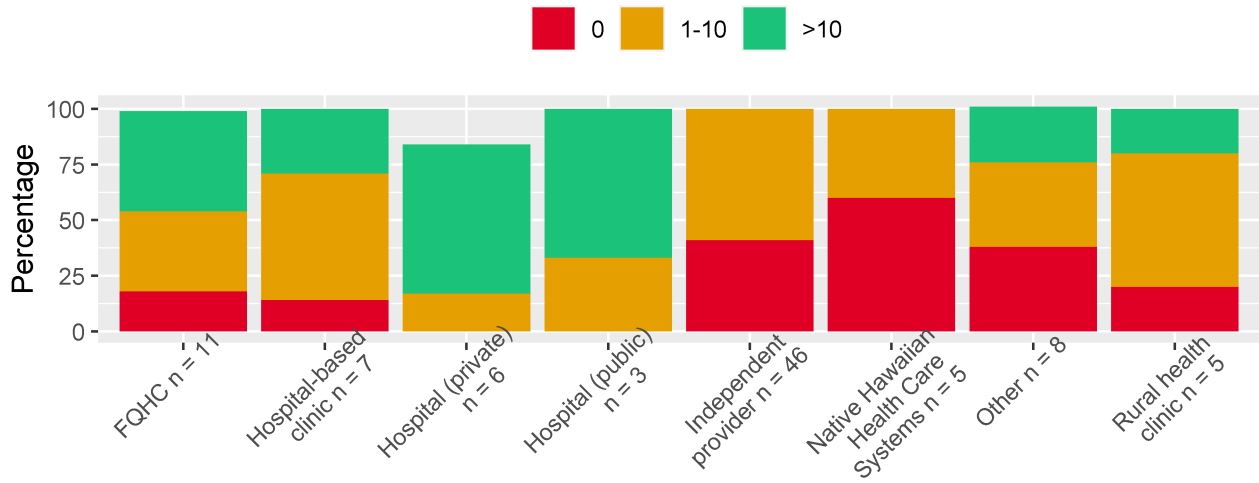
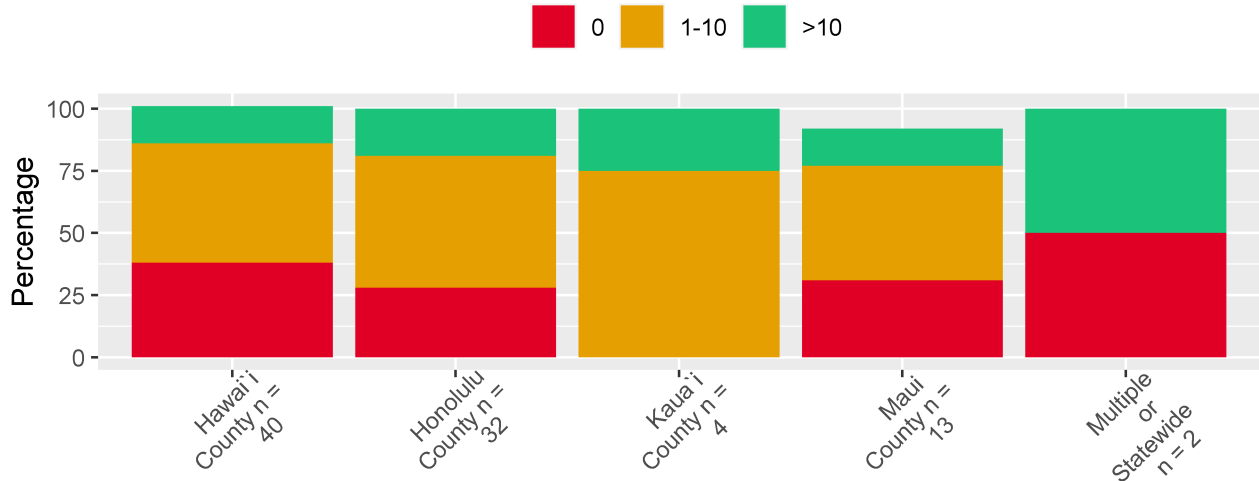


Figure 52: Tablets (e.g., iPads) for Video Conferencing by County, n = 91



Mobile devices (91 respondents)

In terms of number of mobile devices, 15% of respondents selected “0,” 64% selected “1-10,” 15% selected “>10,” and 5% selected “N/A.” Mobile devices were widespread across facility types (Figure 53) and counties (Figure 54).

Figure 53: Mobile Devices (e.g., Cell Phones) by Facility, n = 91

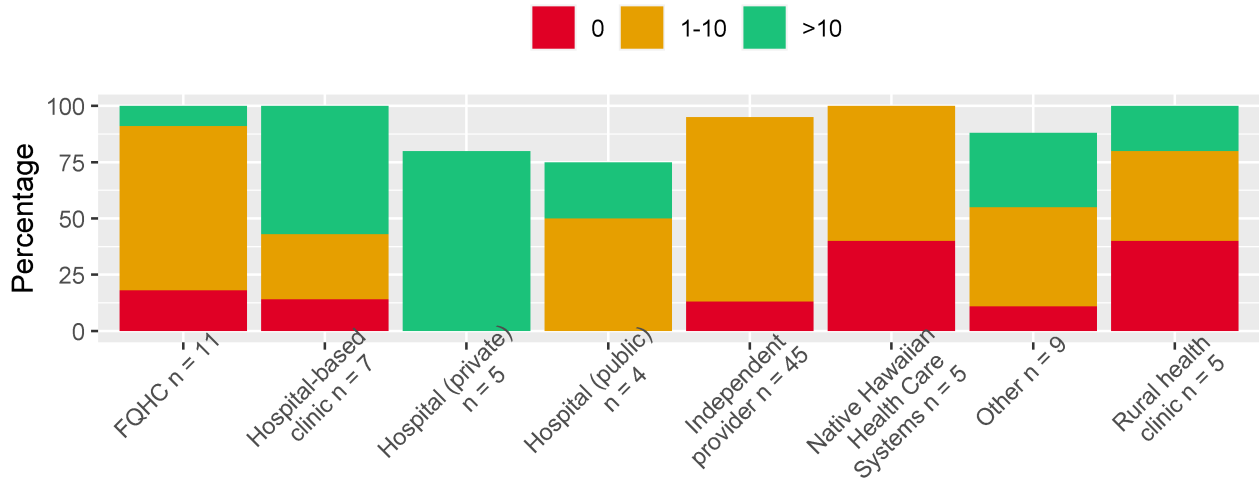
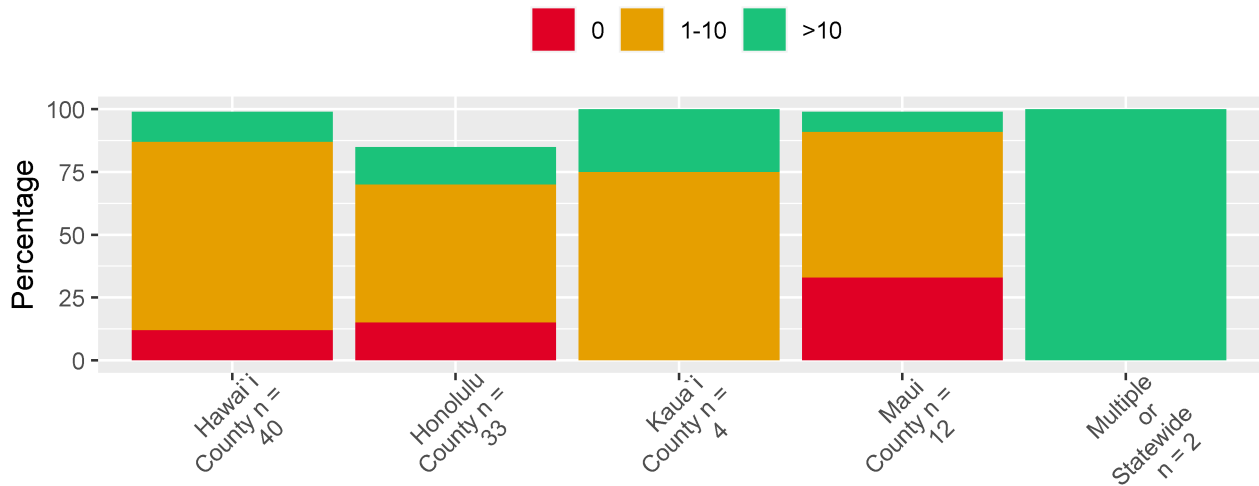


Figure 54: Mobile Devices (e.g., Cell Phones) by County, n = 91



Peripheral Devices

Survey question #14 asked: “Please select the *ESTIMATED* number of items (#) of peripheral devices (e.g., connected devices that are bluetooth-/internet-enabled) your facility or practice currently has for telemedicine. Please input ‘N/A’ if unknown.” Respondents could only select one of four options: “0,” “1-10,” “<10,” or “N/A.” The list of peripheral devices included digital stethoscopes, blood pressure monitors, glucometers, otoscopes, pulse oximeters, ultrasounds, and digital ECGs. The question also provided a separate area for respondents to include additional details. Figures 55-68 show the percentage of respondents’ answers by facility type and county, respectively.

The majority of respondents indicated that their facility/practice did not have any of the devices listed on the survey (i.e., selected “0”). Due to their larger response size, independent providers with no peripheral devices were the main contributors. A majority of facilities by county also did not have many of the devices listed.

Digital stethoscopes (89 respondents)

Figure 55: Digital Stethoscopes by Facility Type

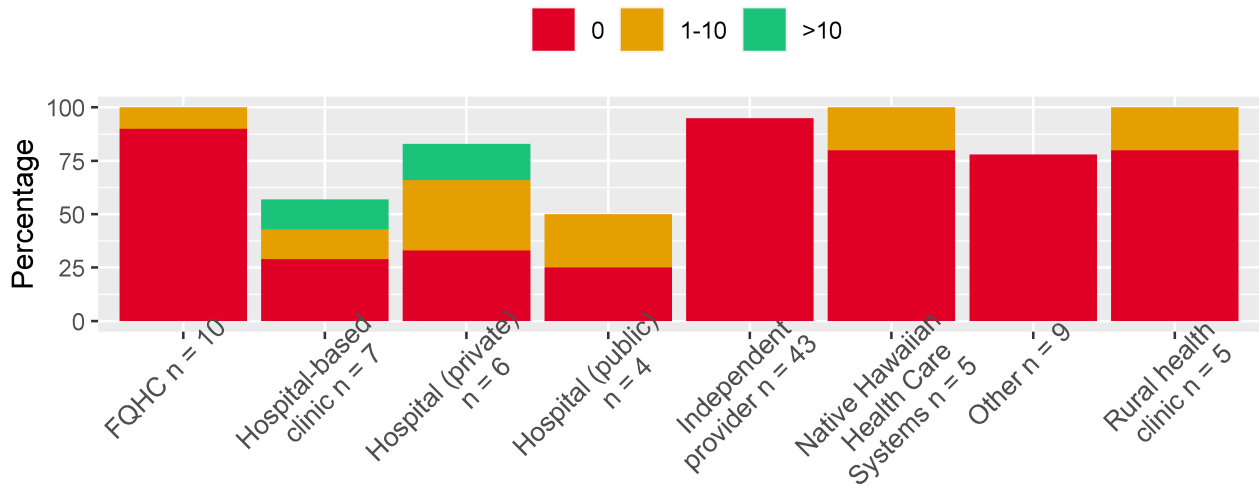
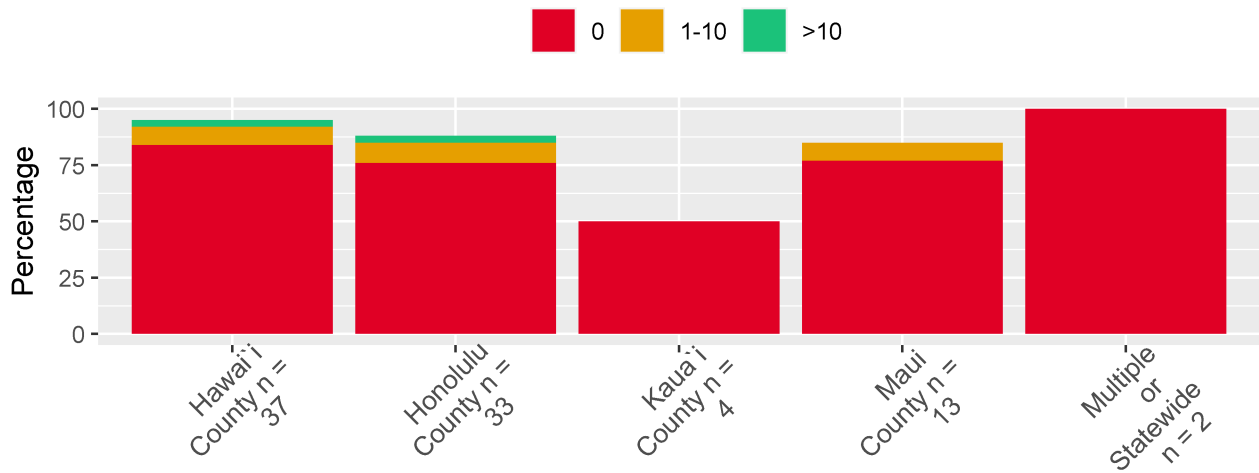


Figure 56: Digital Stethoscopes by County



Blood pressure monitors (89 respondents)

Figure 57: Blood Pressure Monitors by Facility Type

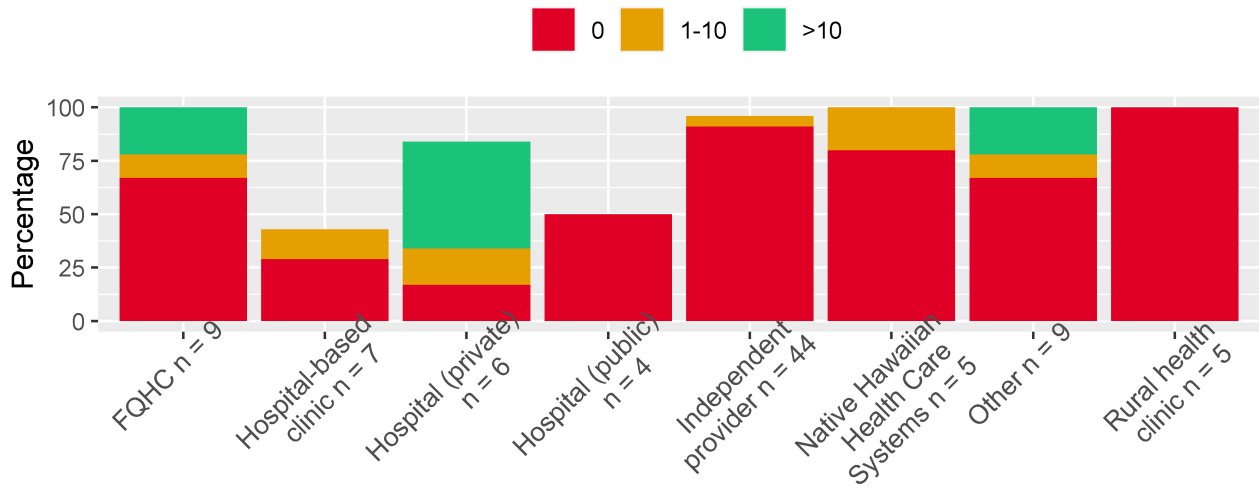
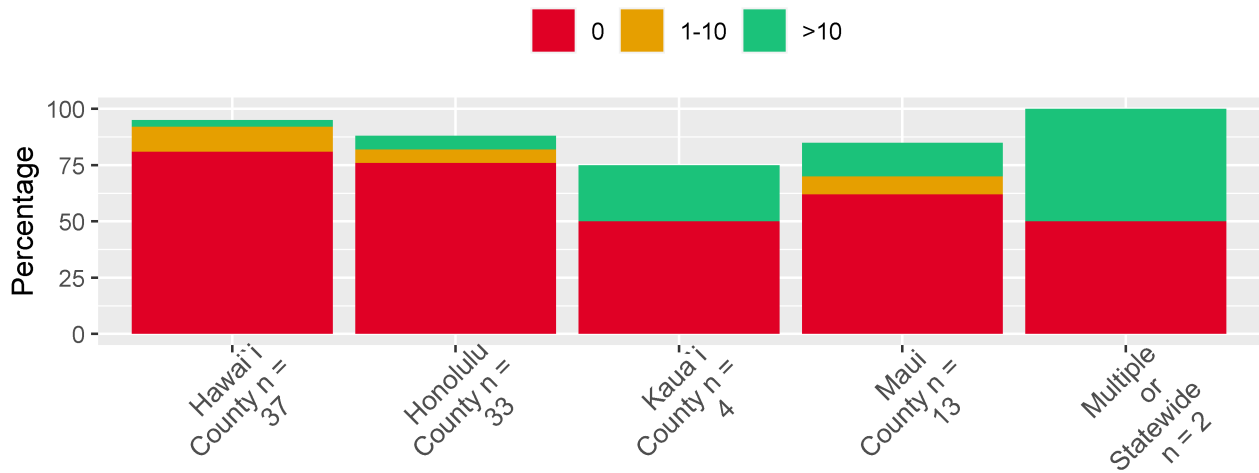


Figure 58: Blood Pressure Monitors by County



Glucometers (89 respondents)

Figure 59: Glucometers by Facility Type

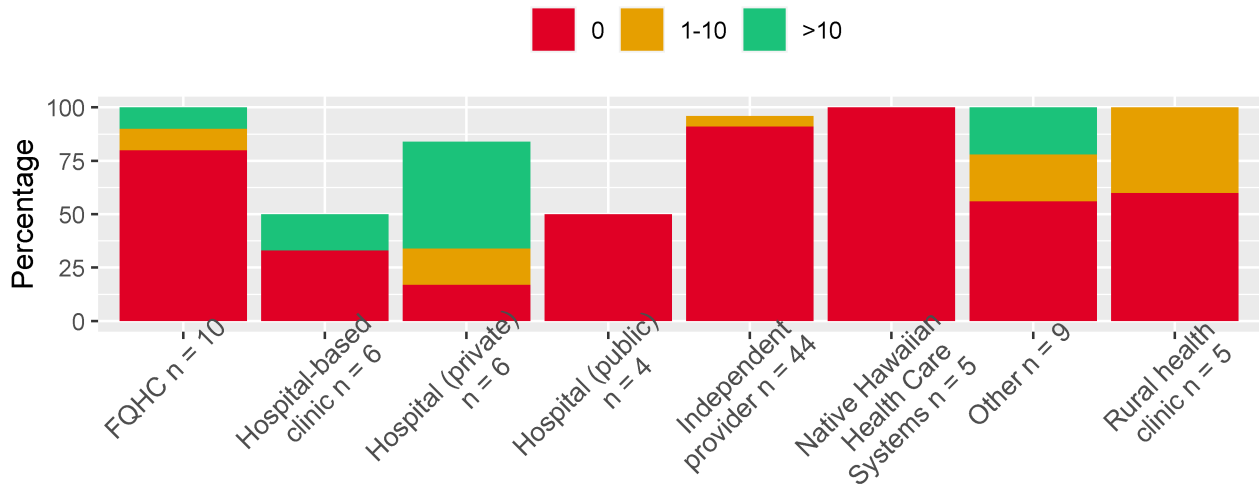
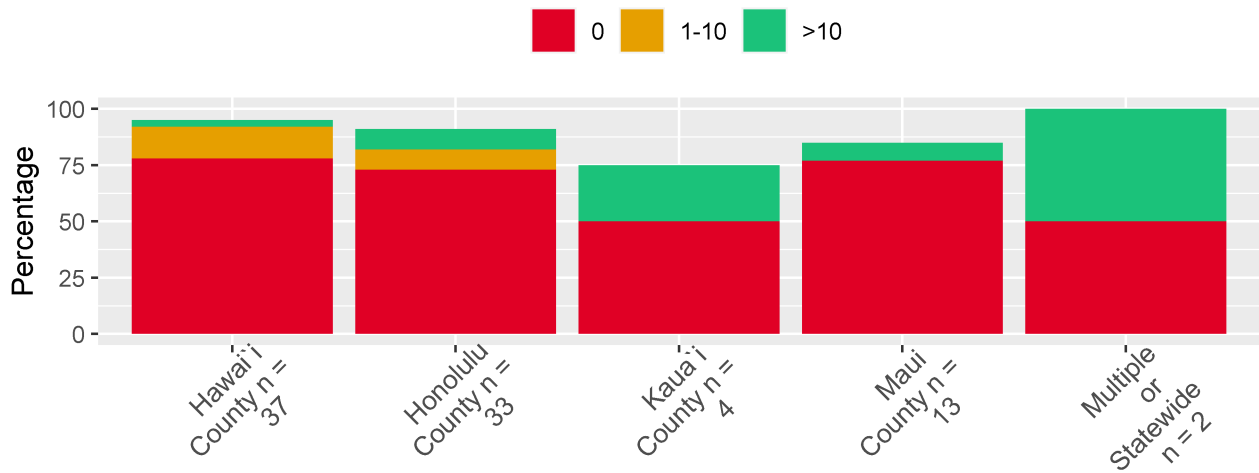


Figure 60: Glucometers by County



Otoscopies (90 respondents)

Figure 61: Otoscopes by Facility Type

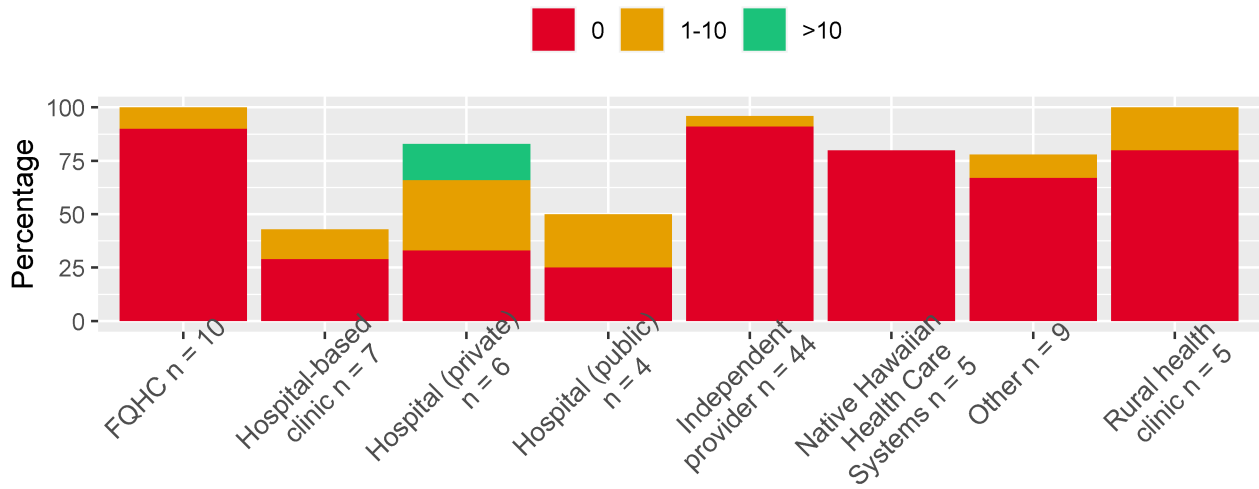
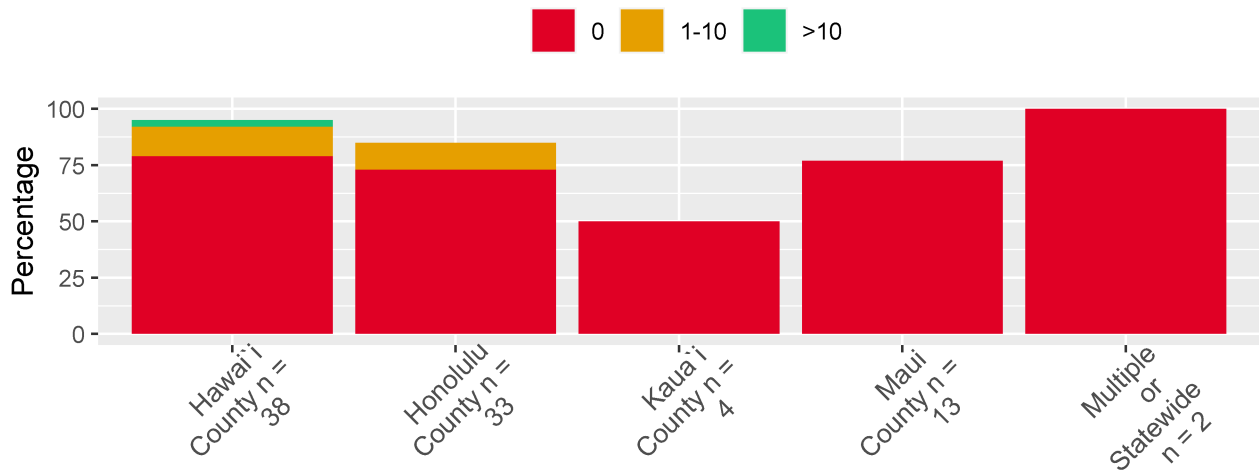


Figure 62: Otoscopes by County



Pulse oximeters (90 respondents)

Figure 63: Pulse Oximeters by Facility Type

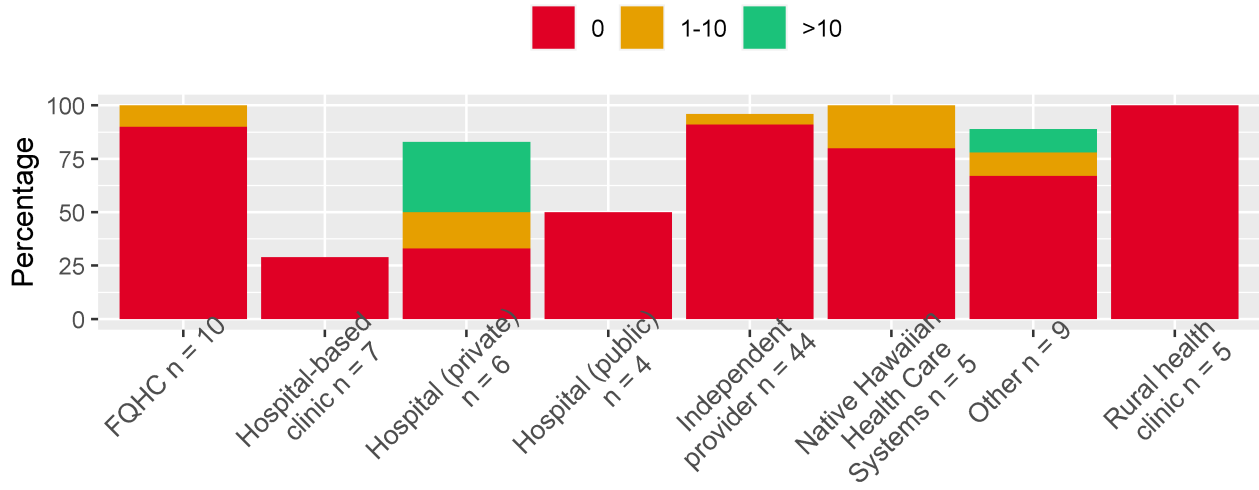
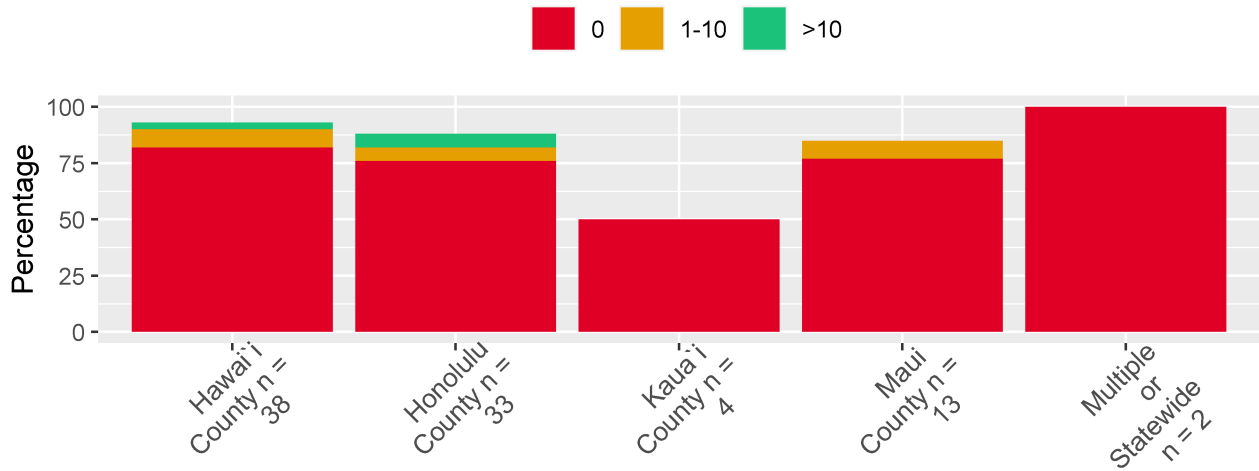


Figure 64: Pulse Oximeters by County



Ultrasound machines (90 respondents)

Figure 65: Ultrasound Machines by Facility Type

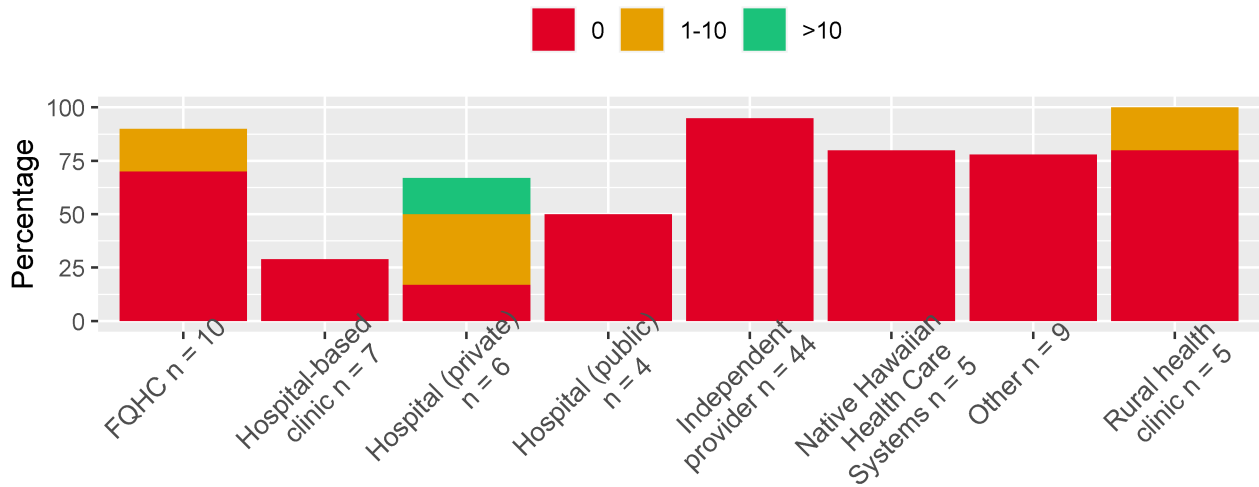
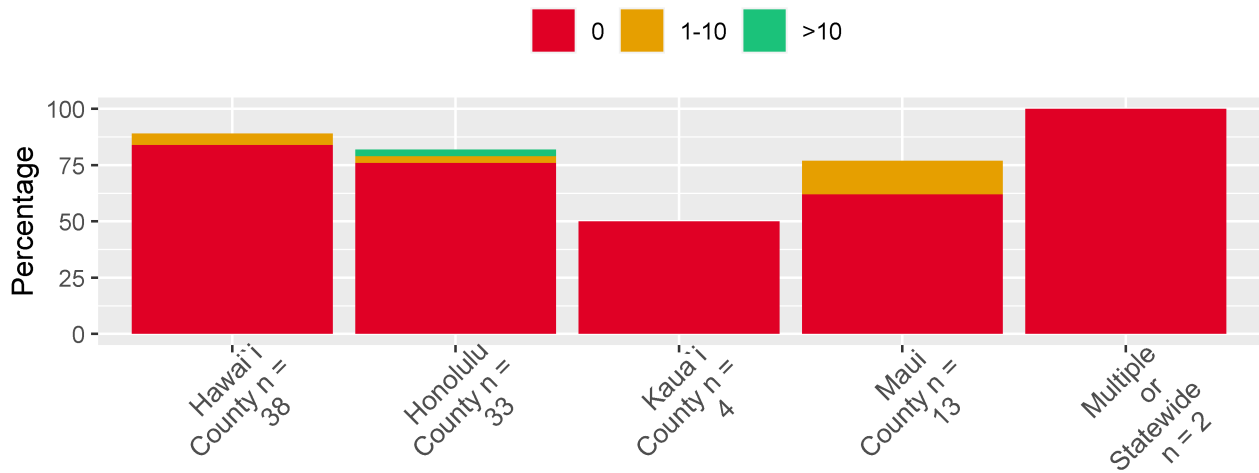


Figure 66: Ultrasound Machines by County



Digital electrocardiograms (ECGs) (87 respondents)

Figure 67: Digital ECGs by Facility Type

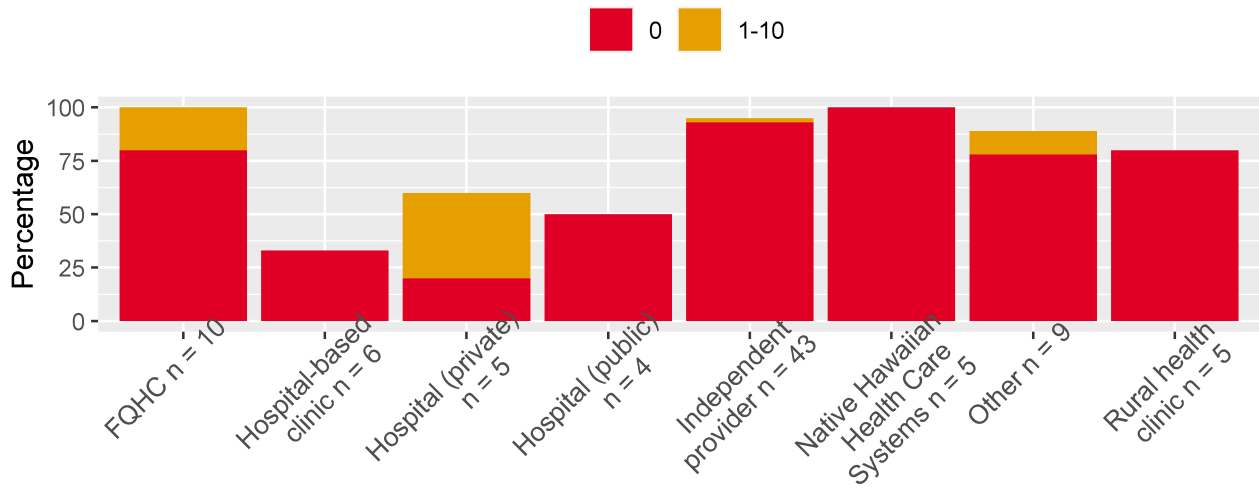
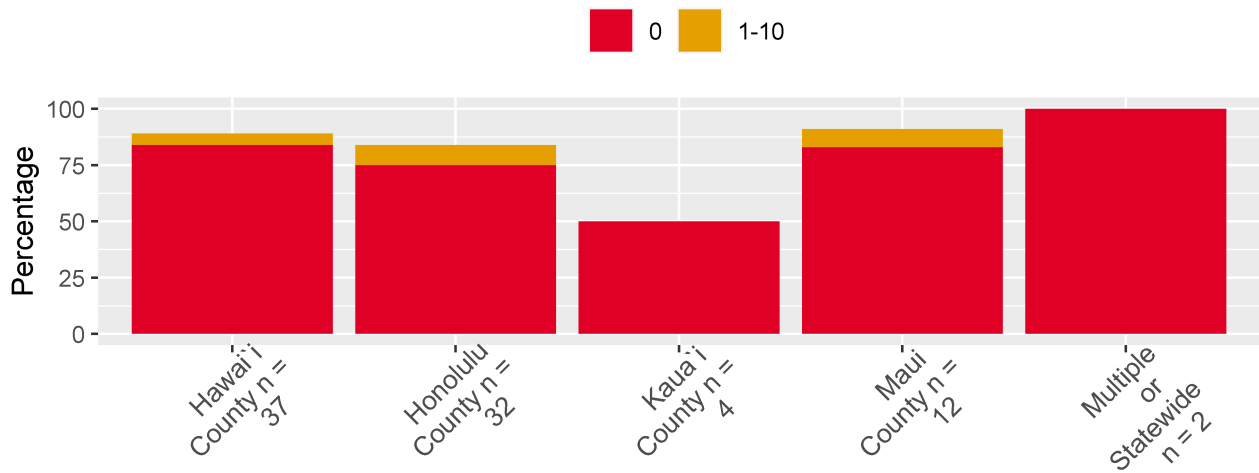


Figure 68: Digital ECGs by County



Barriers

Barriers for starting or expanding telemedicine services

Survey question #12 asked: “What barriers has your facility or practice encountered for starting or expanding telemedicine services? Select all that apply: Funding for equipment/devices; Training for staff; Internet connectivity challenges; Workflow challenges to accommodate telemedicine; Licensure issues.” This question presented checkbox options so respondents could select multiple responses. There was also a separate “Other (please specify)” section where respondents could write out their specific barriers.

Figure 69 below shows that “Internet connectivity challenges” was the top barrier for starting or expanding telemedicine services, followed by training for staff, funding for equipment/devices, and workflow challenges to accommodate telemedicine. In the “Other (please specify)” section, the most commonly-mentioned barrier that was different from the other available options was that the facility/practice needed additional patient assistance, including providing technical support.

Figure 69: Barriers for Telemedicine Services

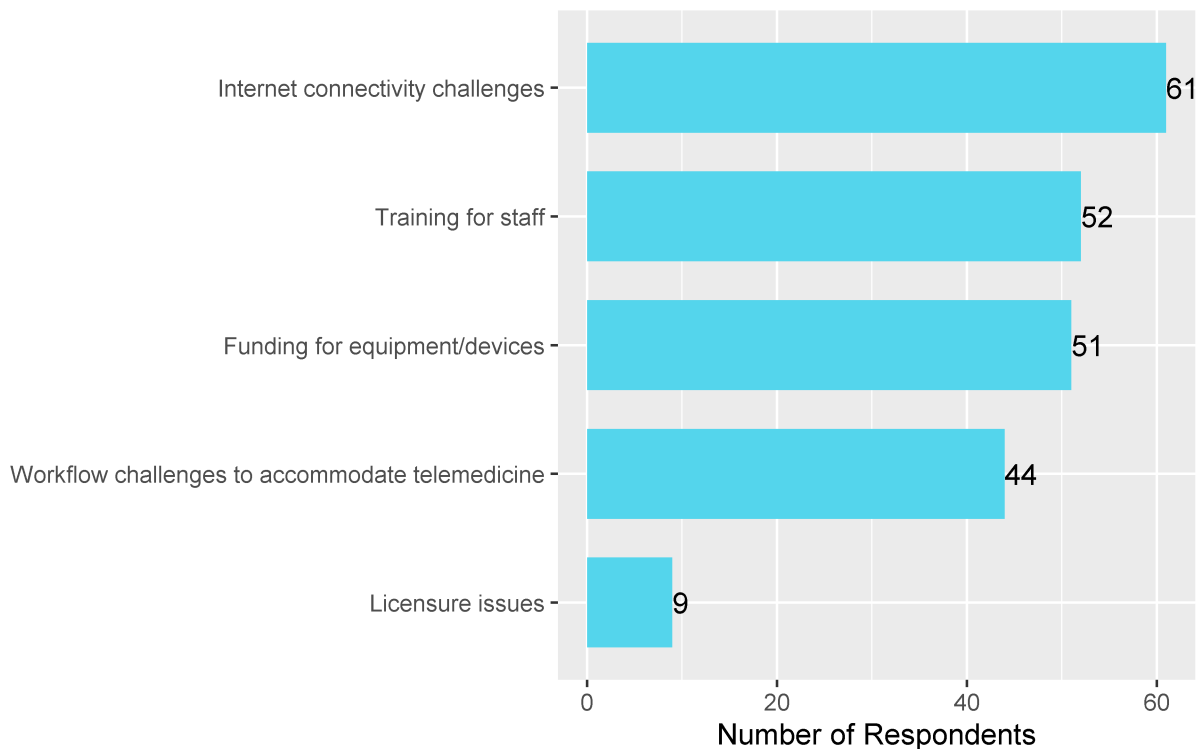


Table 2 shows a further breakdown of those who selected “Internet connectivity challenges” above, disaggregated by facility type and county.

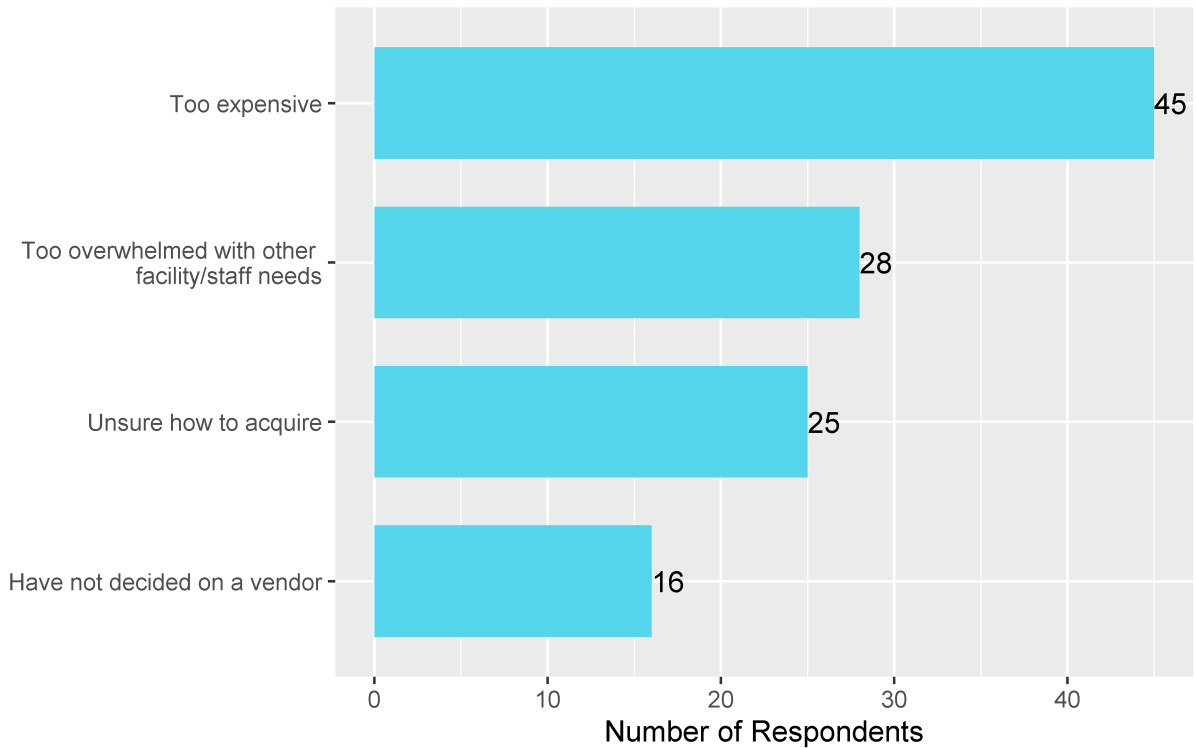
Table 2: Number who Reported Internet Connectivity Challenges by Facility Type and County

	Hawai‘i County	Honolulu County	Kaua‘i County	Maui County	Multiple or Statewide	Total by Facility
FQHC	4	3	0	3	0	10
Hospital-based clinic	1	5	0	1	0	7
Hospital (private)	1	2	0	0	1	4
Hospital (public)	2	1	1	0	0	4
Independent provider	12	10	0	1	0	23
Native Hawaiian Health Care Systems	1	1	0	2	0	4
Other	0	2	2	1	1	6
Rural health clinic	2	1	0	0	0	3
Total by County	23	25	3	8	2	61

Barriers for acquiring equipment/peripheral devices needed for telemedicine

Survey question #16 asked: “If your facility or practice needs equipment/devices to start or expand telemedicine, what are the barriers to acquiring these resources? Please check all that apply: Too expensive; Unsure how to acquire; Have not decided on a vendor; Too overwhelmed with other facility/staff needs.” This question presented checkbox options so respondents could select multiple responses. The top barriers, as seen below in Figure 70, were too expensive, too overwhelmed with other facility/staff needs, unsure how to acquire, and have not decided on a vendor. There was also a separate “Other (please specify)” section where respondents mentioned restrictions due to location, liability, and reimbursement as potential barriers.

Figure 70: Barriers for Acquiring Equipment/Devices

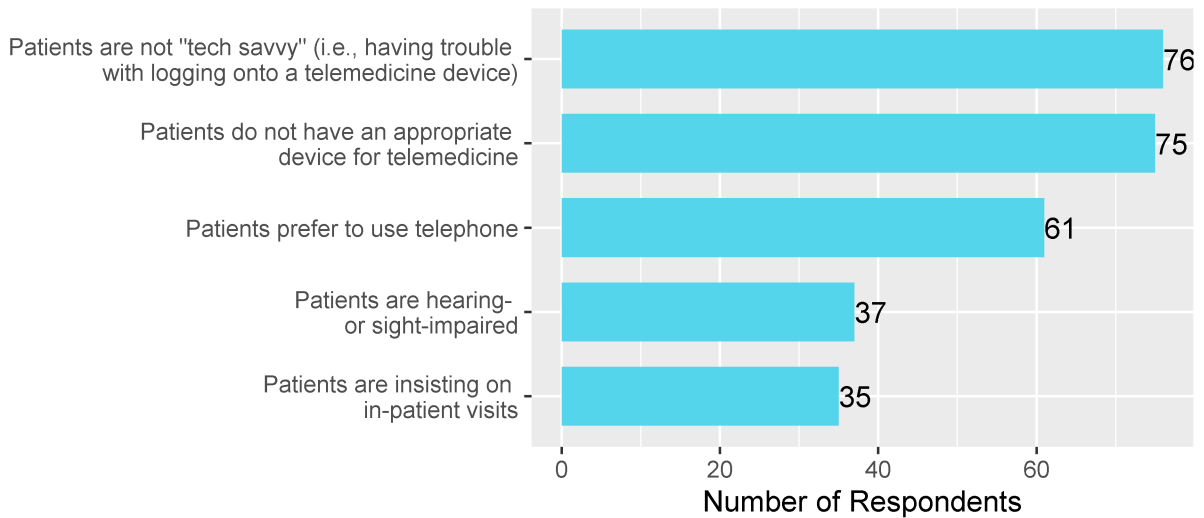


Telemedicine issues patients were experiencing

To gauge patient experience, survey question #25 asked: “What telemedicine issues are your patients experiencing, if any? Select all that apply: Patients do not have an appropriate device for telemedicine; Patients prefer to use telephone; Patients are not ‘tech savvy’ (i.e., having trouble with logging onto a telemedicine device); Patients are hearing- or sight-impaired; Patients are insisting on in-patient visits; and Other (please specify).” This question presented checkbox options so respondents could select multiple responses.

Figure 71 shows that patients’ difficulty with navigating technology and the lack of appropriate devices were the top barriers identified.

Figure 71: List of Telemedicine Issues Reported by Patients



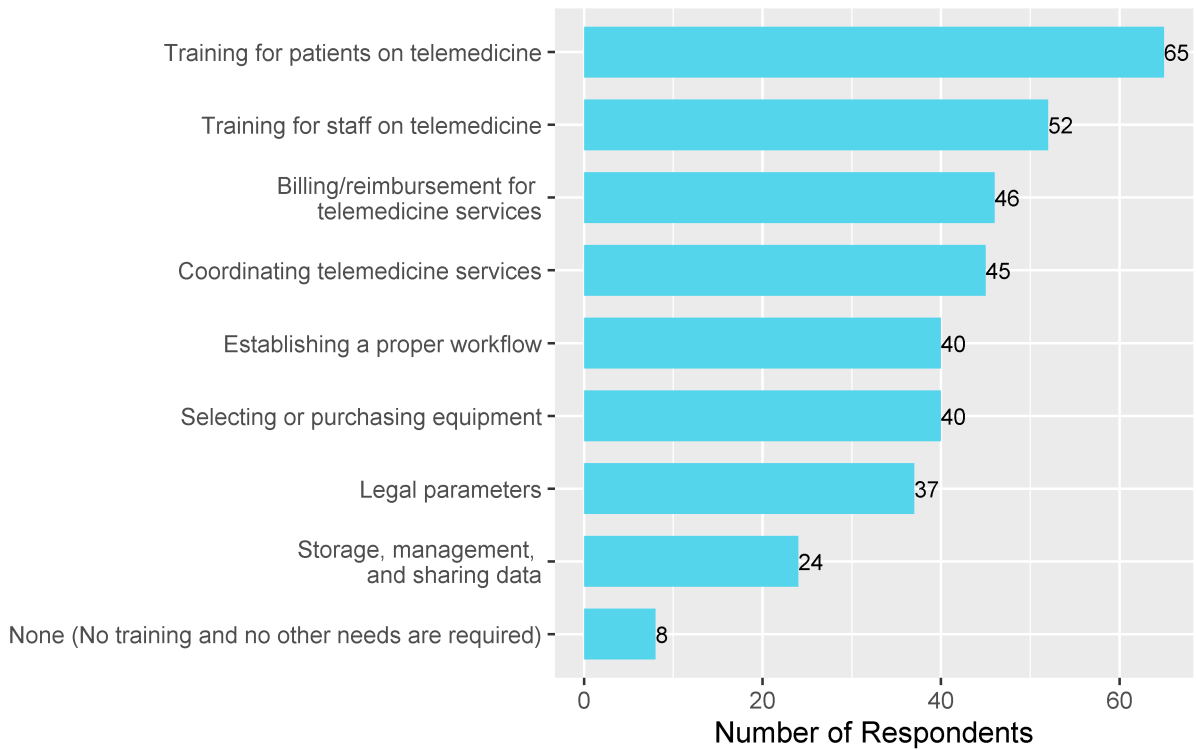
In the open-ended responses, one respondent also noted that providers were also not “tech savvy,” which potentially may have impacted the patient’s experience with telemedicine. Additionally, a few respondents noted a need for Information Technology (IT) support and also that patients needed to access their patient portal. One respondent mentioned that some of their patients are cognitively impaired. As noted above, multiple respondents indicated that internet/broadband connectivity was an issue (for example, 10 respondents noted that poor internet connection and/or a lack of a data plan were issues for their patients).

Training Needs

Survey question #26 asked: “What kind of training and/or needs would your facility or practice require to start or to optimize the use of telemedicine? Select all that apply.” This question presented checkbox options so respondents could select multiple responses including “Other (please specify)” (Figure 72)

The top training needs identified by respondents were training for patients on telemedicine, followed by training for staff on telemedicine.

Figure 72: List of Training Needs Reported by Respondents



Internet Connectivity

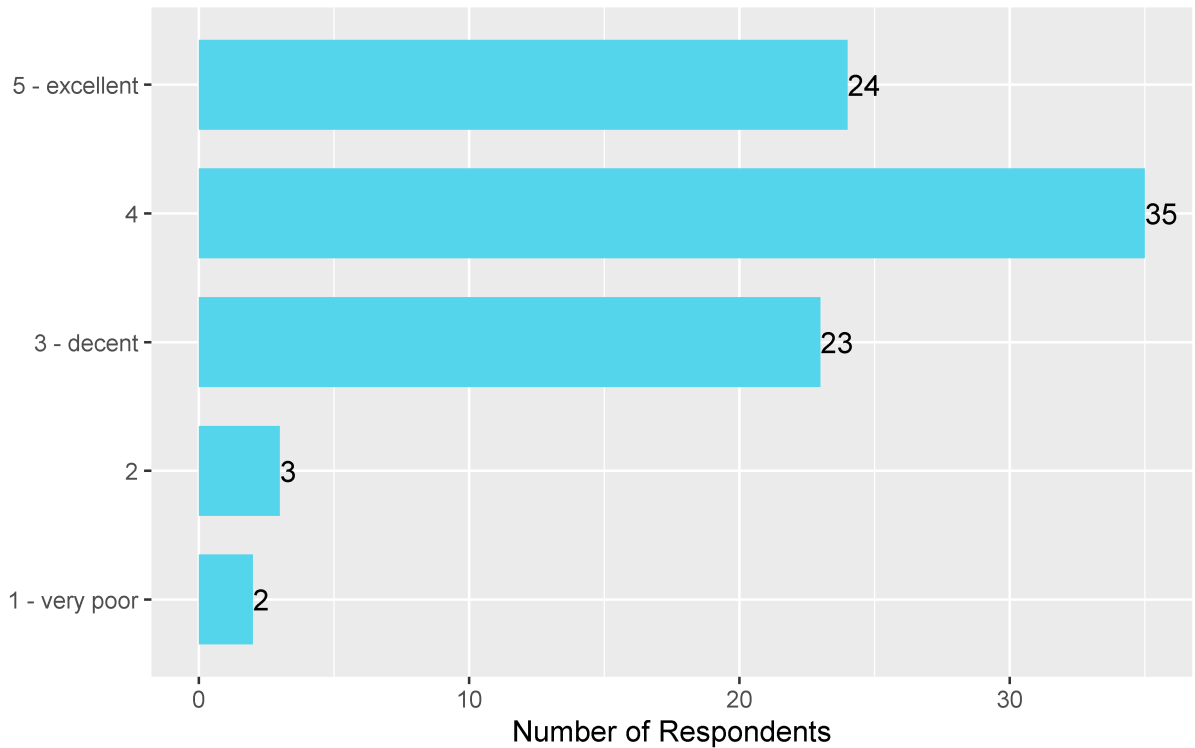
Internet Reliability in the Facility/Practice (87 Respondents)

Survey question #20 asked: “How reliable is the Internet connectivity in your facility or practice?” This question was designed with a Likert scale with “1” being very poor (i.e., “Internet connection is very poor; difficulty downloading/uploading & unable to video conference”), “3” being neutral (“Internet connectivity is decent; slow speed & able to video conference with buffering”), and “5” being excellent (“Internet connection is excellent; quick downloading/uploading speeds & able to video conference”).

Almost all respondents selected 3 or above. Of the five respondents that selected “1” or “2” on the scale, two respondents did not know their internet provider, and the other three identified that their providers were Spectrum/Charter, Hawaiian Telcom, or Servpac (Figure 73). Four of these five respondents were from Honolulu County and the other respondents was from Maui County.

Respondents could select “N/A,” however, no respondent selected this option. Nine respondents left this question blank.

Figure 73: Internet Reliability Rated (1 – Lowest, 5 - Highest) by Respondents



Reported Poor Internet Connections in the Community (87 Respondents)

Following the questions on internet connection and providers, survey question #23 asked: “Anecdotally, have you heard of poor Internet connections in your community (i.e., at the homes of patients or staff)?” Answers could be “Yes”, “No”, or “Unsure.” Respondents were also asked, if they responded “Yes”, to name the location/area with limited internet availability.

Figure 74 shows that there was a high report rate of hearing of poor internet connections (76%).

Figure 74: Poor Internet Connections in the Community Reported by Patients or Staff

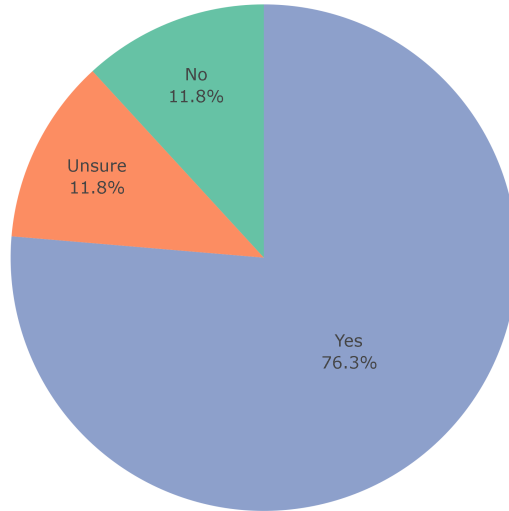


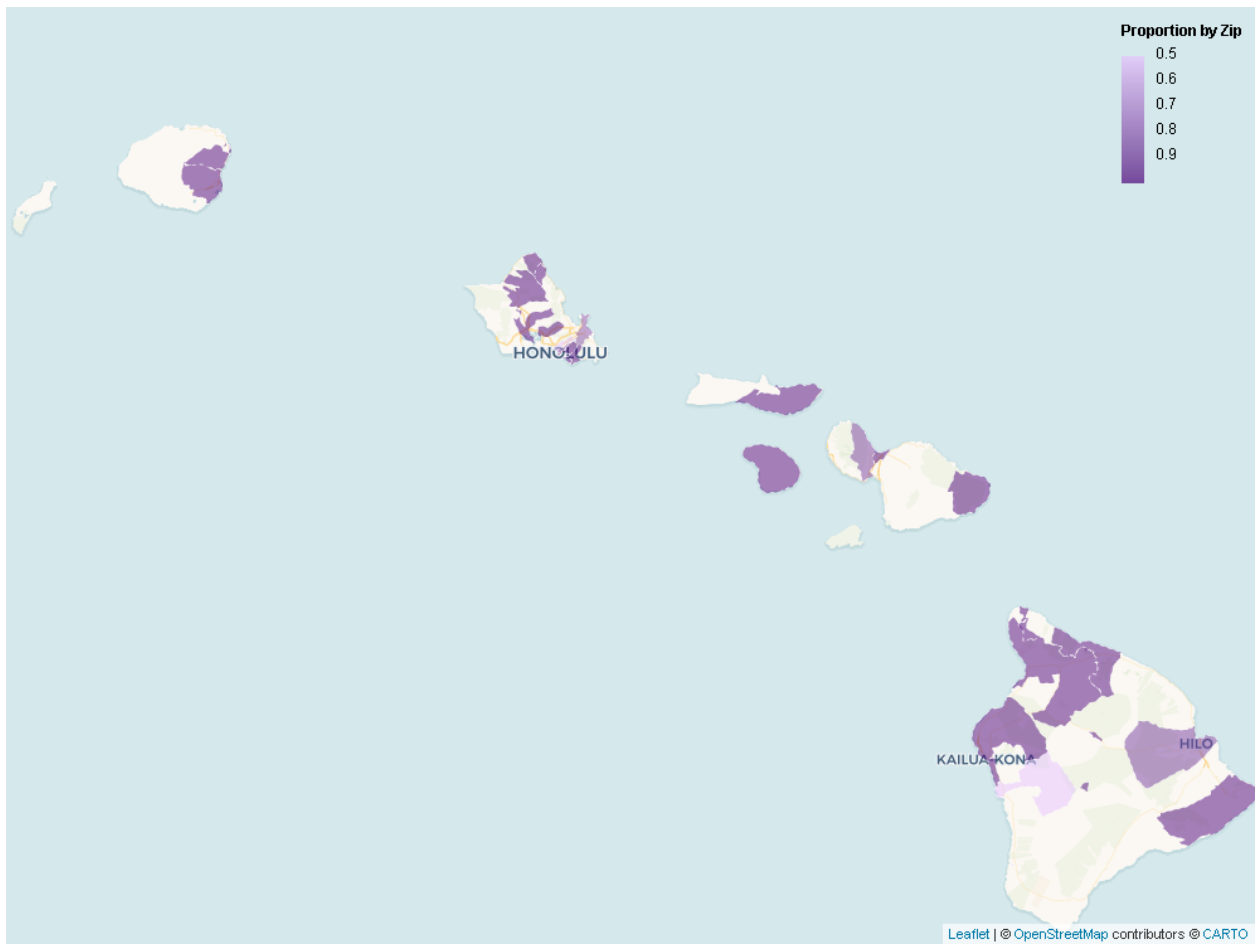
Table 3 (below) shows the breakdown of the respondent’s county if the respondent selected “Yes – poor internet connection.” The percentages are based on the total number of respondents per county by those who selected “Yes.”

Table 3: Poor Internet Connections in the Community Reported by Patients or Staff

County	Yes – heard of poor connections	% reporting poor connections
Hawai‘i County (n = 40)	31	78 %
Honolulu County (n = 34)	23	68 %
Kaua‘i County (n = 4)	4	100 %
Maui County (n = 13)	11	85 %
Multiple/Statewide (n = 2)	2	100 %

Figure 75 shows the proportion of responses that heard of community internet problems, by zipcode.

Figure 75: Map of Responses Reporting Community Internet Problems



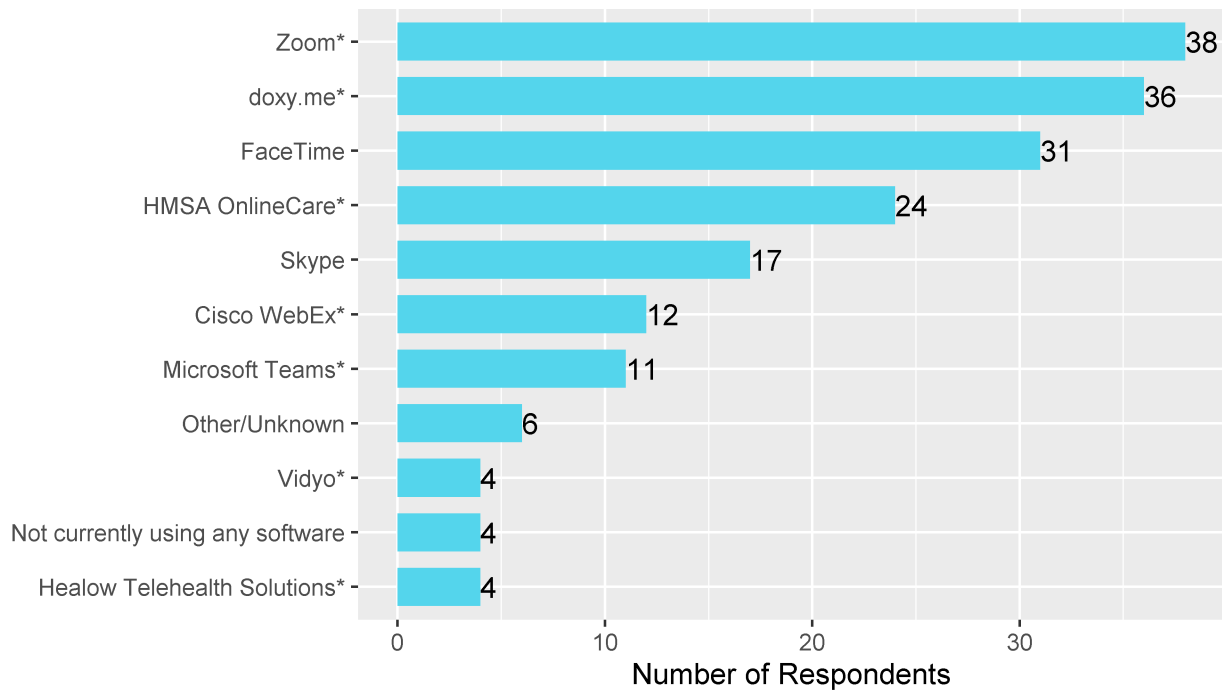
Software Platforms & Service Providers

Video-Conferencing Platforms

Survey question #17 asked: “Which telemedicine software platform(s) is your facility or practice currently using (or will be using)? Please select all that apply.” The graph below shows the frequency with which video-conferencing platforms were selected by the respondents, who could select more than one (Figure 76). Please note that none of the respondents selected HiDoc, MDLive, WePrescribe, or VSee, which were listed as options in the survey.

This graph below shows the frequency of video-conferencing platforms selected by the respondents, who could select more than one (Figure 76).

Figure 76: List of Video-Conferencing Platforms.



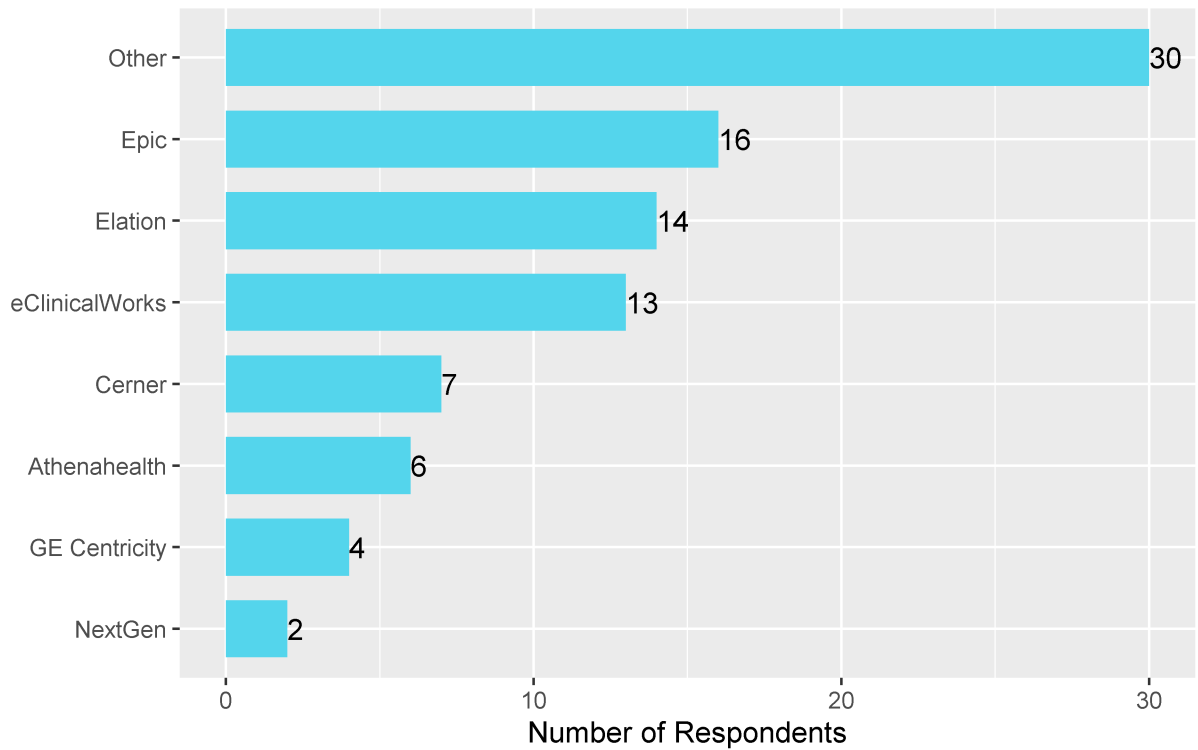
Please note that respondents could select multiple platform options.
HIPAA-compliant platforms (may require a Business Associate Agreement) are designated with an asterisk (*).

Electronic Health Records (93 Respondents)

Survey question #18 asked: “Which Electronic Health Record (EHR) does your facility or practice use?”

Most picked “Other”, as shown in Figure 77, followed by Epic, Elation, and eClinicalWorks. When the “Other” responses were examined separately, no common threads emerged. There were two that listed multiple EHRs, two that mentioned Meditech, two that mentioned Greenway Intergy, and two that mentioned Point Click Care. Future surveys should include these platforms and allow for multiple options.

Figure 77: List of EHR Platforms Used by the Respondents



Survey question #19 asked: “*If your facility or practice has (or will have) a telemedicine system, is it (or will it be) integrated with your EHR?*” Table 4 shows how many respondents currently or plan to have a telemedicine system integrated into their EHR system.

Table 4: Respondents who reported that if their facility or practice has (or will have) a telemedicine system, it is (or will be) integrated with their EHR

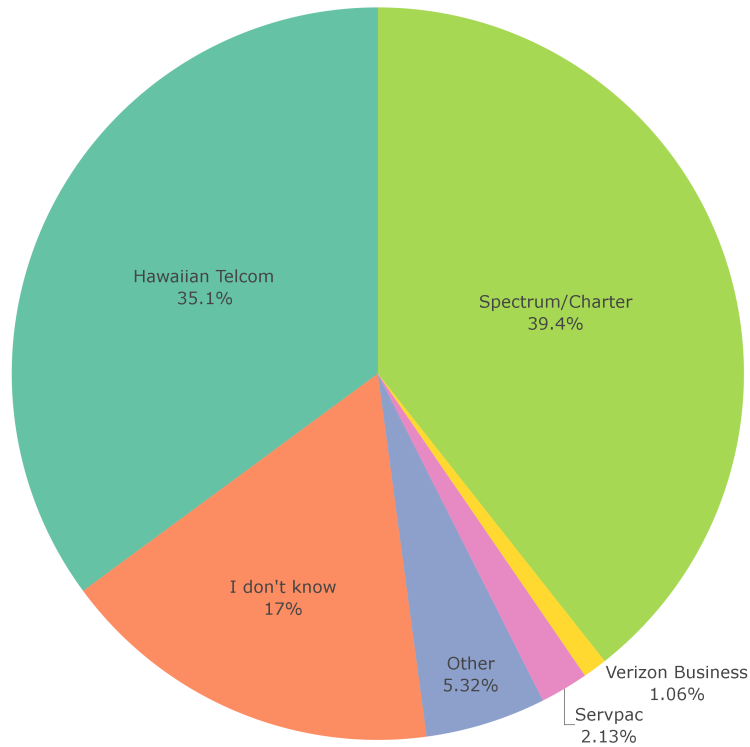
Response	N	%
Yes	45	48
No	28	30
Other	12	13
N/A	9	10

Internet Providers (94 Respondents)

Survey question #21 asked: “Which entity is your facility’s or practice’s internet provider?”

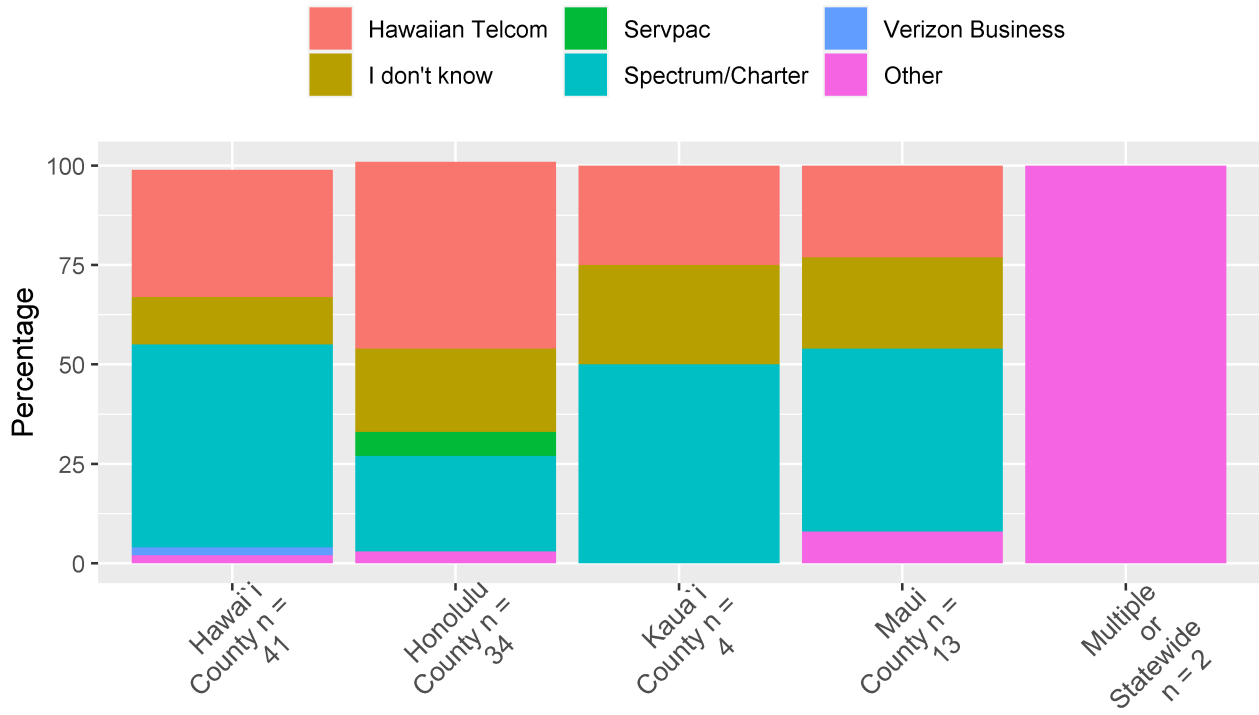
The two largest providers were Spectrum/Charter (37 respondents) and Hawaiian Telcom (33 respondents) (Figure 78).

Figure 78: Pie Chart of Internet Provider for the Facility/Practice



Internet provider was also examined by county (Figure 79).

Figure 79: Internet Provider by County

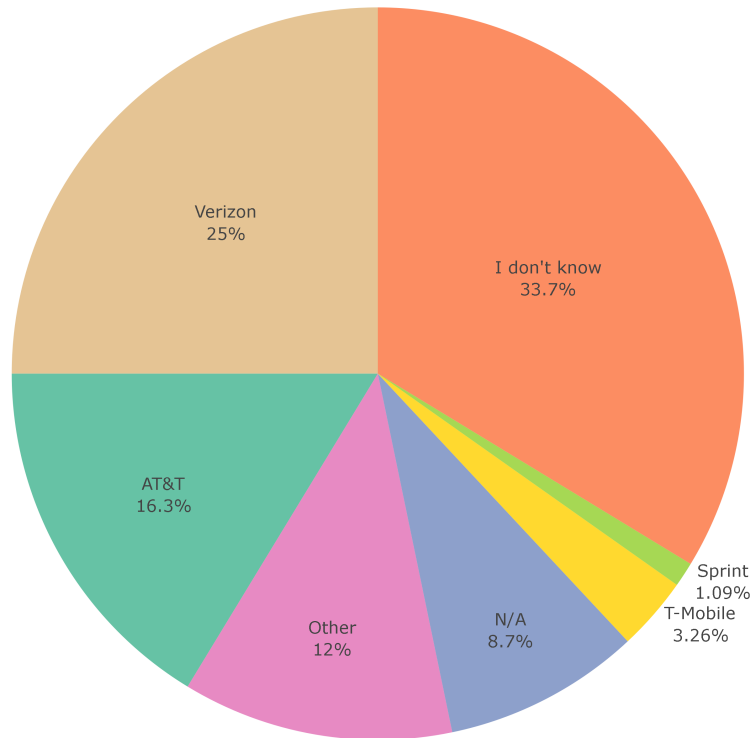


Wireless Providers (92 Respondents)

Survey question #22 asked: “Which entity is your facility’s or practice’s wireless provider?”

The majority of the respondents reported they did not know (34 respondents), followed by Verizon (25 respondents) (Figure 80).

Figure 80: Pie Chart of Wireless Providers at the Facility/Practice



Limitations

While 102 unique respondents submitted the survey, which represented the majority of the known facilities and practices in Hawai'i, some facilities and practices across the state of Hawai'i did not complete the survey. This survey was strategically sent to the individuals that our HI-EMA SESF #8 Statewide Telemedicine Needs Assessment core group felt were the most appropriate point persons for various facilities, practices, organizations, and associations across the state. However, there is a possibility that key point persons were missed.

We were not able to ascertain how many patients across the state were served by the respondents in this survey, as we did not query the respondents about number of patients served. For example, there were more responses from Hawai'i County, particularly Hilo, than from the more-populous Honolulu County. However, we did not assess the size of these facilities/practices to determine how many patients they serve.

Although the needs assessment provided a rapid and widespread snapshot of the telemedicine status of the state, there are several limitations given the nature of the self-reported answers. For example, some respondents selected a facility type that may not appropriately reflect their facility/practice when examined through statewide or federal classification requirements. Additionally, multiple facilities entered multiple entries for facility type, perhaps due to different point persons submitting the survey or lack of clarity regarding which facility/practice should be included (i.e., hospital vs. hospital-based clinic or administrator of practice system vs. individual practices in that system). As noted in the Methodology, the analysts manually removed 18 incomplete or duplicated submissions and recoded others as described above.

As mentioned in the Methodology above, some recoding was also done to further clarify "Pre-COVID" as also applying to current (given our assumption that respondents did not stop their services during COVID-19) and to clarify the answer choice as "Pre-COVID" or "Current" when respondents also selected "Desired" (based on our assumption that those respondents currently have the service in question even if they perhaps desired some more of it). If the survey had been developed on a different platform, such as REDCap, some of the data issues could have been avoided and more granularity elicited.

Some respondents mentioned in the comments that they did not desire to adopt certain services by telemedicine; however, we were not able to see how many did not want these services at all since we did not have an option to select if telemedicine services were not desired.

Conclusions

This survey is the only known statewide telemedicine needs assessment in the state of Hawai'i. The results suggest that many facilities and practices across the state of Hawai'i started providing telemedicine services during the COVID-19 pandemic, but also that many facilities and practices desired to provide more telemedicine services and experienced barriers to expansion. The rapid increase in telemedicine is likely due to the need for physical distancing and decreased travel due to COVID-19, including decreased inter-island travel for health care in Hawai'i, and likely also due to the lifting of federal and state statutory/regulatory barriers during the COVID-19 public health emergency.

In terms of capacity for telemedicine, multiple areas of strength already existed in the state of Hawai'i prior to COVID-19. For example, the Hawai'i Telestroke Network had 8 participating sites prior to COVID-19, although more facilities/practices desire to provide telestroke services. Asynchronous store and forward technology was also quite common across counties and facilities before COVID-19, as were tele-triage services, but none of these telemedicine services were present in a majority of facilities before COVID-19.

Since COVID-19, the most common new telemedicine services provided by respondents were synchronous audio + visual patient visits (of these, most common new services provided by respondents were routine office/outpatient visits, surgery or discharge follow-up visits, and acute care), tele-triage, and mobile health.

In terms of telemedicine gaps in the state of Hawai'i, eConsults, remote patient monitoring, and mobile health were the services that respondents most desired to provide via telemedicine. In order for facilities and practices to provide these services, they would need access to the appropriate equipment and devices to support them. The survey demonstrated that many facilities and practices have limited or no equipment and devices, other than perhaps equipment concentrated in larger facilities. Although computers and tablets were the most common types of equipment already in supply across facility types and counties, the survey showed that telemedicine carts and peripheral devices (including digital stethoscopes, otoscopes, pulse oximeters, ultrasound machines, and digital electrocardiograms) were not commonly found across the state of Hawai'i. This lack of equipment renders services such as remote patient monitoring, which requires specific equipment and peripheral devices, nearly impossible to deliver. Therefore, while respondents may indicate their desire for a service, they are limited by their lack of necessary equipment. This was validated by respondents who indicated that one major barrier to starting and expanding telemedicine was funding for equipment and devices. Increasing funding for telemedicine equipment and devices, including from federal sources (i.e., the U.S. Federal Communications Commission [FCC]) as well as from state and local sources, would help to facilitate telemedicine capacity in the state.

Interestingly, internet reliability appeared to be both an area of existing capacity (i.e., only five respondents indicated that their facility/practice had less than average internet reliability) but also a strong barrier. For example, lack of internet connectivity was the top barrier reported for starting or expanding telemedicine services. Additionally, the majority of survey respondents reported hearing about poor internet connections in the community (i.e., at patients' or staff's houses), particularly for the non-Honolulu counties. The state of Hawai'i currently has a Broadband Hui that is establishing local partnerships and identifying potential sources of funding for increased broadband coverage as well as working with communities and schools to increase digital literacy and digital equity. Importantly, the FCC and other federal sources have funding opportunities to ensure rural access to broadband.

In addition to internet connectivity, other identified key barriers to starting and expanding telemedicine in the state of Hawai'i included training for staff, funding for equipment/devices, workflow challenges to accommodate telemedicine, and (to a much lesser extent) licensure issues. Identified training needs included: training patients on telemedicine, training staff on telemedicine, coordinating telemedicine services, billing/reimbursement for telemedicine services, establishing a proper workflow, selecting or purchasing equipment, legal parameters, and storage, management and sharing data. Only eight respondents said they had no other training needs.

UH's Pacific Basin Telehealth Resource Center (PBTRC),² one of 14 national telehealth resource centers funded by the U.S. Health Resources and Services Administration (HRSA), provides training to health

²<http://www.pbtrc.org/>

providers across the state of Hawai'i to support the use of telehealth. PBTRC's volume of services during COVID-19 in Hawai'i increased by a staggering amount. PBTRC facilitates office hours, webinars, and telehealth roundtable discussions, and has access to national technical resource centers for support of specific issues, including technology, platforms, billing/reimbursement, and federal and state statutory and regulatory issues with regard to telehealth. PBTRC has also supported many facilities and practices across the state with grant applications to support telehealth. These applications have included seeking, for example, FCC funding for equipment, HRSA funding for a telehealth network, and other CARES Act funding for telehealth equipment and services.

The Hawai'i State Department of Health (DOH) has a telehealth and health care access coordinator that has been leading the development of a strategic plan for telehealth in the state of Hawai'i. Additionally, in partnership with UH's Hawai'i/Pacific Basin Area Health Education Center and PBTRC, the DOH has supported multiple efforts during COVID-19 to expand telehealth,³ including an online COVID-19 screening hotline;⁴ a behavioral health access portal;⁵ weekly webinars for provider training; and support for numerous community health centers to increase the provision of telehealth services.

UH is also expanding telehealth education across its units—including in medicine, nursing, and the community colleges—to increase the number of people entering the health workforce who are knowledgeable about telemedicine. Hawai'i Pacific University (HPU) is piloting telehealth certification among faculty and students. Chaminade University incorporates telehealth training into its Bachelor of Science in Nursing program (through class discussions and simulation in selected courses) as well as through a telehealth course for its Bachelor of Science program in Community and Public Health. Multiple facilities and practices have increased training for their staff and patients about telemedicine. Such increased training may help to address the identified staff training and workflow challenges.

Over time, increased and sustained investments in telemedicine services (including through insurance reimbursements and provider support), patient engagement (including through expanding patient support staff to do telemedicine), equipment (including through federal, state, and local funding sources), broadband, licensure, and more will further enable telemedicine to thrive and expand across the state of Hawai'i.

³<http://hawaiicovid19.com/telehealth>

⁴http://hawaii.virtriage.com/#/uh_covid19

⁵<http://mentalhealthhawaii.info>

Next Steps

Given that this survey was completed in May 2020, and the evolving and intensifying nature of the COVID-19 pandemic in Hawai'i, these results may already be outdated. More research is needed to continue to monitor telemedicine use and needs in Hawai'i. With an increasing realization that COVID-19 is not going away anytime soon, the use of telemedicine may become even more in-demand.

Future studies should specifically ask of those who started telemedicine during COVID-19 if providers and patients are satisfied with these services and if they see themselves continuing using these services after the pandemic. It would be worth examining how the lifting of federal and state statutory/regulatory barriers during the public health emergency impacted uptake of telemedicine, and how uncertainty going forward impacts plans for continuation.

Additional surveys should ask facilities to estimate the number of patients these facilities serve, as even if many smaller facilities lack telemedicine services, many patients may still have access to telemedicine services because larger facilities have these services. Future studies may wish to focus specifically on facilities that offer the types of services requested (i.e., tele-ICU in hospitals). As described above, we were not able to ascertain which services were specifically not desired by respondents, which should be explored in the future.

Of note, PBTRC plans to release an upcoming follow-up survey on provider and patient satisfaction with telehealth, shedding more light on the use of telemedicine in Hawai'i and gaps that the community can work together to address, in partnership with policymakers and leaders.