IDENTIFICATION AND IMPLICATIONS OF HIV-1 CRF01_AE SUBTYPE IN HAWAI‘I
Logan S. Dean BS, ATC; Ivo N. SahBandar MD, PhD; Cecilia M. Shikuma MD

AVAILABILITY OF PHARMACIST-PRESCRIBED CONTRACEPTION IN HAWAI‘I
Hannah Collins-Doijode; Julia Oehlers BS; Jasmine Tyson MS; Maria Isabel Rodriguez MD, MPH; Bliss Kaneshiro MD, MPH

EVALUATION OF AN EDUCATION-BASED TRAINING ORIENTATION FOR RESIDENT PHYSICIANS IN AN INTENSIVE CARE UNIT IN HAWAI‘I
Victoria M.F. Mank MD; Amanda Wiggins MD; Derek Lowe MD; Crystal Breighner MD

THE DANIEL K. INOUYE COLLEGE OF PHARMACY SCRIPTS
Co-curricular Activities to Prepare Students for the Expanding Role for Pharmacists in Telehealth
Matthew Clemente; Roy Goo PharmD

SOCIAL WORK IN ACTION
Older Adults, Protective Factors, and Opportunities to Promote Health during the COVID-19 Pandemic
Sophia B. Kim PhD, MSW; Yeonjung Jane Lee PhD
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Identification and Implications of HIV-1 CRF01_AE Subtype in Hawai‘i

Logan S. Dean BS, ATC; Ivo N. SahBandar MD, PhD; Cecilia M. Shikuma MD

Abstract

Human Immunodeficiency Virus has a high propensity for genetic variation, demonstrated by its complex phylogeny and multiplicity of subtypes. Subtype B is predominant in North America as well as in Hawai‘i while CRF01_AE is found in over 50% of cases in the Philippines and Southeast Asia. In a small collaborative study between the Hawai‘i Center for AIDS and Philippines General Hospital, molecular phylogenetic subtyping was conducted on HIV+ participants. Two of 15 (13%) participants from the Hawai‘i cohort and 12 of 21 (57%) participants from the Philippines cohort were identified as having CRF01_AE subtype of HIV-1, with remaining participants identified as subtype B. While one individual in Hawai‘i with CRF01_AE had emigrated from the Philippines, the other participant from Hawai‘i with CRF01_AE subtype was a local individual, born and raised in Hawai‘i. The authors report that HIV subtype diversity may be increased in Hawai‘i and discuss its potential clinical and public health implications.

Keywords

HIV, CRF01_AE, Hawai‘i, Philippines

Abbreviations

ART = Antiretroviral Therapy  
CRF = Circulating Recombinant Form  
HICFA = Hawai‘i Center for AIDS  
HIV = Human Immunodeficiency Virus  
IRB = Internal Review Board  
PBMC = Peripheral Blood Mononuclear Cells  
PCP = Pneumocystis Pneumonia  
PCR = Polymerase Chain Reaction  
PI = Protease Inhibitor  
R5 = CCR5  
URF = Unique Recombinant Form  
X4 = CXCR4

Introduction

Human Immunodeficiency Virus (HIV) is a single stranded, positive sense RNA lentivirus responsible for the HIV pandemic. The virus is characterized by its infection of CD4+ T cells as its main reservoir in the presence of co-receptor CCR5 (R5) or CXCR4 (X4). HIV has a high propensity for mutation, a result of a high reverse transcription error rate and increased viral production in established infection. The virus is divided into 2 distinctive viral types, HIV-1 and HIV-2. HIV-2 circulates primarily in West Africa compared to HIV-1’s global prevalence, and HIV-2 is associated with decreased pathogenicity compared to HIV-1. HIV-1 is further divided into groups (M-P) followed by subtypes. Subtypes are primarily aggregated according to geographic location, however, the presence of HIV infection worldwide has given rise to circulating recombinant forms (CRF) composed of portions of subtypes mixed into a genetically distinguishable novel subtype. Unique recombinant forms (URF) are isolated cases of recombination not yet in primary circulation. Subtype B dominates in North America, however nationwide studies have yet to extensively characterize HIV subtype makeup in all 50 states. Hawai‘i does not have data on subtypes of HIV infections. It is likely that the state follows the subtype B dominance found in the continental US, however it is possible that emigration from Southeast Asia, a subtype CRF01_AE dominant area, may influence’s HIV subtype demographics. Such information may be important as an increase in the presence of the CRF01_AE subtype compared to subtype B within a population may have potential public health and clinical ramifications. The purpose of this study, therefore, was to determine the percentage of individuals with CRF01_AE and B subtypes in a cohort of HIV+ individuals in the Philippines and in Hawai‘i.

Methods

Study Participants

The Hawai‘i Center for AIDS (HICFA) launched a collaborative study with the Philippines General Hospital in Manila to compare clinical and neurologic differences by site between HIV-positive and negative participants. This study recruited 50 HIV+ and 50 HIV- participants in the Philippines and 17 HIV+ and 20 HIV- participants in Hawai‘i. The Philippine cohort participants were recruited from patients of the STD-AIDS Guidance Intervention Prevention Clinic at the Philippines General Hospital. The Hawai‘i participants were recruited through advertisement in the Clint Spencer Clinic and by word of mouth through an established network of clinic/physician practices. The study protocol was approved by the internal review boards (IRB) of the University of Hawai‘i (IRB#: 2016-31099) and Philippines General Hospital (IRB#: UPMREB 2017-201-01) and all participants signed approved informed consent documents. Blood samples and clinical data were collected from study participants in both cohorts. Plasma and peripheral blood mononuclear cells (PBMCs) were separated using standard Ficoll-Paque density gradient separation from whole blood, cryopreserved, and transferred to the HICFA biorepository for further downstream analysis.
Subtype Determination

Proviral DNA was isolated from cryopreserved PBMCs and amplified by polymerase chain reaction (PCR) using in-house primers targeting the gag and pol regions of HIV-1. PCR products were then purified and subsequently sequenced using Applied Biosystems DNA Analyzer (Life Technologies, Carlsbad, CA). Samples were processed at the Genomic Core Facility at the John A. Burns School of Medicine and University of Hawaiʻi Advance Studies in Genomics, Proteomics and Bioinformatics Center. A detailed protocol for subtype determination was previously described. A Phylogenetic subtyping was completed with phylogenetic analysis using molecular evolutionary genetics analysis (MEGA) version 10 software (Penn State University, State College, PA).

Results

Subtype analyses were attempted in 50 HIV+ participants in the Philippines and 17 HIV+ participants from Hawaiʻi and successfully identified in 21 HIV+ participants from the Philippines and 15 HIV+ participants from Hawaiʻi. HIV+ blood samples from 12 participants in the Philippines (57%) and 2 in Hawaiʻi (13%) were identified as having the CRF01_AE subtype. The remaining participants at both sites were identified to have subtype B. Both participants with CRF01_AE subtype in Hawaiʻi self-identified themselves as men who have sex with men and were on combination HIV antiretroviral therapy (ART) with plasma HIV RNA undetectable at < 20 copies/mL at study entry. One participant was a Filipino man diagnosed with HIV in 2014 who emigrated to Hawaiʻi the following year. This participant contracted pneumocystis pneumonia (PCP), an AIDS defining illness, concurrent with HIV+ diagnosis. Nadir CD4 count was self-reported to be between 50-99 cells/μL and CD4 count at study entry was 379 cells/μL. The other participant from the Hawaiʻi cohort with CRF01_AE was a man of mixed Asian, White, and Native Hawaiian race who was born and raised in Hawaiʻi, diagnosed with HIV in 2008, and doing well on stable ART treatment status or HIV subtype. Documented to occur in HIV infected individuals regardless of sub-standard ART regimens.

Discussion

Here the authors describe a serologic survey in a small cohort of HIV+ individuals in Hawaiʻi. The authors unexpectedly identified 2 individuals with the CRF01_AE subtype of HIV-1, 1 of whom was born and raised in Hawaiʻi. Studies examining subtype distribution in Hawaiʻi have been limited to nationwide epidemiologic surveys and have included minimal samples from the state. The assumption seems to be that Hawaiʻi has a dominant subtype B distribution similar to the continental US. The most recent study conducted by the Centers for Disease Control and Prevention (CDC) examined the diversity of HIV-1 subtypes in the US spanning the years 2008-2016 and concluded that the most prevalent strain remains subtype B, accounting for 95.1% of cases. This study characterized HIV specimens from only 17 states and did not include Hawaiʻi. Of note was the increasing prevalence of non-B subtypes across the study time. A study conducted by Pyne, et al in 2013 to explore HIV non-B subtype diversity in the US identified CRF01_AE in the single sample they received from Hawaiʻi. In 2015, Germer, et al characterized HIV-1 subtypes in the US between July 2011 and June of 2012 using clinical laboratory samples from the Mayo Medical Laboratories, and noted that the highest levels of non-B subtypes were found in the West North Central region. States in this area, Minnesota, Iowa, and North and South Dakota, had an average of 20.2% non-B subtypes. A total of 13 (7%) of the total non-B subtype samples were identified as CRF01_AE. The study did not include Hawaiʻi or 5 other states in its analysis.

Identification of CRF01_AE and additional non-B subtypes may have potential public health and clinical ramifications. It has been suggested that genetic diversity among subtypes explains differences in transmission rate, natural history, sensitivity of wild-type strains to ART, and mechanisms of escape due to sub-standard ART regimens. Co-receptor switching has been documented to occur in HIV infected individuals regardless of ART treatment status or HIV subtype. CRF01_AE has been demonstrated to lead to a more rapid viral co-receptor switch from CCR5 (R5) tropism to CXCR4 (X4) tropism. The increased speed at which CRF01_AE switches from R5 to X4 tropism is hypothesized to be a consequence of the subtype’s dual-tropic nature. The switch in tropism to CXCR4 leads to a more rapid decrease in CD4 count compared to CCR5 tropism. However, the authors note that the tropism distribution in the Hawaiʻi cohort were both diagnosed to have HIV in the later years where more rapid transmission is likely, potentially explaining the increased speed of tropism switch.
stages of HIV with CD4 count below 200 cells/mm³. Impaired reconstitution of CD4 count following ART institution has also been associated with CRF01_AE infections. Thus, a potential public health ramification of an increased percentage of HIV infections in the state due to CRF01_AE infection may be the need to increase effort to identify and treat individuals early in their HIV disease course because of the increased risk of more rapid CD4+ T-cell decline in individuals with CRF01_AE subtype. The second potential ramification of increased HIV infection due to CRF01_AE subtype may be that CCR5 antagonists such as maraviroc, which are effective only against CCR5 utilizing viruses, can be expected to be less useful with the increased frequency of CXCR4 and dual tropic X4/R5 virus in CRF01_AE infections.

In conclusion, increasing subtype diversity worldwide has been described and may become of public health and epidemiologic interest. This small study suggests that non-B subtypes are present in Hawai‘i. Because of Hawai‘i’s cultural ties to Southeast Asia, the presence of CRF01_AE in the study is perhaps unsurprising. Medical personnel in Hawai‘i should be aware of the potentially increasing prevalence of non-B subtypes in Hawai‘i and its potential clinical ramifications.

Conflict of Interest

None of the authors identify a conflict of interest.

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References


Availability of Pharmacist-Prescribed Contraception in Hawai‘i

Hannah Collins-Doijode; Julia Oehlers BS; Jasmine Tyson MS; Maria Isabel Rodriguez MD, MPH; Bliss Kaneshiro MD, MPH

Abstract

In 2017, the state of Hawai‘i passed Act 067 which allows trained pharmacists to prescribe hormonal contraceptives in an effort to expand access to contraception. The extent to which this policy has been implemented is not known. This study aimed to determine the proportion of Hawai‘i pharmacies that currently provide pharmacist-prescribed hormonal contraceptives. In June 2020, a list of retail pharmacies was compiled using Google and Google Maps searches and pharmacy directories from major health insurance providers. Between June 23, 2020, and July 2, 2020, two trained interviewers called pharmacies and inquired about the availability of pharmacist-prescribed contraceptives using a “secret shopper” technique. Of the 175 pharmacies included in our analysis, 54 (31%) offered pharmacist-prescribed contraceptives. Hawai‘i Island (40%) had the highest proportion of pharmacies offering pharmacist-prescribed contraceptives, followed by Maui (35%), O‘ahu (30%), and Hawai‘i Island (29%) (P=.88). Among pharmacies located in rural communities, 20 of 63 (32%) prescribed contraceptives, compared to 34 of 112 (30%) pharmacies located in urban communities (P=.85). Of the 116 pharmacies that did not prescribe contraceptives and provided a reason for not doing so 33% cited lack of training and 28% lack of knowledge about Act 067. Thirty-one pharmacies provided information on the cost of pharmacist-prescribed contraceptives with 71% (22) stating that the patient would have to pay extra for the consultation (mean cost = $34.6, range $30–$45). Findings from this study can help inform future public health policies and implementation strategies aimed at improving contraceptive access in Hawai‘i.

Introduction

Comprehensive contraceptive care, including the ability of an individual to choose what contraceptive method, if any is best for them, is a basic health care need. For many individuals, the ability to choose a contraceptive method is constrained by limited access to contraceptive providers as well as the cost and availability of various methods. Contraceptive access is multifaceted: services must be physically available, with a full range of methods, and affordable.

In Hawai‘i, several factors pose a specific barrier to reproductive health care. Hawai‘i has many remote, geographically isolated communities. Individuals living in these communities face additional barriers to accessing contraceptive care. Based on the 2010 census, 93.9% of Hawai‘i is considered rural, and 8.1% of the state’s population live in these areas. As of 2014, only 6.4% of practicing obstetric-gynecologists provide care in rural areas. Additionally, until 2019, the state of Hawai‘i used the Title X Family Planning Program to provide publicly funded contraceptive services and supplies to approximately 15,000 patients per year across the 35 health centers across the state. More than 80% of patients who relied on this program had incomes at or below 100% of the federal poverty level (earning $13,550 per year or less for a household of 1). In 2019, Title X funding in the state of Hawai‘i ended when the state decided not to comply with some of the mandates set forth by the Trump Administration that would have prevented health care providers from giving patients any information about pregnancy termination.

Recognizing the need to strengthen access to contraception, in 2017, Hawai‘i expanded the scope of practice for pharmacists allowing them to prescribe self-administered hormonal contraceptives. This initiative, which removes the need for a traditional in-person clinic visit with a clinician, is both an effective and cost-saving method of making hormonal contraceptives more widely available. Though not every rural town has a practicing contraceptive provider, most will have a pharmacy. In addition to being more abundant, pharmacies typically have longer hours than clinics and often use a walk-in service delivery model. Pharmacists are more likely to reach uninsured young people and to dispense a larger supply, which may help reduce unintended pregnancy by improving consistent use of contraception. Evidence supports that pharmacists in rural areas are as likely as their urban counterparts to prescribe hormonal contraception.

Several other states have passed legislation allowing pharmacists to prescribe contraceptives. A study in Oregon and New Mexico found many pharmacies faced barriers to providing this service, such as being unable to bill the patient’s insurance and lack of insurance reimbursement for pharmacy consultations. To our knowledge, there have not been any studies looking at the implementation of pharmacist-prescribed contraception in Hawai‘i. The purpose of this study was to determine the availability of pharmacist-prescribed contraception, to explore differences by island and rural versus urban pharmacies, and to identify potential barriers to expanding this service.

Methods

The team conducted a cross-sectional “secret shopper” telephone survey of pharmacies in Hawai‘i, from June 23rd through July 2nd, 2020. The primary outcome was the proportion of retail pharmacies in Hawai‘i reporting that they offered pharmacist-prescription of contraception. Secondary objectives included describing the characteristics of pharmacies that did and did not provide pharmacist prescription of contraceptives based on factors such as island, rural versus urban location, population density, and whether the pharmacy was a chain pharmacy.
Census Bureau data from 2010 was used to identify whether pharmacies were in urban or rural counties. This study also sought to describe additional features of pharmacist provision of contraceptives including consultative costs and whether appointments were needed for services.

A database of pharmacies in Hawai'i was created using Google and Google Maps (Alphabet Inc., Mountain View, CA) internet application searches, and pharmacy directories from major health insurance providers. The search terms “pharmacy” and “pharmacies” were used to identify pharmacies on each island. Only retail pharmacies were included; we excluded pharmacies connected to inpatient hospital facilities, clinics, or military facilities as these sites do not serve all members of the public though they do provide services to certain groups of patients.

To assess the availability of pharmacist-prescribed contraception, 2 trained interviewers called pharmacies and used a structured data collection instrument. Staff were asked if their pharmacists prescribe birth control without a prescription from a physician (“Hi. I heard you can get birth control from the pharmacy now without getting a prescription first. Can I do that at your pharmacy?”). If the answer was negative, the interviewer asked about the reason why the service was not offered (“Ok. Do you know why not? I thought pharmacists could now?”). If the answer was affirmative, the interviewer asked questions about the kinds of birth control available (“What kinds of birth control can I get from you?”), if an appointment was needed (“Do I need an appointment? Or can I come anytime?”), if insurance could be billed (“I have insurance that covers birth control when my doctor prescribes it. Will it work the same way? Or will I have to pay extra?” “I have QUEST/Medicaid – is that covered?”), the cost of the consultation (“Is there a consultation cost?”), and age limitations (“I am under 18. Will the pharmacist prescribe for me?”). Though the interviewers attempted to ask every question, not all questions were asked to every pharmacy in order to keep the conversations as natural as possible.

Qualtrics software (Qualtrics, Provo, UT) was used for data management and the dataset was extracted to IBM SPSS Statistics for Window software, Version 26 (IBM Corporation, Armonk, NY) for analyses. Descriptive analyses were used to characterize our study sample. The proportion of pharmacies that provided pharmacist prescription of contraceptives was determined. The mean consultation cost was calculated. If a pharmacy provided a range for the cost, for example, $35.00 to $40.00, the mean for this range ($37.50) was used to calculate the overall mean consultation cost.

This study was reviewed and approved by the Queen’s Medical Center Institutional Review Board and Institutional Review Committee at the University of Hawai’i.

**Results**

One hundred and ninety-two pharmacies met the inclusion criteria including 117 on O‘ahu, 31 on Hawai‘i Island, 23 on Maui, 19 on Kaua‘i, 1 on Moloka‘i, and 1 on Lana‘i. Of these, 17 were excluded from our analysis for the following reasons: 11 phone numbers were no longer in service, 3 pharmacies were permanently closed, 1 pharmacy was closed until further notice, and 2 pharmacies’ responses were incorrectly recorded. Responses were recorded for the remaining 175 pharmacies. Of these, 54 pharmacies (31%) reported they prescribe contraceptives and 121 (69%) did not. Of the pharmacies that did not prescribe contraceptives, 118 provided a reason, including that pharmacists were not trained (39, 33%), they were unaware of the policy (33, 28%), the pharmacy did not carry contraceptives or only carried emergency contraceptives (18, 15%), unsure (10, 9%) or other (18, 15%).

The majority of pharmacies prescribing contraceptives (51/54, 94%) were chain pharmacies (CVS, Times, Costco, Safeway) including 41 CVS pharmacies. The proportion of pharmacies that prescribe contraceptives was not significantly different by island with Kaua‘i (40%) followed by Maui (35%) and O‘ahu (30%), and Hawai‘i Island having the lowest (29%) (Table 1) (P=.88). Pharmacist provision of contraception was not available on Moloka‘i or Lana‘i, both of which had only 1 pharmacy that met the inclusion criteria for the survey (Table 1). Among pharmacies located in rural communities, 20 of 63 (32%) prescribed contraceptives compared to 34 of 112 (30%) pharmacies located in urban communities (P=.85). Using post hoc calculations it was determined that the sample size of 175 and the proportion of rural versus urban pharmacies noted in this sample, resulted in the ability to detect 19% difference in the proportion of pharmacies that prescribed contraceptives.

Figure 1 displays a map of pharmacies in Hawai‘i that prescribe contraception in relation to population density. The majority of pharmacies that prescribe contraception are located in areas of high population density.

Of the 54 pharmacies that prescribed contraceptives, 45 answered the question about whether an appointment was required to obtain contraceptives and 34 (76%) of those did not require an appointment for a consultation. When asked “I have insurance that covers birth control when my doctor prescribes it. Will it work the same way? Or will I have to pay extra?” 31 pharmacies responded. There were 71% (22) that stated that the medications were covered but the consultation was not and the patient would have to pay extra, 19% (6) stated that the visit and medications would be covered in the same way, and 10% (3) stated that it depended on the type of insurance the caller had. When asked specifically about QUEST/Medicaid, 37
<table>
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<td>Total</td>
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Figure 1. Map of Pharmacies Prescribing Contraceptives by Island

Each white dot represents a pharmacy that prescribes contraceptives. On the O‘ahu map, the small dot represents one pharmacy and the larger dot represents 5 pharmacies.
pharmacies responded and 21 (57%) stated there would be an additional charge for the consultation but the medication was covered, 7 (19%) stated that the cost would be the same as if they went to a doctor’s office and 9 (24%) stated that they were unsure. Thirty-six of the 54 pharmacies (67%) provided a dollar amount for the consultation fee ranging from $15 to $45 with a mean of $35 (SD = $5.57). Four pharmacies reported there was a consultation fee but were unsure how much the consultation would cost. Forty-one pharmacies answered the question about whether the pharmacist would prescribe to a minor with 33 (81%) stating they would not, 5 (12%) stating that they would, and 3 (7.3%) reporting they were unsure.

When asked about the types of contraceptive methods available, the most common response was that it would depend on the consultation (29/54, 53%). One pharmacy stated that they were not sure what types of contraception they could provide. Six pharmacies stated they would provide any type of contraception. Four pharmacies earned the response of “other,” that it would depend on the patient’s insurance. Fourteen pharmacies indicated that they provided specific methods. All fourteen stated that they provide oral contraceptives (14/54, 26%), eight stated they would provide the contraceptive patch (8/54, 15%), four stated they would provide the contraceptive ring (4/54, 7%), and two stated they would provide injectable contraceptives (2/54, 4%).

Discussion

Three years after the passage of Act 067, the results of this study suggest that only about a third of pharmacies prescribe contraceptives. Most pharmacies that prescribe contraceptives are located in areas of high population density (towns and cities with a population density of at least 401 people per square mile) and were provided through chain pharmacies. Pharmacies on islands with smaller populations, such as Lana'i and Moloka'i, did not offer this service. Areas with higher population density tend to have clinics and healthcare centers where patients can obtain contraception through a physician or advanced practice clinician. Therefore, the findings of this study make a compelling argument that the greatest need for the pharmacist provision of contraceptives is in rural areas and that this need is not yet being met despite the passing of legislation meant to increase access to reproductive healthcare.

The proportion of Hawai‘i pharmacies that prescribe contraception (31%) is higher than what has been reported in states such as New Mexico (19%) and California (5%), but lower than Oregon (46%). At the time of the study by Rodriguez, et al, laws allowing pharmacist provision in New Mexico had been in place for a little less than 2 years which may have factored into the lower provision rates when compared with our findings in Hawai‘i. This may also be the reason for California’s low provision rates, as their study was conducted only a year after statewide implementation. The reasons for Hawai‘i’s lower provision rates when compared to Oregon may be due to differences in reimbursement practices. In Oregon, Medicaid has reimbursed for both the pharmacists’ time and the contraceptive since the program began.

Pharmacists in Hawai‘i do not currently have a mechanism for seeking reimbursement for consultation time from insurance companies. This may reflect why we found that a majority of pharmacies in Hawai‘i (71%) were charging for services, with a mean out-of-pocket payment of $35. Creating a mechanism where pharmacists bill insurance for the counseling time may reduce costs to the consumers and promote the expansion of pharmacist prescription of contraception in Hawai‘i.

Act 067 requires that pharmacies not require an appointment for contraceptive consultations to promote access. This study found that the majority of pharmacies prescribing contraceptives did not require appointments to be made prior to a visit in accordance with the law. While Act 067 did not specifically mandate pharmacists to prescribe contraception for minors; Hawai‘i Revised Statutes 577A does specifically allow individuals 14 years of age and older to consent to family planning services on their own. However, this study found that 81% of pharmacists would not prescribe to a minor, suggesting a need for education on the rights of minors in Hawai‘i.

This study should be interpreted with the following limitations in mind. First, it is limited by a small sample size and thus is underpowered to detect differences in outcomes. The secret shopper method sometimes prevented the interviewers from asking every question. However, the question addressing the primary outcome – whether or not a pharmacy prescribed contraception – was prioritized and asked to every pharmacy. Also, interviewers did not have a systematic method for determining the availability of each birth control method; therefore, the results for this outcome may not be complete. The data collection tool was not equipped to completely capture the nuanced rationales for pharmacies not adopting pharmacist provision of contraceptives. For example, 1 pharmacist reported that he did not feel comfortable prescribing birth control by himself and would only prescribe if the patient needed a refill and could not get to a doctor. The secret shopper methodology used in this study also has inherent limitations. Though it provided a glimpse of what consumers experience in seeking contraceptives from a pharmacist, it may not have been necessary to obtain information. Pharmacists may have been more forthcoming with information on their rationale for not providing contraceptives if they did not think they were speaking to a consumer. Of note, investigators involved in this study are conducting a study to directly survey pharmacists about motivators and obstacles to the implementation of pharmacist provision but this study has been hindered by a low response rate.

This study provides a snapshot of what pharmacist provision of contraceptives looks like in Hawai‘i 3 years after the passage of Act 067. It has determined the percentages of pharmacies that
have pharmacists taking advantage of their expanded scope of practice in Hawai’i as well as their locations in relation to the population density in various communities. It was also able to identify possible barriers pharmacies face to prescribing contraception. Findings from this study can help inform future public health policies aimed at improving contraceptive access in Hawai’i, particularly in rural and underserved areas. Future research should be focused on understanding the reasons behind low pharmacist certification for prescribing contraception and looking into incentives and barriers that may exist in implementing this service statewide.

 Disclosure Statement

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 Conflict of Interest

None of the authors identify a conflict of interest.

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References


Evaluation of an Education-based Training Orientation for Resident Physicians in an Intensive Care Unit in Hawai'i

Victoria M.F. Mank MD; Amanda Wiggins MD; Derek Lowe MD; Crystal Breighner MD

Abstract

The need for multidisciplinary teams to provide complex care has increased as the population ages. As these teams become increasingly integrated, the knowledge, skills, and attitudes of resident physicians to practice safe and effective care in intensive care units (ICUs) evolves. A structured and multidisciplinary orientation day for resident physicians was implemented to assess improvements in physician confidence at Tripler Army Medical Center in Hawai'i from July 2019 to June 2020. ICU residents received an orientation day from a multidisciplinary team, with an emphasis on practical knowledge for common disease processes in a system-based fashion and competency in procedural skills. A total of 30 residents were asked to complete a pre- and post-orientation survey over a 1-year period, with 17 pre and post surveys completed for a response rate of 57%. The survey measured residents’ perceived confidence in various tasks. Scores were compared using a paired 2-sampled t-test to assess statistical significance. The majority of resident physicians (76%) had at least 1 month of prior ICU experience. Statistically significant improvement was seen in self-reported abilities in performing 6 of the 10 elements assessed. With the diverse pathophysiology in critical care, it was essential to create a broad orientation with didactic and simulation-based learning, which resulted in observed improvement in more than half of the areas of interest. Adopting an orientation day for resident physicians rotating through the ICU can improve resident physician confidence, review important knowledge and skills, and highlight the role of each contributing multidisciplinary team member.

Abbreviations

ICU = Intensive Care Unit
IRB = Institutional Review Board
PGY = Post-Graduate Year
TAMC = Tripler Army Medical Center

Introduction

As the world’s population ages, the medical field continues to evolve in clinician care with the inclusion of multidisciplinary teams.1-4 In hospital settings, physicians work with a multidisciplinary team, which includes physician associates, nurse practitioners, nurses, respiratory therapists, occupational therapists, physical therapists, dieticians, and pharmacists. In academic institutions, resident physicians, who are physicians in training, are part of the multidisciplinary team. Health care is changing quickly in regards to treatment options, physical care of patients, electronic medical records, imaging studies, procedures, and physician resident work hours and academics.1-4 The knowledge, skills, and attitudes resident physicians must possess in order to practice safe and effective patient care in an intensive care unit (ICU) has significantly increased with the inclusion of a multidisciplinary team. However, many resident physicians at Tripler Army Medical Center (TAMC) in Honolulu, Hawai'i had little to no experience in an ICU setting when they began training.

In the past, resident physician orientations focused on promoting group cohesion with activities tailored to hospital services and administrative work.5 Resident physicians are prepared in a variety of ways prior to on-the-job training. For example, during the transition from a medical school student to resident physician, surgical interns undergo a focused and in-depth orientation to supplement their learning, standardize their surgical knowledge, and to give them adequate hands-on experience prior to performing surgery on a patient.6-8 Educational orientation curricula are helpful in very demanding residency tracks. An institution in Honolulu Hawai‘i, within the obstetrics and gynecology department, an orientation curriculum involved lectures, simulation, online modules, and clinical scenarios, similar to the multimodal approach implemented at TAMC.9 This curriculum approach resulted in great improvement among resident physician confidence.

Currently, a common model is to introduce incoming resident physicians to important critical care topics and skills several weeks prior to the residency start date. At TAMC, this was done during the month of June, with hospital rotations beginning July 1. Prior to July 2019, the orientation to the TAMC ICU was conducted on the first day of the rotation and focused on the resident physician rotation schedule and daily workflow, with much of the day revolving on administrative topics. Results of in-service exam scores, resident physician feedback, and attending physician discussions made it apparent that the orientation structure was insufficient and needed to change. TAMC residents and attending physicians were surveyed on rotation experience at other hospitals as well as in civilian and military medical schools. The general consensus of the survey was that the traditional orientation model is commonly used in other ICUs. The traditional model is efficient in time by allowing all incoming resident physicians to participate once and without work-related interruptions. However, this traditional model has several limitations. At the time the orientation is delivered, resident physicians have not learned the necessary skills for completing the basic tasks in their daily workflow, thus limiting the immediate applicability of orientation topics. Additionally, resident physician schedules vary widely and clinical situation assessment of specific topics or skills discussed in the orientation may not occur for many months. As a result, when evaluating previous TAMC interns, the critical care topics
and skills taught during an intern orientation are often forgotten by the time their first individual ICU rotation begins. For these reasons, along with the convenience of a 1-day training, TAMC’s ICU curriculum was changed to improve effectiveness and increase the self-confidence of resident physicians.

When designing the education-based orientation day for the resident physicians in TAMC’s ICU, the basics of learning theory were used in the curriculum design.10 The concepts of behaviorism, controlled environments, structured learning sessions, and educational handouts all fall under the umbrella of learning theory, which was used in designing the ICU orientation. The environment and topics presented in the course were controlled.10,11 For example, the orientation took place directly in the physical location that the residents would be working in, surrounded by other members of the critical care team. This provided an opportunity for the resident to adjust to the new environment and become comfortable working in the ICU. The new curriculum also trained residents to appropriately respond to the fast-paced critical care environment in the future. Educational handouts and structured learning sessions helped build upon previous knowledge the residents gained in medical school and previous hospital rotations. This further strengthened the learning they obtain from the orientation day. The objective of this paper is to assess resident physician confidence after their participation in the newly implemented curriculum.

Methods

Starting in July 2019, a structured, multidisciplinary, and multifaceted education-based orientation was implemented for resident physicians on the first day of each ICU rotation, approximately every 28 days. Efficacy of the education-based orientation on resident physician confidence in patient care in the ICU was measured.

From July 1, 2019 through June 30, 2020, all intern resident physicians rotating through the adult ICU at TAMC, received a mandatory, dedicated education-based orientation. The TAMC adult ICU is a 10-bed, mixed medical-surgical unit. Resident physicians from various fields, including internal medicine, family medicine, general surgery, orthopedic surgery, obstetrics and gynecology, and transitional year medicine were included in this study. All resident physicians were first-year resident interns. Each 12-hour shift in the ICU includes 1 upper-level resident, either from the general surgery or internal medicine department, and 2 interns from any of the aforementioned departments. A total of 30 resident interns rotating through the ICU in the academic year of 2019-2020 participated in the orientation including 5 post-graduate year (PGY) 2 or 3 residents and the remainder resident interns. A subset of the internal medicine and general surgery residents had more than 1 rotation through the ICU in the academic year. On the orientation day, resident physicians received a total of 11 presentations given by various members of the ICU multidisciplinary team including respiratory therapists, intensivists, nurses, pharmacists, dieticians, and physical therapists among others, all facilitating practical knowledge for treating common disease processes from their perspectives to improve procedural skills and team care (Figure 1).

The orientation consisted of traditional didactic sessions, simulation, and hands-on training. Sessions varied in length from 30 minutes to 90 minutes. The staff intensivist demonstrated the nuances of the physical examination of a critically ill patient and gave a brief overview of the various machines used in the ICU. Arterial and central line simulation was also a focus of the procedure portion of the orientation. Simulation was completed on a SimMan® 3G model (Laerdal Medical, Gatesville, TX) that was able to demonstrate various physical

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>0600-0645</td>
<td>Pre-test, Survey</td>
<td>ICU Education Conference Room</td>
<td></td>
</tr>
<tr>
<td>0645-0725</td>
<td>Examining an ICU patient</td>
<td>Physician, Intensivist</td>
<td>ICU Patient Room</td>
</tr>
<tr>
<td>0730-0815</td>
<td>Academic Residency Educational Lecture</td>
<td>Chief Residents</td>
<td>Internal Medicine Conference Room</td>
</tr>
<tr>
<td>0830-0900</td>
<td>Infection Control</td>
<td>Infection Control Specialists</td>
<td>ICU Education Conference Room</td>
</tr>
<tr>
<td>0915-0945</td>
<td>The ICU Liberation Bundle</td>
<td>Critical Care Clinical Nurse Specialist</td>
<td>ICU Education Conference Room</td>
</tr>
<tr>
<td>0945-1045</td>
<td>Oxygen from Nasal Cannula to Invasive Mechanical Ventilation</td>
<td>Respiratory Therapist</td>
<td>ICU Education Conference Room/ICU Patient Room</td>
</tr>
<tr>
<td>1045-1130</td>
<td>Vasopressor Pharmacology</td>
<td>Critical Care Pharmacist</td>
<td>ICU Education Conference Room</td>
</tr>
<tr>
<td>1130-1200</td>
<td>Environment of Care</td>
<td>Critical Care Nurse</td>
<td>ICU</td>
</tr>
<tr>
<td>1200-1300</td>
<td>Lunch</td>
<td>ICU Education Conference Room</td>
<td></td>
</tr>
<tr>
<td>1300-1330</td>
<td>Nutrition in Critical Care</td>
<td>Critical Care Dietician</td>
<td>ICU Education Conference Room</td>
</tr>
<tr>
<td>1330-1400</td>
<td>Physical Therapy in Critical Care</td>
<td>Physical Therapist</td>
<td>ICU Education Conference Room</td>
</tr>
<tr>
<td>1400-1530</td>
<td>Central and arterial line simulation</td>
<td>Physician, Intensivist</td>
<td>Simulation Center</td>
</tr>
<tr>
<td>1530-1600</td>
<td>Social Work in the Care of the Critically III</td>
<td>Social Worker</td>
<td>ICU Education Conference Room</td>
</tr>
<tr>
<td>1600-1615</td>
<td>Survey, Post-test</td>
<td>ICU Education Conference Room</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. ICU Orientation Training Day Schedule
examination findings as well as anatomically correct vasculature to allow for procedures. An infection control specialist reviewed isolation precautions, proper personal protective equipment, and strategies for preventing hospital associated infections. The resident physicians learned about dosages of intravenous medications, scales used to titrate and adjust medications, and nurse-physician teamwork from the critical care clinical nurse specialist. A respiratory therapist educated resident physicians on various devices used to provide supplemental oxygen to patients and ventilator management. Residents had hands-on exposure to the various oxygenation and ventilator machines available in the ICU. The critical care pharmacist reviewed the pharmacology and pharmacokinetics of vasopressors, the body’s physiologic response to these medications, and provided expert guidance for vasopressor selection in various clinical scenarios. Each educational session concluded by providing the resident physicians with an educational handout, further reinforcing the skills and knowledge given during the teaching session.

To assess the impact of the reformed ICU orientation, resident physicians were surveyed at the beginning and end of the day. The survey was voluntary and consisted of 10 questions in which the resident physician selected responses based on their perceived ability to present and manage patients, as well as perform procedures, in an ICU. Questions included in the survey referred to preparedness for the ICU, understanding of pharmacology of critical care medications, management of ventilated patients, performance of bedside procedures, and resident physician perceived comfort in managing patient nutrition, performing point of care evaluations, managing complex cardiothoracic surgery patients, interpreting chest radiographs, presenting ICU patients, and prescribing medications in the ICU. The answers to each of the 10 questions was based on a 5-point Likert scale. The graded scale equated a score of 1 with “strongly disagree” and a score of 5 with “strongly agree.” The pre- and post-orientation scores were compared using paired 2-sampled t-tests to assess statistical significance using Microsoft Excel software version 16.17 (Microsoft Corporation, Redmond, WA). A P-value < .05 was considered significant.

The orientation assessment on resident physician confidence was exempt from TAMC Institutional Review Board (IRB) approval since the training was incorporated into the resident ICU curriculum.

**Results**

A total of 17 Army and civilian resident physicians completed a pre- and post-orientation survey for a response completion rate of 57%. Most of the respondents (76%) had at least 1 month of prior ICU experience.

Among the 10 elements assessed, residents reported statistically significant improvement in their ability to perform 5 elements following the orientation (Table 1). Specifically, residents improved in their ability to present patients in the ICU (P = .03), manage nutritional needs of critically ill patients (P = .0004), understand vasopressor pharmacology (P = .02), ventilator management (P = .04), and place central or arterial lines in patients (P = .002). Additionally, there was a statistically significant improvement in the resident physicians’ overall perceived preparedness for the rotation following the orientation (P = .003).

There were no statistically significant improvements found in self-reported ability to perform point-of-care ultrasound, postoperative management of cardiothoracic surgical patients, comfort with prescribing antibiotics, and interpretation of chest radiographs.

<table>
<thead>
<tr>
<th>Survey Statement</th>
<th>Pre-Orientation Mean ± SD</th>
<th>Post-Orientation Mean ± SD</th>
<th>Mean Difference</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am adequately prepared for the ICU rotation</td>
<td>2.41 ± 0.43</td>
<td>3.12 ± 0.37</td>
<td>0.71</td>
<td>.003</td>
</tr>
<tr>
<td>I am comfortable interpreting chest radiographs in the ICU setting</td>
<td>2.82 ± 0.45</td>
<td>2.88 ± 0.47</td>
<td>0.06</td>
<td>.290</td>
</tr>
<tr>
<td>I am ready to present medically complex ICU patients systematically by organ system</td>
<td>2.76 ± 0.57</td>
<td>3.12 ± 0.44</td>
<td>0.36</td>
<td>.030</td>
</tr>
<tr>
<td>I am comfortable prescribing antibiotics in the ICU setting</td>
<td>2.24 ± 0.57</td>
<td>2.29 ± 0.58</td>
<td>0.05</td>
<td>.400</td>
</tr>
<tr>
<td>I am comfortable managing patient nutrition in the ICU setting</td>
<td>1.94 ± 0.54</td>
<td>3.06 ± 0.46</td>
<td>1.12</td>
<td>.0004</td>
</tr>
<tr>
<td>I understand the pharmacology of different vasopressors and how to select between them</td>
<td>2.35 ± 0.44</td>
<td>3.12 ± 0.44</td>
<td>0.77</td>
<td>.020</td>
</tr>
<tr>
<td>I am prepared to manage post-operative CT surgery patients</td>
<td>2.12 ± 0.44</td>
<td>2.35 ± 0.47</td>
<td>0.23</td>
<td>.190</td>
</tr>
<tr>
<td>I am prepared to manage patients on the ventilator</td>
<td>2.24 ± 0.46</td>
<td>2.71 ± 0.40</td>
<td>0.47</td>
<td>.040</td>
</tr>
<tr>
<td>I can perform bedside procedures such as central and arterial line placement</td>
<td>2.47 ± 0.56</td>
<td>3.12 ± 0.53</td>
<td>0.65</td>
<td>.002</td>
</tr>
<tr>
<td>I can perform point of care ultrasound evaluations such as IVC evaluation, FAST exam, and evaluation for pneumothorax</td>
<td>3.06 ± 0.52</td>
<td>3.12 ± 0.53</td>
<td>0.06</td>
<td>.290</td>
</tr>
</tbody>
</table>
Discussion

New resident physicians often feel anxious and unprepared for inpatient rotations, especially in high-acuity environments such as the ICU, which has been well documented and studied in critical care and inpatient rotations. Practical or a hands-on orientation can help alleviate uneasiness and improve provider confidence. This has been seen in other members of the multidisciplinary team, such as nurses, in the critical care environment. The ICU requires additional training for specialized knowledge to improve provider confidence and competence. This knowledge is often gained from healthcare professionals training the fundamentals of critical care in procedural competence, shock pathophysiology, vasopressor pharmacology, nutrition, and mechanical ventilation management, all of which can be familiarized and achieved through an orientation.

The TAMC education-based orientation day was designed to supplement prior learning from medical school and previous hospital rotations to promote residents’ confidence for real-world performance.

Appropriate care for critically ill patients with diverse disease processes requires a broad foundation of knowledge, skills, and attitudes that can be obtained by using protected didactic and simulation-based learning time. Simulation-based education was included in the orientation day due to promising literature on long-term benefit through this method of learning. Having hands-on exposure through simulation improves participant comfort and competence when faced with similar situations later in the ICU rotation, as supported by many other fields of medicine using this method with excellent results.

In many academic institutions, formalized educational orientations are held to prepare clinicians for the environment in which they will begin working. Other members of the ICU multidisciplinary team, such as critical care nurses, receive similar training across the country prior to beginning work. However, there are limited published data on resident physician orientations preparing specifically for the ICU environment. The current study supports the need for resident physician training prior to an ICU rotation, as the mean score for perceived preparedness prior to the orientation was lower than that following the orientation, suggesting that the majority of resident physicians do not feel adequately prepared for their first ICU rotation. With the current ICU orientation, resident overall self-reported confidence increased, despite more than 75% of participating resident physicians reporting significant prior ICU experience.

TAMC previously had a well-established ICU orientation, including an hour-long slideshow exploring a daily schedule and explanations of administrative procedures. The orientation was remodeled to include didactic lectures and simulation training with a multidisciplinary team to improve resident physician preparedness in the ICU. The assessment of residents’ confidence provides feedback for future improvements in the curriculum such as ultrasound guidance and chest radiology.

The most likely reason behind insignificant findings may have been the complexity of care required in the cardiothoracic surgery patient management, which may need reiteration and further training. Additional training sessions are needed to focus on complex care in the ICU throughout the year in order to improve resident confidence. Examining the collected data further, ultrasound, management of cardiothoracic surgical patients, comfort with prescribing antibiotics, and interpreting radiographs were found to have little change in self-reported confidence. A possible reason for these not improving after the orientation day, was that these are areas that require time and experience to gain appropriate knowledge and skill. The basics were covered in the orientation day, but more patient exposure is likely required before confidence will be reported to improve. Based on the current results, the intervention of tailoring the educational curriculum throughout the year based on resident confidence results should be considered or applied to other medical specialties where feasible. This can be done through an orientation and additional educational trainings throughout the rotations in individual specialties. Additional educational trainings throughout the year may compliment the orientation day, as they further add to the on-the-job trainings that the residents gain from caring for patients daily. Overall, the results from the orientation survey provide support for orientations to include multidisciplinary team training and additional training in other medical specialties in academic medicine.

A strength of this study was its focus on multidisciplinary learning in the ICU. This limited the attending physicians teaching burden, reduced scheduling conflicts, and allowed resident physicians to meet other members of the multidisciplinary team. The members of the multidisciplinary team who participated in the orientation showed great enthusiasm and support of the new curriculum. An unexpected outcome was the interest from students and new employees in various disciplines outside of the resident class who frequently attended the lectures in their respective fields or fields of interest. The restructured orientation intended for resident physicians also became a training for other members of the multidisciplinary team.

There were several limitations to this study. The orientation was implemented in an Army hospital’s ICU with a majority of military resident physicians, which limits the generalizability to physicians in non-military hospitals. The sample size was small with the pre- and post-orientation survey responses. Finally, the project lacked an objective measurement of resident physicians’ critical care knowledge or procedural competency. Future research is needed to assess these measures and verify reproducibility in other medical centers as well as other specialties.

The next step would be to implement orientations for all members of the critical care team and assess confidence in their various occupations within the ICU. A long-term study evaluating patient outcomes from the trained team members in comparison to untrained team members would be useful for the effectiveness of the curriculum.
Conclusion

Critical care encompasses a wide range of complex medical conditions and diverse pathophysiology. Resident physicians at TAMC received an intensive 1-day orientation taught by a multidisciplinary team to increase confidence in caring for medically complicated patients in the ICU. The results from the surveys helped to improve the ICU curriculum by focusing on measures with low confidence levels. Learning the various roles of the multidisciplinary team have improved resident preparation for the ICU. Overall, adopting a focused education-based orientation for incoming resident physicians in demanding specialties may increase foundational knowledge, improve competency skills and patient care, foster self-confidence, and promote team cohesion within their rotation and beyond.

The views expressed in this publication are those of the author(s) and do not necessarily reflect the official policy of the Department of Defense, Department of the Army, US Army Medical Department, or the US Government.

Conflict of Interest

None of the authors identify a conflict of interest.

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References

Co-curricular Activities to Prepare Students for the Expanding Role for Pharmacists in Telehealth

Matthew Clemente; Roy Goo PharmD

HJH&SW contributing editor of the Daniel K. Inouye College of Pharmacy (DKICP) Scripts column is Jarred Prudencio PharmD, BCACP, BC-ADM. Dr. Prudencio is currently Associate Professor of Pharmacy Practice and Chief of Experiential Education, with expertise in healthcare education and outpatient family medicine.

Prevention, early detection, consistent patient monitoring, and follow-up are all cornerstones of essential primary care. COVID-19 has had a profound impact on chronic disease management. During the COVID-19 pandemic, chronic disease management has experienced treatment delays due to canceled in-person appointments and a reallocation of resources towards acute care services. Patient-sided stigma associated with healthcare facilities is another contributing factor in the underutilization of healthcare services. In June 2020, 4 in 10 adults surveyed reported a delay or avoidance in routine or medical care because of the pandemic to reduce the risk of infection.1 As a result, patients with chronic diseases such as diabetes and lipid disorders could experience a cumulative risk and delay in treatment that may eventually result in complications of disease progression and preventable hospitalizations.

Several key contributing factors in the optimal management of chronic disease states include preventative screening and monitoring as well as new medication therapy. In a study conducted in Tennessee and Massachusetts and reported in the Journal of General Internal Medicine, found rates of preventative screening and monitoring fell by 91-90% and rates of new medication therapy fell by 52-60% between February and April 20202. This shortage of healthcare resources and a need to fill gaps in the continuity of care have provided pharmacists with a unique opportunity to assist physicians with the management of patients’ chronic diseases.3 Such services include telehealth appointments for device counseling, more frequent follow-up for high-risk patients, and other medication management services that don’t require a physical exam. During the COVID-19 pandemic, the role of telemedicine has expanded to facilitate patient-provider interactions in times of social distancing and provider shortage. Providing pharmacists with an expanded role in chronic disease state management via telehealth has been shown to be beneficial to both patients and the overall healthcare system.4

The expansion of telehealth services during the COVID-19 pandemic has allowed pharmacists to fill a unique role in the management of chronic diseases. Such roles include specific interventions directed at 3 distinct tiers: primary prevention, early detection, and management of chronic diseases. Pharmacists providing telehealth services has been shown to provide a statistically significant positive impact on patient-centered outcomes in the management of chronic disease. In 2012, McFarland et al found statistically significant improvement in achievement of hemoglobin A1c goals in patients accessing clinical pharmacy services via telehealth compared to patients who did not utilize telehealth. Improvements in chronic disease outcomes via telehealth management has also been shown in patients with hypertension.5 Pharmacists provide frequent monitoring between regularly scheduled appointments with primary care physicians to improve continuity of care. Both clinical and community pharmacists can implement telehealth interventions directed at chronic disease state management through a collaborative healthcare model with physicians. These interventions can include education on chronic disease states and promoting a healthy lifestyle for primary prevention. A second tier of interventions can include early detection of chronic disease states such as hypertension. Rapid evaluation and interpretation of laboratory values coupled with efficient referral protocols can lead to improved patient outcomes and reduced costs by allowing early detection of chronic disease. Lastly, pharmacists can also play a role in the management of chronic disease. They can provide new medication counseling upon diagnosis and treatment of a new chronic disease. Pharmacists can also provide medication management, such as medication administration, review, dose adjustment or titration, monitoring, and reconciliation. Additionally, oftentimes working with patients to improve medication adherence can have a positive impact on patient outcomes rather than adjusting medications. It’s estimated that adherence to chronic medications is about 50%.6 The implementation of pharmacists in telehealth can allow for frequent follow-up and rapid identification of barriers to medication adherence. Interventions can include simplifying medication regimens, using adherence packaging, and minimizing adverse effects.7,8
The COVID-19 pandemic has also necessitated significant changes in the delivery of pharmacy education and training. Prior to 2019 the pharmacy students at the Daniel K. Inouye College of Pharmacy (DKICP) participated in many co-curricular activities designed to instill professional values, attitudes and behaviors required of pharmacists. Most of these activities were focused on community benefit providing health resources to the public through health and wellness education in the form of posters and presentations at public gathering places as well as in person immunization clinics, medication counseling, and blood pressure screening. COVID-19 caused barriers to pharmacy students participating in the traditional co-curricular activities they have provided to the community in the past. However, this also provided students with the invaluable opportunities to interact with the public in new ways, including virtually-delivered health education and providing exposure to the growing role of pharmacists in telemedicine related to the management of chronic disease states. As a result of funding from several private entities in 2020, DKICP was able to shift its student-led co-curricular activities to a virtual platform through the creation of monthly video-based webinars on common health topics as well as partnering with assisted living facilities to provide hypertension related education, medication counseling, blood pressure monitoring, and dietary and lifestyle recommendations. Residents of partnering assisted living facilities were sent blood pressure monitors and were scheduled to meet with 2nd and 3rd year pharmacy students over the phone or utilizing a teleconferencing platform. During these meetings, the pharmacy students had the opportunity to interview patients about their medication compliance, recent blood pressure readings, lifestyle and other health related concerns. Residents were provided with education related to chronic disease states such as diabetes, hypertension, and hyperlipidemia

The implementation and training of pharmacists in this expanded telehealth role can aid in the goal of delivering high quality care while reducing inherent costs. This approach is specifically useful in providing care to rural populations throughout the Pacific region. There are, however, several legislative and procedural barriers that prevent pharmacists from fulfilling this role. These barriers include the identification of pharmacists by payers as “auxiliary personnel” and the requirement for pharmacists to be tied to a Medicare-eligible provider to bill for services. Appropriate pharmacist-driven telehealth models are already in place at several institutions. A shortage of resources, coupled with other burdens of the ongoing pandemic necessitate a change in the healthcare model to one that includes resource and workflow changes that further involve pharmacists as healthcare providers improve patient care during COVID-19 and beyond it. It is also important that educational institutions keep pace by providing opportunities for students to participate in these emerging roles and workflows.

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References
**Social Work in Action**

**Older Adults, Protective Factors, and Opportunities to Promote Health during the COVID-19 Pandemic**

Sophia B. Kim PhD, MSW; Yeonjung Jane Lee PhD

*Social Work in Action is a solicited column from the social work community in Hawai‘i. It is edited by HJHSW Contributing Editor Sophia Kim PhD, of the Thompson School of Social Work & Public Health at the University of Hawai‘i at Mānoa.*

**Introduction**

The coronavirus disease 2019 (COVID-19) pandemic has disproportionately impacted older adults, defined as those aged 65 and older. In the US, 81% of deaths related to COVID-19 were individuals aged 65 years and older. Older adults have higher risk factors that add to the burden of COVID-19, which influences their health and wellbeing. For example, age (65 and older), nursing home or long-term care facility living status, and underlying medical conditions (eg, heart disease, chronic lung disease, cancer, and diabetes) are associated with a higher risk of severe COVID-19 cases, hospitalizations, and mortality. Additional challenges experienced by this group may include lower socioeconomic status, pre-existing conditions such as asthma and heart disease, and social isolation. Social isolation and loneliness, both identified as risk factors for poor aging outcomes, were exacerbated during the COVID-19 pandemic. It is important to distinguish between the 2 constructs as they may be related, but do not always go hand in hand. For example, one may live alone and not feel lonely, and at the same time, one may feel lonely while surrounded by family and friends. Social isolation and loneliness are important social determinants of health that warrant continued examination, especially among older adults.

The pandemic brought on additional stressors that may have had greater impact on older adults, these included food insecurity and scarcity of basic household essentials. Aside from the physical and social health impacts of COVID-19, there was increased awareness of the risk of mental health issues. In this context, older adults should not be missed in awareness efforts and warrant targeted attention. One study conducted in 2020 showed that approximately one-third of older adults reported feeling sad and depressed, so much so that nothing could cheer them up. Having depression can have devastating impacts on older adults with pre-existing medical conditions. They are more likely to have functional impairments in activities of daily living compared to their non-depressed counterparts and have decreased recovery from medical conditions such as stroke.

Another study examined anxiety about developing COVID-19 associated with proactive coping and found that older adults have increased levels of anxiety compared to their younger counterparts. This study also showed that older adults who endorsed more proactive coping (eg, “I prepare for adverse events”) were associated with less COVID-19 stress compared to their younger counterpart. Nevertheless, it is important to continue to monitor the mental health and care needs among older adults as long-term population-level stressors can increase the rates of grief disorders, depression, and anxiety.

Protective factors among older adults must be acknowledged and may buffer the impacts of COVID-19. One study investigated *wisdom*, a personality trait typically attached to older adults, and operationalized it with the inclusion of specific components, such as empathy, compassion, emotion regulation, acceptance of uncertainty, diversity of perspectives, and spirituality. The study findings showed a significant and inverse relationship between compassion and loneliness, in other words older adults in the study who were more compassionate were less likely to be lonely. Interventions that aim to strengthen wisdom may help improve one’s wellbeing. Another study emphasized the quality of relationships rather than quantity as mitigating mental health concerns, such as feeling down or depressed. Moreover, physical activities (eg, walks or yoga), projects (eg, gardening, home improvement, writing, etc.), learning activities (eg, language, instrument, or taking online courses), and planning (eg, making future travels and long-term plans like estate and contingency plans) were described as coping and self-care strategies in response to COVID-19.

**Opportunities to Promote Health**

It is undeniable that the COVID-19 pandemic adversely impacted older adults; therefore, it is critical to understand ways to promote their wellbeing. When planning ways to optimize health among older adults, it is important to combat the ageist stereotypes often attached to this population, which can have negative impacts across health domains. Thus, protective factors and strengths such as greater emotional regulation, prosocial behavior (eg, compassion, and self-reflection), and...
resiliency among this heterogeneous population must not go unnoticed. The resources to help manage mental health and the stress of COVID-19, including increasing knowledge base on smart technology, strengthening social support (eg, family and friends), or cognitive and biological factors (eg, ability to engage in physical exercise or participate in learning activities) are important areas to maintain.

Of particular importance is the role of technology, which has played a large role in maintaining social connections as well as accessing mental health services during the pandemic. Considering the aforementioned quality of relationships, maintaining meaningful quality connections may require better ability and comfort with using the internet and mobile technology, such as social networking and communication applications. Increased comfort and technology proficiency can also help address health care and other essential needs for older adults. A study summarized 15 apps that addressed physical and cognitive limitations among older adults and that may enhance their quality of life. Examples of the app categories included social networking apps (FaceTime and Skype), food/drink apps (DoorDash and Instacart), and health and fitness apps (Calm, MyFitnessPal).

Community-based organizations (CBOs) servicing older adults are important stakeholders because staff members working directly with this population understand the needs and challenges experienced in this diverse older population. With their older population practice experience and expertise, staff at CBOs servicing older adults can help identify relevant apps for their clients that can improve their quality of life. In addition, as older adults maintain varying attitudes, knowledge base, and use of technological support, educational opportunities can be expanded and tailored to optimize their use of these supports. These opportunities can be presented using other information sharing modalities such as teleconferencing, mailing educational information, and small in-person groups. However, it will be important to consider the challenges when planning for interventions such as internet connectivity, especially in rural and remote communities, and to consider health safety precautions and concerns of contracting COVID-19 if intervening in-person.

The association between physical activity and overall health has been heavily investigated for older adults. Supporting this group’s physical activity level during the pandemic is another area to consider while being cognizant of the varying motor functioning capacities of individuals. A study focusing on Native Hawaiian and other Pacific Islander older adults found that engagement in physical activity was associated with lower odds of having memory problems, self-rated poor/fair health, and psychological distress. The researchers in this study emphasized the need for culturally-responsive interventions, which can incorporate cultural values and practices tailored to the client population. Opportunities for CBOs present themselves here, as well as the importance of a trusting relationship between the organization and their target population, and understanding of systemic barriers that impact sociocultural opportunities for older adults.

In conclusion, it is vital to be mindful of ageist stereotypes attached to the older population. Ways to counter ageist stereotypes can include involving clients with intervention development and implementation. In turn, when planning and implementing interventions to promote health and productive aging, amplifying this population’s protective factors, strengths, and resilience can result in more meaningful outcomes. Community and national level efforts to create more opportunities for older adults to thrive during the COVID-19 pandemic and other challenging times continue to be critical.

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References
Guidelines for Publication of HJH&SW Supplements

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

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

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

Hawaiian words that are not proper nouns (such as keiki and kūpuna) should be written in italics throughout the manuscript, and a definition should be provided in parentheses the first time the word is used in the manuscript.

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