

Hawai'i Rural Health Program: Shaping the Next Generation of Rural Doctors

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Abstract

Like many areas of the United States, Hawai'i and its rural communities are suffering from a significant physician shortage. The University of Hawai'i (UH) John A. Burns School of Medicine (JABSOM) developed the Hawai'i Rural Health Program (HRHP) in 2011 to help provide early and substantial rural training experiences for its medical students in hopes of generating more rural health care providers. Thus far, 20.6% of the students who participated in this program and have since graduated from residency are now practicing in rural communities. Final exam grades of students who participated in the program were not statistically different from those who did not participate, suggesting a similar quality of training between both the rural and traditional cohorts of students. Reflections from students who completed the program demonstrate the large and lasting impact that this immersive experience has on their medical education and desire to help rural communities.

Keywords

Rural health, medical education, Hawai'i Rural Health Program (HRHP), University of Hawai'i (UH) John A. Burns School of Medicine (JABSOM), physician shortage

Abbreviations and Acronyms

HRHP = Hawai'i Rural Health Program
JABSOM = John A. Burns School of Medicine
PBL = problem-based learning
UH = University of Hawai'i

Introduction

The health profession shortage in Hawai'i is pervasive throughout the islands, with an estimated physician shortage of 29% statewide according to the 2020 Hawai'i Physician Workforce Assessment Project.¹ This deficit is particularly glaring within Hawai'i's rural communities. Hawai'i Island (colloquially referred to as the Big Island), Maui County (encompassing the islands of Maui, Kaho'olawe, Lana'i, and Moloka'i), and Kaua'i have physician shortages of 53%, 42%, and 33%, respectively.¹ Although the rural physician shortage is profound in Hawai'i, this problem is not unique to the islands. Rural physician shortages are observed nationally and internationally. It is estimated that 20% of the United States population lives in rural areas, while only 11% of physicians practice in these communities.¹

Multiple studies have validated that health care providers who are from rural areas are more likely to practice in rural commu-

nities.²⁻⁴ MacQueen et al's systemic review included 50 studies published between 2005 and 2017 and concluded growing up in a rural place as the strongest predictor of health care workers returning to rural communities.² A study of multiple Australian medical schools found that students from rural areas were 10 times more likely to favor working in rural communities compared to their peers who were from urban areas.⁵ A 2010 survey of University of Hawai'i (UH) John A Burns School of Medicine (JABSOM) students supported these findings and showed that students from rural backgrounds were 11 times more likely to want to practice in rural communities in the future.⁶ This correlation extended beyond intention. A survey of JABSOM alumni showed that 46% of physicians practicing in rural places across Hawai'i were from rural communities.⁶

The literature also suggests that rural medical training programs may improve rural physician recruitment.^{2,3} MacQueen et al's systemic review concluded that approximately 44% of providers who were trained in rural communities were retained in such communities.² Rural residency programs have shown particular promise, with one study showing that physicians who attended rural residencies were three times as likely to practice in a rural area.⁷ Positive associations towards rural practice have also been observed through rural clerkship programs and electives.^{8,9}

Medical students at JABSOM can gain exposure in rural health care via enrollment in the Hawai'i Rural Health Program (HRHP). The HRHP was developed at JABSOM in 2011. Funding for this program has been made possible through multiple sources including the Rural Neighbor Island Medical Education Fund, Area Health Education Center (Grant #U77HP08404), Native Hawaiian Center of Excellence (Grant #D34HP16044), and the North Hawai'i Medical Education Fund. The program provides first-year medical students with opportunities to experience what medical practice is like in rural Hawai'i communities. The state of Hawai'i is comprised of eight main islands. The following seven islands are mostly rural communities and are collectively referred to as the Neighbor Islands: Ni'ihau, Kaua'i, Moloka'i Maui, Lana'i, Kaho'olawe, and Hawai'i Island (Big Island). JABSOM's campus is located in Honolulu, the urban capital of the state, on the island of O'ahu. The main goal of the program is to encourage students to return to these communities, especially the neighbor islands, as physicians in the future.

Methods

Initially HRHP sent up to six students to Hilo during the Spring semester of their first year. In 2014, the program expanded and now sends up to 12 students to Hawai'i Island for a 12-week block in their first year. Six students live in Waimea and six students live in Hilo. The program covers the cost of housing, airfare, and car shipment expenses for the students.

The Hawai'i Island students participate in the same educational activities as their counterparts on O'ahu, such as problem-based learning (PBL), clinical shadowing, and community engagement, with the unique opportunity to do so in a rural setting. Each group on Hawai'i Island is paired with a local physician, their PBL tutor, to guide them through their bi-weekly PBL sessions that follow the same curriculum as the O'ahu students. Students also shadow various community physicians, allowing them to develop their clinical skills and gain experience in rural medicine. The O'ahu students primarily shadow physicians in urban settings. Additionally, students engage with the community on a regular basis by participating in local health events, mentoring elementary and high school students, and exploring the natural beauty of Hawai'i Island. Some of the community events that the Hawai'i Island students lead are also offered on O'ahu, such as Tar Wars and Teen Health Camps, however some events are specific to Hawai'i Island, such as attending Rat Lungworm Support Group meetings.

The Hawai'i Island students have access to the same lectures as their O'ahu classmates, with the option to live-stream them via a video-conference app or to view the archived lecture recordings. When live-streaming the lectures, students can engage with and ask questions to the lecturers, emulating an in-person lecture. The rural health students return to O'ahu three times during the unit to participate in anatomy dissections and review sessions. The students take their mid-unit exam on Hawai'i Island, proctored by their PBL tutor. One week prior to final examinations, the students return to O'ahu so they can participate in end of unit review sessions and take their final examinations with their peers at JABSOM's main campus.

In 2019, surveys were sent to the 12 students once they completed their time on Hawai'i Island. Ten students responded and their subjective responses are included in the reflections section of this paper. Responses were edited for clarity and length.

Results

To date, 97 students have participated in the HRHP on Hawai'i Island, with 56 students rotating in Hilo and 41 students rotating in Waimea. Of the past HRHP students, 29 have finished their residency training and are currently in practice. Of those who have completed their residency training, 21% (6 out of 29) are working in rural communities. Five of the six of these rural physicians are working on a neighbor island in Hawai'i and one is working in a rural community in California.

To ensure that the HRHP students were not compromising their education while training on Hawai'i Island, final exam grades were compared to non-HRHP students. From 2015 to 2019, there were no statistical differences between the end-course exam scores for HRHP students vs. non-HRHP students in any exam (Table 1).

	HRHP Students n=58	Non HRHP Students n=284	P-value
Anatomy Exam	85.1%	83.7%	.45
Pathology Exam	86.4%	85.6%	.73
PBL/Lecture Exam	79.5%	79.1%	.75

Reflections

Some aspects of the HRHP's impact are difficult to distill into numbers and charts. The following are reflections from the 2019 HRHP cohort that highlight the diverse experiences they had while on Hawai'i Island, from providing medical outreach to high school and college students, to shadowing in rural clinics, attending Rat Lungworm support groups, traveling to Lana'i to host health fairs, and even creating similar programs to expand the mission of HRHP. Each subtitle below marks an excerpt written by a different member of the 2019 HRHP cohort, reflecting on a distinct aspect of the program. These experiences emphasize the positive impact that immersive programs like this can have on shaping the next generation of rural doctors.

Promoting Careers in Healthcare for High School and College Students

As a graduate of a public high school on Hawai'i Island myself, I never thought that becoming a physician was an option for me due to lack of exposure to the field of medicine growing up. However, programs like HRHP help to inspire young learners to pursue higher-level education and one day return to work in their communities. I attended an HRHP event back in 2017 when I was a student at UH Hilo, and here I am now helping to conduct the same workshop in 2019 as a medical student! The opportunity to return home and help lead community outreach programs for local students was the highlight of my HRHP experience. It was extremely meaningful to work alongside high school and undergraduate students in hopes of inspiring the next generation of doctors and health care workers.

Insight into the Rural Community

The HRHP experience provides a remarkable opportunity for students to explore and learn from the rural communities they visit. Working closely with the local physicians, we were able to see how intertwined they can be with the lives of their pa-

tients. The family medicine physician I shadowed would speak of her frequent interactions with patients she saw at the coffee shop and about the texts she would receive from concerned parents about their children. One evening, my classmate and I were invited to her hula practice and saw that it served as an opportunity for her fellow dancers to share health updates and concerns. It was apparent how deeply ingrained into the community she was and how much joy it gave her to help her patients in and out of the clinic.

Hawai'i Island left us overflowing with memories of its natural beauty, its devoted physicians, and treasured time shared together as classmates. The experience showed us how vital local physicians are to a rural community. While the physicians we worked with showed great sacrifice, it was clear that they found their work to be very rewarding. The HRHP experience opened our eyes to the joys that a future career in rural health could offer.

The Parasite Plaguing Rural Hawai'i

We attended Rat Lungworm support group meetings in both Puna and North Kohala on Hawai'i Island. These meetings brought together patients who have been affected by Rat Lungworm, their loved ones, local hospital staff, and concerned community members. JABSOM teaches more about Rat Lungworm than most medical schools in the U.S., so we attended that meeting with what we thought was a sufficient understanding of this parasite and its effect on the human body. It quickly became evident that there was a disconnect between our medical textbooks and reality. Our textbooks also failed to highlight how a devastating parasite can uniquely affect rural communities like these.

One community member expressed frustration that if this had affected Honolulu, then doctors would be better educated on how to diagnose this disease, travelers would be warned of the serious consequences of not washing local vegetables properly, and more resources would be dedicated to finding a cure for this parasite. We interviewed community members living with Rat Lungworm and created a video for JABSOM's PBL curriculum to provide a humanistic understanding of this condition. This video is now shown to all first year JABSOM students.

The Unique Healthcare System of Lana'i

Our HRHP cohort was fortunate to travel beyond Hawai'i Island as well; we flew to Lana'i. The agenda for our trip included hosting a health fair where we taught students how to cast and suture, perform an array of clinical skills, and treat select infectious diseases. There has not been a student from Lana'i enrolled at JABSOM in the past few decades, but hopefully, this bright group will change this, and potentially alleviate the healthcare shortage on the island.

Our first visit to the island opened our eyes to the significant challenge Lana'i faces with their shortage of physicians. A small population of roughly 3,000 people is not enough to support certain specialties such as OB/GYN, pediatrics, emergency medicine, and cardiology. However, the need for these services is indisputable. Most people on Lana'i have to purchase air ambulance insurance to cover the cost of flying to neighboring islands for medical treatment. A pregnant woman in Lana'i must move to Honolulu weeks before delivery because babies cannot be delivered locally. For the more urgent care, the time it takes to be driven to the airport and subsequently airlifted to a Honolulu hospital may affect the patient's prognosis.

Student Advocacy Projects

As part of the HRHP curriculum, medical students complete an advocacy project that requires them to identify and research medically related issues in a rural area and provide a sensible solution and detailed plan on how to combat the problem. In doing so, medical students learn more about the unique healthcare challenges that rural communities face while envisioning practical ways they could help support them now and in the future.

With the help of two classmates, my project focused on piquing the interest of high school students to pursue a career in medicine and return to practice in rural Hawai'i. We focused our efforts on the district of Honoka'a: an old plantation community located on the northern tip of Hawai'i Island; a town rich in culture and neighborly comradery, but in need of more healthcare professionals to serve its residents. We outlined a program that provides Honoka'a High School students the opportunity to participate in several healthcare-related service projects and provide invaluable mentorship to help guide them into the medical field. As COVID-19 hindered the start of this program, plans are being made for future, modified efforts to carry out this program.

Discussion

Programs like the HRHP are vital to the continued effort to educate future physicians who will be ready and willing to commit to a life of medical practice in rural communities. The preliminary outcome of 21% of former HRHP students currently practicing in rural communities is promising. Future studies could compare this to the percentage of students who do not participate in HRHP to evaluate the impact that the HRHP has on rural practice selection independent of other factors known to help predict future practice in rural communities, such as growing up in a rural community.

The average final exam scores of the HRHP students were not statistically different from the rest of the class for the anatomy, pathology, and PBL/lecture exams, suggesting that participating in the program does not hinder students' academic performance.

The students on Hawai‘i Island have the same curriculum as those on O‘ahu, however they attend lectures virtually. In response to the COVID-19 pandemic, a significant portion of JABSOM’s curriculum has been transitioned to remote learning. This has normalized the remote learning experiences of the HRHP students. The PBL curriculum lends well to students studying remotely from campus since only one faculty or volunteer physician is required to oversee the small group of students during their PBL sessions. Some students choosing to enroll in HRHP have previously expressed concerns about learning anatomy virtually throughout the unit; however, the data shows that the mean anatomy scores of the HRHP students are not statistically different from their peers, suggesting the adapted curriculum is adequate and effective.

The student reflections highlight the meaningful experiences offered through HRHP, particularly the unique ways in which the students were able to connect with the Hawai‘i Island communities. Common themes found in the reflections are community involvement, mentorship, empathy, and advocacy, all of which emphasize the positive impact this program has on its participants.

This data is preliminary as only 30% of all students who have enrolled in HRHP have graduated from residency while the remaining 70% are still in training. As more students participate in HRHP and complete residency, future directions for research may include data on how many students in the program originally come from rural backgrounds and how this correlates with eventual rural practice. Additional data could include the overall rate of rural practice by JABSOM graduates before versus after implementation of HRHP. Another consideration would be to determine the number of physicians working with the students on Hawai‘i Island who are originally from rural areas themselves and whether this influenced their decision to practice there.

An obvious strength of the program is the promotion of rural health opportunities to students who are just beginning their formal medical education who may have otherwise not had exposure to rural medicine. This is done through the neighbor island outreach visits and time spent living on Hawai‘i Island. These aspects also provide students who are originally from rural areas to revisit those environments during medical school and re-solidify their sense of place and desire to return as licensed physicians. Since these individuals are more likely to return to practice in their community, the HRHP is an important tool in helping to inspire and recruit youth from these communities to pursue careers in medicine. Possible directions for growth of the HRHP include increasing the number of rural training sites across the Hawaiian Islands and/or creating a fully rural

pre-clinical track for a set number of MD candidates. Expansion of the HRHP in these ways could provide medical students and local youth alike with greater exposure to careers in rural health care, potentially addressing the physician shortage by generating more rural providers in the future.

Conclusion

In a location such as Hawai‘i, where the barrier between rural populations and access to primary and specialty medical care is limited not only by the insufficient proportion of doctors to patients but also by the geographic separation between islands, active efforts to make these locations more attractive to future physicians need to come from within the curriculum of the state’s local medical school. The challenge of recruiting physicians for rural practice discussed in this article is not unique to the islands of Hawai‘i, thus the HRHP’s success can be adapted to the other areas of the United States struggling with similar doctor shortage issues.

Conflict of Interest

None of the authors identify a conflict of interest.

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