

An Examination of Practices and Barriers of Procedures Performed by Physicians in Rural Hawai'i

Joseph W. Turban MD; Eun Ah Cho BA; Weston McCue BS; Kelley Withy MD, PhD

Abstract

There is an estimated shortage of 46 000 to 90 000 physicians in the US, especially in rural areas. Physicians working in rural areas often maintain a larger scope of practice compared to their urban counterparts. This scope may include performing procedures which may require additional training, and lack of that training may limit rural physicians' capability to perform procedures. Physicians practicing in rural areas of Hawai'i were surveyed about their scope of practice regarding procedures and the perceived hindrances in performing procedures. Physicians identified as rural practitioners and rural physicians attending local conferences were asked to participate. Forty-seven (out of 301) rural Hawai'i physicians participated in the survey, of which 89% reported performing procedures. The most common procedures performed included suture removal, incision and drainage, wound care, and suturing. Of the 47 respondents, a total of 28 physicians or 60% reported wishing to perform procedures but not doing so. The procedures physicians would like to perform included gynecological (36%), casting (21%) and wound care (14%). Barriers to performing procedures included lack of time (51%), inadequate training (37%), out of practice (22%), and poor reimbursement (17%). While most rural physicians in this study perform procedures, many would like to perform more. Lack of training and support are significant barriers to increasing scope of procedures performed. Medical schools, residencies, and continuing education programs should consider expanding training in these areas, especially for those planning to practice or currently practicing in rural areas.

Keywords

procedures in primary care, rural health services, rural medicine, scope of practice

Abbreviations

ED = emergency department
GIS = geographic information system
IUD = intrauterine device
PCP = primary care provider
US = United States

Introduction

There is a projected shortage of 46 000 to 90 000 physicians in the United States (US) by 2025, which will be more pronounced in rural areas.¹ Although 20% of the US population lives outside of metropolitan areas, less than 12% of physicians practice in rural areas.^{1,2} Concern for recruiting to rural areas is noted not just in the US, but internationally in the UK, Canada, Australia, New Zealand and other countries.³ Physicians who practice rurally tend to manage more specialty care and are responsible for a broader range of services compared to their urban counterparts.⁴ Primary care physicians (PCPs) working in rural areas practice

a more diverse spectrum of surgery, maternity, and emergency services than metropolitan providers^{5,6} and typically perform more procedures than their urban counterparts.⁷ This pattern holds true internationally as well. In Canada, graduating rural physicians report greater experience and competence in performing emergency, diagnostic, and labor and delivery procedures compared to graduates in urban settings.⁸ In Germany, rural general practitioners perform more procedures than those in urban areas.⁹

Efforts dedicated to promoting recruitment of rural physicians to decrease the shortage in non-metropolitan areas, including rural residency programs, have been successful.¹ Rural practice tracks in medical school and residency have significantly increased selection of practice in a rural setting.¹⁰ Myhre et al found family medicine graduates of rural programs performed a broader scope of clinical procedures in-office and in-hospital, including postnatal care, intrapartum care, emergency care, and palliative care compared to urban graduates.¹¹ Likewise, in 14 family medicine residencies across the US, graduates of rural programs reported performing a broader scope of obstetric and hospital procedures, as well as endometrial biopsy, joint injections and aspirations, and fracture care compared to graduates in urban communities.⁵ Physicians who practice rurally require increased training to meet this challenge/requirement. Medical schools, residency training, and continuing education programs need to evaluate if physicians training is adequate in this area. The purpose of this study was to describe practices of and barriers to procedures performed by PCPs in rural Hawai'i.

Methods

An anonymous 9-question survey was developed to determine the type of procedures rural PCPs practice in Hawai'i. Rural was considered neighboring islands and the O'ahu areas of: Wai'anae, Waimānalo, and Wahiawā to Lā'ie. The survey was developed by the research team to collect information on the physician's specialty, length of time in practice, type of practice setting, procedures performed, procedures physicians seek to perform, barriers preventing performing procedures, distance from nearest emergency department (ED), and space for additional comments. The choices for procedures were: none; splinting; casting; suture removal; suturing/would repair; wound care; incision and drainage; bladder catheterization; colposcopy; endometrial biopsy, intrauterine device (IUD) placement; vasectomy; circumcision; and other (please specify). Options for the question on barriers to performing procedures were: lack

of training; poor reimbursement; not enough time; impinging on other's scope of practice; out of practice; and other (please specify). See **Table 1** for full results.

There are approximately 3500 practicing physicians in Hawai'i, of whom, only 301 are rural PCPs.¹² A survey request was sent to the 189 (of the 301) rural primary care physicians in Hawai'i for whom the research team had email addresses, which netted 5 returned surveys after 30 days. The survey was also administered in hard copy at the 2018 Hawai'i Health Workforce Summit (attended by 220 Hawai'i physicians), and the 2019 Hawai'i Academy of Family Physicians Conference (attended by 135 Hawai'i physicians). A table with surveys was placed in the conference with a sign asking PCPs who practiced in rural areas of the state of Hawai'i to participate. Medical and prehealth students staffed the table to ask rural Hawai'i physicians to complete the survey. A total of 47 eligible physicians completed the survey. Using the total of 301 rural physicians as a denominator, this represented 16% of rural physicians practicing in Hawai'i. Not all responders answered all questions, which resulted in missing data to some questions, as identified in **Table 2**. IRB approval was obtained through the University of Hawai'i Human Subjects Committee, protocol number 2018-00064.

Statistical Analysis

Descriptive statistics are reported as frequency and percentages. Categorical data examining performance of procedures and size of group was analyzed using chi-square. A logistic regression model was performed to examine the relationship between distance to nearest ED and length of time in practice to determine if this may impact the findings. A *P* value of .05 was considered significant. Logistic regression analysis was performed using free statistical software from MedCalc, version 20.218 (MedCalc Software Ltd, Belgium). The chi-square analyses were performed using Social Science Statistics, no version (<https://www.socscistatistics.com/tests/chisquare2/default2.aspx>).

Barrier	Respondents n = 41 (%)
Not enough time	21 (51)
Lack of training	15 (37)
Out of practice	9 (22)
Poor reimbursement	7 (17)
Lack of equipment	3 (7)
Impinging on other's scope of practice	3 (7)
Cost of equipment	1 (2)
Lack of staff	1 (2)
Large size of medical group	1 (2)

Results

There were initially only 5 responses to the online survey request, which was sent out to approximately 189 physicians. The family physician conference yielded 22 responses and the workforce summit conference contributed 20 responses for a total of 47 participants. A majority of the participants identified as Family Medicine specialists (**Table 2**). The average length of time in practice was 14.8 years (SD: 13.8 years) with a range from 4 months to 49 years.

Physician respondents reported group size as: solo practitioners (33%), less than five providers (20%), five or more providers (17%) and medical group/hospital practice (30%). Eighty nine percent of responding physicians reported performing procedures in their offices. A majority (60%) of physicians responded that there were procedures they would like to perform but they did not.

The procedures are listed in **Table 3**. The most common procedure performed was suture removal (100%), followed by wound care (95%), incision and drainage (93%), and suturing and wound repair (74%). The procedures that were not performed but were most desired to perform were casting (26%), endometrial biopsy (26%), and colposcopy (26%), followed by IUD placement (22%), vasectomy (17%), and splinting (17%). The 5 physicians who were not currently performing any listed procedures had no wish to perform procedures. Perceived barriers to performing more procedures included: not enough time (51%), lack of training (37%), out of practice (22%) and poor reimbursement (17%).

There was no statistically significant correlation between distance to nearest ED and performing procedures (*P*>.5). There was a negative correlation between years in practice and performance of procedures (coefficient -0.084319, *P*=.0053, odds ratio 0.9191 [95% confidence interval 0.8662-0.9753]), indicating that more recent graduates in the study reported performing more procedures than physicians who have been in practice longer. There was no association between practice size and desire to perform procedures (*P*=.37).

Medical Specialty of Respondents	N (%)
Family Medicine	31 (66)
Internal Medicine	9 (19)
Pediatrics	3 (6)
Obstetrics/Gynecology	1 (2)
General Practice	1 (2)
No response	2 (4)
Total	47

Table 3. Medical Procedures Performed by Hawai'i Rural Primary Care Providers and Procedures Providers Would Like to Perform

Medical Procedure (Including write in options)	Respondents who perform N (%)	Respondents who seek to perform N (%)
Bladder catheterization	16 (37)	1 (4)
Casting	9 (21)	6 (26)
Circumcision	7 (16)	1 (4)
Colposcopy	4 (10)	6 (26)
Endometrial biopsy	5 (12)	6 (26)
Incision & drainage	39 (93)	
Intrauterine device placement	16 (37)	5 (22)
Splinting	20 (47)	4 (17)
Suture removal	42 (100)	
Suturing/wound repair	32 (74)	3 (13)
Vasectomy	2 (5)	4 (17)
Wound care	40 (95)	
Write in answers below:		
Biopsies (shave, punch, excisional)/lesion removal	6 (14)	2 (9)
Nexplanon® placement	4 (10)	2 (9)
Injections/Joint injections	3 (7)	1 (4)
Laboratory testing/microscopy	2 (5)	
Colonoscopy		2 (9)
Cryotherapy	2 (5)	
Nail removal	2 (5)	
Spirometry	2 (5)	
Foreign body removal	2 (5)	
Ultrasound	1 (2)	1 (4)
IV placement	1 (2)	
Acupuncture nerve block	1 (2)	
Ear wax removal	1 (2)	
Cosmetic fillers	1 (2)	
Dermatological procedures		1 (4)
Diabetic Eye Exams		1 (4)
Joint aspiration		1 (4)
Endoscopy		1 (4)
Hair restoration		1 (4)
Laser treatment		1 (4)
Lingual frenotomy		1 (4)
Stress test		1 (4)

Suggestions for Improvement

Three themes were highlighted in the open-ended comments section of the survey: increasing student and or residency training (n=4), continuing medical education training (n=4), and reimbursement (n=4). Four physicians suggested increasing medical school or residency training opportunities. For this to happen, more physicians are needed who would be willing to train students on the procedures. Training can be in the form of procedural workshops or as sponsored, focused events.

One physician advocated for family medicine physicians to be able to practice to their true level of ability and comfort, indicating that primary care is the most cost-effective option for care and less expensive than having to send patients to specialists, the ED, or urgent care facilities. Another commented that some continuing medical education and training opportunities are geographically distant and expensive; therefore, they preferred to have training be offered through the medical school. To implement effective training, one suggested contacting regional or out-of-state family practice programs to learn how they train staff to perform clinical procedures.

Three physicians stressed that there is little to no reimbursement within the payment transformation system for office procedures. This may decrease the number and breadth of procedures performed. They noted that there is also no reimbursement for vaccine administration or taking samples for testing. They collectively suggested that to move forward in rural care and reduce costs, there must be better reimbursement. Another commented that the paperwork required by insurance companies was a barrier to performing procedures.

Discussion

Patients in rural Hawai'i are adversely affected by physician shortages but could be better served if their PCPs were able to perform procedures that they require. The majority of PCPs practicing in rural Hawai'i responding to this survey perform procedures; however, many would like to expand that aspect of their practice. Perceived barriers to conducting procedures included lack of training, lack of time, and lack of reimbursement. The fact that there were 22 additional procedures described by participants, in addition to the 12 listed on the survey, indicates that rural primary care providers are thinking about performing more procedures. All practices perform suture removal and almost all practices perform incision and drainage, suturing and wound care. Many practices are performing biopsies and joint injections as well as inserting Nexplanon. There is limited interest in other procedures including handheld ultrasound scanning.

Most studies indicate that PCPs practicing in rural areas typically perform more procedures than their suburban and urban counterparts,⁴⁻¹¹ although a report from Canada using academic societies and medical associations does not mention a difference

depending on choice of practice location.¹³ Current training programs may not be preparing future physicians to practice in rural settings if they do not train in all the procedures needed. Medical schools and residency programs must do more to provide PCPs a broader spectrum of training to care for their patients. In addition, continuing education programs, either hands-on, or possibly by distance learning, can train PCPs in desired procedural skills; therefore, such trainings should be increased.

This study also indicated that payment transformation creates disincentives to perform procedures as there is no additional pay for the effort involved, thereby further discouraging PCPs from doing procedures. Research shows that physicians perform procedures if incentivized.¹⁴ Since the procedures take longer than general visits and are often added time that is not reimbursed, there is no incentive for physicians to perform procedures. Yet, performing more procedures would lower the cost of medicine, as it would decrease ED visits and specialist referrals. It is possible that as the cost of medicine continues to increase, expanded procedural skills may be a viable area for insurance companies to investigate to decrease expenses. If more procedural skills were attained by physicians during medical school and residency, such action would decrease need for travel as well as missed workdays for rural patients. In this era of revisiting managed care, it is likely that funding for procedures would have to be mandated at a state or federal level to encourage additional payment. If that were to occur, and there were time and encouragement to perform procedures, it is likely that patients in rural areas, and even in urban areas, would benefit from a more robust primary care experience and the health system would be more cost-effective.

The results showed physicians who had more recently completed training reported performing more procedures than established physicians. A prior study indicates that family medicine graduates of rural residency programs reported, after 18 months in practice, performing a broader scope of obstetric and hospital procedures, endometrial biopsy, joint injections and aspirations, and fracture care compared to graduates in urban communities.⁵ It has also been found that graduates who were exposed to lengthened training (either starting residency in the 4th year of medical school, or a 4th year of residency) were more likely to perform 19 out of 30 procedures at higher rates than residents in shorter training programs.¹⁵ Lack of opportunity would affect willingness to continue performing procedures, since loss of skills can occur when physicians do not have the opportunity to practice procedures regularly. Thus, it is not clear if it is the type of training that impacts tendency to perform procedures, time out from training, or physician preference.

A study conducted in Canada reported an increase in geographic distance from a city of more than 100000 people led to a broader spectrum of procedures and services.¹⁶ This makes intuitive sense, because the farther a patient is from an urban center, the less likely a procedure is available, therefore there is more need

for physicians to perform procedures. However, the results of this study did not show a statistically significant correlation between distance from the nearest ED and performance of procedures. In this survey, the greatest distance noted to the nearest ED was 40 kilometers [25 miles], suggesting remoteness may be less of a factor in the desire or need to perform more procedures. Hawai'i's island geography varies significantly from Canada, so this may be an impact of the varied geography and not true distance.

The large representation of family medicine physicians compared to other specialties may be a result of recruitment from the family medicine annual conference. Further studies could examine the association between specialty selection (such as family medicine) and opportunities to expand practice roles among rural practitioners. Another avenue of future study could be confirming these findings in urban practices.

This study sheds light on a desire to learn more procedures among rural physicians in Hawai'i, however the study has limitations. Being a voluntary survey, it may not encompass an accurate representation of all rural physicians. Practitioners who felt strongly on this subject may represent a majority of the respondents, skewing results. The study had a small sample size to represent rural PCPs in Hawai'i. For logistical reasons, the survey was limited to 9 questions that were not validated. Given the opportunity, further surveys could investigate demographics including gender, race and age; satisfaction with current practice setting, and comparison of scope of procedural practice with physicians in an urban setting. Although sex was not collected or analyzed, results in the literature have been conflicting regarding associations with sex and increased scope of practice.¹⁶⁻¹⁸

Study limitations include the fact that only 47 rural primary care physicians answered the survey. The authors estimate that there are 301 rural primary care physicians practicing in Hawai'i which indicates approximately 16% response rate. While this cannot be assumed to represent the opinions of all primary care physicians in Hawai'i, it is a good initial study that can inform future research in the area. Perhaps it can be a question asked during residency training or upon relicensure to create a better sample in the future. Furthermore, the questions asked in the survey were not validated questions, but written by the researchers to answer the specific question of what procedures would rural doctors in Hawai'i like to perform. Large scale surveys across the US would be helpful to create validated questions and inform the full population of primary care providers nationwide.

Conclusion

A majority of the rural PCPs in Hawai'i surveyed perform medical procedures and would like to increase their scope of practice. Increased procedural training for rural PCPs during residency and medical school would enhance physician skills, reduce need for patients to travel to services, and likely improve health care costs and career satisfaction. Post residency training in gynecologic and orthopedic office procedures, wound care and vasectomy would be beneficial to the rural primary care physician population if the insurers provided payment for performing such procedures, and time were allotted as needed.

Conflict of Interest

None of the authors identify a conflict of interest.

Authors' Affiliation:

- John A. Burns School of Medicine, University of Hawai'i, Honolulu, HI

Corresponding Author:

Joseph W. Turban MD; Email jwturban@hawaii.edu

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