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The influence of loan repayment on rural healthcare provider recruitment and retention in Colorado

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ABSTRACT

Introduction: There is an ongoing shortage of rural healthcare providers relative to urban healthcare providers worldwide. Many strategies have been implemented to increase the distribution of rural healthcare providers, and financial incentives such as loan repayment programs have become popular means to both recruit and retain healthcare providers in rural communities. Studies detailing the effects of such programs on rural provider recruitment and retention are limited. The objective of this study was to assess the influence of loan repayment and other factors on the recruitment and retention of healthcare providers in rural Colorado, USA, and to compare the motivations and attitudes of these rural providers with their urban counterparts.

Methods: A survey was sent to 122 healthcare providers who had participated in one of three loan repayment programs in Colorado between the years of 1992 and 2007: the Colorado Health Professional Loan Repayment Program; the Colorado Rural Outreach Program; and the Dental Loan Repayment Program of Colorado. Differentiation between rural and urban communities was accomplished by using the Rural Urban Commuting Area Codes developed by the University of Washington's Rural Health Research Center and Economic Research Service. Statistical analysis was performed using STATA from StataCorp.

Results: Of the 93 respondents included in the study, 57 worked in rural communities and 36 worked in urban communities during their programs. Of the rural participants, 74% were already working in or intending to work in an eligible community when they were made aware of the loan repayment program. Of those planning to work in a rural community regardless of any loan repayment option, 42% reported that the loan repayment program had an important influence on the specific community in which

they chose to practice. Of the rural participants already working in a rural community, 38% reported loan repayment as being an important factor in their retention. The most important factors the rural providers cited for their recruitment were the location of the community, scope of practice, and family fit with the community. The most important factors for the urban providers were the location of the community, salary, and scope of practice. Of the rural providers, 36% attended rural high schools, while 9% of urban providers attended rural high schools. Of the rural providers who were planning on practicing in a rural area regardless of any loan repayment option, 37% had attended rural high schools. Rural participants most often left their communities because their families wanted to move, personal or professional isolation, and dissatisfaction with the medical community. Of rural participants 22% cited the desire for a higher income as an important reason to leave their communities, while the desire for a higher income was the most commonly cited reason for the urban providers. Rural retention rates were not influenced by past attendance at rural high schools or by intention to practice in a rural community regardless of loan repayment.

Conclusions: Loan repayment programs targeting rural Colorado usually enroll providers who would have worked in a rural area regardless of loan repayment opportunities, but are likely to play a role in providers' choice of specific rural community for practice. They also appear to have a limited but important influence on rural provider retention, though financial concerns are generally less influential for non-retained rural providers than are family preferences and professional dissatisfaction.

Key words: incentives, loan repayment, physician, recruitment, retention, rural workforce, shortage.

Introduction

Rural communities worldwide are experiencing an ongoing shortage of healthcare providers[1]. Many countries have been found to have lower healthcare provider or physician densities in their rural communities than in their urban communities, including Tanzania[2], India[3], Nicaragua[4], Australia[5], and Japan[6]. The USA is experiencing similar rural healthcare provider shortages[7-11]. In 2000, over half of all US frontier counties with hospitals were classified as nurse shortage counties, while only 30% of non-frontier counties carried this designation[9]; the population density of dentists in non-metropolitan areas is less than half of what it is in metropolitan areas[12]; and for every 100 000 people in 2005, there were 210 physicians in urban locations but only 52 in more remote rural areas[8]. This disparity is likely to worsen, because a greater proportion of generalist physicians are nearing retirement in rural US counties, compared with urban counties[13].

Medical educators and healthcare policymakers have sought strategies to promote recruitment and retention of the rural healthcare workforce. Several provider characteristics and systems interventions have been linked with rural practice choice, most notably being raised in a rural area[14-23], exposure to rural areas during medical training[14,24-32], and being offered financial incentives to work in a rural community[33-38]. Financial incentives have become a popular intervention to enhance recruitment, given the rising debt levels of US medical graduates (the median debt level of indebted 2008 medical school graduates was US$155,000, up 53% from 1998 after inflation adjustment)[39]. Examples of such incentives include direct financial incentives, resident support, scholarships, and loan repayment programs (LRPs), all with or without associated service commitments[31].

For the past three decades, LRPs have increased in popularity as a means to enhance recruitment and retention in medically underserved areas, including rural communities[34]. This trend has been attributed to both the rising debt load of medical graduates and the tendency of these incentives to target providers in the stage of their career when they are ready to make new commitments[34]. Indeed, several studies have reported medical students and residents' willingness to consider changing their field of practice or clientele if offered loan repayment[40-43]. Fewer studies have retrospectively correlated the influence of loan

repayment on actual decisions involving practice location[14,33,44]. To our knowledge, no studies have followed loan repayment recipients to investigate the motivations and attitudes that led them to their current practice location and to assess the influence of these values on provider retention.

The purpose of this study was to investigate the effects of loan repayment on recruitment and retention of healthcare providers in rural versus urban communities in Colorado. We hypothesized that LRPs would be influential in recruitment of providers to rural areas but ineffective at retention beyond the service commitment or loan repayment period.

Methods

This study was a retrospective cohort study of the participants of three Colorado LRPs. It was approved by the Colorado Multiple Institutional Review Board as an exempt protocol with a waiver of informed consent.

From July to October 2007, a survey was administered through the Colorado Rural Health Center (CRHC) to all healthcare providers who had most recently participated in any of three Colorado LRPs, chosen because they were the major LRPs in Colorado and had existing relationships with the CRHC. The three Colorado LRPs were the:

1. Colorado Health Professional Loan Repayment Program (CHPLRP)
2. Colorado Rural Outreach Program (CROP)
3. Dental Loan Repayment Program (DLRP)

Colorado Health Professional Loan Repayment Program

The CHPLRP, beginning in 1992, rewards physicians, dentists, physician assistants (PAs), nurse practitioners (NPs), certified nurse midwives, and mental health specialists with up to $35,000 per year of educational loan repayment (with a maximum of $70,000) for working in any rural or urban Health Professional Shortage Area (HPSA) in Colorado[45] with a minimum two-year service commitment. The program is funded federally with community dollar-for-dollar matching, and the funds are distributed by Colorado Area Health Education Center (AHEC)[46,47]. Surveys were mailed to all providers enrolled between 1992 and 2007.

Colorado Rural Outreach Program

The CROP, created in 1998, currently rewards all types of healthcare professionals (including but not limited to physicians, NPs, PAs, nurses, providers of mental health services, providers of dental health services such as dentists and dental hygienists, allied health professionals such as lab or radiology technicians, and pharmacists) up to $10,000 per year of educational loan repayment for up to 3 years. The provider must be working in a rural community in Colorado to be eligible, and the program requires a one-year service commitment. Funding comes from private donations, grants, and community matching, and distribution changed from the Colorado Medical Society Foundation to the Colorado Rural Health Center (CRHC) in 2005[46,47]. Thus, surveys were mailed to all providers enrolled between 2005 and 2007.

Dental Loan Repayment Program

The DLRP of Colorado, beginning in 2002, rewards dentists up to $25,000 per year and dental hygienists up to $6,000 per year up to the amount of the provider's full outstanding educational loans. The providers must work with underserved populations in either rural or urban areas to be eligible. The program is state funded, and awards are distributed by the Colorado Department of Public Health and Environment (CDPHE). There is no service commitment[46,47]. Surveys were mailed to all providers enrolled between 2002 and 2007.

The survey

The survey was mailed to all subjects and returned via mail or fax. Non-responders were mailed a second survey, emailed, and phoned twice before considered 'missed'.

Subjects for whom contact information could not be obtained were excluded from the study. Respondents were asked to provide demographic information and to identify why they decided to participate in a LRP, if they were planning on going to similar communities if no loan repayment had been offered, and if they stayed in their initial communities after their loan repayment awards were received. Five-point Likert scales were used throughout the survey for the respondents to rate the relative importance of factors such as loan repayment and various community characteristics on their decision making (1='not important' and 5='very important'). The importance of such factors was assessed for decisions such as where to practice during LRP enrollment as well as why to leave the community after loan repayment awards were received, if applicable. Other data such as amount of educational debt upon enrolling in a LRP, year of graduation from training, and the length of time the participant expected to stay in the community in which they enrolled in a LRP was collected by write-in responses.

Respondents were also asked to indicate where they attended high school, locations of previous practice, and their current practice location. Rural and urban locations in the USA were quantified and differentiated using the Rural Urban Commuting Area Codes (RUCA), developed by the University of Washington's Rural Health Research Center and the Economic Research Service (ERS)[48]. These codes differentiate rural and urban census tracts using the standard Bureau of Census Urbanized Area and Urban Cluster definitions in combination with work commuting information (v 2.0 used in this analysis). For this study, 'rural' was defined as any zip-code with a RUCA designation above and including 4.0 (to include both the 'large rural' and 'small rural' categories of the RUCA coding system), and 'urban' was defined as any zip-code with a designation below 4.0.

Surveys for which greater than 50% of the questions were left blank were excluded from the analysis (and considered as non-responders).

Statistical analysis

All analyses were performed using STATA 10.1 (StataCorp; College Station, TX). Data are presented using descriptive statistics. Respondents were classified by type of provider (physician, dentist, or non-physician, with registered dental hygienists being considered non-physicians), and by LRP practice location (rural participant or urban participant). The LRP practice location represents the type of community the provider practiced in during enrollment in the LRP, which is not necessarily indicative of the current practice location of the provider. Additionally, Likert scores of 4 and 5 were pooled and simply labeled as 'important' in the results. Chi-square testing was used to compare differences among the survey responses of relevant groups. Two-tailed $p<0.05$ was considered statistically significant.

Results

Those surveyed were 46 CROP participants (27 physicians, 1 dentist, and 18 non-physicians), 42 CHPLRP participants (27 physicians, 2 dentists, and 13 non-physicians) and 52 DLRP participants (39 dentists and 13 non-physicians). Included were two participants who participated in more than one program (one CROP and CHPLRP, the other CHPLRP and DLRP). Of 138 total LRP participants, 16 were unable to be located. Of the 122 surveys that were sent, 97 were returned (80% response rate). Of these 97, four surveys (all CROP participants) were excluded from the analysis due to the respondent's lack of recollection of participating in a LRP and thus inability to complete the survey.

Of those unable to be located, 3 were CROP participants, 5 were CHPLRP participants, and 8 were DLRP participants; 2 were physicians, 5 were dentists, and 8 were non-physicians. Of those who didn't respond, 9 were CROP participants, 10 were CHPLRP participants, and 7 were DLRP participants; 11 were physicians, 8 were dentists, and 7 were non-physicians.

The characteristics of the remaining 93 respondents are summarized (Table 1). The two professions most heavily represented in our data are physicians and dental professionals. The rural participants were mostly physicians (31; 54%), while the urban participants were mostly dentists (22; 61%).

Motivational factors

Over half of all survey respondents (52; 56%) reported they were already working in an eligible community prior to LRP application. Further, an additional 17 (18%) of all providers were planning to work in a specific community eligible for loan repayment when they became aware of the program. Thus, only 24 (26%) of the respondents were not already working in or intending to work in an eligible community when they became aware of the LRP. Nineteen (79%) of these respondents were physicians.

Overall, 32 (34%) reported having a desire to serve underserved populations as a primary reason in choosing to enroll in a LRP. Given the opportunity to write-in other motivations for enrolling in a LRP, 9 (24%) of the physicians cited 'money' or 'debt'.

Recruitment

The importance of several factors in the providers' choices of specific loan repayment-eligible community is shown, stratified by location and provider type (Table 2). Overall, the most important factors were the location of the community, scope of practice, and fit between family and community. Rural participants rated location, scope of practice, and family fit with the community as the most important factors; while urban participants rated location, salary, and scope of practice as important most often. Almost all (29; 94%) rural physicians rated scope of practice as an important factor.

Several questions addressed the effects that loan repayment had on decision-making. Excluding respondents already working in an eligible community when they applied for the LRP, 22 (69%) of those who enrolled in a LRP in a rural community reported that the opportunity for loan repayment was an important influence on their choice of where to practice; however, 21 (66%) reported that they planned to work in a rural community regardless of any loan repayment option. Of the providers who planned to practice in a rural community, 8 (38%) cited the LRP as having an important influence on their choice of the specific rural community in which to practice.

Rural participants were more likely to have gone to high school in a rural area than urban participants (21 [38%] vs 3 [9%]; p=0.007). Of the providers who stated they were planning to practice in a rural area regardless of any loan repayment option, 16 (38%) went to high school in a rural area.

Retention

Of the 66 providers who had fulfilled their terms of service at the time of the survey, 30 (45%) had left their original community; 9 of these were urban participants and 21 were rural participants. Of these who left, 47% (4 urban, 10 rural) had stayed 0-1 additional years beyond their obligation; 20% (2 urban, 4 rural) stayed 2-4 years, and 33% (3 urban, 7 rural) stayed 5 years or longer. Of the 15 physicians who had left, 6 (40%) stayed 0-1 years, 4 (27%) stayed 2-4 years, and 5 (33%) had stayed 5 years or longer.

Of the 36 (55%) providers who were still at their original site after completing their terms of service, 15 were urban participants and 21 were rural participants. Of these who stayed, 42% (5 urban, 10 rural) had stayed 0-1 additional years, 28% (2 urban, 8 rural) had stayed 2-4 years, and 31% (8 urban, 3 rural) had stayed for 5 years or longer. Of the 12 physicians who had stayed, 4 (33%) had stayed 0-1 additional years, 4 (33%) had stayed 2-4 years, and 4 (33%) had stayed 5 years or longer.

Table 1: Demographics of survey respondents

Demographic	Respondents *n* (%)					
	Total	**Rural participants**	**Urban participants**	**Physicians**	**Dentists**	**Non-physicians**
Total	93 (100)	57 (100)	36 (100)	38 (100)	29 (100)	26 (100)
Program†						
CHPLRP	28 (30)	16 (28)	12 (33)	19 (50)	2 (7)	7 (27)
CROP	30 (32)	30 (53)	0	20 (53)	0	10 (38)
Dental LRP	37 (40)	12 (21)	25 (69)	0	28 (97)	9 (35)
Age (years)¶						
26–35	30 (32)	19 (33)	11 (31)	10 (26)	12 (41)	8 (31)
36–45	37 (40)	23 (40)	14 (39)	16 (42)	11 (38)	10 (38)
46–55	17 (18)	9 (16)	8 (22)	7 (18)	4 (14)	6 (23)
56–65	6 (6)	4 (7)	2 (6)	3 (8)	1 (3)	2 (7)
Sex§						
Male	47 (51)	30 (53)	17 (47)	26 (68)	17 (59)	4 (15)
Female	44 (47)	26 (46)	18 (50)	12 (32)	11 (38)	21 (81)
Race/ethnicity§						
Non-Hispanic White	81 (87)	52 (91)	29 (81)	38 (100)	24 (83)	19 (73)
Non-Hispanic Black	1 (1)	1 (2)	0	0	0	1 (2)
Hispanic	5 (5)	2 (4)	3 (8)	0	1 (3)	4 (15)
Asian	4 (4)	1 (2)	3 (8)	0	3 (10)	1 (4)
Degree						
MD/DO	38 (41)	31 (54)	7 (19)	38 (100)	0	0
DDS	29 (31)	7 (12)	22 (61)	0	29 (100)	0
PA/NP	13 (14)	10 (18)	3 (8)	0	0	13 (50)
RDH/RN/DPT/CRNA	13 (14)	9 (16)	4 (11)	0	0	13 (50)
Approximate educational debt before LRP§						
$0–49,999	29 (31)	18 (32)	11 (31)	4 (11)	7 (24)	18 (69)
$50,000–99,999	17 (18)	13 (23)	4 (11)	8 (21)	4 (14)	5 (19)
$100,000–149,999	21 (23)	11 (19)	10 (28)	11 (29)	8 (28)	2 (8)
$150,000–199,999	14 (15)	6 (11)	8 (22)	8 (21)	6 (21)	0
>$200,000	10 (11)	8 (14)	2 (6)	6 (16)	4 (14)	0
Year of graduation from training§						
2000–Present	48 (52)	31 (54)	17 (47)	20 (53)	15 (52)	13 (50)
1990–1999	35 (38)	21 (37)	14 (39)	14 (37)	10 (34)	11 (42)
1980–1989	8 (9)	4 (7)	4 (11)	3 (8)	3 (10)	2 (8)

CHPLRP, Colorado Health Professional Loan Repayment Program; CROP, Colorado Rural Outreach Program; DDS, Doctor of Dental Surgery; DLRP, Dental Loan Repayment Program; MD, Doctor of Medicine; DO, Doctor of Osteopathy; PA, Physician's Assistant; NP, Nurse Practitioner; RDH, Registered Dental Hygienist; RN, Registered Nurse; DPT, Doctor of Physical Therapy; CRNA, Certified Registered Nurse Anesthetist; LRP, Loan Repayment Program.
†Two respondents participated in multiple programs; ¶three respondents did not answer this part of the survey; §two respondents did not answer this part of the survey.

Of the providers who had completed their service commitment at the time of the survey, 27 (64%) of the rural participants were still practicing in a rural community and 23 (96%) of the urban participants were still practicing in an urban community. For those rural participants who stayed in rural communities, 11 (41%) said the LRP was an important factor in their decision to do so.

Of the 23 rural participants finished with their commitment who were already working in an eligible community when they enrolled in a LRP, 21 (91%) had remained in that practice at the time of the survey, and 8 (38%) reported that participation in a LRP was important in their decision to stay.

Table 2: Numbers of providers rating the following factors as important in choosing where to work

Factor	Provider *n* (%)					
	Total (*n*=93)	**Rural participants (*n*=57)**	**Urban participants (*n*=36)**	**Physicians (*n*=38)**	**Dentists (*n*=29)**	**Non-physicians (*n*=26)**
Location of community	70 (77)	47 (82)	24 (67)	36 (95)	22 (76)	13 (50)
Amount of time 'on call'	40 (44)	30 (53)	12 (33)	20 (53)	9 (31)	13 (50)
Other practitioners available to cover my practice	46 (51)	32 (57)	15 (43)	29 (76)	9 (31)	9 (35)
Availability of educational programs, CME, or other skill development for me	30 (33)	20 (35)	11 (31)	14 (37)	5 (17)	12 (46)
Availability of hospital privileges	31 (34)	24 (43)	9 (25)	24 (63)	4 (14)	5 (19)
Size or type of practice	50 (56)	35 (63)	17 (47)	29 (76)	11 (38)	12 (46)
Scope of practice	64 (71)	44 (79)	22 (61)	34 (89)	13 (45)	19 (73)
Opportunity to be a community leader	30 (33)	20 (36)	11(31)	13 (34)	7 (24)	11 (42)
Less bureaucracy and/or paperwork	24 (27)	17 (31)	7 (19)	12 (32)	6 (21)	6 (23)
Ideal fit between my family and the community	58 (64)	41 (73)*	19 (53)*	29 (76)	15 (52)	16 (62)
Education/school opportunity for my children	36 (40)	26 (46)	12 (33)	19 (50)	8 (28)	11 (42)
Recreation/sports activities	52 (58)	39 (71)*	14 (39)*	29 (78)	12 (41)	12 (46)
Extended family in the area	18 (20)	10 (18)	8 (22)	5 (13)	7 (24)	6 (23)
Friends/colleagues in the area	22 (24)	9 (16)*	13 (36)*	3 (8)	10 (34)	9 (35)
Job of spouse/significant other	25 (28)	15 (27)	10 (28)	4 (11)	7 (24)	14 (54)
Salary/compensation	52 (58)	31 (56)	23 (64)	21 (57)	16 (55)	17 (65)
Signing bonus	13 (15)	9 (16)	5 (14)	6 (16)	5 (17)	3 (12)
Dollar amount of loan repayment	36 (40)	21 (38)	16 (44)	16 (42)	9 (31)	12 (46)
Other recruitment incentives	17 (20)	10 (20)	8 (23)	4 (11)	6 (21)	8 (31)

CME, Continuing medical education.
*P<0.05 when comparing rural participants with urban participants.

Thirty-eight of the rural participants who had completed their commitment specified on the survey where they had attended high school. Of the 25 participants who had attended urban high schools, 16 (64%) were currently practicing in a rural community; while, of the 13 participants who attended rural high schools, 10 (77%) were currently practicing in a rural community. This difference in current rural practice rates between the urban and rural high school groups was not significant (p=0.42).

Thirty-nine of the rural participants who had completed their commitment answered whether or not they were initially planning on practicing in a rural community regardless of any loan repayment option. Of the 6 who answered they were not, 3 (50%) were practicing in rural communities at the time of the survey. Of the 33 who answered that they were, 21 (64%) were practicing in rural communities.

When asked to recall how long they initially intended to stay in the community when they enrolled in a LRP, 29 (31%) of the respondents reported 'indefinitely', with no difference between rural and urban participants or physicians and non-physicians (data not shown).

The 41 respondents who eventually left the community in which they received their loan repayment awards were asked to rate various factors on their decisions to leave (Table 3). The factors most frequently rated as important were 'family's desire to move' for rural participants and 'desire for a higher income' for urban participants (however, notably, two-thirds of the urban participants who desired higher incomes were dentists). Physicians most often rated their family's desire to move as an important factor, while dentists most often desired a higher income.

Table 3: Of providers who left the community where they enrolled in a loan repayment program, numbers rating the following factors as important in their decisions to leave

Factor	Provider *n* ()					
	Total (*n*=40)	**Rural participants (*n*=22)**	**Urban participants (*n*=18)**	**Physicians (*n*=16)**	**Dentists (*n*=13)**	**Non-physicians (*n*=11)**
Desired a higher income	17 (43)	5 (22)*	12 (67)*	5 (31)	8 (62)	4 (36)
Family wanted to move	14 (35)	11 (48)	4 (22)	8 (50)	3 (23)	4 (36)
The position was not what I expected	7 (18)	5 (22)	2 (11)	5 (31)	2 (15)	0 (0)
Professional/personal isolation	9 (23)	8 (35)*	1 (6)*	6 (38)	2 (15)	1 (9)
Dissatisfaction with the medical community	9 (23)	7 (30)	2 (11)	4 (25)	2 (15)	3 (27)
Dissatisfaction with community life	3 (8)	3 (13)	0 (0)	2 (13)	1 (8)	0 (0)
Lack of other medical and ancillary services	6 (15)	4 (18)	2 (11)	3 (20)	2 (15)	1 (9)
Poor fit between me and the community	2 (5)	1 (4)	1 (6)	1 (6)	1 (8)	0 (0)
Poor fit between my family and the community	5 (13)	4 (17)	1 (6)	3 (20)	1 (8)	1 (9)

*$P<0.05$ when comparing rural participants with urban participants.

Discussion

Influence of loan repayment on rural recruitment and retention

Intuitively, financial incentives such as loan repayment given to healthcare providers should influence where they choose to practice, especially considering the high costs of education currently. Two-thirds of the physicians responding to the survey reported educational debt loads of more than $100,000, with over one-third more than $150,000; dentists were statistically similar. Prior studies have shown there to be a significant influence of loan repayment on rural physician recruitment[14,44], while several more have shown that medical students and residents are interested in financial incentives, and many would consider serving underserved populations in exchange for loan repayment[40-43,49].

The present data are consistent with these reports, because a majority of rural participants cited loan repayment as being an important factor in deciding where to practice. However, 21 (66%) of the rural participants said they were planning on practicing in a rural area regardless of whether they received loan repayment. These proportions do not even include the 52 providers who enrolled in a LRP while already working at an eligible practice. Thus, it appears from our survey that the vast majority of loan repayment awards for rural Colorado are awarded to providers who would have been likely to practice in a rural community regardless of any loan repayment distribution. However, although most rural participants planned on practicing in a rural community, 8 (38%) still reported that loan repayment had an important influence on the specific rural community in which they chose to practice. This suggests that while LRPs may only have a limited influence on the recruitment of providers to rural Colorado in general, rural communities that offer loan repayment may attract more providers than those that do not.

The present data suggest that LRPs may be more important in rural provider retention. The vast majority of newly recruited rural participants stayed in rural communities for some time after their LRP was complete, and 11 (41%) of

these reported that the LRP was important in their decision to do so. The LRP also appears to have had a significant influence on the providers who were already working at an eligible rural practice when they signed up for the program; 8 (38%) of these providers also said that the LRP was important in their decision to stay. The influence of LRPs on retention has been previously supported in the literature, and it has been shown that they may have higher retention rates than many other types of financial incentive programs[31]. A study of Maine nurses also revealed that 65% considered loan repayment an important reason for staying at their current practices[50].

Influences of rural upbringing

Rural upbringing has been correlated with higher rates of physician recruitment to rural community practice[14-23,25]. Regarding LRPs in Colorado, the present data shows that while 21 rural participants (38%) came from rural high schools, only 3 urban participants (9%) came from rural high schools. Though the present data agrees that there is some influence of rural upbringing on likelihood to practice in a rural area, the majority of rural participants came from urban high schools. Thus, the survey results suggest that rural recruitment strategies should not be limited solely to providers with rural upbringing.

These data also showed that rural or urban upbringing had no influence on the likelihood of retention in a rural area. The lack of correlation between rural retention and rural upbringing has been supported by some[15,51] but not all prior studies[18].

Other factors influencing recruitment

There were differences between rural and urban participants in the importance of some factors involving recruitment. Rural participants placed more importance on their family's fit with the community as well as the opportunity for recreation, while urban participants placed more importance on having friends and colleagues in the area. Spousal influences may factor heavily on rural provider recruitment[25,44,52,53], but multiple authors have argued against any correlation between marital status and rural recruitment[15,20]. The present data suggest family influences are important, but few respondents rated their spouse's job as an important factor in practice location decision-making.

Physicians and non-physicians also rated several factors much differently in terms of their importance in the decision of where to practice. Notably, physicians nearly universally rated scope of practice as important, a trend that has been previously reported[53-55].

Other factors influencing retention

Most of the LRP recipients in our study were still practicing in the communities where they received their loan repayment awards. However, the retention of participants in rural communities has been less than that of participants in urban communities. After enrollment in a LRP has ended, rural participants were more likely to move to urban areas than vice versa.

Of the rural participants who changed practice after their LRP enrollment was over, 11 (48%) reported that their family's desire to move was important in their decision. The next most important factors were professional/personal isolation and dissatisfaction with the medical community, factors which have been previously emphasized for their importance in retention[15,51,56-59] Although some authors have demonstrated the importance of income on rural provider retention[15,58], desire for higher income was an important factor for only 5 non-retained rural participants (22%), suggesting that money was not as important for rural retention as satisfaction with the professional environment in general.

Limitations

This study is limited by only assessing LRP participants in Colorado, so the results may not generalize to other areas of the country or beyond the USA.

Because this survey asked providers to recall decisions made in the past, recall bias must be considered. Although the response rate was high, response bias may also influence results; non-responders or those that could not be located may have been more likely to have left their original LRP practice location or have different attitudes and motivations.

Of the 66 respondents who had completed their terms of service at the time of the survey, only 21 (32%) were more than 5 years from completion of their LRPs. Thus, inferences about long-term retention are limited.

By design, this study included a cohort of health providers who received loan repayment. Therefore, the attitudes and motivations of providers who have declined participation in LRPs could not be assessed. It is possible that a significant number of providers would be interested in and satisfied with rural practice but selected urban practice due to financial or other constraints.

Due to the methods by which participants were collected, there was a correlation between rural participants and physicians as well as urban participants and dentists. While there was an attempt to stratify these groups, the location-provider type association may have potentially confounded the results. Due to the relatively small sample sizes, further stratification or multivariable modeling to explore confounding by location or provider type was not possible.

Marital status was not measured in the survey. This limits the interpretation of family and spousal influence, as it cannot be differentiated if a participant reported a low influence of these factors simply because there was no spouse or family involved in decision-making.

Conclusions

Loan repayment programs have increased in popularity as a means to enhance recruitment and retention of healthcare providers in medically underserved areas. From the survey responses obtained in this study, it appears that loan repayment in rural Colorado is most often distributed to providers who are already practicing or planning to practice in a rural community regardless of the award. Although loan repayment appears to have limited influence on the decision of a provider to practice in a rural community, it does appear to have notable influence on the specific rural community the provider chooses as well as on the retention of the provider in a rural community. Rural provider recruitment was most heavily influenced by the location of the community, the size and scope of practice, family fit, and recreational opportunities, while retention was most dependent on family preferences, personal and professional support, and satisfaction with the medical community. The desire for a higher income was not a leading factor in the retention of rural providers. These data are important to inform policymakers and administrators of LRPs and to better tailor loan repayment for optimal provider recruitment and retention to rural communities in the USA and worldwide.

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