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Employment selections of resident and non-resident graduates of physical therapy programs in underserved Western states


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EMPLOYMENT SELECTIONS OF RESIDENT AND NON-RESIDENT
GRADUATES OF PHYSICAL THERAPY PROGRAMS
IN UNDERSERVED WESTERN STATES

by

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Bachelor of Science
Utah State University
2007

A doctoral document submitted in partial fulfillment of
the requirements for the

**Doctor of Physical Therapy
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School of Allied Health Sciences
Division of Health Sciences**

**Graduate College
University of Nevada, Las Vegas
May 2011**

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THE GRADUATE COLLEGE

5/4/2011

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Is approved in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

Merrill Landers, Research Project Coordinator, Department of Physical Therapy

Harvey Wallman, Chair, Department of Physical Therapy

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ABSTRACT

Employment Selections of Resident and Non-Resident Graduates of Physical Therapy Programs in Underserved Western States

by

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Background and Purpose

Physical therapy (PT) is an essential component of the healthcare system in providing a comprehensive treatment plan for patients with functional limitations. The demand for physical therapy services is projected to expand in the next eight years, leading to an increased need for practicing physical therapists. The Mountain States plus Washington State (MSPWS) demonstrate the greatest shortage of therapists and are considered to be medically underserved. The purpose of this study was to determine the retention rates of resident and non-resident physical therapy graduates of public universities in the MSPWS and to determine which factors influenced their employment decisions.

Subjects

Two hundred and forty two graduates of physical therapy education programs (PTEP) from six public universities located in the MSPWS participated in the study. The participants' ages ranged from 25 to 55 years old and included 159 females, 82 males, and 1 individual who did not indicate a gender.

Methods

A 10-question internet survey was developed and distributed to graduates of PTEPs. The department chairs of each PTEP as well as individuals who had associated with graduates of these PTEPs helped to distribute the survey to participants.

Results

Resident graduates were 5.2 times more likely than non-resident graduates to accept employment in the state from which they received their PT degree after graduation. Family and spouse played an important role in employment choice and was the most frequent option selected. Female residents were 2.4 times more likely than male residents to obtain employment in the state in which they received their PT education.

Discussion and Conclusion

The results of this study suggest that resident graduates within the MSPWS are more likely than non-resident graduates to accept employment in the state from which they graduated.

Introduction

Physical therapy (PT) is an essential component of the healthcare system in providing a comprehensive treatment plan for patients with functional limitations. The demand for PT services is projected to increase by 30% from 2008 to 2018, which is greater than the average for other healthcare occupations.¹ Changes in insurance reimbursement as a result of direct access which allows patients greater access to physical therapy services, the increasing elderly population and the survival rate of trauma victims and newborns with birth defects will all contribute to the need for increased PT services in the near future. Due to advances in medical technology and the use of evidence-based practices, many disabling conditions which were untreatable in the past can now be treated.¹ Additionally, the Individuals with Disabilities Education Act (IDEA) federally mandates that students with disabilities have access to PT services. All of the aforementioned factors lead to an increase in the demand for practicing physical therapists.¹

Demand for physical therapists varies between states as evidenced by the ratio of physical therapists per capita in the United States (US).^{1,2} According to the federal government, more than 10% of United States residents live in medically underserved areas.^{1,2} The U.S. Department of Health and Human Services defines a medically underserved area (MUA) using the following four variables: “ratio of primary medical care physicians per 1,000 population, infant mortality rate, percentage of the population with incomes below the poverty level, and percentage of the population age 65 or over.”³ Based on these variables, a score on a scale of 0 to 100 is given to each region, with a score less than 62 indicating a MUA.³ The Mountain States which include: Arizona,

Colorado, Idaho, Montana, Nevada, New Mexico, and Utah as well as Washington State demonstrate a shortage of therapists and are some of the states that are considered to be highly medically underserved.⁴ This shortage of medical personal in the Mountain States plus Washington State (MSPWS) emphasizes the need to retain graduates of healthcare professional programs within each of these states.

The goal of state-funded and accredited physical therapy education programs (PTEP) is to provide qualified physical therapists to help meet the increased demand within their respective states.⁵ These publicly-funded institutions have the responsibility to provide physical therapy graduates that will choose to remain within that state to meet the needs of the population.⁵ This presents a challenge since graduates of state university programs are not compelled to seek employment in the state in which they were educated. PT programs would benefit by identifying factors that influence new graduates to stay within the state and then utilizing this information in their candidate selection process. For example, financial considerations are one factor to consider and may include salaries, employer compensation for indebtedness, Health Care Access Program (HCAP) of the Western Interstate Commission for Higher Education (WICHE),^{6,7} expense of relocating, cost of living, employment benefits, and continuing education opportunities.⁸⁻
¹¹ Another factor to consider is job prospects which may include job opportunity, possibility of career advancement and research availability. An additional factor to consider is family needs which include spouse's career or educational opportunities, quality of schools for children, extended family's proximity, and quality of life for a family. Lastly, a positive and successful student clinical affiliation may lead to a job offer enticing the student to locate to that area.

It has been shown that if a health care provider program emphasizes a more rural theory and practice over the course of that program, it is more likely that graduates of the program will be employed in a rural setting. According to Silva et al, there is a positive correlation between the number of resident dental students educated in a state and the supply of dentists in that state.¹¹ Applying these correlations may assist state-funded universities in producing graduates who will provide much needed PT services for their state.

Finding ways to improve retention rates of physical therapists in the MSPWS may benefit the underserved in these states. This is particularly important in times when funding resources for state-funded programs may be limited or threatened.¹² Although several studies of recruitment and retention factors of underserved areas have been conducted, only one unpublished pilot study has examined residency status of PTEP students as a possible factor influencing their decision to serve the state in which they were educated. Therefore, the purpose of this study was to determine the retention rates of resident and non-resident physical therapy graduates of public universities in the MSPWS, to determine which factors influenced their employment decisions and to compare retention rates of males to females. The researchers hypothesized that graduates who were residents of the state upon acceptance into a public PTEP in the MSPWS would be more likely to accept employment in the state from which they graduated than would graduates who were non-residents of the state. The researchers also hypothesize that family and spouse would be the most significant factor influencing employment selection. In addition, it was hypothesized that there would be no difference in the retention rate between males and females.

Methods

Design and Subjects

A cross-sectional survey was used for this research study. Study participants were required to have graduated with a degree in physical therapy from an accredited public university located in a Mountain State or Washington State. Of the 200 physical therapy programs in the United States accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), only 13 are located in the western states, 9 of which are publicly funded.¹³ The MSPWS were chosen because of the disproportionate number of PT programs in those states compared to the number of programs in rest of the country. Institutional Review Board (IRB) approval was obtained through the University of Nevada, Las Vegas (UNLV) to conduct the research study.

Data were collected from 242 respondents from six of the eight states invited to participate in this study (Figure 1). Data from the University of Washington and Eastern Washington University were combined and referred to in the analysis of the data as the state of Washington. There were no responses from Colorado (University of Colorado) or Idaho (Idaho State University). The average age of the respondents was 34.61 years old ($SD = \pm 8.3$, range = 25 to 55). There were 82 male responses and 159 female responses. One participant did not indicate gender. Graduation years of the participants ranged from 1980 to 2009. Among the 242 subjects that participated in the study, 191 (78.9%) of the participants were residents of the state in which they received their entry-level physical therapy education and 51 (21.1%) were non-residents upon acceptance. Additionally, the majority of the subjects were employed as full-time physical therapists (79.8%) and 67.0% were employed primarily in outpatient settings (Figure 2, Figure 3).

Data Collection

This study utilized a questionnaire previously developed by researchers during a pilot study. Five professionals in the field of research, education, and/or physical therapy evaluated the initial questionnaire for face and content validity; as a result of this, minor changes were made. In order to establish test-retest reliability, the revised questionnaire was presented to 28 PTs on two different occasions approximately two weeks apart. On survey responses containing continuous data, intraclass correlation coefficient analyses were used and revealed a range of 0.985 to 0.999 (95% Confidence Interval = 0.964 to 1.000) indicating high test-retest reliability. Categorical responses were analyzed using kappa statistics, revealing high test retest reliability with a range of 0.777 to 1.000.

A professional web-based data collection company, Survey Monkey^{*}, was used to design the 10-question survey and to collect data (Appendix 1). Since the primary objective of the study was to evaluate the relationship between residency status upon acceptance to the PTEP and employment acceptance within that same state, questions focused on residency and employment location. The questionnaire also included secondary areas of interest such as employment setting, reasoning behind employment selection, employment status, years employed as a PT, and year of graduation.

Procedure

Letters requesting participation in the study were sent to the chairs of the PTEPs of the MSPWS. Some of the chairs of these programs were unable to release the contact information of their graduates due to privacy issues. The chairs of these physical therapy

* SurveyMonkey.com
815 NW 13th Ave. Suite D
Portland, OR 97209

departments were asked to forward the e-mail containing the hyperlink to the questionnaire to their graduates. In addition to the hyperlink, the letters included the purpose of the study. To ensure that the respondent was not part of the original pilot study, the reader was advised to disregard this survey if they had previously participated.

In an effort to recruit more participants, snowball sampling techniques were used wherein physical therapists were also contacted through acquaintances and asked to complete the questionnaire. These individuals were also asked to recruit fellow classmates who had graduated from the same PTEP. After this strategy was implemented, a large number of responses was received. Other methods that were used to collect data for the study included Facebook[†], MySpace[‡] and LinkedIn[§]. Since the researchers had no way of knowing whether a respondent received the hyperlink through an email from their institution, from a classmate, or from a social network website, it was not possible to determine which method was the most effective.

Data Analysis

The data were analyzed using, SPSS 17.0.^{**} Chi-square analyses were used to determine whether or not a graduate was more likely to seek employment in the state in

[†] Facebook, Inc.
156 University Ave. Suite 300
Palo Alto, CA 94301

[‡] MySpace, Fox Interactive Media Headquarters
407 N Maple Drive
Beverly Hills, CA 90210

[§] LinkedIn Corporation
2029 Stierlin Court
Mountain View, CA 94043.

^{**} SPSS Inc., an IBM Company Headquarters
233 S. Wacker Dr., 11th Floor
Chicago, IL 60606

which they received their degree based on their residency status upon acceptance to their respective PTEPs. This analysis was conducted for all states combined as well as for each state individually with the purpose of investigating retention within the respective state following graduation. An odds ratio was also calculated to determine the odds of participants seeking employment in the state from which they graduated. Chi-square analysis was also conducted for factors that influence employment decisions and to compare retention rates of males to females.

Results

A statistically significant association between resident status entering a PTEP and employment after graduation in the state in which they were educated was obtained, $\chi^2(1) = 27.82$, $p < .0005$, $\phi = .339$ (Table 1, Figure 4). An odds ratio revealed that residents were 5.2 times more likely than non-residents to work in the state in which they were educated (95% confidence interval = 2.75 to 10.04).

For Arizona graduates, there was a statistically significant association between residency status and employment in Arizona initially after graduation, $\chi^2(1) = 7.43$, $p = .006$, $\phi = .297$ (Figure 5). An odds ratio revealed that Arizona residents were 5.08 times more likely than non-residents to work in Arizona after graduation (95% confidence interval = 1.47 to 17.62).

For Montana graduates, there was a statistically significant association between residency status and employment in Montana initially after graduation, $\chi^2(1) = 4.73$, $p = .030$, $\phi = .335$ (Figure 5). An odds ratio revealed that Montana residents were 5.85 times more likely than non-residents to work in Montana after graduation (95% confidence interval = 1.07 to 32.08).

For Nevada graduates, there was a statistically significant association between residency status and employment in Nevada initially after graduation, $\chi^2(1) = 12.61$, $p < .0005$, $\phi = .410$ (Figure 5). An odds ratio revealed that Nevada residents were 8.0 times more likely than non-residents to work in Nevada after graduation (95% confidence interval = 2.30 to 27.81).

For Utah graduates, there was not a statistically significant association between residency status and employment in Utah initially after graduation, $\chi^2(1) = .000$, $p = 1$, $\phi = .218$.

For Washington graduates, there was a statistically significant association between residency status and employment in Washington initially after graduation, $\chi^2(1) = 12.61$, $p < .0005$, $\phi = .410$. An odds ratio revealed that Washington residents were 8.0 times more likely than non-residents to work in Washington after graduation (95% confidence interval = 2.30 to 27.81).

Secondary analysis revealed that family/spouse was the most frequent option selected (179) in playing a role in employment decision (Figure 6). There was a statistically significant association between residency status at the time of acceptance and initial employment after graduation for male physical therapists, $\chi^2(1) = 4.86$, $p = 0.04$ (Fisher's exact test). An odds ratio revealed that male residents were 3.01 times more likely than non-resident males to work in their respective state after graduation (95% confidence interval = 1.109 to 8.644). Secondary analysis also revealed a statistically significant association between residency status at the time of acceptance and initial employment after graduation for female physical therapists, $\chi^2(1) = 24.004$, $p < 0.0005$, $\phi = .392$. An odds ratio revealed that female residents were 7.31 times more likely than

non-resident females to work in their respective state after graduation (95% confidence interval =3.118 to 17.129).

Discussion

The results of this study showed that graduates who were accepted into a PTEP as residents of the state were 5.2 times more likely than non residents to accept employment within that state upon graduation in the MSPWS. Based on this data, it would be beneficial for publicly funded PTEPs within the MSPWS to give priority to resident applicants seeking acceptance into their program as this would increase the number of PTs in the state. Currently, UNLV, University of New Mexico, Northern Arizona University and Idaho State University already have policies that favor residents of the state over non-residents during the admission process.¹⁴⁻¹⁸ Based on the results of this study, it may be beneficial for other publicly funded universities to adopt similar policies.

Of the six states from which we received responses to the questionnaire, only five had a high enough number of responses to conduct statistical analysis. These states included Arizona (84), Nevada (75), Montana (42), Utah (10) and Washington (28). It was found that residents of the state of Arizona upon acceptance to the PTEP of Northern Arizona University were 5.1 times more likely than non-residents to stay and obtain employment in Arizona post-graduation. At the University of Nevada, Las Vegas in the state of Nevada, residents of the state were 8.0 times more likely than non-residents to find employment within the state. For residents of the state of Montana who graduated from the University of Montana, it was found that they were 5.9 times more likely to obtain employment in that state than non-residents. In the state of Washington, graduates of the University of Washington and Eastern Washington University who were residents

upon acceptance to their PTEP were 11.0 times more likely to stay and work within the state following graduation than non-residents. The consistent results from each state revealing higher retention rates for residents compared with non-residents strengthens the argument that publicly funded schools may benefit from considering residency when selecting students for their programs.

From the data, researchers found that family/spouse was the most commonly selected response in influencing employment location both within each individual state and overall. This may explain the propensity for non-resident graduates to leave the state from which they received their PT education in order to be closer to their families. Likewise, one of the main reasons residents may choose to remain in state is to live near their families.^{9,10} This is contrary to some studies suggesting that financial incentives and job location are the top considerations when selecting PT employment.⁸⁻¹⁰

It was determined that there was a difference between genders and post-graduation employment selection. It was found that males who were residents upon acceptance to their PTEP were 3.1 times more likely to stay and obtain employment in that state than those males who were not residents. Female residents of their state were 7.3 times more likely to stay and obtain employment in the state than those females who were not residents. Female residents were 2.4 times more likely than male residents to obtain employment in the state in which they received their PT education. While the exact reason for this is unclear, these findings may have possibly been due to several factors.

Due to the fact that family and spouse was the most commonly chosen reason for job selection, it is possible that this factor played a significant role in influencing women

when selecting job location. It has been shown in past research that the career expectations of females in the medical field differ from those of males.¹⁹ In an article by Johanson, it was found that male physical therapy students were more likely than female physical therapy students to expect to own their own practice, have an administrative or managerial position, become a faculty member, publish literature in a professional journal, and to have a higher income in the first year of employment. A possible factor influencing the female graduates' decision on where to seek employment following graduation could be their anticipation of the increased responsibility of childcare and other familial duties.^{19,22} These factors may have led to graduates accepting employment within the state in which they were educated.

In other medical professions these career expectation differences have also been found. In a study conducted on the aspirations of first and fourth-year dental students it was found that fourth-year female students expected that they would be in an associate position five years following graduation.²⁰ It was also stated that women in dental private practice were more likely to work part-time than men, spent roughly two times the amount of time in childcare and housework than their male counterparts, and were more likely to take a leave of absence from their occupation to raise their children.²⁰ These female dentists' career choices also illustrate the possibility that females may expect to choose a situation in which they better balance family and work. The differences in career expectations and activities between male and female PT students parallel those of medical students,²¹⁻²⁴ physicians,²⁵ veterinary students,²⁶ and nurses.²⁷ This study supports previous research indicating that spouse/family was one of the most frequently chosen factors when selecting employment.

This study was not without limitations. One limitation was the inability to prioritize or rank the responses to the last question in the questionnaire. Respondents were able to mark multiple reasons as to why they chose their employment location. This limited the options for statistical analysis. Also, a definition of the meaning of each answer was not included which would have clarified the response options. Results could not be generalized to New Mexico, Idaho, or Colorado due to a low number or lack of responses. The overall low number of responses could have been a result of the inability to obtain contact information because of confidentiality policies and a lack of PTEP alumni records. The low number of responses may also be due to response bias secondary to the unwillingness of participants to complete the survey. Another limitation was the larger number of responses from graduates who were accepted into their PTEP as residents than graduates who were accepted as non-residents. This could have led to another possible bias in the results.

Future studies should include a way to prioritize or rank the options given for question number ten in the questionnaire, “What influenced your decision to leave or stay in the state where you received your entry-level physical therapy degree?” This would help to obtain more specific results as to what influenced each individual to make their respective employment selection following graduation. Future researchers could include another question asking graduates if their state residency status changed while attending school. This would allow researchers to see if a change in residency has an effect on post-graduation employment selection.

Conclusion

Our results suggest that residents are more likely to seek employment within the

state in which they received their PT degree than non-residents within the MSPWS. There are currently four PTEPs within the MSPWS that give preference to residents of those respective states when accepting students. Because these PTEPs are publicly funded and have a commitment to meet the needs of the state, it is recommended that other publicly funded PTEPs implement similar policies during acceptance to their program. By giving preference to residents, the PTEPs may better be able to meet the physical therapy needs of their respective states by increasing their retention of graduates within the state.

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Figure 1. Number of responses from each state

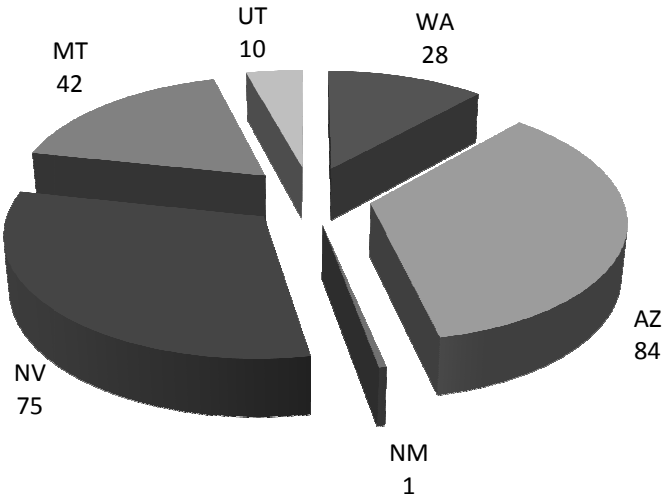


Figure 2. Number of responses pertaining to current employment status of physical therapists

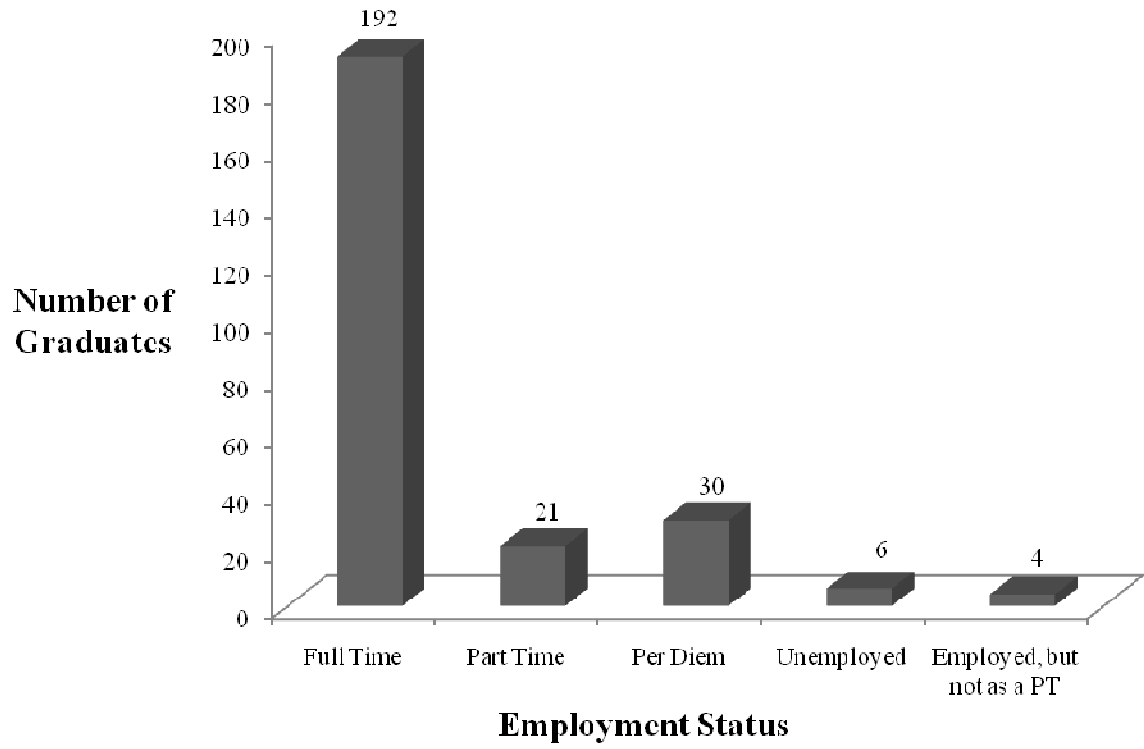


Figure 3. Number of responses pertaining to the type of physical therapy setting in which physical therapists work

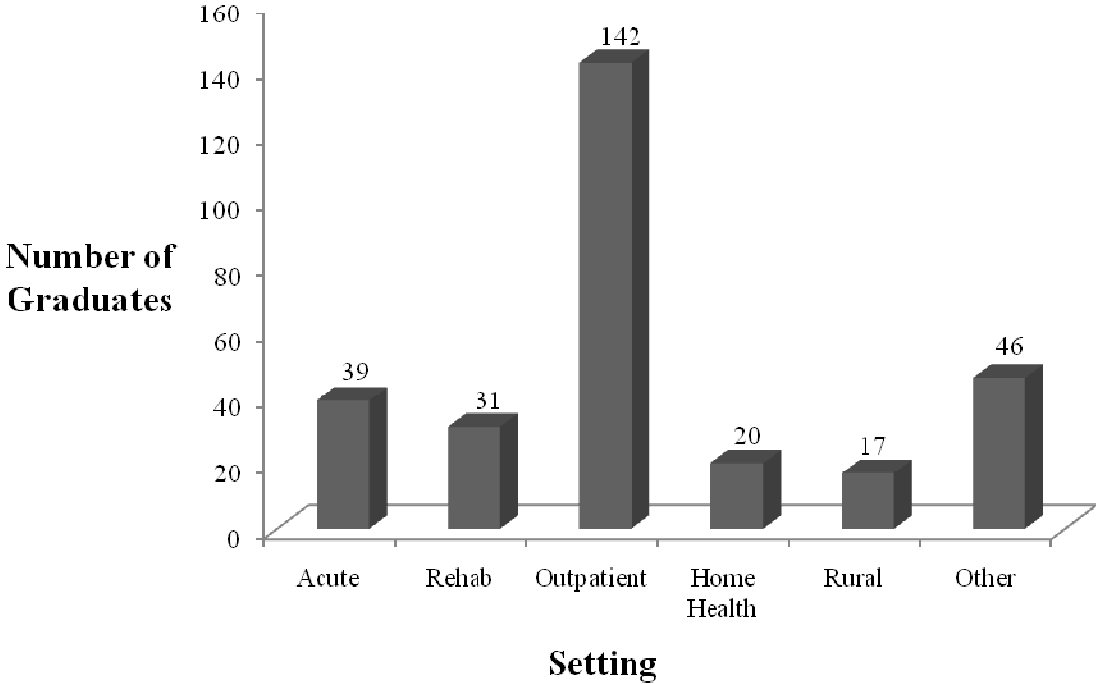


Figure 4. Residency status upon admission and acceptance of employment within or outside the MSPWS upon graduation

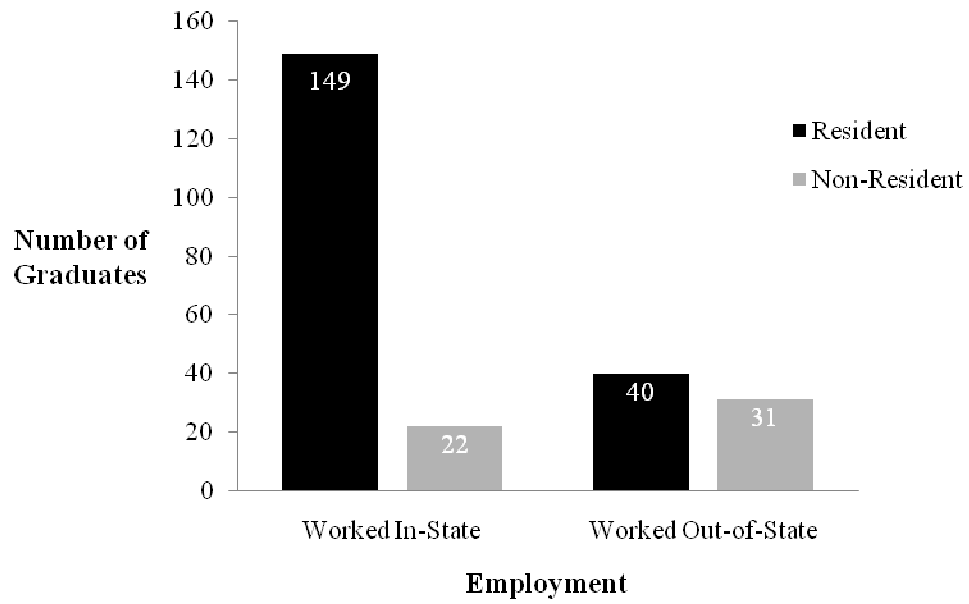


Figure 5. Residency status upon admission vs. Post-graduation employment location for Nevada, Arizona and Montana PT students

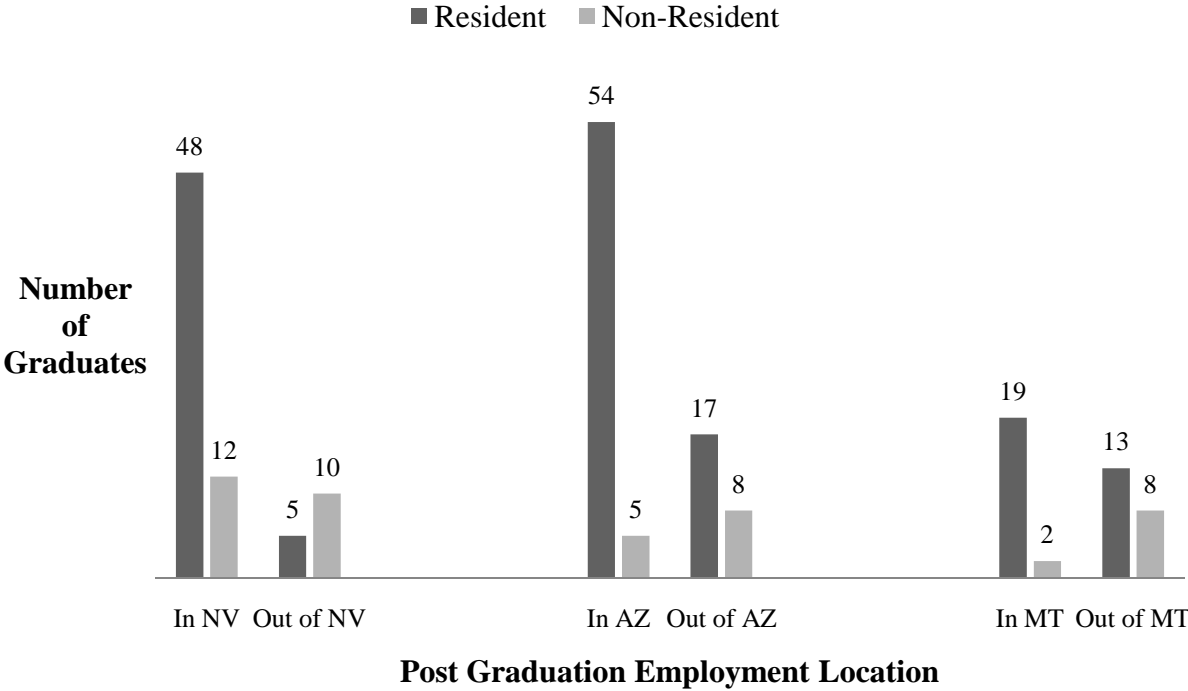


Figure 6. Number of responses pertaining to what factors influenced decisions to leave or stay in the state in which graduates received their entry-level PT degree

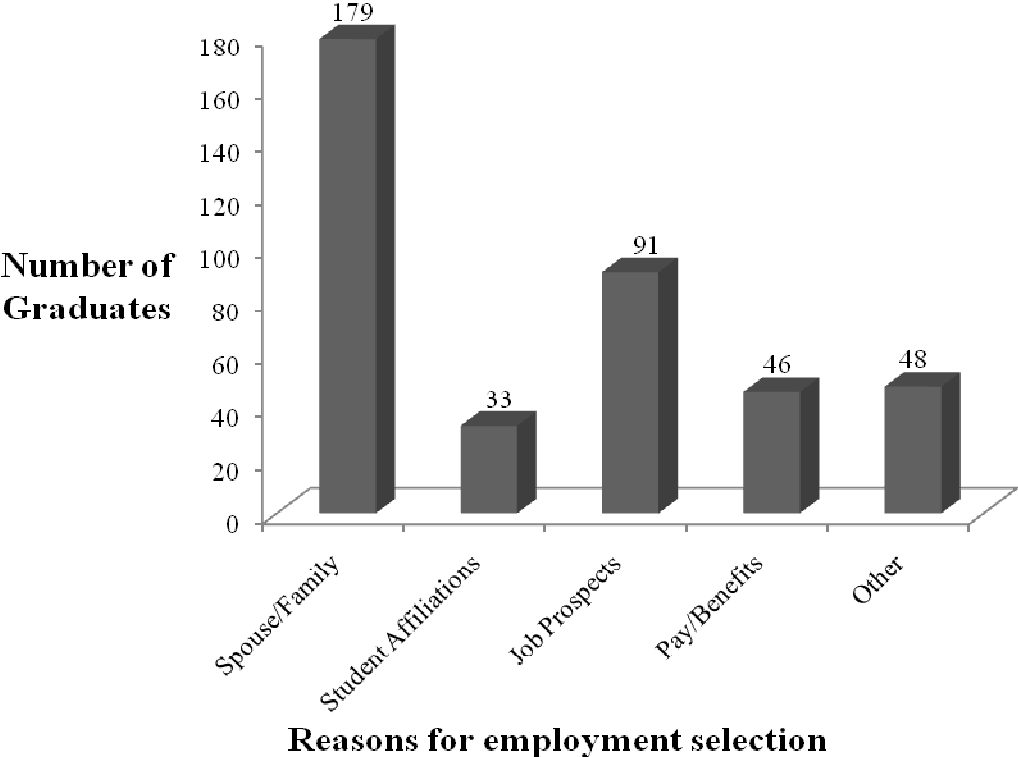


Table 1. Contingency table of residency status and initial employment status MSPWS

		Initial Employment within State	
		Yes	No
Resident of the state at time of acceptance	Yes	61.6%	16.5%
	No	9.1%	12.8%

Appendix 1 - Questions from questionnaire

1. What is your gender and age in years?
2. What is your current employment status as a physical therapist?
 - a. Full-time
 - b. Part-time
 - c. Per Diem
 - d. Not currently employed
 - e. Employed, but not currently as a physical therapist
3. In which setting(s) do you predominately practice as a physical therapist?
 - a. Acute
 - b. Rehab
 - c. Outpatient
 - d. Home Health
 - e. Rural
4. Choose the state where you received your entry-level physical therapy degree:
 - a. Washington
 - b. Arizona
 - c. Idaho
 - d. New Mexico
 - e. Nevada
 - f. Colorado
 - g. Montana
 - h. Utah
5. In what year did you graduate with your entry-level physical therapy degree?
6. For how many years have you practiced as a licensed physical therapist?
7. Upon acceptance to your entry-level physical therapy program, were you a resident of that state?
 - a. Yes
 - b. No
8. Upon graduation, did you accept employment in the state where you received your entry-level physical therapy degree?
 - a. Yes
 - b. No
9. At any time in your professional career, did you accept employment out of the state where you received your entry-level physical therapy degree?
 - a. Yes
 - b. No
10. What influenced your decision to leave or stay in the state where you received your entry-level physical therapy degree?
 - a. Spouse/Family
 - b. Student Affiliations/Clinicals
 - c. Job Prospects
 - d. Pay/Benefits

Appendix 2 - IRB Approval Letter



**Biomedical IRB – Expedited Review
Continuing Review Approved**

NOTICE TO ALL RESEARCHERS:

Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: September 14, 2009
TO: Dr. J. Wesley McWhorter, Physical Therapy
FROM: Office for the Protection of Research Subjects
RE: Notification of IRB Action by Dr. Charles Rasmussen, Co-Chair *CR*
Protocol Title: **Employment Trends of Resident and Non-resident Physical Therapy Graduates in Largely Underserved States**
Protocol #: 0809-2837

Continuing review of the protocol named above has been reviewed and approved.

This IRB action will reset your expiration date for this protocol. The protocol is approved for a period of one year from the date of IRB approval. The new expiration date for this protocol is September 9, 2010.

PLEASE NOTE:

Attached to this approval notice is the **official Informed Consent/Assent (IC/IA) Form** for this study. The IC/IA contains an official approval stamp. Only copies of this official IC/IA form may be used when obtaining consent. Please keep the original for your records.

Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through OPRS. No changes may be made to the existing protocol until modifications have been approved by the IRB.

Should the use of human subjects described in this protocol continue beyond September 9, 2010, it would be necessary to submit a **Continuing Review Request Form** 60 days before the expiration date.

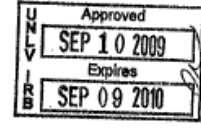
If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at OPRSHumanSubjects@unlv.edu or call 895-2794.

Office for the Protection of Research Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047

RECEIVED

SEP 02 2009

4505 S. Maryland Parkway Box 453029
Las Vegas, Nevada 89154-3029



August 1, 2008

Dear Physical Therapy Alumnus:

I am writing in regards to a research study that I am conducting and your assistance would be greatly appreciated. The study is entitled "Employment Trends of Resident and Non-resident Physical Therapy Graduates in Underserved States." The purpose of this study is determine the retention rates of physical therapy graduates in underserved states with those in the rest of the country.

You are being asked to participate in the study because you have been identified as a graduate of a physical therapy program located in a state that has a population that is underserved for physical therapy.

If you volunteer to participate in this study, you will be asked to take a internet linked survey of 7 questions.

The survey link is: www.surveymonkey.com/s.aspx?sm=iztdRJKSb1KCSy7rgm2Zrw_3d_3d.

There are no direct benefits to you from participating in this study. However, we hope to learn the employment trends of physical therapy graduates and why they choose to seek employment in states other than where they graduated. The risks of participating are minimal: You may feel uncomfortable when answering some of the survey questions.

There will be no financial cost to you to participate in this study. Your participation will require only 10 minutes of your time.

Your participation in this study is voluntary. By clicking on the link above and filling out the survey, you are voluntarily consenting to participate. You may refuse to participate in this study or withdraw at any time without prejudice to your relations to the university.

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for 3 years after completion of the study. After the storage time the information gathered will be shredded.

Please consider our request. If you have any questions please contact me at 702-895-2629 or james.mcwhorter@unlv.edu.

Sincerely,
Dr. J. Wesley McWhorter, MPT, Ph.D.
Associate Professor
University of Nevada Las Vegas

VITA

Graduate College
University of Nevada, Las Vegas

Trever J. Cornia

Degrees:

Bachelor of Science, Kinesiology, 2004
California State University, Long Beach

Dissertation/Thesis Title: Employment Selections of Resident and Non-Resident
Graduates of Physical Therapy Programs in Underserved Western States

Dissertation/Thesis Examination Committee:

Associate Professor, Dr. J. Wesley McWhorter, MPT, Ph.D.
Associate Professor, Dr. Merrill Landers, DPT, OCS