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# The Effect of a Hybrid Continuing Education Course on Outpatient Physical Therapy for Individuals with Low Back Pain

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### ABSTRACT

This study used an augmented version of Kirkpatrick's four-level model of training criteria as a theoretical framework to evaluate a hybrid teaching approach to continuing education (CE) for physical therapists who treat patients with low back pain. This model provides a framework for relating changes in practitioner knowledge to changes in practice. Forty-three orthopedic physical therapists who attended a CE course on evidence-based practice participated in the study. The hybrid CE course consisted of online (reading assignments and quizzes) and onsite components (traditional lecture and skill review laboratory). It addressed evidence for application of a clinical prediction rule to identify patients most likely to benefit from spinal manipulation treatment for low back pain. The participants received surveys to determine their preferences and frequencies for treating patients with low back pain prior to attending the CE course, 6 weeks and 6 months post-attendance. Self-reported use of lumbar spinal manipulation increased by greater than 47% 6 weeks and 6 months post-CE course participation. While preferential use of several of the interventions which were less supported by an evidence base decreased post-CE, the overall preference for use of lumbar spinal manipulation by course participants remained lower than expected.

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### INTRODUCTION

Evidence exists to support spinal manipulation as an effective intervention for patients with low back pain (LBP). The evidence supporting the use of spinal manipulation in the treatment of LBP appears to be stronger than that for the majority of traditional medical interventions, such as physical agents and traction.<sup>1</sup> For example, a systematic review of the use of spinal manipulation reported that this technique provided more short-term pain relief and possibly faster recovery from LBP than commonly used physical therapy treatments including ultrasound, traction, and moist heat.<sup>2</sup>

Recent findings suggest that using spinal manipulation is most effective when applied to certain subgroups of patients with LBP.<sup>3</sup> Flynn et al. developed a clinical prediction rule to identify those patients most likely to benefit from lumbopelvic spinal manipulation.<sup>3</sup> Of 11 potential prediction variables studied, 5 were included in the final model: duration of symptoms < 16 days, at least one hip with > 35 degrees of internal rotation, hypomobility with lumbar spring testing, a work subscale score <19 on the Fear-Avoidance Behavior Questionnaire, and absence of symptoms distal to the knee. A successful outcome was defined as having a >50% improvement on the Oswestry Disability Index (ODI) after the second or third visit. Results showed that if a patient had any four of the five prediction variables upon initial examination, the probability of success with manipulation increased from 45% (1-2 prediction variables present) to 95%. Therapists who treated subjects in the Flynn et al. study had varying degrees of clinical experience. No evidence has been published that substantiates the amount of experience necessary

to perform lumbopelvic spinal manipulation in a safe and successful manner. A subsequent validation study resulted in similar outcome findings.<sup>4</sup> Using an alternative lumbar spine manipulation technique, Cleland et al. studied 12 patients who presented with 4 of the 5 criteria from the clinical prediction rule.<sup>5</sup> They observed an average of 57% improvement on the ODI after only two visits. Based on data reported in these studies, approximately 30% of persons with acute LBP meet the spinal manipulation CPR criteria. These studies provide strong evidence in favor of use of spinal manipulation for select patients with low back pain.

Despite the published evidence supporting the use of spinal manipulation for subgroups of individuals with acute low back pain, reports on physical therapy practice patterns show that this intervention is not frequently used in the United States.<sup>6</sup> Specifically, an analysis of outpatient physical therapy discharge data revealed that spinal manipulation comprised approximately 5% of 1,279 episodes of care for acute LBP administered by 141 therapists. However, recent data show that physical therapy students participating in their first full-time 8-week clinical education experience used spinal manipulation 36.2% of the time during an initial patient visit, and 26.1% and 13.3% of the time at subsequent and final visits.<sup>7</sup> A survey by Mikhail et al. of 100 physical therapists sought to determine the prevalence of the use of evidence-based interventions in the management of acute, nonspecific low back pain.<sup>8</sup> This survey revealed that 90% to 96% of therapists used interventions with limited or non-existent evidence of effectiveness. Using interventions with higher evidence of effectiveness was associated with having graduated more recently, participating in a higher number of CE courses, and attending CE courses that focused on manual therapy interventions using interactive and manual "hands-on" techniques.<sup>8</sup>

The above review of the literature suggests that we can address the low prevalence of appropriate use of spinal manipulation through continued emphasis on evidence-based practice in entry-level physical therapy curricula and through CE of practicing therapists. A 2005 survey by Landers et al. indicated that physical therapists attended an average of 28.3 hours of CE annually in states that did not require formal CE for licensure renewal, and 33.8 hours in states that did.<sup>9</sup> While 96% of the therapists surveyed by Landers et al. stated that they believed that CE benefited their clinical practice, recent research indicates that the format of CE influences the transfer of new knowledge into practice. For example, studies of physicians have indicated that didactic sessions alone are unlikely to alter professional practice behaviors.<sup>10</sup> However, interactive CE courses that emphasize participant activity and provide an opportunity to practice skills can change professional practice and impact health care outcomes.<sup>11</sup> No studies have been published which assess the effectiveness of a hybrid CE course for physical therapists. In addition, no information has been published in the physical therapy literature concerning ideal strategies for analyzing barriers to the implementation of evidence-based practice.

There are significant barriers to practitioners seeking interactive CE. These barriers include cost, time away from patient care, and accessibility. A hybrid CE course that combines computer-based distance learning and on-site interactive learning can decrease time away from patient care and improve accessibility to evidence-based CE. This hybrid format enables learners to access didactic information and testing materials over the Internet. Thus, the time spent on-site can be reduced and the focus can be directed toward learning and practicing clinical skills. The purpose of this study was to evaluate the effect of a hybrid CE course on physical therapist use of interventions for individuals with acute LBP. An augmented version of Kirkpatrick's taxonomy of training criteria was used to guide analysis of the outcomes of a hybrid CE approach. This taxonomy categorizes the effects of training programs at four levels: (1) learner satisfaction with the training; (2) changes in learner knowledge, which includes demonstration of new skills; (3) transfer of new knowledge and skill to the work environment; and (4) changes in desired outcomes at the level of the organization and/or patient.<sup>12</sup> Examples of outcome assessment tools for each respective category include: (1) post-CE course satisfaction survey; (2) quizzes over didactic information; (3) a survey of changes in practice; and (4) patient outcome measures.

The topic of the CE course taught for this study was evidence-based practice of spinal manipulation for individuals with LBP. Physical therapists who regularly treat patients with LBP were the target audience. Our hypothesis was that presenting the recent evidence concerning use of spinal manipulation and reviewing and practicing the manipulation technique used in the research would increase the use of spinal manipulation by participants in their clinical practice. The intent was to increase physical therapist use and application of the clinical prediction rule developed by Flynn et al. so that appropriate patients would be identified and treated accordingly to achieve optimal outcomes.<sup>3</sup> Consequently, if the frequency of use of spinal manipulation increased, we expected to observe a decrease in the use of interventions such as physical agents that are not supported by evidence. Outcomes of this study regarding the use of a hybrid pedagogical approach in CE for physical therapists may stimulate additional study of optimal teaching strategies for other health care practitioners as well. Patients stand to benefit from effective dissemination and implementation of recent evidence-based advances in the treatment and management of impairments. The CE course assessed in this study consisted of online reading assignments and quizzes and an onsite lecture with a "hands on" laboratory review session to allow learners to practice the manual skills and obtain meaningful feedback.

## **METHODS**

### **Subjects**

The study population consisted of 43 licensed physical therapists with one to four years of clinical experience. All were master degree level graduates of the Division of Physical Therapy Education Program at a University and were recruited from a cohort of postgraduate, transitional doctor of physical therapy program students. All participants identified their clinical practice environment as an outpatient orthopedic setting. Demographics of the study population are summarized in Table 1. Study subjects signed an informed consent prior to their participation. The protocol for this study was approved by the Institutional Review Board at the University.

### **Intervention**

The online educational intervention was a required component of a Musculoskeletal Course module within a transitional doctor of physical therapy program. The course was delivered using the Blackboard™ course platform software. Didactic requirements to be completed online included reading three journal articles concerning spinal manipulation for LBP patients and completing multiple choice and short answer examination questions for each article.<sup>3,13,14</sup> Onsite requirements consisted of a one hour lecture that summarized the current evidence on use of spinal manipulation for a specific sub-group of individuals with LBP, and a one hour laboratory experience. The laboratory experience was conducted by the first two authors of this report and consisted of a review and practice session of the lumbosacral manipulation technique used in the study by Flynn et al. and taught in the professional entry-level program curriculum.<sup>3</sup> During lab, the instructors demonstrated a specific spinal manipulation intervention which was followed by student practice with multiple partners. Each subject was required to demonstrate the skills and receive feedback from an instructor during the session.

### **Study Design and Outcomes Assessed**

Pre-experimental designs were used to evaluate the impact of the intervention.<sup>15</sup> Specifically, we assessed the first two levels of the augmented version of Kirkpatrick's taxonomy—learner satisfaction and changes in learner knowledge—after the intervention. Learner satisfaction was determined via feedback from a post-course evaluation survey. We assessed immediate knowledge of current spinal manipulation research by requiring subjects to read three articles accessed via the Internet and to answer multiple choice and short answer quiz questions (80% pass rate required) pertaining to each article.<sup>3,13,14</sup> We assessed each subject's immediate post-training competency in spinal manipulation manual skills during the onsite laboratory portion of the course. We used the pre-experimental one-group pretest-posttest design to assess the third level of the taxonomy—transfer of the new spinal manipulation/manual skills to a subject's clinical environment. Specifically, we used a survey questionnaire to assess changes in physical therapy practice patterns before and after the educational intervention. The survey questionnaire assessed subjects' utilization of spinal manipulation and other preferred interventions when treating patients with LBP. The survey was sent to participants at three intervals relative to the educational intervention: prior to the intervention, 6-weeks post, and 6-months post. Surveys were delivered electronically or by mail based on subject preference.

Subjects were asked to indicate "yes" or "no" as to whether they used spinal manipulation techniques on patients with low back pain in their clinical practice. Spinal manipulation was defined as Grade V, high-velocity, low amplitude, thrust technique, while spinal mobilization was defined as Grades I-IV, non-thrust techniques based on Maitland's classification system.<sup>16</sup> To determine the subjects' preferred interventions used with this patient population, they used a Likert scale to rank order the top five interventions that they used most frequently, with the option to include "other" in place of one on the list. Options for interventions included: traction, manipulation, mobilization, physical agents, and exercise. Interventions ranked 1, 2, or 3 by participants were considered "high frequency" or commonly used interventions and those ranked 4, 5, or 0 were considered "low frequency" or rarely used interventions in the survey analysis.

### **Data Analysis**

Due to the blinded nature of the data collection, we were unable to pair observations before and after the CE course. Consequently, we used a one sample test for a proportion to generate a z score to test for differences in the proportions of subjects preferring specific interventions at six weeks and six months after the CE course. We used a n = 36 for the sample size in these calculations.

## **RESULTS**

### **Satisfaction, Immediate Knowledge and Demonstration**

All subjects reported being satisfied or extremely satisfied with their CE training. All subjects achieved the required score of 80% or greater on all quizzes covering the required research articles ensuring knowledge of the evidence base for the use of spinal manipulation manual skills. All subjects were able to appropriately demonstrate the required spinal manipulation manual skills for the instructors during the onsite laboratory session.

### Transfer to the Clinical Environment

A 100% (43 physical therapists) return rate was obtained for the pre-course survey, and an 84% (36 physical therapists) return rate for each of the two post-course surveys conducted 6 weeks and 6 months after the intervention. The surveys were anonymous and without identifiers. See Table 1 for results. See appendix for survey form.

**Table 1. Demographics of Physical Therapists Participating in the Hybrid CE Course**

Item	Pre-Hybrid CE (n = 43)	6-wks Post Hybrid CE (n = 36)	6-mos Post Hybrid CE (n = 36)
Average years in clinical practice, (SD)*	2.5 (1.0)	2.9 (1.0)	2.9 (0.8)
Gender			
Female (%)	67.4	63.9	69.4
Male (%)	32.6	36.1	30.6

\*Standard Deviation

Subject responses to three of the pre-course survey questions are summarized in Table 2. Over half of the subjects (53%) had previously attended a CE course that included spinal mobilization training, and 16% had previously attended a continuing education course that included spinal manipulation training. However, only 7% were familiar with the evidence-based clinical prediction rule on spinal manipulation for persons with low back pain prior to the hybrid CE course.

**Table 2. Pre-Intervention Survey Responses Prior to the Hybrid CE Course**

QUESTION	YES n = 43 (%)
Have you attended a CE course which included training on spinal mobilization techniques (Grades I-IV; non-thrust techniques) for patients with LBP?	23 (53%)
Have you attended a continuing education course which included training on spinal manipulation techniques (Grade V; high-velocity, low amplitude, thrust techniques) for patients with LBP?	7 (16%)
Prior to receiving the reading assignments for this course, were you familiar with the "clinical prediction rule" when using spinal manipulation (Grade V; high-velocity, low amplitude, thrust techniques) in the treatment of patients with LBP?	3 (7%)

#### *Utilization of Interventions Pre- and Post-Hybrid CE Course*

Figure 1 illustrates that prior to the educational intervention, 21% of the subjects had previously used spinal manipulation as an intervention. After attending the CE course, 72% and 69% of the subjects reported having used spinal manipulation, 6 weeks and 6 months later, respectively. This represents a greater than 47% increase in the use of spinal manipulation post-CE.

#### *Preferred Interventions*

Table 3 summarizes the proportion of subjects' who responded that an intervention was preferred for use with patients who have LBP. Nearly all subjects cited exercise as a preferred intervention before and after the CE course. The proportion of subjects preferring to use physical agents decreased significantly from 84% pre-CE course to 61% post-CE ( $p < 0.001$ ). However this difference was not sustained six months after the CE course. The proportion of subjects preferring to use mobilization and manipulation were significantly greater at both time periods post-CE as compared to pre-CE. However, the proportion preferring to use manipulation decreased from 25% to 11% from 6 weeks to 6 months post-CE. The proportion of subjects preferring to use traction decreased significantly post-CE.

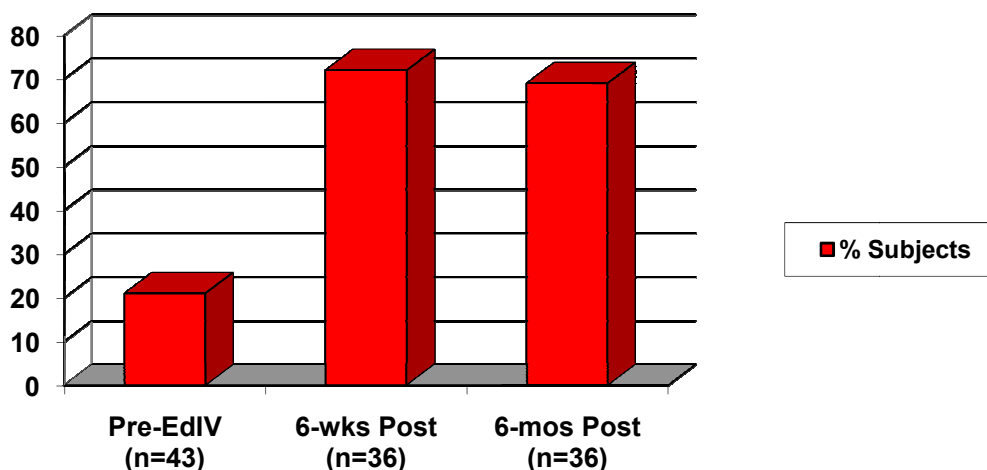


Figure 1: Percentage of subjects who answered affirmatively to the question, “Do you use SM techniques (Grade V, high-velocity, low amplitude, thrust techniques) on patients with LBP in your clinical practice? [EdIV = Educational Intervention]

Table 3. Proportion of Subjects Preferring an Intervention Pre- and Post-Hybrid CE Course

Intervention	Proportion Preferring Intervention Pre CE	Proportion Preferring Intervention 6 Weeks Post CE	p value for z score *	Proportion Preferring Intervention 6 Months Post CE	p value for z score**
Exercise	98%	100%	0.390	100%	0.390
Physical Agents	84%	61%	<0.001	75%	0.142
Mobilization	58%	81%	0.005	89%	<0.001
Manipulation	3%	25%	<0.001	11%	0.005
Traction	33%	6%	<0.001	8%	0.001

\* One sample test comparing proportion of subjects who preferred an intervention six weeks post-CE as compared to pre-CE

\*\* One sample test comparing proportion of subjects who preferred an intervention six months post-CE as compared to pre-CE

**DISCUSSION**

The hypothesis for this study was that presenting the recent evidence concerning use of spinal manipulation and practicing the manipulation technique in the context of a hybrid CE course would increase the use of spinal manipulation by participants in their clinical practice. Our results revealed that participation in the hybrid CE course was associated with change in clinical practice. However, the use of spinal manipulation—an evidence-based intervention—remained lower than expected as compared to interventions that are not supported by evidence. Promotion of evidence-based clinical practice is important for all health practitioners. A popular approach used to inform practitioners of recent advancements in evidence is CE. While the influence of CE on clinical practice has been studied in many of the health professions, little research has been conducted regarding the impact of CE on physical therapists. One study from England indicated that while physiotherapists appeared to be in favor of evidence-based practice, they remained reluctant to change their current practices.<sup>17</sup> Systematic reviews of continuing medical education effectiveness have resulted in recommendations for optimizing CE for health professionals. Some recommended approaches for improving the effectiveness of CE include linking learning to clinical practice, using multiple educational interventions, using “opinion leaders” for advocacy and education, and incorporating “hands on” learning sessions into the course.<sup>18,19</sup> The approach used in this study applied all of these strategies as well as a hybrid course design. The hybrid design enabled delivery of didactic information to learners over a broad geographic area via the Internet, which enabled onsite contact to emphasize practice and feedback for acquisition of the new spinal manipulation skills. The hybrid course design has been well received by health professions students.<sup>20,21</sup>

The increase in the of use of manipulation and mobilization as interventions for patients with LBP (Fig 1, Table 3) post-CE indicate that subjects retained and applied the knowledge and skills taught in the course. This finding also supports the

hypothesis that the use of a hybrid approach to CE can be effective. Only one study by Alexander was found that described the use of a hybrid teaching approach to CE.<sup>22</sup> Our study followed Alexander's recommendation to "keep the online activity brief and concise." We required participants to complete three online modules. Each module consisted of a research article and a brief multiple choice/short answer quiz addressing the didactic information presented in the article. Subjects provided verbal feedback estimating the typical time spent per module as approximately one hour. A previously reported study of physical therapy students that compared classroom lecture and computer-based instruction reported equivalent pass rates for exams and a reduction in time spent studying by the students in the computer-based group.<sup>23</sup> However, all students in the study reported a preference for direct contact with a course instructor.<sup>22</sup> These results support the use of a hybrid approach for education of physical therapists, which maximizes the efficiency of a computer-based approach for didactic learning and the availability of practice and feedback required for new skill acquisition that is available only when learners are in direct contact with an instructor.

While an increase in the reported frequency of use of manipulation and mobilization by study subjects occurred post intervention (Fig 1, Table 3), this increase was lower than expected given the incidence of patients with LBP who may benefit from spinal manipulation (~30%).<sup>3,4</sup> In addition, several interventions continued to receive high rankings in spite of limited evidence for use on patients with LBP (Table 3). Both of these findings suggest that the study subjects may have experienced some barriers to the implementation of the evidence-based practice taught in the hybrid CE course. Although a majority of practicing physical therapists consider research findings useful and are interested in learning evidence-based practice skills, numerous barriers to transferring and sustaining new skills in clinical practice have been reported. Salbach described these barriers as insufficient time to update others or investigate new information, lack of support among colleagues, and lack of interest.<sup>24</sup> Strategies to mitigate these barriers and enhance the integration of evidence into practice include developing a supportive organizational infrastructure and peer support network, providing dedicated time to seek new information,<sup>24</sup> and engaging clinicians in follow-up activities after the initial education session.<sup>25</sup>

Rogers' "diffusion of innovations" (DOI) theory provides a general framework to assess the adoption of evidence-based healthcare interventions.<sup>26,27</sup> DOI describes the general process by which new ideas diffuse over time through communication channels among the members of a social system.<sup>26</sup> DOI theory is used by researchers in behavioral science and healthcare to understand the dissemination and uptake of evidence-based practices because it considers the context of the social systems in which healthcare professionals practice.<sup>27-32</sup> This context includes the extent of managerial and financial support for the innovation, the presence of champions to promote the innovation, and the consistency of the innovation with existing organizational values.<sup>26,33</sup> Theories of individual behavior change such as the five stages-of-change contribute to the innovation-decision process component of DOI.<sup>26,34</sup> In DOI theory, an innovation is most likely to be adopted when the following criteria are met: the adopter (an individual or organization) recognizes that the innovation is better than the old way of doing things; the innovation is compatible with the adopter's values, past experiences, and needs; the innovation is not overly complex; the adopter is able to experiment with and "try out" the innovation; and the adopter is able to observe the results of others adopting the innovation.<sup>26,33</sup> The increased frequency of the use of spinal manipulation by subjects post-course is consistent with perceptions that it provided a relative advantage as compared to other techniques, that it was consistent with subjects' values, and that it was not overly complex. The fact that this increase was lower than expected may be related to subjects' limited experimentation with the technique and limited ability to observe the results of others' use of the technique upon return to the clinical environment. In addition, post-course follow-up activities may have reinforced the principles learned and improved frequency of clinical application of the new information.

There were limitations to this study. The subjects self-reported their changes in practice patterns. An independent review of interventions without subject knowledge would have been the optimal approach for assessing change in practice patterns as a result of the hybrid CE. It would also have been helpful to determine the frequency with which subjects in the study treated LBP patients. This denominator would have provided a means to normalize the reported frequencies. We used a pre-experimental study design—no comparison or control group was included, which is a common limitation of educational research<sup>15</sup>. Thus, the effectiveness of the hybrid CE model relative to other approaches cannot be conclusively determined based on our findings. Finally, while the overall survey response rates were excellent (100% first, 84% second and third surveys), the number of subjects was relatively small (n=43). Despite these limitations, our intent was to describe this novel approach to CE and assess selected outcomes using a standard taxonomy of training criteria.

## Conclusion

Participants in the hybrid CE course did report change in their clinician practice. However, the overall prevalence of the use of lumbar spinal manipulation remained lower than expected as compared to interventions less supported by an evidence base. Diffusions of innovation theory is a promising strategy to analyze barriers to implementation of evidence-based practice. Based on this theory, future research related to diffusion of spinal manipulation should 1) determine the specific barriers to

implementation encountered by clinicians who are skilled in its application, 2) identify whether changes in patient outcomes occurred as a result of the use of spinal manipulation, and 3) assess whether healthcare costs are reduced as a result of implementation of evidence-based interventions. Refinement of this hybrid approach to CE may yield even better results. If additional research demonstrates the effectiveness of this teaching approach for practicing clinicians, it would be worthwhile to evaluate the value of this approach for other health professionals as well.

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**APPENDIX**  
**Division of Physical Therapy Education**  
**School of Allied Health**  
**University of Nebraska Medical Center**

**PT PRACTICE PATTERN SURVEY**

**Purpose:** The purpose of this brief questionnaire is to determine practice patterns for the P-DPT students, specifically with regard to spinal mobilization and manipulation. Results of this survey will be shared and discussed when you meet on-campus. A follow-up questionnaire will also be administered several months after your on-campus visit.

1. In which physical therapy practice area do you spend the majority of your time as a clinician?  
 outpatient orthopedics/sports medicine  
 outpatient neurological rehabilitation (adult and pediatrics)  
 inpatient acute care  
 cardiopulmonary rehabilitation  
 wound care  
 home health  
 other, please indicate \_\_\_\_\_
2. How many years have you been practicing as a licensed physical therapist?  
 1 year  
 2 years  
 3 years  
 4 years
3. Gender:  
 Male  
 Female
4. Age range:  
 21-25 years  
 26-30 years  
 31-35 years  
 36-40 years  
 41-45 years

**For the purposes of this questionnaire, "low back pain" (LBP) is defined inclusively as pain or discomfort between the regions of L1 and the gluteal fold.**

5. Prior to receiving the reading assignments for this course, were you familiar with the "clinical prediction rule" when using **spinal manipulation** (Grade V; high-velocity, low amplitude, thrust techniques) in the treatment of patients with LBP?  
 yes  
 no (proceed to question #7)
6. If you answered "yes" to question #5, have you implemented the "clinical prediction rule" into your clinical practice with patients who have LBP?  
 yes  
 no
7. Do you use **spinal manipulation** techniques (Grade V; high-velocity, low amplitude, thrust techniques) on patients with LBP in your clinical practice?  
 yes  
 no

If you answered "yes" to question #7, please estimate the frequency at which you use **spinal manipulation** techniques among all patients that **you** treat with LBP.

Please mark your response by placing the vertical hash mark on the line below.  
(To do so, please click, drag, and drop the hash mark from the left-hand column.)

8. If you do NOT use **spinal manipulation** on patients with LBP in your clinical practice, what do you feel are some of the barriers or perceived barriers to using this intervention? (Rank order the top 4: 1 = the barrier perceived as the strongest, ... and 4 = the barrier perceived as the weakest.)

- prefer other interventions
- not enough years of clinical experience
- fear of litigation
- unaware of supportive research (evidence)
- fear of hurting the patient
- do not know if Nebraska practice act legally permits this
- did not learn this in school
- other, please indicate \_\_\_\_\_

9. Have you attended a continuing education course which included training on **spinal manipulation** techniques (Grade V; high-velocity, low amplitude, thrust techniques) for patients with LBP?

- yes
- no

10. Do you use **spinal mobilization techniques** (Grades I-IV, non-thrust techniques) on patients with LBP in your clinical practice?

- yes
- no

If you answered "yes", please estimate the frequency at which you use these techniques among all patients that **you** treat with LBP.

Please mark your response by placing the vertical hash mark on the line below.  
(To do so, please click, drag, and drop the hash mark from the left-hand column.)

11. If you do NOT use **spinal mobilization** (Grades I-IV, non-thrust techniques) in your clinical practice, what do you feel are some of the barriers or perceived barriers to using this intervention? (Rank order the top 4: 1 = the barrier perceived as the strongest,... and 4 = the barrier perceived as the weakest.)
- prefer other interventions
  - not enough years of clinical experience
  - fear of litigation
  - unaware of supportive research (evidence)
  - fear of hurting the patient
  - do not know if Nebraska practice act legally permits this
  - did not learn this in school
  - other, please indicate \_\_\_\_\_
12. Have you attended a continuing education course which included training on **spinal mobilization** techniques (Grades I-IV; non-thrust techniques) for patients with LBP?
- yes
  - no
13. Do you practice or have you practiced as a licensed physical therapist with peers who use **spinal mobilization** or **manipulation** with patients who have low back pain?
- |              |                              |              |                              |
|--------------|------------------------------|--------------|------------------------------|
| Mobilization | <input type="checkbox"/> yes | Manipulation | <input type="checkbox"/> yes |
|              | <input type="checkbox"/> no  |              | <input type="checkbox"/> no  |
14. Please rank order the 5 interventions that you use most frequently with patients who have low back pain (1 = most frequent,... 5 = least frequent)
- traction
  - manipulation
  - mobilization
  - physical agents (heat, cold, ultrasound, electrical stimulation, etc.)
  - exercises
  - other, please indicate \_\_\_\_\_
  - I do not treat patients with low back pain in my practice.