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Differences Among Life Care Planners and Physiatrists Regarding the Likelihood and Frequency of Secondary Complications for Persons with Spinal Cord Injury

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Abstract

Life care planners (LCPs) who provide expert witness testimony must provide their professional opinions within a certain degree of life care planning probability or essentially a 51% chance or greater likelihood of the good or service occurring. In cases involving spinal cord injury (SCI), such opinions become complicated when attempting to include the costs of future secondary complications (SCs) that may or may not have a consistent body of empirical support and/or several physician specialists supporting the probability of occurrence. The present study surveyed 243 life care planners (LCPs), life care planning physiatrists (physiatrist LCPs), and non-life care planning physiatrists (physiatrist non-LCPs) in ascertaining their professional opinions regarding 13 SCs among individuals with a SCI, based upon level of injury. Results revealed that LCPs and physiatrist LCPs generally endorsed higher ratings for SCs in comparison to physiatrist non-LCPs.

Life care planning in the legal arena is an adversarial specialization where LCP opinions are often contested by opposing attorneys and their retained experts when the opposition's report(s) are perceived as unreasonably leaning in one direction (e.g., too costly to fund without validation). Being qualified and certified/licensed as an expert witness in any discipline is a privilege that carries with it a code of ethics and standards of practice (e.g., International Academy of Life Care Planners, n.d.). Triers of fact typically expect an impartial and objective set of opinions based upon a reliable and valid methodology from the expert which is generally supported by peers in that profession (Field, 2000; Hoyt & Aalberts, 2001; Johnston & Sartwelle, 2013).

Expert witnesses who provide testimony must base their opinions on a certain degree of life-care planning probability, which is defined in the legal arena as a 51% or greater chance of occurring. Prior to 1993, this practice was not present as experts from various disciplines provided testimony they opined as probable, but there were no laws or litmus test required to determine reliability (Field, 2000; Hoyt & Aalberts, 2001). It was not until the 1993 *Daubert v. Merrill Dow Pharmaceuticals* and later the 1999 *Kumho Tire Company v. Carmichael* rulings that expert witnesses had to comply with stricter guidelines when proffering their opinions (Hoyt & Aalberts, 2001; Rutkin, 1999). After these rulings, experts were required to demonstrate that their opinions were generally accepted in their field, were subjected to peer-review publication, and employed a reliable methodology to arrive at their conclusions.

In most expert witness disciplines, there appears to be a gray area where opposing experts do not always agree. Attorneys from both sides will often only retain an opposing expert when they perceive the life care plan developed by the opposing side is lacking in reasonableness, overall conclusions, and cost. Marini (2012) described the possibility versus probability dilemma life care planners face regarding when to include costs for yet-to-be determined future medical complications and when this is inappropriate. As Marini (2012) argued, some life care planners may "cherry pick" one or two studies in support of their opinions while ignoring the larger body of literature that does not. As noted earlier, the gray area exists when opposing experts cite different literature to support their opinions. Deutsch and Sawyer (1997) previously established a protocol for identifying and documenting potential medical complications that are yet-to-be determined. They stated that possible complication costs should not be included in a life care plan if they are not deemed probable to occur. Physician experts are also supposed to provide generally accepted opinions in their field. However, it is unknown as to whether their opinions have been scrutinized with the same rigor as non-physician life care planners (Marini, 2012).

The purpose of the present study was to investigate the ratings of SCs among life care planners and physiatrists to provide those operating as a LCP with empirical support for cost inclusion in a plan when a SC reaches the probability threshold. In addition, we sought to examine whether differences occurred among physiatrists and LCPs when they provided their expert opinions of the likelihood of SCs occurring among people with a SCI. According to the 1993 *Daubert* and 1999 *Kumho* rulings, costs may be included if the empirical literature supports the prevalence of such occurrences with a 51% or greater frequency. However, as demonstrated through a comprehensive literature review by

Ysasi et al. (2016), research on SCs among individuals with a SCI is often outdated; therefore, the research addressing the 13 secondary complications outlined in this research was long overdue.

Spinal Cord Injury and Secondary Complications

Acquiring a spinal cord injury at any age is a traumatic and sudden shock to the system both physiologically and psychologically. An individual's life is often transformed from one of independence to one of partial or total dependence on others for assistance, and in some cases there arises the need to relearn basic activities that are usually learned by age four (Marini & Brown, 2015). There are varying functional ramification levels of SCI; with the higher the injury level, generally the greater impact on functional impairment. For example, an individual who sustained a cervical neck injury at C7-C8 typically experiences tetraplegia (all four limbs are impaired to some degree). Each cervical level has vast implications as to whether an individual will be ventilator independent (C2-C3), able to feed oneself with an adaptive aid (C5), able to drive independently with vehicle modifications (C6), or whether he or she is capable of transferring independently to/from bed into a wheelchair at C7-C8 (Blackwell, Winkler, Krause, & Steins, 2001; Marini & Brown, 2015).

Paraplegia generally involves a spinal cord injury at the first thoracic vertebrae (T1) and extending down into the sacral region. Once again, each level generally signifies more or less motor and/or sensory function or loss. Those with paraplegia are typically independent in almost all activities of daily living. The higher thoracic levels often require some assistance in certain activities depending on home accessibility and comorbidities. Different energy expenditures for ambulating depends on hip mobility; but in the majority of cases, persons with paraplegia often choose a wheelchair for longer distances (Blackwell et al., 2001). For more detailed information on the type and severity level implications for SCI, see Blackwell et al. (2001), the International Medical Society of Paraplegia (2000), and the National Spinal Cord Injury Statistical Center (2013).

Secondary complications. Although there are 20+ SCs of SCI noted in the literature, we will briefly discuss only several of the more prevalent SCs within this article (Jensen et al., 2011). Despite the fact that a traumatic SCI remains an otherwise rather stable or static injury regarding relative minimal functional gains or losses post-injury, paralysis of various functional systems, such as our phrenic nerve for independent respiration, neurogenic bowel and bladder, loss of sensation, and loss of bone structure, all can facilitate secondary complications stemming from these losses. For example, loss of sensation in the lower extremities is common for most injuries, and since most persons with traumatic SCI ambulate by wheelchair, they are essentially sitting much of the waking day. If the individual is able to but otherwise neglectful in performing pressure release (i.e., lifts off their buttocks periodically), this can lead to loss of blood flow to an area and cause the death of skin tissue (Ash, 2002; McKinley, Jackson, Cardenas, & DeVivo, 1999).

Depending on the extensiveness of necrotic tissue (stages I-IV), treatment may extensively vary from no-cost by simply relieving the pressure for several days and remaining off of the area (stage I) to stage IV involving both necrotic skin and muscle tissue damage. Stage IV injuries can be life-threatening at their worst, and at their best, may still typically involve months or years of hospitalization and/or complete bed rest, antibiotics, extensive daily wound care, and skin flap surgery costing in excess of $100,000 or more (Rutherford Owen & Jones Wilkins, 2013).

Another common secondary complication of SCI are urinary tract infections (UTIs). Due to loss of normal bladder function, many individuals with SCI must void by condom drainage (reflex-triggered voiding), periodic catheterization, an indwelling catheter, or a suprapubic catheter (Ysasi, Silva, & Guerrero, 2013). In all instances, the bladder generally is not able to completely empty and therefore leaves bacteria which may build over time and become symptomatic, resulting in a UTI. Depending on the severity of the UTI, treatment may range from low-cost oral antibiotics for a 7-10 day period to more costly hospitalization with IV antibiotics for several days or longer (Ysasi et al., 2013).

Neuropathic pain is generally caused by damage to the somatosensory nervous system, an abnormal sensation (dysesthesia) pain or otherwise non-painful stimuli (allodynia) that is reported to be constant or occurs episodically (Serrata & Rocha, 2013). The prevalence of neuropathic pain reported by persons with SCI varies within the literature but typically has been reported to range between 40-75% (Henwood, Ellis, Logan, Dubouloz, & D'Eon, 2012). Neuropathic pain is generally described by persons with SCI as aching, stabbing, throbbing, pulsating, shooting and burning pain typically at or below the level of injury (Siddall, McClelland, Rutkowski, & Cousins, 2003). Pain intensity varies depending upon an individual's tolerance and the episodic nature as well as perceived severity. Pharmaceutical treatment is oftentimes recommended in the form of analgesics, anticonvulsants such as gabapentin, and antidepressants (Finnerup, Sindrup, Bach, Johannesen, & Jensen, 2002). Analgesics, such as nonsteroidal anti-inflammatories (NSAIDs), have been reported to be less effective with neuropathic pain compared to musculoskeletal pain, but nevertheless they continue to be prescribed (Cardenas & Jensen, 2005; Finnerup et al., 2002). Although neuropathic pain is commonly reported among persons with SCI, many will forgo taking pain medication unless otherwise necessary.

The impact of secondary complications is further facilitated or compromised depending upon other aspects regarding the type and severity of SCI as well as pre or comorbid medical conditions the individual has and their lifestyle choices. For example, individuals with tetraplegia

generally sustain more decubiti and report more neuropathic pain than persons with paraplegia (Rutherford Owen & Jones Wilkins, 2013; Siddall et al., 2003). Similarly, individuals with premorbid conditions such as diabetes mellitus will typically experience a longer healing period than those without diabetes. Lifestyle factors, such as smoking, obesity, alcohol or other substance use, serve as facilitators of secondary complications, such as decubiti and UTIs (Krause, 1996; Krause, Saunders, DiPiro, & Reed, 2013). These factors must also be taken into consideration when contemplating the possibility versus probability of cost inclusion for secondary complication problems yet-to-be determined.

As previously discussed, the purpose of the present study was to investigate the decision-making process as it relates to when and why a life care planner decides to include the costs of potential secondary complications (SCs) from a spinal cord injury (SCI) when these complications have not yet occurred. Specifically, *non-physician* life *care* planners, *physiatrist* life care planners, and *non-life* care planning physiatrists were surveyed to measure their opinions regarding the perceived likelihood and frequency of 13 SCs surrounding SCI. These include: decubitus ulcers with/without necessitated hospitalization, pneumonia/atelectasis/aspiration, heterotrophic ossification, autonomic dysreflexia, deep vein thrombosis, cardiovascular disease, syringomyelia, neuropathic/spinal cord pain, respiratory dysfunction, urinary tract infection, osteoporosis/bone fracture, and repetitive motion/overuse syndrome (shoulder). Although there are various publications regarding the reliability of life care planning, the focus of this research was specific to SCI and the possibility versus probability (empirical support) for cost inclusion within the LCP for the 13 SCs noted. Likert scale questions based on the literature regarding the most prevalent SCs of SCI were included. Specifically, we were interested in answering three research questions:

1) Are ratings of the **likelihood** of 13 secondary complications a function of demographics or type of practitioner?

2) Are ratings of the **frequency** of 13 secondary complications requiring hospitalization/treatment a function of demographics or type of practitioner?

3) Do life care planners, life care planning physiatrists, and non-life care planning physiatrists differ in their summary ratings regarding the likelihood of SC occurrence and frequency of hospitalization due to secondary complications incurred by persons with SCI?

Method

Study Design

Life care planner and physiatrist responses were analyzed utilizing a within-group and between-group design for group differences. Separately, responses were compared for differences and similarities between life care planners and physiatrists concerning the inclusion of SCs within a life care plan when accounting for the probability versus possibility of these occurrences over an individual's lifetime. Primary focus was to assess differences in frequency counts of secondary complications and hospitalization predictions over a lifetime due the SCs included in the survey. This study was aimed to obtain the professional opinion among three separate groups (i.e., LCPs; physiatrist LCPs, and physiatrist non-LCPs) and assess whether findings would exist between these groups.

Materials

The *Survey for Life Care Planners* is a six-section scale used to measure a life care planner's beliefs about including potential secondary complication costs into a life care plan. *Section 1* includes seven demographic and supplemental questions related to the participant's gender, percentage of plaintiff versus defense life care plans developed, approximate number of life care plans developed, current certification or licenses held, and whether the participant is employed full or part time in developing life care plans. *Section 2* is an eight-question multi-response scale regarding a life care planner's belief about including potential secondary complication costs into their life care plan. Study participants were presented with a question (e.g., when developing life care plans, I typically (more than 51% of the time) include costs for future SCI-related complications and other conditions only if they are deemed probably (51%) by empirical statistics) and were requested to rate their level of agreement on a four-point Likert Scale (i.e., strongly disagree, disagree, agree, strongly agree). *Section 3* presented study participants with a case scenario of an individual with C5-C6 tetraplegia. Participants were presented with a series of potential secondary complications (e.g., autonomic dysreflexia, deep vein thrombosis) and were instructed to rate how likely it will be that secondary complications occur at least once in an individual's lifetime if reasonable and medically necessary life care planning preventive care and treatment measures were taken. Participants could choose 0%, 1-25%, 26-50%, 51-75%, or 76-100% for each complication presented. In *Section 4*, participants were instructed to rate how frequently an individual may require hospitalization for one of 13 secondary complications over their lifetime, if any. The fifth and sixth sections of the survey were identical to three and four, except the case scenario represented an individual with a T6 paraplegia.

The *Survey for Physiatrists* contained a demographic section requesting gender, age, race/ethnicity, board certified or not, whether they ever worked at a SCI Model System Rehabilitation Hospital, whether they worked at a university

hospital, and their employment status (i.e., part-time or full-time physiatrist or part-time or full-time physiatrist who performs life care plans). Physiatrists who selected that they conducted life care plans were directed to provide a percentage of plaintiff- versus defense-related life care plans developed, approximate number of life care plans developed (total to date specifically for SCI), number of patients with SCI they see in an average year, and whether their life care plans included possible future SC costs (49% occurrence or lower), or probable SC costs (51% occurrence or greater). Physiatrists were presented the scenarios and rating scales identical to sections 3 to 6 from the *Survey for Life Care Planners*. Whether physiatrists selected the option for employed as a LCP or not, they were directed to describe their knowledge regarding the prevalence of SCs related to SCIs, the likelihood for SCs to occur if preventative measures were taken, and the likelihood of SCs were to occur if preventative measures are not taken.

Procedure

Data collection procedures included contacting certified and non-certified planners who were current members of the International Association of Rehabilitation Professionals (i.e., International Academy of Life Care Planners) and/or the American Association of Nurse Life Care Planners by email to solicit participation in the current study. Physiatrists who were current members of the Association for Academic Physiatrists, the American Board of Physical Medicine and Rehabilitation, and the American Academy of Physical Medicine and Rehabilitation were also contacted. Participants were instructed that they would be requested to complete a survey consisting of several questions in order to obtain vital information on the role that potential secondary complications play when developing life care plans of individuals with SCIs.

Once potential participants reviewed the recruitment email (e.g., purpose of the study, basic rights, approximate duration to complete the survey), they were instructed to click the link to participate in the survey. After participants clicked the link, they were taken to our survey generated by Qualtrics™ . Qualtrics is a password-protected online survey application software that was utilized to create the survey. Once directed to the survey, a welcome paragraph appeared that explained their rights when participating in the study, the right to discontinue the survey at any time, and anonymity assurance. After indicating that they consented to participate, they were able to proceed to the actual survey and instructed to complete all six sections of the survey. Once the survey was completed, participants were thanked for their participation and instructed that study results would be incorporated into a manuscript that would be sent for peer-review in a life care planning professional journal.

Initial Data Screening

Initial data screening was conducted to ensure data were imported correctly and to remove any unsuitable cases. In total, 260 potential respondents accessed the surveys of which 80.8% (n = 210) finished the entire survey and 19.2% (n = 50) did not. One respondent did not agree to participate on the informed consent form and was therefore excluded. Another 15 cases did not respond to the initial group classification item (LCP or physiatrist) nor to any other survey items and were similarly excluded. Two cases reported that they were both a LCP and physiatrist. One of these cases did not respond to any further items on the survey and, as such, was removed from the analysis. The other case responded to some of the LCP survey items and was therefore classified as a LCP.

After the initial screening and removal of cases, there remained 243 cases in the data set. Of these, 49.4% (n = 120) were life care planners and 50.6% (n = 123) were physiatrists. Physiatrists were further classified by whether they were LCP physiatrists or a non-LCP physiatrist based on their responses to their employment status. Of the 117 cases that responded to the item, 39.3% (n = 46) were classified as LCP physiatrists and 60.7% (n = 71) as non-LCP physiatists. Non-LCP physiatists were asked to skip the survey items pertaining to the inclusion of possible and probable secondary costs within the plan. To optimize sample sizes for the analysis, cases with missing data were excluded on an analysis-by-analysis basis.

Results

In this study, we sought to investigate the relationship between several demographic variables and the responses to the survey regarding costs and secondary complications. Some items were common to both surveys and could be combined, whereas others were specific to LCPs or physiatrists. After the initial screening and removal of cases, there remained 243 cases in the data set. Of these, 49.4% (n = 120) were LCP and 50.6% (n = 123) were physiatrists. Physiatrists were further classified into whether they were a physiatrist LCP or a non-LCP physiatrist based on their responses to the employment item. Table 1 below presents the predictor variables used in this study, their coding/measurement levels, and the groups they pertain to.

Table 1

Explanatory Demographic Variables Used in the Analyses

Survey Item	Item Description	Coding / Measurement	Group
L3/P3	Certified or non-certified	Dichotomous; (0 = non-certified, 1 = certified)	LCP Phy-LCP Phy-Non-LCP
L7 / P17	Knowledge of SCs related to SCI	Ordinal 1-5; (1 = Poor, 5 = Excellent)	LCP Phy-LCP Phy-Non-LCP
L5 / P7	# of LCPs developed for SCI	Ordinal 1-6 (1 = 0, 6 = 101+)	LCP Phy-LCP
L20 / P14	Percentage of LCPs that are Plaintiff Cases	Ordinal 1-5 (1 = 0%, 5 = 76-100%)	LCP Phy-LCP
L4	Employment status	Dichotomous; (1 = FT, 2 = PT)	LCP
P4	Ever worked at SCI model system	Dichotomous; (1 = No, 2 = Yes)	Phy-LCP Phy-Non-LCP
L6	# of SCI patients seen per year	Ordinal 1-6; (1 = 0, 6 = 50+)	LCP
P6	# of SCI patients seen per year	Ordinal 1-5 (1 = <25, 5 = 101+)	Phy-LCP

Note. LCP = life care planner, Phy-LCP = physiatrist life care planner, Phy-Non-LCP = physiatrist non-life care planner.

Research Question 1: ***Are ratings of the likelihood of 13 secondary complications a function of demographics or type of practitioner?***

In this study, we sought to investigate whether differences in inclusion of SC probability existed based upon demographic variables (i.e., certified or non-certified LCP, knowledge of SCs) and type of practitioner (LCP, physiatrist LCP, or physiatrist non-LCP). Two scenarios were given to respondents and were asked to report the likelihood of 13 SCI-related complications based on an ordinal scale from 1 to 5 (1 = 0%, 5 = 76-100%). Specifically, in the two scenarios we asked the following:

Scenario 1

For the FIRST case scenario, please consider an otherwise healthy lifestyle male in his mid-20s with a C5-C6 complete tetraplegia, of average height and weight with no pre-injury medical conditions or diseases. In your professional opinion, how likely will it be that the following secondary complications occur at least once in one's lifetime if reasonable and medically necessary life care planning preventive care and treatment measures are taken?

Scenario 2

For the SECOND case scenario, please consider an otherwise healthy lifestyle male in his mid-20s with a T6 complete paraplegia, of average height and weight with no pre-injury medical conditions or diseases. In your professional opinion, how likely will it be that the following secondary complications occur at least once in one's lifetime if reasonable and medically necessary life care planning preventive care and treatment measures are taken?

The set of independent variables were limited to those common to both groups; namely, certification and knowledge of secondary complications. A grouping variable was also included to examine whether responses differed between LCPs, physiatrist LCPs, and physiatrist non-LCPs for both scenarios.

Table 2

LCP Participant Demographics

Identified Demographic	*n*	*%*
Race/Ethnicity		
Caucasian (non-Hispanic)	117	97.5
African-American	2	1.7
Hispanic	1	.8
Gender		
Male	25	20.8
Female	95	79.2
Certified vs. Non-Certified LCP		
Certified LCP	91	75.8
Non-Certified Life Care Planner	29	24.2
Training Disciplines		
Physician	4	3.3
Registered Nurse	48	40.0
Certified Rehabilitation Counselor	39	32.5
Licensed Professional Counselor	15	12.5
Other	36	30.0
Employment Status		
Employed FT as a LCP (> 40 hours weekly)	71	61
Employed PT as a LCP (< 40 hours weekly)	46	39
LCPs developed (total to date) for individuals with SCI		
0	4	3
1-25	39	33
26-50	23	20
51-75	11	9
76-100	6	5
101+	34	29
Percentage of your current/past LCPs as plaintiff cases		
0	7	18
1-25	9	24
26-50	7	18
51-75	8	21
76-100	7	18
Bulk of your LCPs		
Plaintiff cases (more than 51%+ of the time)	79	75
Defense cases (more than 51%+ of the time)	27	25
Total	120	49.4

Note. For training disciplines, participants included within the "Other" category included: Occupational Therapist, Physiotherapist, Public Health Nurse, Registered Occupational Therapist, etc., FT = full time, PT = part time.

Table 3

Physiatrist Participant Demographics

Identified Demographic	*n*	*%*
Race/Ethnicity		
Caucasian (non-Hispanic)	84	67
African-American	8	5
Hispanic	10	7
Asian	27	21
Gender		
Male	59	42
Female	71	58
Certified vs. Non-Certified		
Board Certified Physiatrist	92	74
Non-Board Certified Physiatrist	31	26
Area of Employment (Multiple Answer Choices Were Allowed)		
I have worked at a SCI model system.	59	48
I am currently working at a SCI model system.	28	23
I have worked at a university hospital.	65	53
I am currently working at a university hospital.	71	58
I have never worked at any of the SCI medical systems above.	10	8
Spinal cord injury patients seen per year		
Less than 25	7	18
26-50	3	8
51-75	5	13
76-100	8	21
101+	15	39
Employment Status		
Employed FT as a Physiatrist and develop LCPs part time	12	10
Employed PT as a Physiatrist and full time develop LCPs	2	2
Employed FT as a Physiatrist but only consult on LCPs	36	29
A FT or PT Physiatrist who is not involved in LCP	74	60
Total	123	50.6

Note. LCP = life care planner, LCPs = life care plans, FT = full time, PT = part time.

Table 4

Physiatrist-LCP Participant Demographics

Identified Demographic	*n*	*%*
LCPs developed (total to date) for individuals with SCI		
1-25	26	68
26-50	6	16
51-75	3	8
76-100	0	0
101+	3	8
Percentage of your current/past LCPs as plaintiff cases		
0	7	18
1-25	9	24
26-50	7	18
51-75	8	21
76-100	7	18
Bulk of your LCPs		
Plaintiff cases (more than 51%+ of the time)	24	71
Defense cases (more than 51%+ of the time)	10	29
Total	46	39.3

Note. LCP = life care planner, LCPs = life care plans.

Summary of Methods

Table 5

List of Variables, Coding/Measurement Levels, and Methods for RQ1

Survey #	List of Variables	Coding / Measurement	Statistical Method
Explanatory Variables			
L3/P3	Certified or non-certified	Dichotomous; Non-certified = 0, Certified = 1	
L7/P17	Knowledge of SCs related to SCI	Ordinal 1-5; (1 = Poor, 5 = Excellent)	
(coded)	Group LCP, Phy-LCP, or Phy-Non-LCP	Categorical; LCP = 1, Phy-LCP = 2, Phy-Non-LCP = 3	
Outcome Variables			
L16/P20A–L16/P20M	Likelihood of secondary complications for Scenario 1 (total = 13)	Ordinal 1-5; (1 = 0%, 5 = 76-100%)	POM/PPOM
L18/P22A-L18/P22M	Likelihood of secondary complications for Scenario 2 (total = 13)	Ordinal 1-5; (1 = 0%, 5 = 76-100%)	POM/PPOM

Note. Survey # prefix L or P refers to the item on the LCP survey (L) or the physiatrist survey (P). LCP = life care planner, Phy-LCP = Physiatrist life care planner, Phy-Non-LCP = Physiatrist non-life care planner, PPOM = partial proportional odds model, POM = proportional odds model (i.e., all explanatory variables met parallel lines assumption). Adjusted alpha for model significance for each scenario = .05/13 = .004.

These analyses were conducted using the gogolit2 program in STATA with the autofit option. The responses to the dependent variables were all ordinal and were coded as follows: 1 = 0%, 2 = 1-25%, 3 = 26-50%, 4 = 51-75%, and 5 = 76-100%. Certification was coded as 0 = non-certified and 1 = certified. Knowledge of secondary complications was an ordinal variable with 5 levels (1 = poor, 5 = excellent). Finally, each group was coded 1 = LCP, 2 = Phy-LCP, and 3 = Phy-Non-LCP. Statistically significant results of groups were followed up with factor specifications (Phy-Non-LCP as reference) to determine if any differences existed. A Bonferroni corrected alpha level of .004 (.05/13) was used to determine model significance for each scenario.

Scenario 1. The majority of the analyses for Scenario 1 (S1) met the parallel lines assumption (PL) for all explanatory variables. Only S1K (urinary tract infection) failed to meet the assumption (for group) and, thus, the results for this item are presented in a separate table by levels of the outcome variable. Two models had statistically significant results using the adjusted alpha level of .004; S1A (skin breakdown requiring surgery; $p = .004$) and S1D (heterotopic ossification; $p < .001$). S1F (deep vein thrombosis) also approached significance with a p value of .006. In all cases, group was the statistically significant explanatory variable driving the model. Group coefficients indicated that LCPs rated significantly greater likelihood of higher ratings than either Phy-LCP or Phy-Non-LCPs. The two physiatrist subgroups did not differ significantly from one another on many of the comparisons.

The results are shown separately by response category for S1K: UTI due to violation of the parallel lines assumption for group ($p = .004$). Overall, the model was statistically significant ($p < .001$). Knowledge of secondary complications was a statistically significant and positive predictor. Thus, higher knowledge levels were associated with higher ratings of UTI frequency. Group was a significant (negative) predictor only within the response category of 26-50%. Non-LCP physiatrists were more likely to report frequencies of 26-50% or less than the other two groups.

Table 6

*Descriptive Statistics for **LCP Scenario 1**: Likelihood of Secondary Complications*

			0%	1-25%	26-50%	51-75%	76-100%	0-50%	51-100%	
	M (SD)	Mode	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	Total
SB-Sx	2.83 (.999)	1-25%	5 (4.5)	46 (41.4)	28 (25.2)	27 (24.3)	5 (4.5)	79 (71.2)	32 (28.8)	111
SBHWC	3.52 (1.14)	51-75%	3 (2.7)	24 (21.6)	21 (18.9)	38 (34.2)	25 (22.5)	48 (43.2)	63 (56.8)	111
PNA	3.18 (1.05)	51-75%	3 (2.7)	33 (30.0)	25 (22.7)	39 (35.5)	10 (9.1)	61 (55.5)	49 (44.5)	110
HO	2.83 (.961)	1-25%	3 (2.8)	48 (44.0)	27 (24.8)	27 (24.8)	4 (3.7)	78 (71.6)	31 (28.4)	109
AD	3.41 (1.11)	51-75%	5 (4.5)	21 (19.1)	26 (23.6)	40 (36.4)	18 (16.4)	52 (47.3)	58 (52.7)	110
DVT	2.75 (.898)	1-25%	4 (3.7)	45 (41.7)	36 (33.3)	20 (18.5)	3 (2.8)	85 (78.7)	23 (21.3)	108
CVD	3.12 (.926)	26-50%	3 (2.7)	22 (20.0)	54 (49.1)	21 (19.1)	1 (9.1)	79 (71.8)	31 (28.2)	110
SMI	2.25 (.685)	1-25%	8 (7.4)	72 (66.7)	21 (19.4)	7 (6.5)	N/A	101 (93.5)	7 (6.5)	108
NP	3.40 (1.04)	51-75%	3 (2.7)	20 (18.2)	34 (30.9)	36 (32.7)	17 (15.5)	57 (51.8)	53 (48.2)	110
RD	3.42 (1.05)	51-75%	1 (.9)	25 (23.1)	28 (25.9)	36 (33.3)	18 (16.7)	54 (50.0)	54 (50.0)	108
UTI	4.13 (1.00)	76-100%	1 (.8)	10 (9.2)	12 (11.0)	37 (33.9)	49 (45.0)	23 (21.1)	86 (78.9)	109
OP/Fx	3.49 (1.07)	51-75%	2 (1.8)	23 (20.9)	24 (21.8)	41 (37.3)	20 (18.2)	49 (44.5)	61 (55.5)	110
RMI	3.07 (1.19)	1-25%	8 (7.3)	35 (31.8)	23 (20.9)	29 (26.4)	15 (13.6)	66 (60.0)	44 (40.0)	110

Note. SB-Sx = skin breakdown requiring surgery, SBHWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 7

*Descriptive Statistics for **Phy-LCP Scenario 1**: Likelihood of Secondary Complications*

	M (SD)	Mode	0% n (%)	1-25% n (%)	26-50% n (%)	51-75% n (%)	76-100% n (%)	0-50% n (%)	51-100% n (%)	Total
SB-Sx	2.15 (.744)	1-25%	5 (14.7)	21 (61.8)	6 (17.6)	2 (5.9)	N/A	32 (94.1)	2 (5.9)	34
SBHWC	3.24 (1.10)	51-75%	3 (8.8)	5 (14.7)	10 (29.4)	13 (38.2)	3 (8.8)	18 (52.9)	16 (47.1)	34
PNA	2.97 (1.05)	1-25%	1 (2.9)	13 (38.2)	9 (26.5)	8 (23.5)	3 (8.8)	23 (67.6)	11 (32.4)	34
HO	2.21 (.729)	1-25%	3 (8.8)	24 (70.6)	4 (11.8)	3 (8.8)	N/A	31 (91.2)	3 (8.8)	34
AD	3.38 (1.05)	26-50%	N/A	8 (23.5)	11 (32.4)	9 (26.5)	6 (17.6)	19 (55.9)	15 (44.1)	34
DVT	2.47 (.706)	1-25%	1 (2.9)	19 (55.9)	11 (32.4)	3 (8.8)	N/A	31 (91.2)	3 (8.8)	34
CVD	3.50 (.929)	26-75%	N/A	5 (14.7)	12 (35.3)	12 (35.3)	5 (14.7)	17 (50)	17 (50)	34
SMI	2.15 (.500)	1-25%	1 (2.9)	28 (82.4)	4 (11.8)	1 (2.9)	N/A	33 (97.1)	1 (2.9)	34
NP	3.59 (.857)	26-75%	N/A	3 (8.8)	13 (38.2)	13 (38.2)	5 (14.7)	16 (47.1)	18 (52.9)	34
RD	3.65 (1.13)	76-100%	N/A	7 (20.6)	8 (23.5)	9 (26.5)	10 (29.4)	15 (44.1)	19 (55.9)	34
UTI	4.29 (.836)	76-100%	N/A	1 (2.9)	5 (14.7)	11 (32.4)	17 (50.0)	6 (17.6)	28 (82.4)	34
OP/Fx	3.24 (.890)	51-75%	N/A	9 (26.5)	9 (26.5)	15 (44.1)	1 (2.9)	18 (52.9)	16 (47.1)	34
RMI	3.79 (.880)	51-75%	N/A	2 (5.9)	11 (32.4)	13 (38.2)	8 (23.5)	13 (38.2)	21 (61.8)	34

Note. SB-Sx = skin breakdown requiring surgery, SBHWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome, N/A = not applicable/not reported.

Table 8

*Descriptive Statistics for **Phy-Non-LCP Scenario 1**: Likelihood of Secondary Complications*

	M (SD)	Mode	0% n (%)	1-25% n (%)	26-50% n (%)	51-75% n (%)	76-100% n (%)	0-50% n (%)	51-100% n (%)	Total
SB-Sx	2.37 (.760)	1-25%	2 (3.7)	36 (66.7)	11 (20.4)	4 (7.4)	1 (1.9)	49 (90.7)	5 (9.3)	54
SBHWC	3.15 (1.10)	51-75%	N/A	18 (34.0)	17 (32.1)	10 (18.9)	8 (15.1)	35 (66.0)	18 (34.0)	53
PNA	2.96 (1.05)	1-25%	N/A	23 (44.2)	14 (26.9)	9 (17.3)	6 (11.5)	37 (71.2)	15 (28.8)	52
HO	2.22 (.502)	1-25%	1 (1.9)	41 (75.9)	11 (20.4)	1 (1.9)	N/A	53 (98.1)	1 (1.9)	54
AD	3.32 (1.05)	26-50%	N/A	14 (26.4)	17 (32.1)	13 (24.5)	9 (17.0)	31 (58.5)	22 (41.5)	53
DVT	2.34 (.618)	1-25%	1 (1.9)	36 (67.9)	13 (24.5)	3 (5.7)	N/A	50 (94.3)	3 (5.7)	53
CVD	3.06 (1.03)	26-75%	N/A	20 (37.7)	16 (30.2)	11 (20.8)	6 (11.3)	36 (67.9)	17 (32.1)	53
SMI	2.13 (.520)	1-25%	2 (3.8)	44 (83.0)	5 (9.4)	2 (3.8)	N/A	51 (96.2)	2 (3.8)	53
NP	3.47 (1.05)	51-75%	N/A	12 (22.6)	14 (26.4)	17 (32.1)	10 (18.9)	26 (49.1)	27 (50.9)	53
RD	3.23 (1.15)	1-25%	1 (1.9)	17 (32.1)	14 (26.4)	11 (20.8)	10 (18.9)	32 (60.4)	21 (39.6)	53
UTI	3.96 (1.14)	76-100%	N/A	7 (13.2)	14 (26.4)	6 (11.3)	26 (49.1)	21 (39.6)	32 (60.4)	53
OP/Fx	3.58 (1.08)	26-50%	N/A	10 (18.9)	16 (30.2)	13 (24.5)	14 (26.4)	26 (49.1)	27 (50.9)	53
RMI	3.26 (1.16)	26-50%	2 (3.8)	13 (24.5)	18 (34.0)	9 (17.0)	11 (20.8)	33 (62.3)	20 (37.7)	53

Note. SB-Sx = skin breakdown requiring surgery, SBHWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome, N/A = not applicable/not reported.

Table 9

Results of Multiple POM *Investigating the Association Between Demographic Variables and Frequency Ratings of Secondary Complications for* ***Scenario 1*** *(All explanatory variables meet the PL assumption)*

Model Statistics	S1A SB-Sx	S1B SB-HWC	S1C PNA	S1D HO	S1E AD	S1F DVT	S1G CVD	S1H SMI	S1I NP	S1J RD	S1K UTI[a]	S1L OP/Fx	S1M RMI
Model coefficients b (se(b))													
Certified	.415	.377	.487	.335	.602	.283	.215	.442	-.663	-.274	--	-.129	.031
	(.346)	(.331)	(.337)	(.358)	(.332)	(.358)	(.335)	(.424)	(.344)	(.333)		(.330)	(.332)
Knowledge	.028	-.025	.154	-.177	.107	-.240	.273	-.096	-.026	.302*	--	.158	.059
	(.149)	(.139)	(.144)	(.157)	(.146)	(.153)	(.144)	(.183)	(.145)	(.144)		(.142)	(.138)
Group	-.537**	-.337*	-.267	-.707***	-.135	-.482**	-.092	-.240	.070	-.172	--	-.004	.186
	(.163)	(.150)	(.153)	(.175)	(.150)	(.165)	(.155)	(.194)	(.152)	(.152)		(.151)	(.150)
Specific group coefficients [Phy-Non-LCP as reference]													
LCP	.961**	.658*		1.315***		.954**							
	(.328)	(.303)		(.354)		(.338)							
Phy-LCP	-.759	.186		-.219		.399							
	(.463)	(.403)		(.495)		(.374)							
Model Summary													
LR $\chi 2$ (df=3)	13.23	6.17	6.05	20.62	4.66	12.50	4.42	3.08	0.27	5.68	PPOM	1.36	1.83
p	**.004****	.104	.109	**< .001*****	.198	.006**	.219	.380	.965	.129	--	.716	.609
Pseudo R^2	.027	.011	.011	.047	.008	.028	.009	.010	.001	.010	--	.003	.003
p for Wald test of PL	.635	.717	.354	.092	.887	.841	.320	.109	.591	.477	--	.895	.081
N	197	196	194	195	195	193	195	193	195	193	--	195	195

Note. SB-Sx = skin breakdown requiring surgery, SB-HWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome. Certified coded 0 = non-certified and 1 = certified. Knowledge coded 1-5 (1 = poor, 5 = excellent). Group coded 1 = LCP, 2 = Phy-LCP, 3 = Phy-Non-LCP. Adjusted alpha for model significance = .05/13 = .004.

[a]PL assumption not met for group, thus a PPOM was used.

*$p<.05$, **$p<.01$, ***$p<.001$.

Table 10

PPOM for Items Not Meeting the Parallel Lines Assumption, ***Scenario 1***

Item	Variable	0%	1-25%	26-50%	51-75%
S1K: UTI		*Model coefficients b (se(b))*			
	Certified		.377 (.341)		
	Knowledge		.418** (.150)		
	Group	11.799	-.207	-.551**	.015
		(1302.416)	(.275)	(.193)	(.173)
	Model Summary				
	LR $\chi 2$	23.46 (df = 6)			
	p	**< .001*****			
	Pseudo R^2	.049			
	Wald test of PL p	.691			
	N	194			

Note. UTI = urinary tract infections, Certified coded 0 = non-certified and 1 = certified. Knowledge coded 1-5 (1 = poor, 5 = excellent). Group coded 1 = LCP, 2 = Phy-LCP, 3 = Phy-Non-LCP. Adjusted alpha for model significance = .05/13 = .004. $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$.

Scenario 2. Analysis of seven of the 13 items did not converge for items related to Scenario 2. Two items did not meet the parallel lines (PL) assumption for all explanatory variables and are presented separately according to outcome variable level using partial proportional odds model (PPOM) analyses. The proportional odds model (POM) analyses for the remaining four items in Scenario 2 were all statistically significant ($p < .001$ for each analysis). These included ratings of skin breakdown requiring home wound care (S2B), cardiovascular disease (S2G), respiratory dysfunction (S2J), and urinary tract infections (S2K). In each analysis, group differences were again a statistically significant and negative predictor meaning that higher levels of group were associated with an increased likelihood of being in the lower outcome categories. In other words, LCPs (coded 1) were more likely to provide higher frequency ratings than either Phy-LCPs or Phy-Non-LCPs, who did not differ significantly from one another.

The two items that did not meet the PL assumption were S2I (neuropathic pain) and S2L (osteoporosis/fractures). Both models were statistically significant ($p < .001$). Group was a statistically significant and negative predictor for the outcome categorizations of 0% through 26-50%. Thus, as seen with the results from the POM analyses, LCPs indicated a greater likelihood of reporting the higher frequency categories than the physiatrist groups. The coefficients for 51-75% were unstable since there were no Phy-LCPs or Phy-Non-LCPs reporting frequencies of 76-100% on these items (the coefficient for 51-75% compares the cumulative percentage of the current and lower categories to the highest category).

Table 11

*Descriptive Statistics for **LCP Scenario 2**: Likelihood of Secondary Complications*

			0%	1-25%	26-50%	51-75%	76-100%	0-50%	51-100%	
	M (SD)	Mode	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	Total
SB-Sx	2.34 (1.01)	1-25%	18 (17.5)	52 (50.5)	16 (15.5)	14 (13.6)	3 (2.9)	86 (83.5)	17 (16.5)	103
SBHWC	2.92 (1.09)	1-25%	6 (5.8)	37 (35.9)	29 (28.2)	21 (20.4)	10 (9.7)	72 (60.0)	31 (25.8)	103
PNA	2.32 (.992)	1-25%	18 (17.5)	51 (49.5)	21 (20.4)	9 (8.7)	4 (3.9)	90 (87.4)	13 (12.6)	103
HO	2.33 (.856)	1-25%	10 (9.7)	62 (60.2)	21 (20.4)	7 (6.8)	3 (2.9)	93 (90.3)	10 (9.7)	103
AD	2.23 (1.00)	1-25%	23 (22.3)	49 (47.6)	18 (17.5)	10 (9.7)	3 (2.9)	90 (87.4)	13 (12.6)	103
DVT	2.35 (.830)	1-25%	11 (10.9)	55 (54.5)	25 (24.8)	9 (8.9)	1 (1.0)	91 (90.1)	10 (9.9)	101
CVD	2.77 (1.06)	1-25%	8 (7.9)	38 (37.6)	32 (31.7)	15 (14.9)	8 (7.9)	78 (77.2)	23 (22.8)	101
SMI	1.97 (.780)	1-25%	22 (21.8)	67 (66.3)	8 (7.9)	1 (1.0)	3 (3.0)	97 (96.0)	4 (4.0)	101
NP	3.17 (1.10)	1-25%	3 (2.9)	32 (31.1)	25 (24.3)	30 (29.1)	13 (12.6)	60 (58.3)	43 (41.7)	103
RD	2.45 (1.04)	1-25%	15 (14.6)	50 (48.5)	19 (18.4)	15 (14.6)	4 (3.9)	84 (81.6)	19 (18.4)	103
UTI	3.57 (1.17)	51-75%	4 (3.9)	20 (19.4)	17 (16.5)	37 (35.9)	25 (24.3)	41 (39.8)	62 (60.2)	103
OP/Fx	2.97 (1.08)	1-25%	3 (2.9)	44 (42.7)	17 (16.5)	31 (30.1)	8 (7.8)	64 (62.1)	39 (37.9)	103
RMI	3.64 (1.18)	51-75%	5 (4.9)	15 (14.7)	20 (19.6)	34 (33.3)	28 (27.5)	40 (39.2)	62 (60.8)	102

Note. SB-Sx = skin breakdown requiring surgery, SBHWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 12

*Descriptive Statistics for **Physiatrist-Non-LCP Scenario 2**: Likelihood of Secondary Complications*

			0%	1-25%	26-50%	51-75%	76-100%	0-50%	51-100%	
	M (SD)	Mode	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	Total
SB-Sx	1.41 (.599)	0%	35 (64.8)	16 (29.6)	3 (5.6)	N/A	N/A	54 (100)	N/A	54
SBHWC	1.81 (.878)	0%	24 (45.3)	17 (32.1)	10 (18.9)	2 (3.8)	N/A	51 (96.2)	2 (3.8)	53
PNA	1.33 (.583)	0%	39 (72.2)	12 (22.2)	3 (5.6)	N/A	N/A	54 (100)	N/A	54
HO	1.31 (.469)	0%	37 (68.5)	17 (31.5)	N/A	N/A	N/A	54 (100)	N/A	54
AD	1.31 (.543)	0%	39 (72.2)	13 (24.1)	2 (3.7)	N/A	N/A	54 (100)	N/A	54
DVT	1.48 (.637)	0%	32 (59.3)	18 (33.3)	4 (7.4)	N/A	N/A	54 (100)	N/A	54
CVD	2.06 (1.04)	0%	21 (38.9)	15 (27.8)	12 (22.2)	6 (11.1)	N/A	48 (88.9)	6 (11.1)	54
SMI	1.15 (.411)	0%	46 (86.8)	6 (11.3)	1 (1.9)	N/A	N/A	53 (100)	N/A	53
NP	2.32 (1.02)	26-50%	14 (26.4)	15 (28.3)	17 (32.1)	7 (13.2)	N/A	46 (86.8)	7(13.2)	53
RD	1.34 (.586)	0%	38 (71.7)	12 (22.6)	3 (5.7)	N/A	N/A	53 (100)	N/A	53
UTI	2.71 (1.09)	51-75%	9 (17.3)	13 (25.0)	14 (26.9)	16 (30.8)	N/A	36 (69.2)	16 (30.8)	52
OP/Fx	2.13 (.971)	1-25%	15 (28.8)	21 (40.4)	10 (19.2)	6 (11.5)	N/A	46 (88.5)	6 (11.5)	52
RMI	2.81 (.982)	1-75%	5 (9.4)	16 (30.2)	16 (30.2)	16 (30.2)	N/A	37 (69.8)	16 (30.2)	53

Note. SB-Sx = skin breakdown requiring surgery, SBHWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome, N/A = not applicable/not reported

Table 13

*Descriptive Statistics for **Phy-LCP Scenario 2**: Likelihood of Secondary Complications*

	M (SD)	Mode	0% n (%)	1-25% n (%)	26-50% n (%)	51-75% n (%)	76-100% n (%)	0-50% n (%)	51-100% n (%)	Total
SB-Sx	1.47 (.718)	0%	21 (65.6)	7 (21.9)	4 (12.5)	N/A	N/A	32 (100)	N/A	32
SBHWC	2.06 (1.08)	0%	13 (40.6)	8 (25.0)	7 (21.9)	4 (12.5)	N/A	28 (87.5)	4 (12.5)	32
PNA	1.38 (.660)	0%	23 (71.9)	6 (18.8)	3 (9.4)	N/A	N/A	32 (100)	N/A	32
HO	1.44 (.619)	0%	20 (62.5)	10 (31.3)	2 (6.3)	N/A	N/A	32 (100)	N/A	32
AD	1.38 (.554)	0%	21 (65.6)	10 (31.3)	1 (3.1)	N/A	N/A	32 (100)	N/A	32
DVT	1.44 (.564)	0%	19 (59.4)	12 (37.5)	1 (3.1)	N/A	N/A	32 (100)	N/A	32
CVD	2.34 (1.0)	26-50%	8 (25.0)	9 (28.1)	11 (34.4)	4 (12.5)	N/A	28 (87.5)	4 (12.5)	32
SMI	1.22 (.491)	0%	26 (81.3)	5 (15.6)	1 (3.1)	N/A	N/A	32 (100)	N/A	32
NP	2.22 (.906)	1-25%	6 (18.8)	17 (53.1)	5 (15.6)	4 (12.5)	N/A	28 (87.5)	4 (12.5)	32
RD	1.56 (.878)	0%	20 (62.5)	8 (25.0)	2 (6.3)	2 (6.3)	N/A	30 (93.8)	2 (6.3)	32
UTI	3.06 (1.01)	51-75%	2 (6.3)	8 (25.0)	9 (28.1)	12 (37.5)	1 (3.1)	19 (59.4)	13 (40.6)	32
OP/Fx	2.19 (.859)	1-25%	7 (21.9)	14 (43.8)	9 (28.1)	2 (6.3)	N/A	30 (93.8)	2 (6.3)	32
RMI	2.91 (1.06)	26-50%	5 (15.6)	4 (12.5)	12 (37.5)	11 (34.4)	N/A	21 (65.6)	11 (34.4)	32

Note. SB-Sx = skin breakdown requiring surgery, SBHWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome, N/A = not applicable/not reported.

Table 14

Results of Multiple POM *Investigating the Association Between Demographic Variables and Frequency Ratings of Secondary Complications for* ***Scenario 2*** *(All explanatory variables meet the PL assumption)*

Model Statistics	S2A SB-Sx	S2B SB-HWC	S2C PNA	S2D HO	S2E AD	S2F DVT	S2G CVD	S2H SMI	S2I NP	S2J RD	S2K UTI	S2L OP/Fx	S2M RMI
Model coefficients b (se(b))													
Certified		.247					.175			.065	.545		
		(.342)					(.324)			(.361)	(.353)		
Knowledge		.215					.230			.116	.341*		
		(.147)					(.146)			(.157)	(.149)		
Group		-1.011***					-.666***			-1.349***	-.735***		
		(.168)					(.162)			(.196)	(.159)		
Specific group coefficients [Phy-Non-LCP as reference]													
LCP		1.964***					1.311***			2.600***	1.439***		
		(.340)					(.320)			(.388)	(.322)		
Phy-LCP		.228					.460			.447	.233		
		(.426)					(.418)			(.476)	(.417)		
Model Summary													
	DNC	41.06	DNC	DNC	DNC	DNC	19.01	DNC	PPOM	58.88	27.65	PPOM	DNC
LR $\chi 2$ (df=3)													
p		< .001***					< .001***			< .001***	< .001***		
Pseudo R^2		.074					.035			.121	.049		
p for Wald test of PL		.316					.136			.828	.326		
N		187					186			187	186		

Note. SB-Sx = skin breakdown requiring surgery, SB-HWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome. Certified coded 0 = non-certified and 1 = certified. Knowledge coded 1-5 (1 = poor, 5 = excellent). Group coded 1 = LCP, 2 = Phy-LCP, 3 = Phy-Non-LCP. Adjusted alpha for model significance = .05/13 = .004.

[a]PL assumption not met for group.

*$p<.05$, **$p<.01$, ***$p<.001$.

Table 15

PPOM for Items Not Meeting the Parallel Lines Assumption, ***Scenario 2***

Item	Variable	0%	76-100% compared to: 1-25%	26-50%	51-75%
S2I: NP			*Model coefficients b (se(b))*		
	Certified		.201 (.332)		
	Knowledge		-.025 (.150)		
	Group	-1.207*** (.297)	-.478** (.172)	-.808*** (.221)	-13.501 (551.592)
			Model Summary		
	LR χ2	37.40			
	p	< .001***			
	Pseudo R^2	.067			
	Wald test of PL p	.150			
	N	187			
S2L: Os/Fx			*Model coefficients b (se(b))*		
	Certified		.742 (.351)*		
	Knowledge		1.000 (.151)		
	Group	-1.201*** (.279)	-.554** (.183)	-1.013*** (.266)	-12.535 (769.591)
			Model Summary		
	LR χ2	41.19 (6)			
	p	< .001***			
	Pseudo R^2	.079			
	Wald test of PL p	.398			
	N	186			

Note. NP = neuropathic pain, Os/Fx = Osteoporosis, fractures. Certified coded 0 = non-certified and 1 = certified. Knowledge coded 1-5 (1 = poor, 5 = excellent). Group coded 1 = LCP, 2 = Phy-LCP, 3 = Phy-Non-LCP. Adjusted alpha for model significance = .05/13 = .004. *p<.05, **p<.01, ***p<.001.

Research Question 2: ***Are ratings based on demographic variables and type of practitioner for the frequency of 13 secondary complications requiring hospitalization and or treatment?***

Summary of Methods

Table 16

List of Variables, Coding/Measurement Levels, and Methods for RQ2

RQ2: Are ratings of the frequency of 13 secondary complications requiring hospitalization/treatment a function of demographics or type of practitioner?

Survey #	List of Variables	Coding / Measurement	Statistical Method	Optimal Scaling Level
Explanatory Variables				
L3/P3	Certified or non-certified	Dichotomous; Non-certified = 0, Certified = 1		Nominal
L7/P17	Knowledge of SCs related to SCI	Ordinal 1-5; (1 = Poor, 5 = Excellent)		Ordinal
(coded)	Group LCP, Phy-LCP, or Phy-Non-LCP	Categorical; LCP = 1, Phy-LCP = 2, Phy-Non-LCP = 3		Nominal
Outcome Variables				
L17/P21A–L17/P21M	Frequency of secondary complication for scenario 1 (total = 13)	Count (integer) 0-25	CATREG	Ordinal
L19/P23A-L19/P23M	Likelihood of secondary complications for scenario 2 (total = 13)	Count (integer) 0-25	CATREG	Ordinal

Note. Survey # prefix L or P refers to the item on the LCP survey (L) or the physiatrist survey (P). LCP = life care planner, Phy-LCP = Physiatrist life care planner, Phy-Non-LCP = Physiatrist non-life care planner, Catreg = categorical regression with optimal scaling. Adjusted alpha for model significance for each scenario = .05/13 = .004.

This research question sought to investigate whether differences existed based on demographic variables and type of practitioner for two scenarios. Specifically, these two scenarios were similar to Research Question 1; however, the difference was on the frequency for SCs that would require hospitalization and/or treatment within one's lifetime. Continuous response options ranged from 0-25+. Specifically, Scenario 1 asked the following: Considering our same patient in scenario ONE with a C5-C6 injury, how frequently are the following conditions likely to occur that require hospitalization and/or treatment in one's lifetime if reasonable and medically necessary life care planning care and treatment preventive measures are taken?

The second scenario assessing for frequency asked the following: Considering our same patient in scenario TWO with a T6 injury, how frequently are the following conditions likely to occur that require hospitalization and/or treatment in one's lifetime if reasonable and medically necessary life care planning preventive care and treatment measures are taken? The two survey items included answer choices ranging from 1-25+.

The distributions of responses to these items were decidedly non-normal. Preliminary analyses using linear regression provided unsatisfactory results. Inspection of residual and case-wise diagnostics indicated frequent violation of assumptions and many cases with large residuals.

Therefore, the alternative method of categorical regression (CATREG) with optimal scaling was selected to analyze these data. This procedure quantifies categorical data by assigning numeric values to produce an optimal linear regression equation for the transformed variables. Bonferroni correction of the alpha level was conducted for each scenario, resulting in an adjusted alpha level of .004 (.05/13) for model significance.

Analyses were conducted on each item separately. The standardized regression coefficients for each explanatory variable, the overall model summary, the number of quantifications for each variable, and the specific values of quantifications obtained for any significant predictors are reported in the tables. Initially, it can be observed that the number of quantifications for the outcome variables ranged between 2 and 5, indicating that an ordinal scaling level was optimal for these data. Should the quantifications have been more numerous and corresponded to a roughly straight line, then a numerical transformation would have been more appropriate. The fact that few quantifications were obtained indicated that the distinction amongst many of the values was unnecessary and that the categories could be combined.

For Scenario 1, only the frequency of neuropathic pain (S1I) reached statistical significance at the adjusted alpha level (p = .002). Both knowledge and group were statistically significant negative predictors of pain frequency responses. As revealed by the quantification values, respondents who reported their knowledge of SC to be poor to very good reported higher frequencies of secondary complications than those who reported excellent knowledge of SC. As seen by the group quantifications, Phy-LCPs reported the highest frequency of neuropathic pain, followed by Phy-Non-LCPs, and LCPs reported the lowest frequencies.

For Scenario 2, only the model predicting ratings of frequency of urinary tract infections was statistically significant (p = .003). Knowledge was a statistically significant and positive predictor. As indicated by the quantifications for knowledge, frequencies essentially increased for each successive step in reported knowledge (although those reporting fair and good knowledge received the same quantification).

Table 17

DescriptiveStatistics for ***LCP Scenario 1:*** *Frequency of Secondary Complications*

	M (SD)	Md	n **0**	n **1**	n **2**	n **3**	n **4**	n **5**	n **6**	n **7**	n **8**	n **9**	n **10**	n **11**	n **12**	n **13**	n **14**	n **15**	n **16**	n **17**	n **18**	n **19**	n **20**	n **21**	n **22**	n **23**	n **24**	n **25**
SB-S	4.4 (6.6)	0	25	17	16	3	7	10	1	0	0	0	5	0	0	2	0	2	0	0	0	0	1	0	0	0	1	5
SB-H	9.5 (7.8)	10	6	3	7	9	4	16	3	1	1	0	20	0	3	0	0	5	0	0	0	0	5	0	0	0	1	12
PNA	7.8 (7.8)	5	6	9	11	10	9	13	3	1	0	0	13	0	0	0	0	2	0	0	0	0	1	0	0	0	1	25
HO	5.2 (7.0)	1	18	23	12	6	0	8	1	0	2	0	8	0	0	1	0	5	0	0	0	0	2	0	1	0	0	5
AD	10.4 (9.1)	25	10	6	5	9	5	13	1	1	0	0	7	0	2	0	0	8	0	1	0	0	9	0	0	0	0	17
DVT	5.5 (6.7)	2	10	19	20	6	3	12	0	0	1	0	9	0	0	0	0	5	0	0	0	0	3	0	0	0	0	5
CVD	8.3 (9.0)	1	8	16	15	4	2	12	2	0	0	0	10	0	0	0	0	4	0	1	0	0	1	0	0	0	1	16
SMI	3.3 (5.2)	0	31	27	3	4	1	8	0	1	2	0	9	1	0	0	0	0	1	0	0	0	1	0	0	0	0	2
NP	9.5 (9.5)	1	7	15	8	7	2	13	2	0	0	0	5	0	2	0	0	6	0	0	0	0	7	0	0	0	0	17
RD	9.7 (8.4)	10	6	3	11	6	6	13	4	1	2	0	16	0	0	0	0	2	0	0	1	0	6	0	3	0	0	13
UTI	15.9 (8.6)	25	2	0	1	5	2	8	3	0	5	2	11	1	2	0	0	4	0	1	1	1	11	0	0	0	0	37
OP/F	8.4 (8.9)	5	7	13	13	9	3	14	1	0	0	0	6	2	0	0	0	3	1	0	1	0	3	0	1	1	0	14
RMI	7.4 (8.6)	0	22	12	8	5	2	6	3	1	0	0	13	0	1	0	0	4	0	0	1	0	2	0	0	1	1	11

Note. Md = Mode; SB-S = skin breakdown requiring surgery, SB-H = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 18

Descriptive Statistics for ***Physiatrist-Non-LCP Scenario 1****:Frequency of Secondary Complications*

	M (SD)	Md	n **0**	n **1**	n **2**	n **3**	n **4**	n **5**	n **6**	n **7**	n **8**	n **9**	n **10**	n **11**	n **12**	n **13**	n **14**	n **15**	n **16**	n **17**	n **18**	n **19**	n **20**	n **21**	n **22**	n **23**	n **24**	n **25**
SB-S	2.9 (3.9)	1	3	23	7	3	2	5	1	0	0	0	3	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
SB-H	6.9 (7.2)	3	1	3	4	12	5	8	0	0	1	2	5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5
PNA	7.3 (7.4)	2	0	4	9	7	4	5	0	3	1	0	5	0	0	0	0	2	0	0	0	0	1	0	0	1	1	4
HO	2.7 (4.0)	1	6	16	10	5	1	5	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
AD	10.5 (9.6)	25	2	4	2	3	3	5	2	1	2	0	6	0	0	0	0	2	0	0	0	0	0	0	0	0	1	13
DVT	3.0 (3.5)	1	3	16	9	5	4	4	0	1	0	0	3	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
CVD	5.9 (7.8)	1	5	14	5	4	0	5	0	1	0	1	5	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5
SMI	3.0 (5.8)	1	11	20	3	5	0	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
NP	10.8 (9.8)	25	4	9	3	0	1	2	1	7	2	0	6	0	0	0	0	1	0	0	0	0	3	0	0	0	0	11
RD	8.2 (7.7)	2	0	7	3	4	4	1	0	1	2	1	7	0	1	0	0	1	0	0	1	0	2	0	0	0	0	5
UTI	15.9 (8.7)	25	1	2	0	0	2	4	2	0	1	2	4	0	0	0	0	6	0	0	0	0	4	0	0	0	0	18
OP/F	5.9 (7.5)	1	0	14	8	5	2	8	0	0	0	0	1	0	0	1	0	1	1	0	0	0	0	0	0	0	1	4
RMI	6.2 (6.7)	2	6	4	8	2	2	7	1	2	1	0	17	0	0	0	0	0	1	0	0	0	1	0	0	0	0	3

Note. Md = Mode; SB-S = skin breakdown requiring surgery, SB-H = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 19

*Descriptive Statistics for **Physiatrist LCP Scenario 1**: Frequency of Secondary Complications*

	M (SD)	Md	**0**	n **1**	n **2**	n **3**	n **4**	n **5**	n **6**	n **7**	n **8**	n **9**	n **10**	n **11**	n **12**	n **13**	n **14**	n **15**	n **16**	n **17**	n **18**	n **19**	n **20**	n **21**	n **22**	n **23**	n **24**	n **25**
SB-S	4.6 (6.9)	0	8	4	7	3	0	2	0	0	0	0	2	0	0	0	0	0	0	1	0	0	2	0	0	0	0	1
SB-H	9.7 (7.8)	10	1	1	2	3	1	6	1	0	0	0	8	0	1	0	0	2	0	0	0	0	0	0	0	0	0	5
PNA	8.8 (6.8)	5	1	2	1	1	2	9	0	1	0	1	5	0	2	0	1	1	0	1	0	0	2	0	0	0	0	2
HO	4.8 (5.9)	1	4	7	4	5	0	4	0	0	0	0	1	0	0	0	1	2	0	0	0	0	2	0	0	0	0	0
AD	11.3 (8.9)	5	1	2	1	3	0	7	0	0	0	0	4	0	1	0	0	2	0	0	0	0	3	0	0	0	0	6
DVT	4.14 (4.8)	1	3	7	6	2	1	4	1	0	0	1	2	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0
CVD	9.8 (9.13)	1	1	5	3	1	0	4	1	0	0	0	4	0	0	1	1	0	0	0	0	1	0	0	1	0	0	5
SMI	1.7 (2.3)	0	13	5	3	2	3	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NP	11.7 (10.2)	25	2	5	2	0	0	3	2	1	0	0	3	0	1	0	0	1	0	0	0	0	0	0	0	0	0	10
RD	11.7 (9.3)	25	1	4	0	0	2	5	1	1	0	2	2	0	2	0	0	1	0	0	0	0	2	1	0	0	0	7
UTI	18.6 (7.8)	25	0	0	0	0	0	2	2	1	0	0	2	0	2	0	0	1	0	0	0	0	4	0	0	0	1	14
OP/F	6.5 (8.47)	2	4	4	5	3	3	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	3
RMI	9.1 (8.7)	3	4	3	1	5	0	3	0	0	0	0	4	0	0	1	0	2	1	0	0	0	2	0	0	0	0	4

Note. Md = Mode; SB-S = skin breakdown requiring surgery, SB-H = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/F = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 20

*Descriptive Statistics for **LCP Scenario 2**: Frequency of Secondary Complications*

	M (SD)	Md	n **0**	n **1**	n **2**	n **3**	n **4**	n **5**	n **6**	n **7**	n **8**	n **9**	n **10**	n **11**	n **12**	n **13**	n **14**	n **15**	n **16**	n **17**	n **18**	n **19**	n **20**	n **21**	n **22**	n **23**	n **24**	n **25**
SB-S	3.9 (6.2)	0	25	22	14	3	3	7	1	0	0	0	4	0	2	1	0	1	0	0	0	0	2	0	0	0	0	4
SB-H	7.3 (7.3)	5	7	12	7	12	3	15	8	0	1	0	6	0	2	0	0	8	0	0	1	0	2	0	0	0	0	8
PNA	4.4 (5.9)	1	18	21	15	7	1	6	0	1	1	0	11	0	1	0	0	2	0	0	0	0	2	0	0	0	0	3
HO	4.1 (6.4)	0	25	24	11	5	1	5	1	0	2	0	6	0	1	1	0	2	0	1	0	0	0	0	0	0	0	5
AD	4.7 (7.1)	0	28	18	9	3	1	10	0	0	3	0	6	0	1	0	0	2	0	1	0	0	0	0	0	0	0	7
DVT	4.5 (6.4)	1	15	24	14	5	7	9	0	0	1	0	3	0	1	0	0	3	1	0	2	0	1	1	0	0	0	4
CVD	6.9 (8.5)	1	13	16	13	10	2	9	1	0	0	0	6	0	0	0	0	5	0	0	0	1	2	0	0	0	0	12
SMI	2.3 (4.2)	0	37	25	5	3	2	8	1	0	1	0	5	0	1	0	0	0	0	0	0	1	0	0	0	0	0	1
NP	8.9 (9.2)	1	8	20	10	2	2	10	0	0	1	0	11	0	1	1	0	4	0	1	0	0	3	0	0	0	0	17
RD	5.8 (7.3)	0	19	11	14	7	5	8	0	2	0	0	12	1	0	0	0	2	0	0	0	0	3	0	0	0	0	7
UTI	12.9 (9.2)	25	5	2	8	5	0	10	4	0	2	1	13	0	2	0	0	6	1	0	2	0	5	0	0	1	0	6
OP/F	6.7 (7.7)	1	8	19	12	7	2	11	3	0	0	1	8	1	0	0	1	5	0	0	0	1	1	0	0	0	0	9
RMI	8.6 (8.3)	2	6	10	14	2	8	11	4	1	1	0	12	0	0	0	0	3	0	0	1	0	4	1	0	1	1	11

Note. Md = Mode; SB-S = skin breakdown requiring surgery, SB-HWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/F = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 21

Descriptive Statistics for ***Physiatrist Non-LCP Scenario 2****: Frequency of Secondary Complications*

	M (SD)	Md	n **0**	n **1**	n **2**	n **3**	n **4**	n **5**	n **6**	n **7**	n **8**	n **9**	n **10**	n **11**	n **12**	n **13**	n **14**	n **15**	n **16**	n **17**	n **18**	n **19**	n **20**	n **21**	n **22**	n **23**	n **24**	n **25**
SB-S	2.6 (4.1)	1	9	20	9	0	0	3	1	0	0	0	3	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
SB-H	6.2 (7.6)	1	0	8	8	8	3	5	1	0	1	0	3	0	0	0	0	1	0	0	0	0	1	0	0	0	0	5
PNA	2.6 (2.9)	1	10	13	8	5	1	5	0	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HO	1.9 (2.4)	1	11	19	5	2	2	6	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
AD	3.6 (6.4)	0	18	11	6	2	1	1	0	0	0	0	3	0	0	0	0	2	0	0	0	0	1	0	0	0	0	2
DVT	2.9 (3.1)	1	5	15	10	3	4	4	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CVD	6.2 (7.8)	1	5	13	5	3	1	5	1	1	2	0	3	0	1	0	0	1	0	0	0	0	1	0	0	0	0	5
SMI	2.3 (5.0)	0	16	15	5	6	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
NP	8.5 (9.3)	1	5	9	4	4	3	2	0	0	0	1	7	0	0	0	0	1	0	0	0	0	1	0	0	0	0	9
RD	3.3 (4.9)	0	15	8	7	2	2	4	1	0	0	0	5	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
UTI	14.7 (9.2)	25	1	3	2	3	1	1	0	1	1	1	8	0	0	0	0	4	0	0	0	0	4	0	0	1	0	16
OP/F	4.2 (4.9)	1	2	13	11	3	2	6	1	0	1	0	5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
RMI	9.6 (8.7)	25	5	2	6	2	1	5	2	1	1	0	7	0	2	0	0	1	0	1	1	0	1	0	0	0	0	8

Note. Md = Mode; SB-S = skin breakdown requiring surgery, SB-HWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/F = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 22

Descriptive Statistics for ***Physiatrist LCP Scenario 2****: Frequency of Secondary Complications*

	M (SD)	Md	n **0**	n **1**	n **2**	n **3**	n **4**	n **5**	n **6**	n **7**	n **8**	n **9**	n **10**	n **11**	n **12**	n **13**	n **14**	n **15**	n **16**	n **17**	n **18**	n **19**	n **20**	n **21**	n **22**	n **23**	n **24**	n **25**
SB-S	4.7 (6.9)	0	8	6	2	3	2	2	0	0	0	0	2	0	0	0	0	1	0	0	0	0	2	0	0	0	0	1
SB-H	8.7 (8.9)	25	2	2	3	4	4	4	0	0	1	0	2	0	1	0	0	1	0	0	0	0	0	0	0	0	1	5
PNA	3.4 (4.4)	0	8	7	0	3	3	3	0	1	1	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
HO	3.2 (4.0)	1	7	9	3	2	0	1	2	0	0	1	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
AD	4.1 (6.0)	0	11	2	4	1	4	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
DVT	3.3 (4.4)	2	6	6	7	2	0	3	1	0	1	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
CVD	9.1 (9.3)	25	3	4	5	0	0	2	2	0	0	1	4	0	0	1	0	0	1	0	0	0	0	0	0	0	0	6
SMI	1.3 (2.0)	0	16	5	2	0	1	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NP	9.3 (9.9)	25	4	5	1	2	2	3	1	0	1	0	2	0	0	0	0	1	0	0	0	0	1	0	0	0	0	7
RD	3.8 (6.4)	1	7	9	3	3	0	3	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
UTI	16.7 (8.8)	25	0	1	0	0	1	3	0	0	2	1	5	0	0	0	1	0	0	0	0	0	1	0	1	0	0	14
OP/F	6.5 (8.5)	1	3	8	3	5	1	1	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	0	1	0	0	3
RMI	12.5 (9.3)	25	1	2	2	2	1	2	1	1	1	0	4	0	0	0	0	1	1	0	2	0	1	0	0	0	0	8

Note. Md = Mode; SB-S = skin breakdown requiring surgery, SB-H = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/F = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome.

Table 23

Categorical Regression with Optimal Scaling — Prediction of Scenario 1 Frequency of Hospitalizations Due to Secondary Complications from LCP and Physiatrist Variables

Model Statistics	S1A SB-Sx	S1B SB-HWC	S1C PNA	S1D HO	S1E AD	S1F DVT	S1G CVD	S1H SMI	S1I NP	S1J RD	S1K UTI	S1L OP/Fx	S1M RMI
Standardized Coefficients (β)													
Certification	-.016	.113	.071	-.134	.071	-.097	-.119	.060	-.077	-.134	.025	-.117*	-.087
Knowledge	-.085	.114	.186*	-.186	.156*	-.080	-.110	.164**	-.283*	-.129	.268***	-.052	-.081
Group	-.223***	.068	.177**	-.182**	.147*	-.063	-.212**	.188***	-.189**	-.191**	.072	-.158**	-.164**
Model Summary													
F	1.972	1.362	2.052	3.430	1.540	0.574	2.724	1.902	4.354	2.719	2.374	1.470	1.413
df	5,165	4,168	7,162	4,162	6,162	6,160	4,160	5,159	4,161	4,161	6,164	5,160	5,161
p	.085	.249	.052	.010*	.168	.750	.030*	.097	**.002****	.032*	.032*	.202	.222
Adj R2	.028	.008	.042	.055	.019	-.016	.040	.027	.075	.040	.046	.014	.012
Number of Quantifications													
Outcome	2	2	3	4	3	2	4	4	3	2	3	2	3
Certification	2	2	2	2	2	2	2	2	2	2	2	2	2
Knowledge	3	2	5	2	4	4	2	3	2	2	4	3	3
Group	3	3	3	3	3	3	3	3	3	3	3	3	3
Certification Quantifications													
Non-Certified												-2.008	
Certified												.498	
Knowledge Quantifications													
Poor			-6.933		-3.094			-.7689	-.802		-1.593		
Fair			-2.160		-1.567			-1.238	-.802		-1.513		
Good			-1.210		-1.567			-1.238	-.802		-1.513		
Very Good			.387		.568			.548	-.802		.182		
Excellent			.696		.657			.548	1.247		.945		
Group Quantifications													
LCP	.636		-.252	-.098	-.760		.079	-.051	.743	.067		.468	.826
Phy-LCP	.548		2.089	-1.748	-.040		-2.055	-1.849	-1.968	-1.938		1.055	-1.745
Phy-Non-LCP	-1.623		-.849	1.298	1.579		1.047	1.225	-.251	1.135		-1.579	-.582

Note. SB-Sx = skin breakdown requiring surgery, SB-HWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome. Optimal scaling levels for outcomes and knowledge of SC were set at ordinal, whereas certification and group were set at a nominal scaling level. Adjusted alpha for model significance = .05/13 = .004.
*$p<.05$, **$p<.01$, ***$p<.001$.

Table 24

Categorical Regression with Optimal Scaling — Prediction of Scenario 2 Frequency of Hospitalizations Due to Secondary Complications from LCP and Physiatrist Variables

Model Statistics	S2A SB-Sx	S2B SB-HWC	S2C PNA	S2D HO	S2E AD	S2F DVT	S2G CVD	S2H SMI	S2I NP	S2J RD	S2K UTI	S2L OP/Fx	S2M RMI
Standardized Coefficients (β)													
Certification	.024	.082	.023	.032	-.038	-.108	-.033	-.040	-.053	-.103	.075	-.071	.030
Knowledge	.219**	.241***	.174*	.138	-.237*	-.120	-.120	-.126	-.215	-.075	.275***	-.050	.226**
Group	.102	.067	.188**	.069	-.177**	-.097	-.195**	-.149*	-.087	-.189**	.117	-.080	.096
Model Summary													
F	1.986	2.143	2.373	0.975	2.534	0.848	1.623	1.688	2.048	1.858	3.445	0.376	2.147
df	5,158	6,161	4,159	4,160	5,159	6,158	5,159	4,160	4,161	5,160	6,162	6,156	6,161
p	.084	.051	.055	.423	.031*	.535	.157	.155	.090	.105	**.003****	.893	.051
Adj R2	.029	.039	.033	-.001	.045	-.006	.019	.017	.025	.025	.080	-.024	.040
Number of Quantifications													
Outcome	4	4	3	2	3	2	4	3	3	4	5	2	4
Certification	2	2	2	2	2	2	2	2	2	2	2	2	2
Knowledge	3	4	2	2	3	4	3	2	2	3	4	4	4
Group	3	3	3	3	3	3	3	3	3	3	3	3	3
Certification Quantifications													
Non-Certified													
Certified													
Knowledge Quantifications													
Poor	-1.355	-1.500	-1.555		-1.554						-2.514		-2.036
Fair	-1.355	-1.500	-1.555		-1.554						-.841		-1.508
Good	-1.355	-1.456	-1.555		-1.554						-.841		-1.508
Very Good	-.088	.059	.643		.517						-.671		.198
Excellent	1.125	1.035	.643		.748						1.282		.951
Group Quantifications													
LCP			.912		.053		.511	.314		-.905			
Phy-LCP			-.872		-1.935		-2.206	1.429		.957			
Phy-Non-LCP			-1.208		1.093		.335	-1.451		1.188			

Note. SB-Sx = skin breakdown requiring surgery, SB-HWC = skin breakdown requiring home wound care, PNA = pneumonia (atelectasis, and/or aspiration), HO = heterotopic ossification, AD = autonomic dysreflexia, DVT = deep vein thrombosis, CVD = cardiovascular disease, SMI = syringomyelia, NP = neuropathic pain, RD = respiratory dysfunction, UTI = urinary tract infections, OP/Fx = osteoporosis/bone fractures, RMI = repetitive motion injury/overuse syndrome. Optimal scaling levels for outcomes and knowledge of SC were set at ordinal, whereas certification and group were set at a nominal scaling level. Adjusted alpha for model significance = .05/13 = .004.

Research Question 3: ***Do LCPs, LCP physiatrists and non-LCP physiatrists differ in their summary ratings regarding the likelihood of SC occurrence and frequency of hospitalization due to SCs incurred by persons with SCI?***

Summary of Methods

Table 25

List of Variables, Coding/Measurement Levels, and Methods for RQ3

RQ3: Do life care planners, life care planner physiatrists, and non-LCP physiatrists differ in their summary ratings regarding the likelihood of SC occurrence and frequency of hospitalization due to secondary complications that commonly occur?

Survey #	List of Variables	Coding / Measurement	Statistical Method
Explanatory Variables			
(coded)	Group LCP, Phy-LCP, or Phy-Non-LCP	Categorical; LCP = 1, Phy-LCP = 2, Phy-Non-LCP = 3	
Outcome Variables			
(scored and transformed)	S1 likelihood of SC – average rating	Numeric; -1 to 1	1-way ANOVA
(scored and transformed)	S1 hosp/treatment frequency – average rating	Numeric; -1 to 1	1-way ANOVA
(scored and transformed)	S2 likelihood of SC – average rating	Numeric; -1 to 1	1-way ANOVA
(scored and transformed)	S2 hosp/treatment freq – average rating	Numeric; -1 to 1	1-way ANOVA

Note. Scenario items were averaged to create summary scores, then transformed using the box-cox transformation and standardized to a mean of 0 and an SD of 1. S1 = scenario 1, S2 = scenario 2. Adjusted alpha for model significance for each analysis = .05/4 = .013.

This research question was addressed by using a one-way Analysis of Variance (ANOVA) for each of the four summarized scenario scores. As described previously, the scenario scores were created by averaging across all 13 items within each section (for cases with 75% or more responses). Thus, for each scenario, there was a mean score pertaining to likelihood of secondary complications (SCs) and another score pertaining to frequency of hospitalizations due to SC after which the mean scores were transformed using the box-cox transformation to reduce skewness. The transformation was also specified to yield final scores with means of 0 and standard deviations of 1. Preliminary analyses investigated the relationship between the dependent variables, the groups, and demographic variables using hierarchical regression analyses. Controlling for demographic effects had no impact on the outcomes as pertained to the results of group. As such, no demographic variables were included in these analyses. Each one-way ANOVA was conducted separately. The grouping factor consisted of three levels: life care planners (LCP), physiatrist life care planners (Phy-LCP), and physiatrist non-life care planners (Phy-Non-LCP). Where indicated by a significant omnibus F test, Bonferroni post-hoc comparisons were conducted between the means. The assumptions of the one-way ANOVA were evaluated and were assumed. First, the data was transformed to obtain normality of the dependent variables. Furthermore, ANOVA is generally robust to violations of the normality assumptions given sufficient cell sizes. Levene's tests of homogeneity of variances were all non-significant ($p > .05$), indicating that the assumptions of homogeneity of variance could be assumed. Finally, the samples were statistically independent. The Bonferroni-adjusted alpha level for this RQ was .013 (.05/4).

The results of the one-way ANOVAs revealed significant differences among groups only for the likelihood of secondary complications in Scenario 2, $F(2,185) = 46.29$, $p < .001$, Adj. $R^2 = .326$ (see tables 26-33). Bonferroni post-hoc tests indicated that the mean for LCPs was higher than the means for either of the physiatrist groups, which did not differ significantly from one another. Thus, on average, LCPs provided higher ratings pertaining to likelihood of secondary complications for this scenario (T6 complete paraplegia) than did physiatrists.

Table 26

Descriptive Statistics for LCPs, Phy-LCPs, and Phy-Non-LCP: Likelihood of SCs for S1

	M	SD	n
LCP	.103	1.064	110
LCP-Physiatrist	-0.19	8.42	34
Physiatrist-Non-LCP	-.192	.949	53
Total	.0025	1.00	197

Table 27

One-way ANOVA Summary for S1: Likelihood of SCs

Source	SS	df	MS	F	*P* value
Between Groups	3.127	2	1.563	1.566	.211
Within Groups	193.6	194	.998		
Total	196.7	196			

Note. ^{2} = .016 (adj. R^2 = .006). R

Table 28

Descriptive Statistics for LCPs, Phy-LCPs, and Phy-Non-LCP: Hospitalization of SCs for S1

	M	SD	n
LCP	-.033	1.097	91
LCP-Physiatrist	.239	.877	29
Physiatrist-Non-LCP	-.095	.868	46
Total	-.0025	1.00	166

Table 29

One-way ANOVA Summary: Hospitalization of SCs for S1

Source	SS	df	MS	F	*P* value
Between Groups	2.162	2	1.08	1.077	.343
Within Groups	163.6	163	1.00		
Total	165.8	165			

Note. ^{2} = .013 (adj. R^2 = .001). R

Table 30

Descriptive Statistics for LCPs, Phy-LCPs, and Phy-Non-LCP: Likelihood of SCs for S2

	M	SD	n
LCP	.526	.879	103
LCP-Physiatrist	-.521	.746	32
Physiatrist-Non-LCP	-.689	.740	53
Total	.0054	.999	188

Table 31

One-way ANOVA Summary: Likelihood of SCs for S2

Source	SS	df	MS	F	*P* value
Between Groups	62.359	2	31.2	46.3	.000
Within Groups	125	185	.674		
Total	186.9	187			

Note. ^{2} = .334 (adj. R^2 = .326). R

Table 32

Descriptive Statistics for LCPs, Phy-LCPs, and Phy-Non-LCP: Frequency of Hospitalization S2

	M	SD	n
LCP	-.040	1.09	89
LCP-Physiatrist	.204	.907	29
Physiatrist-Non-LCP	-.057	.879	46
Total	-.0012	1.00	164

Table 33

One-way ANOVA Summary: Frequency of Hospitalization for S2

Source	SS	df	MS	F	*P* value
Between Groups	1.43	2	.747	.740	.479
Within Groups	162.4	161	1.00		
Total	164	163			

Note. ^{2} = .009 (adj. R^2 = .003). R

Discussion

The current study was intended to determine whether differences in opinions exist between life care planners (LCPs) and physiatrists (LCPs and non-LCPs) based upon various demographic characteristics (i.e., certification, knowledge of SCs, etc.). The following entails a summary of results pertaining to each of the three research questions and provides a detailed discussion of the limitations of the study, implications for life care planners, and recommendations for future research.

To assess participant ratings for the likelihood of 13 SCs occurring for a person with a C5 level of injury (Scenario 1 with Likert-scaled responses), findings revealed LCPs had higher ratings for the SCs (skin breakdown requiring surgery, heterotopic ossification, and deep vein thrombosis) than physiatrist LCPs or physiatrist non-LCPs with regards to this scenario. Furthermore, descriptive statistics revealed that among 108 LCPs, at least half or more reported skin breakdown requiring home wound care, autonomic dysreflexia, respiratory dysfunction, urinary tract infection (UTI), and osteoporosis/bone fractures as likely to occur more than 51% of the time. Lastly, at least 40% of LCPs reported pneumonia, neuropathic pain, and repetitive motion injury as likely to occur more than 51% of the time. In summary, a significant number of LCPs reported eight of 13 SCs as meeting the probability threshold (more than 51% likelihood to occur within one's life time).

For physiatrist LCPs, 34 participants responded to Scenario 1; and although no statistically significant findings were found between this group and non-physiatrist LCPs, more than half physiatrist LCPs rated the following to meet the probability threshold: neuropathic pain, respiratory dysfunction, UTI, and repetitive motion injury, while approximately half reported cardiovascular disease to occur more than 51% of the time as revealed through the descriptive statistics provided. Furthermore, skin breakdown requiring surgery, skin breakdown requiring home wound care, and osteoporosis/bone fractures were reported to occur at the probability threshold by more than 40% of physiatrist LCP respondents. In summary, more than 40% of physiatrist LCPs reported eight of 13 SCs as meeting the probability threshold (more than 51% likelihood to occur within one's life time). Additionally, knowledge was considered a positive predictor for the high ratings of UTI in Scenario 1. In other words, those who indicated higher knowledge reported higher percentages for the UTI secondary complication.

Interestingly, physiatrist-non LCPs had the lowest ratings for SCs regarding Scenario 1. Among the 54 respondents, only three complications were reported to occur more than 51% of the time by descriptive statistics. These included neuropathic pain, UTI, and osteoporosis/bone fractures followed by autonomic dysreflexia by a little more than 40% of physiatrist non-LCPs; overall, only four of 13 SCs were reported as meeting the probability threshold by the vast majority of this group. This finding is of much practical significance in that physiatrists who are not LCPs have no invested or incentive bias either way in providing their opinions.

The second part of Scenario 1 focused on asking respondents to provide the frequency of hospitalization and/or treatment for the 13 SCs provided. When assessing one's knowledge as a predictor for the frequency of SCs in Scenario 1 (response choices ranging from 0-25+), persons who indicated their knowledge of SCs as poor, fair, good, and very good, all reported higher frequencies of neuropathic pain in comparison to those who reported excellent knowledge of SCs. Furthermore, the group (physiatrist LCPs) reported the highest frequency for neuropathic pain, followed by physiatrist non-LCPs and LCPs. Moreover, the overall mean scores was higher for physiatrist LCPs and LCPs than physiatrist non-LCPs with regard to all remaining SCs.

For Scenario 2, respondents were given a similar case; however, the difference was of an otherwise healthy male who had a T6 level of injury; Likert scale answer choices were provided for the first part. Similar findings with the first scenario were discovered. Life care planners overall provided higher frequency ratings than physiatrist LCPs and physiatrist non-LCPs with regard to six SCs, including skin breakdown requiring home wound care, cardiovascular disease, respiratory dysfunction, UTIs, neuropathic pain, and osteoporosis/bone fractures. However, when summing the scores for all SCs for this specific scenario, findings revealed that LCPs overall provided higher ratings. Significant differences were found when the vast majority of LCP cases were plaintiff. The demographics for LCPs and physiatrist LCPs reported preparing life care plans for plaintiff cases to a greater degree than defense cases. The percentage of LCPs reporting that the bulk of their plans were plaintiff fell into the range of 75-76%.

It should be noted that although there was a statistically significant difference found among non-physician LCPs and both physiatrist groups with regards to reporting higher frequency ratings of SCs, the majority of LCPs reported only UTI and repetitive motion injury as meeting the probability threshold (likely to occur within one's lifetime more than 51% of the time). Among non-physician LCPs (certified and non-certified), more of the non-certified LCPs opined that possible and probable SC costs should be included within a plan. Without having certified life care planner standards of practice guidelines to follow, non-certified LCPs may be placing themselves at greater risk for a *Daubert* challenge by deviating from published standards.

For the second part of the scenario (frequency of hospitalization and/or treatment for 13 SCs), descriptive statistics revealed both LCPs and physiatrist LCPs reported higher frequency counts for 10 SCs than non-LCP physiatrists. Furthermore, "knowledge" was found to be a positive predictor for one SC (UTI). In other words, persons

who indicated higher levels of knowledge (i.e., very good and excellent) tended to rate this SC as higher.

In summary, the majority of all SCs for each of four scenarios were found to be higher for LCPs and physiatrist LCPs in comparison to non-LCP physiatrists as demonstrated through descriptive statistics. However, careful consideration should be taken from this finding as there were no statistically significant differences other than what was previously discussed, primarily due to the stringent alpha level created due to Bonferroni corrections. However, the practical significance of these findings cannot be ignored as potential bias in providing plaintiff-friendly opinions may exist.

When addressing both physiatrist groups as to their professional opinion of the likelihood of SCs occurring if preventative measures are *not* taken, participants who reported higher levels of knowledge indicated higher frequencies of SCs more likely to occur. Yet when comparing the findings with empirical research, aside from neuropathic pain, all groups (i.e., LCPs, physiatrist LCPs, and physiatrist non-LCPs) provided inaccurate estimated opinions regarding the likelihood of SCs actually occurring among persons with either a C5-C6 level of injury or a T6 level of injury. The literature review demonstrates that among the SCs only repetitive motion injury has at least three studies revealing an incidence rate meeting the probability threshold (Eriks-Hogland et al., 2013; Escobedo et al., 1997; and Hetz et al., 2011). The certified LCPs in this study among all other groups reported the highest use of empirical literature when creating their plans and is a positive affirmation of the International Academy of Life Care Planners' standards put into practice.

Implications for Life Care Planners

This study overall indicates a diverse range of opinions among the three groups surveyed with higher ratings of likelihood and frequency of certain SCs among non-certified life care planners, non-physician life care planners, physiatrists who are life care planners, and physiatrists who are not involved in life care planning, respectively. Since non-physician life care planners generally do not overstep their standards of practice (e.g., giving medical opinions) for fear of being *Daubert* challenged, it nevertheless sometimes occurs. As such, life care planners must be mindful regarding this arguable SC gray area in relation to having such opinions supported by a physician specialist and ideally also backed by empirically supported prevalence literature.

Second, since there are a number of physiatrists who appear to opine the probability of certain secondary complications (e.g., UTI, neuropathic pain), non-physician life care planners can initiate a dialogue with the treating specialist regarding the medical probability of these potentially higher occurring SCs, and whether future projected costs should be included in the life care plan. Treating specialists will be aware of comorbidities (e.g., obesity, diabetes, smoker) related to their patient, and as Krause et al. (2013) have indicated, this can increase the likelihood of certain complications into the probability threshold.

Third, results of this study regarding physiatrist LCPs indicates that about half of physiatrist LCPs do not consult with the treating specialist or rely on the medical literature to guide their opinions. As *Daubert* rulings and related legislation apply to them as well, simply relying on one's education, training, and experience can and should be challenged when SCs costs are included in the life care plan but not supported in the field. We observed in this study that physiatrist LCPs reported a greater likelihood and frequency of SC than non-physiatrist LCPs. Although one could argue this finding is simply a coincidence, an alternative hypothesis could be biased opinions to obtain more referrals (due to higher-priced life care plans) since over 70% of all the physician and non-physician LCPs in this study are retained by plaintiff attorneys. An alternative explanation, however, is that physiatrists see mostly sick patients with SCI on a daily basis, and this may well have been our respondents' mindset when completing the survey.

Finally, since this is an ongoing debatable issue regarding the possible versus probable SCs of SCI and whether to include such costs into the life care plan, it would behoove life care planners to become more knowledgeable about these SCs as well as the various treatment modalities available. Again, with this information in hand, a dialogue with a treating specialist can become more fruitful in fully developing the particular patient's life care plan by encouraging such physicians to conceptualize their patient's lifelong needs in a preventative manner rather than dealing with crises as they occur.

Limitations of the Study

There were various limitations that could be found in the research conducted. First, a lack of proportionate number of respondents was needed to compare differences between groups and within groups. However, preliminary analysis was conducted and all violations of assumptions were addressed to ensure the results were valid. Second, although probability sampling (i.e., random sampling) is a preferred method for gathering a representative sample of the population, it was not feasible due to the inability of a sampling frame (i.e., no identifiable information for physiatrists that operate as life care planners). Furthermore, many participants were unwilling to take the survey (e.g., several life care planners emailed, stating their concern over the results of the study being held against them during litigation), followed by the inability to gather the specified number of participants to obtain the required number of respondents based upon the power analysis conducted. However, no sampling method, regardless of whether random sampling is implemented, guarantees the sample will be generalizable to the population (Gay, Mills, & Airasian, 2009). Third, considering the number of independent

variables, a larger sample size was required and, therefore, various analyses had to be removed. One can hypothesize that an increase in sample size could have greatly improved the findings. Difficulty in obtaining large numbers of participants could have been due to some life care planners specifying their reluctance to take part in the study, as previously stated. Fourth, for the scenario questions designed to assess one's knowledge of SCs, the validity of the findings should only be considered reliable when compared to the empirical research. Otherwise, merely speculating based on professional experience alone should not merit consideration during litigation. Therefore, including a physiatrist's professional opinion solely based on this study without consideration to the empirical literature and/or specialist opinions does meet the required *Standards of Practice* as set forth by the International Academy of Life Care Planners. As such, the opinions gathered from the study along with the literature specifying the incidence rate for each SC should be used with caution, noting patient pre-existing or comorbid conditions, demographics (e.g., level of injury, obesity, gender, etc.), and lifestyle (e.g., smoker).

Finally, an additional limitation was the necessary omission, separation, and/or inclusion of particular SCs. For example, bone fracture/osteoporosis are two separate and distinct complications. Although a person may be at risk for developing osteoporosis, it does not mean one will develop bone fractures. Therefore, it would have been beneficial to have those two conditions separated and given a response choice for each. In addition, pneumonia, atelectasis, and aspiration could have been combined with one overarching SC, respiratory dysfunction.

Future Research Considerations

This is the first study of its kind to our knowledge, and future research considerations in life care planning could include other arguably gray area disabilities and potential SCs. These may include traumatic brain injury, cerebral palsy, spina bifida, and severe burns. In each of these disabilities, although periods of stability or plateauing in measurable health gains can be somewhat static, like SCI, there are also fluid aspects regarding potential SCs occurring. Dealing with potential secondary complications, such as severe scoliosis for childhood cerebral palsy and spina bifida cases, may require probable future spinal stabilization surgeries. Similarly with survivors of third-degree burns, multiple future skin debridement and cosmetic surgery improvements may be required. As the field of life care planning continues to build empirical support and evidence-based education, it continues as part of our code of ethics to remain up to date with the literature.

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