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Physical Therapy Non-Treatment of the Acute Hospital Inpatient

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PHYSICAL THERAPY NON-TREATMENT OF THE ACUTE HOSPITAL INPATIENT

By

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A dissertation submitted in partial fulfillment of the requirements for the
Doctor of Philosophy - Public Health

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Physical Therapy Non-Treatment of the Acute Hospital Patient

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ABSTRACT

Physical Therapy Non-Treatment of the Acute Hospital Inpatient

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The detrimental effects of inactivity and mobility extend to the most ill and injured patients in the acute hospital setting. Facilitating the activity and exercise of these most critical patients often requires the skill and expertise of a physical therapist. When physical therapists are involved in the care of hospital inpatients they experience significant benefits; patients experience fewer secondary complications related to their primary illness or injury, they spend less time in critical care units and less time in the hospital overall, and when they leave they go to less restrictive environments and more comfortable care settings. These known benefits can only occur when therapy is provided. Scheduling patients for needed therapy often results in no therapy being provided, termed non-treatment. It is documented that as many as 1 in 3 scheduled therapy sessions in the acute hospital never occur. This phenomenon of non-treatment is poorly described in the literature. In fact actual rates of non-treatment are only in 2 published reports and neither of these offer good evidence for the underlying cause. Therefore, the purpose of this dissertation is to explore the non-treatment phenomenon at two hospitals, describe the rates, therapist explanations, and associated factors related to the patient, therapist, and environment. Non-treatment events were examined for 4 years at one hospital and 6 months at the other. Statistical modeling with

Generalized Estimating Equations was employed to quantify the association of variables on non-treatment events. The findings from this dissertation suggest that the therapist documented explanation for non-treatment events explains very little of its occurrence or variability; however, the treating therapists, patient diagnoses, and staffing and scheduling do significantly impact non-treatment.

Keywords: physical therapy, acute care, non-treatment, staffing, productivity

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CHAPTER 1

Physical Therapy and the Acute Hospital

Acute Hospital Environment and Limited Activity

The acute hospital is a care setting that has evolved to provide intensive and specialized medical care. Despite known benefits of patient centered design on patient outcomes, many facilities are designed for physicians and nurses to perform their work, even if less optimal for patients.¹ Examples of this are rooms centered on beds with features to keep people lying down, poorly designed and unavailable chairs, medical monitors and tubes that prevent movement, and few areas in which patients can walk outside their rooms; all of these can be associated with functional declines in patients.²⁻⁸

In addition to the built environment of hospitals limiting patient mobility to their detriment, hospital policies can also have negative effects. Frequently hospitals have policies that discourage walking in favor of wheelchair transportation, alarms on furniture to keep people sitting down, and devices and restraints of different varieties to discourage and prevent movement.⁹⁻¹⁴ Some of these policies exist to limit the risk of injury due to falling, but often they are universally applied to patients that are at very low fall risk.¹⁵⁻¹⁸

Another issue relating to limited activity in the hospital is a mindset that people should stay in bed to rest. This is less frequently believed by health care providers, but still commonly believed by patients and their families. Patients are not aware of the benefits of appropriate levels and types of activity while in the acute hospital setting.¹⁹

The Acute Care Physical Therapist

A survey of members of the American Physical Therapy Association (APTA) reported that 11% of physical therapists work primarily in the acute hospital setting compared to over 50% of physical therapists that practice in an outpatient setting.²⁰ It is

not known what proportion of therapists from other settings practice in acute care on a part time basis to supplement their full time work. Additionally, acute care physical therapists that work full time in this setting, see as many or more patients in a typical week than therapists practicing in any other setting.²⁰

Functional mobility, being able to move in bed, stand up and sit down, and walk about, are fundamental to carrying out normal life tasks and maintaining health in the circulatory, pulmonary, and integumentary systems. People with illness or injury significant enough to warrant hospitalization frequently have limited functional mobility. Physical therapists are experts in providing skilled interventions to help facilitate functional mobility for hospital inpatients.²¹ For the majority of patients seen in one study there were three main rehabilitation treatment groups: neurological, musculoskeletal, and cardiopulmonary.²² In fact, irrespective of medical diagnosis, more than 80% of the patients seen by physical therapists in acute care settings have goals and interventions related to functional mobility.^{21,23}

In addition to directly providing functional mobility training, physical therapists in the acute hospital must collect and analyze medical information that would inform the application of physical therapy interventions. The acute hospital also requires that physical therapists be proficient and efficient in communicating with other health care providers to gain information, and communicating to provide information both to other health care providers, patients and families.²³ There is a greater need to collect and quickly interpret medical information for decision making by acute care physical therapists than physical therapists in other practice settings.²³⁻²⁶

Seniors in the hospital have unique attributes that make them particularly vulnerable to not get enough exercise or activity. In addition to the hospital environment that has been discussed, there are patient specific factors that have been associated with functional decline. These factors include age, sociodemographic characteristics, pre-

existing disability and disease states, dementia, anemia, pain, fear of falling, depression, motivation, nutritional status, hydration, sedation, and polypharmacy.^{6,27}

Despite all that is known about the benefits of activity, the barriers to activity, and the skills that physical therapists bring to the care of patients in the hospital, responsibility for activity and exercise in the hospital is not clear.¹⁶ The unique skills and training of a physical therapist is not always required for patients to be more active; however, sometimes other care providers are reluctant to encourage or facilitate patient activity. Nurses and physicians may not feel that it is their responsibility, they may be fearful about fall risk or titrating activity levels, or they may feel that they do not have the time to help patients be more active.¹⁶

Finally, the acute hospital setting provides care for the most medically demanding patients. When those medical issues no longer require that level of care, patients are often not well enough or independent enough to return home. There are a myriad of less medically intensive care settings to which a patient may be discharged including, long-term acute care, sub-acute care, acute rehabilitation, assisted living, home health, and hospice. Often the functional ability of a patient is a qualifying factor in admission to one of these levels of care. Physical therapists have demonstrated that they provide important input regarding discharge destination of acute hospital patients.^{21,23,28,29}

Benefits of Acute Care Physical Therapy

In addition to discharge destination and general mobility, other direct benefits are observed when physical therapists are involved in the care of patients in the acute hospital. When the discharge recommendations from physical therapists are followed there is a lower readmission rate.³⁰ Readmission occurs when a patient is discharged before their conditions has been properly treated and must return for treatment of the same medical problem. This is financially important for hospitals because the Centers for

Medicare and Medicaid Services will reduce reimbursement to hospitals that have high readmission rates.³¹

When patients receive physical therapy in the acute hospital setting significant improvements in function and quality of life are observed. This effect exists for patients who are seen early in critical care units or later in less intensive hospital care units as well as for patients across many different medical conditions.^{18,32-43} One aspect of care related to quality of life for patients and cost to hospitals is length of stay (LOS). In the US, acute hospitalization is typically reimbursed in a prospective payment model that involves a single payment based on the admitting diagnosis of the patient. Shorter LOS is thus financially advantageous for hospitals. Provision of physical therapy in the acute hospital has been associated with a decrease in LOS.^{2,18,19,21,34,35,37,38,41,44-58}

Challenges for Acute Care Physical Therapists

In addition to the hospital environment and the serious illness of this patient population other barriers to physical therapy exist. In most hospitals, policies require the physician overseeing the care of a patient to specifically request or at least consent to a physical therapist working with one of their patients. Some physicians are simply not aware of the evidence behind physical therapy practice in this setting. Interestingly, orthopedic surgeons who have practiced for more than 20 years and paradoxically those new to practice, are less likely to order therapy.⁵⁹

Physical therapy is different than other medical treatment. In most other medical interventions the patient is the passive recipient of care. While some passive physical therapy treatments do exist, they are not often the ones needed for this inpatient population. The closely monitored functional mobility, guided activity, and titrated exercise provided to hospital inpatients by physical therapists, requires the active participation of the patient. When feeling the effects of acute illness and injury, patients may refuse to participate in therapy when it is offered.¹⁷

In this dissertation, the overarching goal is to describe and explain the associated factors of physical therapy non-treatment of hospital inpatients. Three different sets of data were analyzed. The first data set (Chapter 2), addresses the occurrence of non-treatment in an academic medical center. The focus was on therapist-documented reasons for non-treatment and the effect of an intervention, to change the non-treatment rate. The second data set was obtained from a community hospital (Chapter 3) and included additional information on the patient and scheduled sessions to further explain non-treatment. The data were modeled to find associated factors of the patient and session to explain non-treatment. The third data set (Chapter 4) came from the same hospital as the second, but included additional information about the patient's entire episode of care, as well as data from a survey of the treating therapists. This third data set was obtained to further explore the relationship between patient and therapist and the effects of their characteristics on non-treatment.

CHAPTER 2

Rates and Reasons for Patient Non-treatment in Physical Therapy in an Acute Care Hospital.

Abstract: This was a retrospective analysis of therapist documentation from every patient with orders for physical therapy in a Midwestern hospital over 4 years. Not all scheduled physical therapy treatment sessions result in actual treatment in the acute care hospital. Little is known regarding rates and reasons for patient non-treatment in physical therapy in this setting. As physical therapy can impact patient outcomes and length of stay for patients, a greater understanding is needed on the non-treatment phenomenon.

Objective: To describe rates and reasons for patient non-treatment in physical therapy in an acute care hospital. Documentation regarding scheduled treatments, treatments not administered (non-treatment), and the reasons for non-treatment were reviewed.

Reasons for non-treatment were grouped as follows: (1) patient refused, (2) patient condition contraindicated therapy, (3) patient scheduling (patient was unavailable), (4) insufficient staffing, (5) patient had been discharged from the hospital, (6) patient expired, and (7) unknown. The average non-treatment rate was 15.3%. The most common reasons were condition (37.8%), refused (27.6%), and scheduling (26.6%).

Non-treatment occurred in nearly one of seven scheduled therapy sessions with potential negative consequences for patients, physical therapy departments and the acute care hospitals in which they function. More research is needed to explore the factors that contribute to non-treatment and to identify effective ways to reduce the rate of non-treatment.

INTRODUCTION

Just over 11% of physical therapists work primarily in an acute care hospital setting; however, more than 28% spent some time working in an acute hospital.^{60,61} The ability of physical therapists to contribute positively to health care delivery is predicated on patient participation in physical therapy sessions, while there exists a lack of available evidence on non-treatment in the acute hospital setting.^{21,62} To my knowledge there are only two studies that report on physical therapy non-treatment in the acute hospital.^{21,62} These two studies reported non-treatment rates between 0.8% and 26% for scheduled sessions, but were not focused on explaining the phenomenon.

In addition to the patient not receiving needed treatment, scheduled therapy sessions that result in non-treatment take approximately 8 minutes each and the work satisfaction of the physical therapist is reduced.^{21,62} Considering the potential impact on the cost of health care when non-treatment occurs is an important consideration. Beginning in 1983 the Centers for Medicare & Medicaid Services (CMS), formerly the Health Care Financing Administration (HCFA) implemented a prospective payment systems (PPS) for acute care hospitals through which Medicare pays for the care of a patient based on the patient's diagnosis in a lump sum, regardless of the individual services provided to the patient.⁶³ The average length of stay (LOS) for the patient in the acute hospital is 4.6 days, at an average cost of \$9,140 per patient or \$1,987 per day.⁶⁴ The PPS gives the physical therapy profession financial incentive to demonstrate results if they want to continue providing care for hospital patients.⁶⁵

The concluding argument to make for studying non-treatment is the potential impact on patient outcomes. Studies have shown physical therapy reduces hospital LOS,^{41,51,63,66} The principle theory being that physical therapy reduces deconditioning brought on by bed rest and thus, or additionally, reduces secondary complications such as functional weakness, blood clots, and pneumonia.^{48,67-69}

METHODS

The hospital from which the data were obtained was designated as a level-one trauma center. This was hospital with six 30-bed nursing units with an average of 8 full-time therapists needed to cover their caseload. The hospital used computer-based documentation such that it could be queried and exported into a spreadsheet. In order for the retrospective analysis to provide anonymity of the patients and therapists to the researchers, the manager of the physical therapy department performed the data extraction and de-identification. Microsoft Excel 2004^{*} was used for the data management and analysis. The data obtained represented all scheduled physical therapy sessions during a 4-year span. The data were reviewed to obtain the number of treatments scheduled, provided, not provided when scheduled, and the reasons for non-treatment.⁶⁵

There were seven reasons that physical therapists used to explain a non-treatment event: unwillingness by the patient to participate (*refuse*), the patient having a medical condition that contraindicated therapy (*condition*), the patient being occupied with another healthcare provider or event (*schedule*), insufficient physical therapists available (*no PT*), the patient being discharged before the therapist could attempt treatment (*D/C*), the patient expiring before the attempt to treat (*death*), and finally a reason was not documented or clear (*unknown*).

Reading the documentation of the therapists provided insight into each non-treatment event. As an example, the category *condition* may have indicated a consultation verbally with a physician or nurse to determine that the patient was not well enough to tolerate therapy, lab values outside acceptable limits, medical conditions such as deep vein thrombosis or fracture, or patient nausea or unstable vital signs.

^{*} Microsoft Excel 2007; Microsoft, Seattle WA.

The data obtained in this study represented individual encounters of one therapist and one patient; however, specific therapists and patients could not be tracked due to the way the data had been de-identified by the hospital. Additionally, total scheduled treatments were not available for all months of data even while non-treatment events were. Thus statistical comparisons to indicate significant change between months or years were impossible to calculate, leaving only descriptive statistics for review.

One very interesting aspect of the data obtained was that it spanned a department quality improvement/assurance project to reduce non-treatment by focusing on *refusal* rate reduction. Beginning near the midpoint of the data set (chronologically) each therapist was provided their individual refusal rate and asked to set goals for reduction. The refusal rate was given to the therapists monthly and reviewed with their supervisor throughout the second half of the time during which data were obtained. No other category of non-treatment was tracked or given to the treating therapists as part of the department project.

RESULTS

In total 103,946 scheduled treatment sessions were reviewed. Some of the data were missing all scheduled sessions and only provided instances of non-treatment. The most complete data sets were from 2004 and 2006 and these had average non-treatment rates of 14.3% and 13.9% respectively. Depending on the month, non-treatment rates ranged from 10.7% to 16.8% with an average throughout the four years of 15.4%. Due to the large time period over which data were collected, a table with seasonal values is presented first.

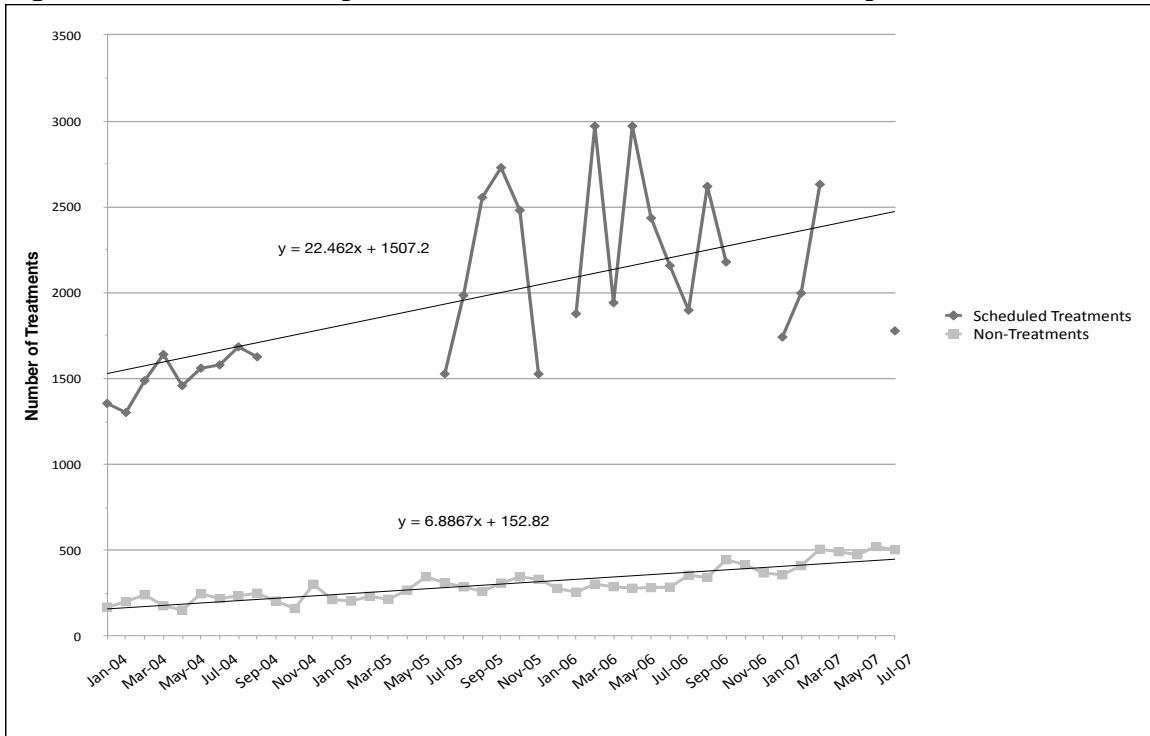
Table 1. Mean frequency of scheduled treatments and non-treatments per seasonal period, with mean percentage of non-treatment.

	Mean Scheduled Treatments	Mean Non-Treatments	Mean Percentage Non-Treatment
Jan-Mar 2004	1587.00	204.67	12.9%
Apr-June 2004	1746.67	193	11.0%
July-Sept 2004	1866.33	235.67	12.6%
Oct-Dec 2004*	-	223.33	-
Jan-Mar 2005*	-	217.67	-
Apr-June 2005*	-	277.33	-
July-Sept 2005	2309.67	287	13.0%
Oct-Dec 2005	2574.33	329.33	13.4%
Jan-Mar 2006	2704.50	280	10.7%
Apr-June 2006	2733.33	284.33	10.7%
July-Sept 2006	2553.33	328.33	13.0%
Oct-Dec 2006*	-	410.67	-
Jan-Mar 2007	2549.33	425.67	16.8%
Apr-June 2007*	-	467	-
July-Sept 2007	2111.00	470.33	15.5%

*Scheduled visits were not tracked by the department during these time periods and were thus not available for analysis.

The data revealed a mean of 1,587 scheduled treatments per month and a 12.9% non-treatment rate at the beginning of their time period. At the end of the time period reviewed there were 2111 scheduled visits per month and the non-treatment rate was 15.5%. Over the course of time, the mean number of scheduled visits increased as much as 60.6% (1,587 to 2,549.33), and the non-treatment events increased 108.1% (204.67 to 425.67). A commensurate rise occurred in the mean rate of patients not seen from 12.9% at the beginning to 16.8% near the end. When the data were not averaged based on season but rather plotted monthly, the variability is increased, but still followed the same pattern as shown by Figure 1.

Figure 1. Trends of average total scheduled treatments and average non-treatments



The monthly mean for the therapist documented reasons for non-treatment as a proportion of total non-treatment events are shown in Table 2. Initially, *refuse*, *condition*, and *schedule* categories were the largest at 33.4%, 32.7%, and 24.1%. These three categories remained at similar values until the spring of 2006 when the frequency for the *refuse* category began to drop while *condition* and *schedule* categories both rose. This fall in *refuse* and rise in *condition* and *schedule* continued for the remainder of the months in the data. During the last 4 months of data collected, *condition* was 45.7%, *schedule* 34.1%, and *refuse* 16.7% of non-treatment events. Therapist documentation of non-treatment events in categories *D/C*, *no PT*, *unknown*, and *death* was very rare.

Table 2. Monthly average proportion of each reason for non-treatment

	Cond	D/C	No PT	Refuse	Sched	Unk	Death
Jan-Mar 2004	32.7%	8.3%	0.1%	33.4%	24.1%	1.2%	0.2%
Apr-Jun 2004	33.5%	5.9%	1.7%	38.4%	20.3%	0.1%	0.1%
Jul-Sept 2004	30.5%	7.0%	1.1%	34.7%	26.5%	0.3%	0.0%
Oct-Dec 2004	35.1%	2.9%	1.2%	39.7%	21.0%	0.0%	0.2%
Jan-Mar 2005	39.6%	5.0%	0.9%	32.8%	19.4%	2.0%	0.2%
Apr-Jun 2005	39.3%	6.4%	0.6%	29.9%	21.3%	2.4%	0.0%
Jul-Sept 2005	33.1%	10.3%	0.7%	36.6%	19.1%	0.1%	0.1%
Oct-Dec 2005	37.6%	6.1%	1.2%	32.5%	21.4%	1.1%	0.1%
Jan-Mar 2006	41.5%	8.2%	1.3%	23.6%	24.6%	0.6%	0.1%
Apr-Jun 2006	33.2%	8.4%	2.1%	30.2%	24.5%	1.3%	0.2%
Jul-Sept 2006	35.1%	8.4%	1.8%	22.6%	31.9%	0.1%	0.1%
Oct-Dec 2006	35.1%	8.7%	0.5%	24.0%	31.3%	0.2%	0.3%
Jan-Mar 2007	38.1%	6.4%	1.4%	22.9%	29.5%	1.6%	0.1%
Apr-Jun 2007	43.5%	3.8%	1.3%	18.2%	31.9%	1.1%	0.1%
Jul-Sept 2007	45.3%	1.9%	0.7%	21.0%	30.0%	0.9%	0.0%
Oct-Dec 2007	40.5%	4.6%	0.9%	19.9%	32.8%	1.1%	0.2%
Jan-Mar 2008	41.3%	1.7%	0.4%	19.3%	36.1%	1.1%	0.1%
Apr-July 2008	45.7%	1.4%	0.8%	16.7%	34.1%	1.2%	0.2%

*Bolded values are two highest percentages per period of time.

Figure 2 displays the mean monthly proportion for each of the non-treatment categories from the beginning to the end of the data set in six-month periods. This chart shows clearly the increase in the *condition* and *schedule* categories while the *refusal* category was decreasing. When the time periods before and after the department project to reduce *refusal* were examined separately it appeared that the trend did not begin until after the department project for these changes (see Figures 3 & 4). Finally, the overall rate of non-treatment did not decrease even though there was a large drop in in the therapist-documented occurrence of *refusal*, but rather went up over the time covered by the data.

Figure 2. Trends in reasons for non-treatment over the entire data set.

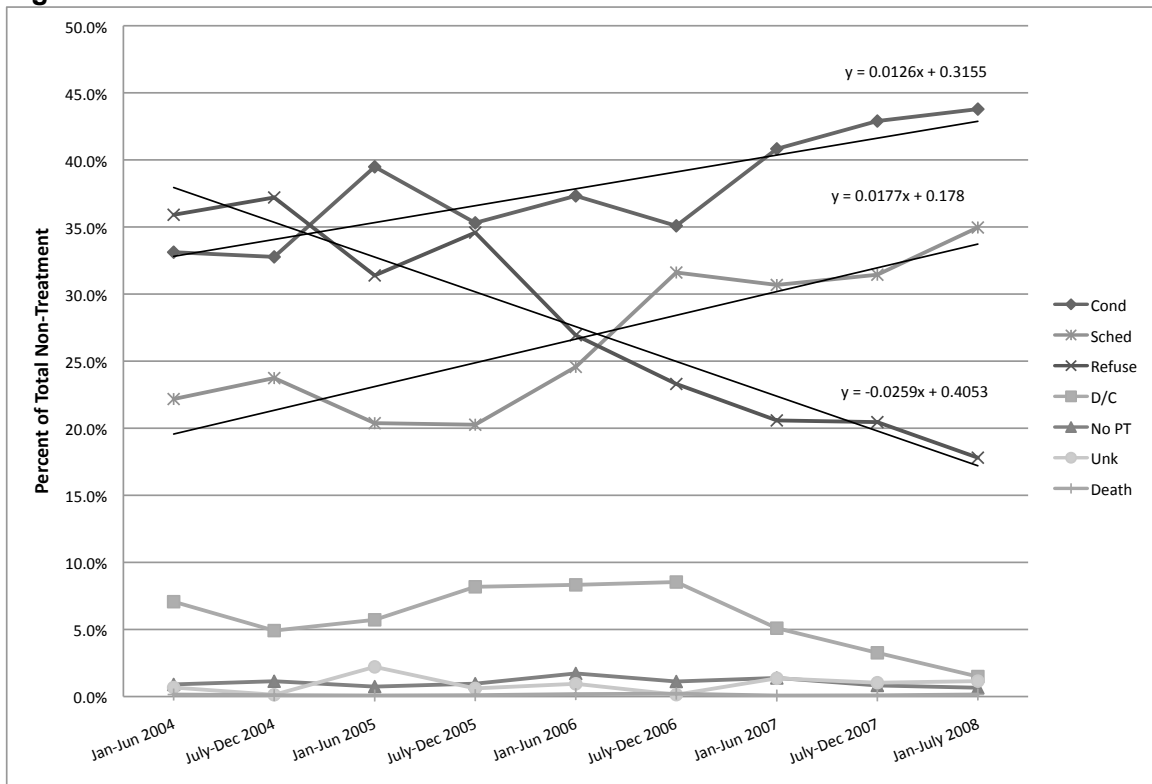


Figure 3. Trends in reasons for non-treatment prior to the department project to reduce refusal.

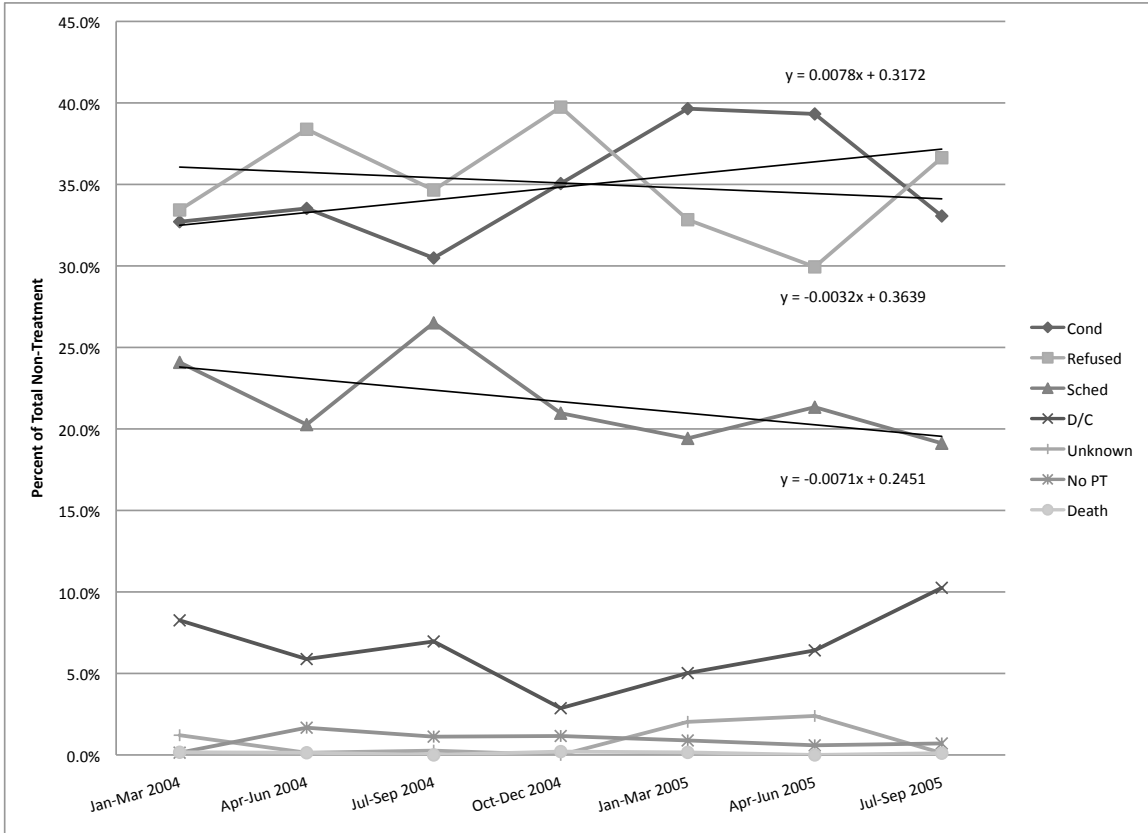
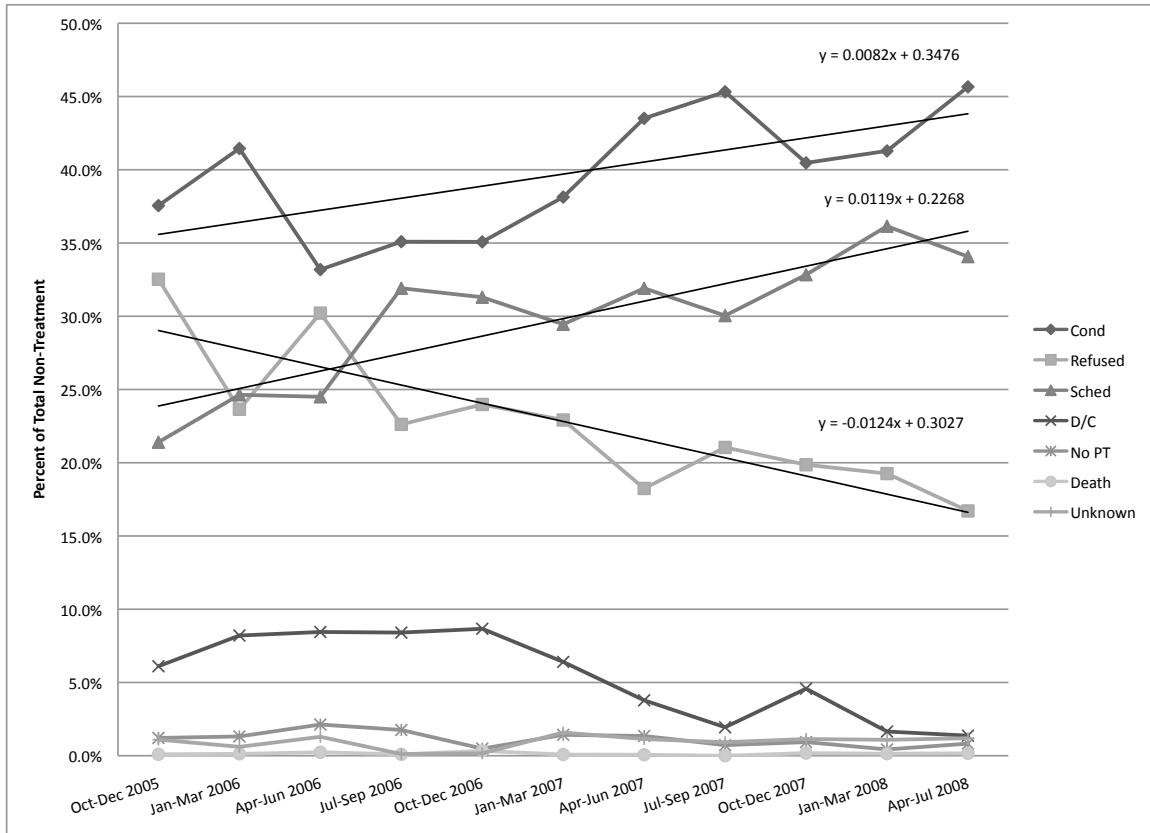


Figure 4. Trends of reasons for non-treatment after the department project to reduce refusal.



DISCUSSION

In this study we investigated both the rate of non-treatment and the therapist documented reasons for non-treatment at a single hospital. The increase in patient load over the time covered by the data did not result in additional physical therapy staff to treat the additional patients. Since there was a rise in the rate of non-treatment we expected the categories of *no PT* and *scheduling* to account for that rise; however, the two categories receiving the greatest percentage increase were *scheduling* and *condition*. Either an increased patient load does not affect non-treatment in [*no PT* and *scheduling*], or therapists are reluctant to admit they miss treating patients due to limited staffing.⁶⁵

One of the most interesting results in the data was the drop in *refusals* without a concurrent drop in the overall non-treatment rate. In fact as the rate of *refusals* declined, *scheduling* and *condition* rates increased. There was pressure from hospital administration to during the period from which the data were obtained for physical therapists to provide more billable treatment per day. In response to this the physical therapy department leaders presented therapists with their refusal rate and asked them to lower the rate. A decrease in refusals was observed to coincide with this effort; however, overall rates of non-treatment actually worsened. Either physical therapists changed their documentation or there were actually fewer refusals and more sick busy patients. In the course of a day, attempting to provide treatment to any given patient may require several visits to the patient's room. Thus, it may be that therapists have more than one valid reason they were unable to treat that patient and are able to pick the one reason that seems most significant. It is also possible that with the administrative pressure on a physical therapist, they documented a scheduling conflict or a condition that contraindicated therapy, even if the actual encounter may have been best described as a refusal.

The most frequently documented reason for non-treatment was patient *condition*; the frequency even increased over the time the data were collected. Interestingly, at this hospital, physical therapy was automatically requested for patients with a diagnosis of cardiothoracic surgery or trauma at the time of admission. Occasionally patients are actually too ill for activity and exercise for the first couple of days in the acute hospital. If the physical therapist with these early referrals documented non-treatment from the day of admission until therapy was appropriate the number could have been inflated. As medical records become fully electronic and available in multiple places and formats it should improve therapists efficiency at gathering data on lab values and diagnostic test results before attempting to see a patient. Electronic medical records should also

facilitate triage of appropriateness for therapy by a manager, prior to assignment of patients to therapists' schedules.⁶²

This study was strengthened by the large number of scheduled sessions obtained over a period of four years. While statistical significance was not calculated, visual comparisons and trends between months, seasons, and years were telling. It is likely that individual patients and therapists contributed to the data unequally and it was impossible to adjust for this impact. It is also valuable to have non-treatment events categorized into specific groups, allowing others to use them in the future. Another limitation was that the data were collected from a single hospital.

Future research focused on changing non-treatment occurrence could be guided by the categories described. For example, the *refused* category could be improved by including the patient in the goal-setting process, empowering the patient, and implementing motivational programs since these have all been shown to improve patient participation and performance in outpatient and rehabilitation settings.⁷⁰⁻⁷³ Similar suggestions for other reasons of non-treatment could be made; however, noting what happened at this hospital with refusal, any effort to change one category of non-treatment must prompt caution in the researcher that non-treatment is not simply shifted to another category. Future research to explain the phenomenon of non-treatment would certainly want to include characteristics of both patients (age, diagnosis, prior experience with physical therapy, etc) and therapists (age relative to patient, level of education, time in practice, acute setting experience, etc). These data would facilitate the development of a model to predict non-treatment likelihood allowing focus for future studies on methods to reduce non-treatment based on those identified factors.

CONCLUSIONS

This study reported an average non-treatment rate of 15.3% representing roughly 1 of every 7 scheduled treatments. The most common therapist documented reasons for non-treatment related to patients being too sick, busy with other health care providers, or simply refusing to engage in therapy. Administrative attempts to reduce non-treatment in one category alone did not reduce overall non-treatment events. More research is needed to explain and help predict non-treatment in the acute hospital.

CHAPTER 3

Factors affecting participation in the second session of physical therapy in the acute hospital setting

Abstract: In acute care hospitals, scheduled physical therapy visits not resulting in treatment may increase patient length of stay and the financial burden to the hospital. Previous literature has not fully evaluated the occurrence of these events, nor have any associated factors been identified. The purpose of this study was to describe non-treatment events in an acute hospital and model non-treatment to determine which factors are most likely to predict a non-treatment event. This study was a retrospective review of documentation at a suburban hospital. Data were collected from records of 1,084 patients for their second scheduled session of physical therapy. The rate of non-treatment was calculated based on several variables. Logistic regression was used to evaluate the odds of scheduled therapy visits resulting in no treatment with covariates of: therapist, patient age, patient gender, day of the week, and patient diagnosis. The non-treatment rate for all scheduled second sessions was 15.04%. Therapist documentation for non-treatment indicated 39% were for unknown reasons, 26% were due to the patients' medical condition, 15% were due to the patients' refusal to participate, and 11% were due to insufficient staffing. Individual therapists had non-treatment rates ranging from 0%, to 20%; 37.9% of non-treatment events did not have documentation indicating which therapist attempted treatment. Sunday had the poorest non-treatment rate (26.26%) and Tuesday had the best (6.98%). There was a wide range of non-treatment rates among patients with different diagnosis ranging from 7.23% for those with musculoskeletal diagnoses to 22.69% for those with a Pulmonary diagnosis. Therapist documented, reasons for non-treatment were most often based on patient condition or

patient willingness to participate; however different therapists had a wide range of non-treatment rates, indicating that the therapist may have influence on how often these reasons result in non-treatment. Patients with pulmonary diagnosis were significantly more likely to experience non-treatment than patients with neurological, musculoskeletal, or genitourinary/renal diagnosis. This may be reflective of the impact these diagnosis have on activity and exercise. Complete documentation of all scheduled sessions including which therapist attempted treatment will improve understanding non-treatment. Future studies should consider all scheduled sessions and other variables related to the therapist.

INTRODUCTION

Physical therapy services are provided to patients with a broad spectrum of debilitating conditions in a wide variety of settings, including acute care hospitals. In this setting, physical therapy intervention focused on functional activities has been shown to optimize patient recovery, shorten length of stay (LOS), and facilitate discharge to a less restrictive environment.^{21,32,46,47,51,52,66,74,75} There have been several methods discussed in the literature for improving care outcomes based on changes in PT services. The most common of these is initiation of weekend therapy, which appears beneficial both in terms of health outcomes and reducing LOS across a variety of patients when compared to treatment five days per week.^{51,52,74}

Other programs have included early mobilization in the intensive care unit (ICU) through implementation of specific care teams¹ and increasing PT staffing in critical care units.⁷⁵ These changes improved patients' functional mobility while decreasing both the patient's LOS in the ICU and their total LOS in the hospital.^{66,75} A 2009 Cochrane review evaluating the effects of exercise for acutely hospitalized elderly patients concluded that with individualized exercise programs, patients may expect a one day reduction in LOS.⁴⁶ This shortened LOS reduced operating costs by \$278.65 per patient when compared to usual care. Poor patient participation in therapy has been associated with a negative impact on both functional outcomes and LOS in non-acute hospital settings,⁴¹ and may be influenced by patient driven factors.⁷⁶ In the inpatient rehabilitation setting, Lenze et al demonstrated that patients who participated poorly in therapy were able to achieve comparable outcomes as their controls, but required three additional days to do so.⁴¹ Additionally, not all scheduled therapy sessions result in the provision of therapy services.⁶⁵

An analysis of changes in hospital costs from 1992 to 1995 revealed that decreased LOS explained 97 percent of the reduction in hospital costs per patient

discharge.⁷⁷ The authors attributed this change to shifting the burden of care to others health care settings, but neglected to suggest how the shorter LOS was achieved while maintaining acceptable patient outcomes. Holt and Winograd attributed part of this reduction in LOS to increased utilization of PT services.⁶³ They reported that referral to PT increased under prospective payment reimbursement, consistent with another study.⁷⁸ Additionally, this increase in PT referral was associated with shorter LOS and fewer PT sessions per patient when compared to pre-PPS numbers.⁶³ It is important to consider the impact non-treatment would have on LOS and overall health care costs.

There are many factors that may contribute to scheduled visits resulting in non-treatment; however, there is currently a paucity of evidence regarding this topic. Jette et al described PT practice in three acute care hospitals, each of which reported non-treatment rates of 26.5%, 15.6%, and 15.9%.²¹ In these hospitals, the average time lost per attempted session that did not result in treatment (non-treatment event) was estimated to be eight minutes per therapist. Therefore, one potential method for improving outcomes related to provision of PT services is to minimize the number scheduled therapy sessions in which treatment does not occur.

Young et al reported on a quality improvement project at an acute care hospital in which the physical therapy department attempted to reduce non-treatment.⁶⁵ In this hospital, the overall non-treatment rate was 15.3%. The department sought to reduce this rate by focusing on patient refusal of therapy. Therapists in the department were asked to reduce their refusal rates and their progress was tracked for over two years. These data were compared to the non-treatment rates for the two years prior to this initiative. They observed that refusal rates did drop, but that the overall rate of non-treatment remained nearly constant. They concluded that this phenomenon needed more study to be understood.

If factors predictive of non-treatment could be identified, this information could be used by providers to identify scheduled treatments at high-risk for resulting in non-treatment and modify their approach to improve the likelihood of scheduled treatment resulting in actual treatment. Hospital administrators would also find this information useful when making decisions regarding staffing and hospital policy.

Without previous research to guide the study of factors associated with non-treatment, easily obtainable and logically associated variables should be considered first. Items such as patient age, patient gender, and patient diagnosis may influence a patient's medical severity and response to a request for exercise. The day of the week on which a therapy session is scheduled can influence the availability of therapists and patients attitudes about therapy and exercise. Which therapist attempts care with any particular patient is likely the most important factor when evaluating the non-treatment phenomenon. The interpersonal interactions between people with both verbal and non-verbal communication certainly influence the success or failure of a scheduled session. In this study, non-treatment rate, or the rate of scheduled visits not resulting in treatment, was examined in light of patient age, gender, diagnosis, day of the week, and which therapist attempted care. The purpose of this study was to measure and describe the rate of non-treatment.

METHODS

Facility and Subjects

Data were collected retrospectively from the charting at a suburban hospital in the Southwest United States. This was a 454-bed hospital with a physical therapy staff consisting of 8 full-time and 16 per diem therapists, 2 full-time physical therapy assistants (PTA), and 3 full-time aides. Weekday staffing typically required 6 PTs, 2 PTAs and 2 aides. Weekends saw a 20-35% reduction in therapist-hours. The typical

Medicare patient had an average LOS of 4.3 days in this facility. From physical therapist documentation, data were obtained on 1,084 patients, 587 (54.2 %) females and 497 (45.9%) males. Adult mean age was 68.9 years (SD=17.85). Inclusion criteria were that patients be admitted to the hospital and have at least two scheduled physical therapist (no PTA or aid sessions were analyzed) sessions (including the evaluation) as an inpatient; there were no exclusion criteria. The University of Nevada, Las Vegas institutional review board, approved the study.

The provision of physical therapy services at this hospital was directly organized by a lead physical therapist. This therapist arrived before the others to organize and allocate patients at the beginning of each day. Referrals for new patients came to the physical therapy department through an electronic notification system from each nursing unit. Each physical therapist was assigned approximately eight patients per day with a mix of treatment and evaluation sessions. Once these morning assignments were made each therapist decided how to organize and schedule their patients for the day. During the day, new evaluations were given to the therapist working in the area of that patient.

The department used a paper 'card' to track each patient. These cards were not part of the medical record but were used for note taking throughout a patient's stay. Information on the front of the card included patient demographic and evaluation information such as diagnosis and goals. The back of the card included brief notation of the daily care provided to the patient. Therapists at the hospital were encouraged to keep the cards updated to facilitate ease of communication between treating therapists, but the formal medical record was always the ultimate location for information about patient management and the cards did not contain all the information of the full medical record.

Data Collection and Interpretation Procedures

The research team was composed of individuals that are not affiliated with the hospital; one faculty member and two graduate students. These three individuals performed all data extraction, analysis, and manuscript preparation. The lead inpatient therapist at the hospital was consulted for information about hospital process and procedure. The lead inpatient therapist was not directly involved in data extraction, analysis, or manuscript preparation.

The hospital risk management department would not allow the research team access to the formal medical record, but would allow access to the handwritten therapist-generated cards, previously described. Data for this study were extracted from these cards. In addition to descriptive statistics, binary logistic regression modeling was used for modeling the second scheduled session per patient. Scheduled session number two, was selected for use in the modeling because this allowed us to exclude the first session, which was always a successful encounter (there were no documented non-treatment encounters for the first visit). All data reflect the results of the second scheduled therapy session by a physical therapist, with any individual patient.

Overall non-treatment rates were calculated by dividing the total number of visits that did not result in treatment by the total number of scheduled treatment sessions. For each patient, the plan of care may have included twice or three times daily scheduled treatment. Occasionally the documentation did not clearly separate these different sessions occurring in a single day. When this occurred on one of the second sessions of interest, and it was not clear what had happened, the patient was not included for analysis.

The therapist-documented reason for each event of non-treatment was also collected. If there was no reason for non-treatment specified, or no documentation when a session was scheduled, the reason was coded as "Unknown." "Refusal" was used

when it was clear the patient refused treatment for that encounter. In cases where documentation indicated the patient refused treatment due to their condition, the failed encounter was coded as “Medical condition” rather than “Refusal.” If a medical hold was placed on a patient and documented, those encounters were also counted as “Medical condition.” If a patient was noted to be unavailable due to additional testing or treatments with other health care providers, the non-treatment event was categorized as “Scheduling conflict.” “Insufficient staff” was used when either it was stated as such on the record or when the therapist documentation indicated a high patient load or not having enough time to see all patients. Other infrequently used categories were “Already discharged” and “Patient death.”

Patient diagnosis was determined by the primary medical diagnosis. If multiple diagnoses were listed, the diagnosis thought to most likely contribute to the patient’s current condition was used. For example, a patient with a diagnosis of chest pain may have been experiencing musculoskeletal or gastrointestinal symptoms rather than cardiovascular.⁶³ Such instances were coded after review of as much information from the documentation as possible to obtain confidence by the research team. Any diagnoses that could not be clearly classified with the charted information were classified as “Other.”

Data Analysis

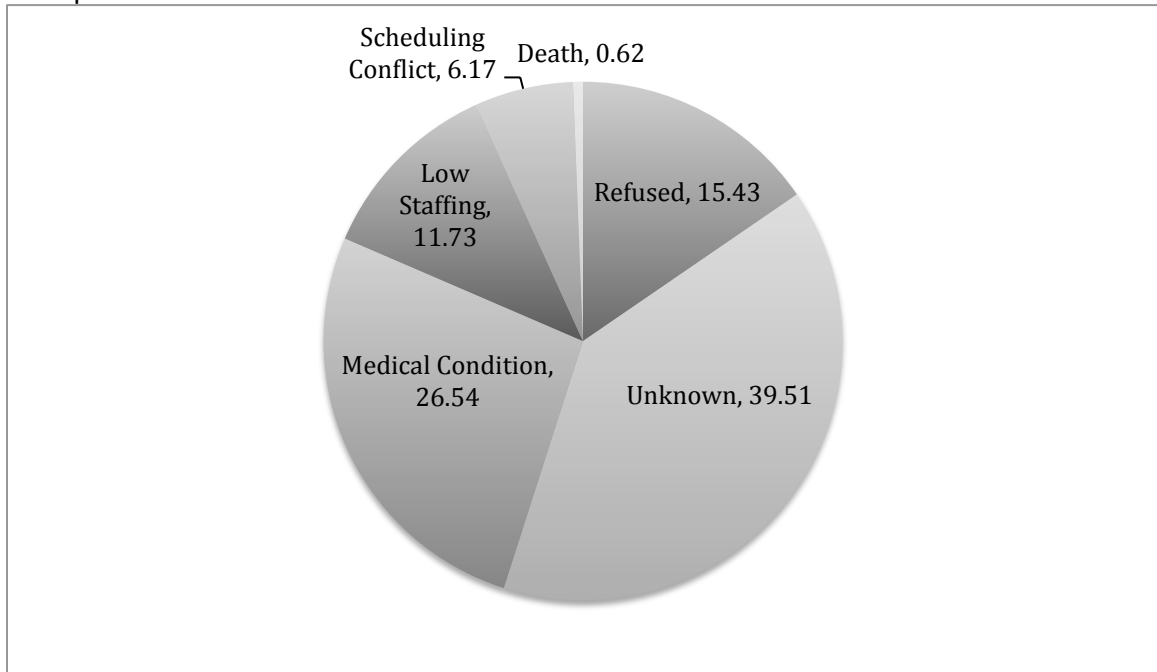
All data were analyzed using SAS 9.3. Descriptive statistics included rates of non-treatment for different tracked variables, calculated by dividing the number of non-treatment events and dividing by the total number of scheduled events. Binary logistic regression was used to model treatment outcome (yes or no) for scheduled second sessions. Two models were created. One included all scheduled second sessions, including those for which the therapist was unknown. In this model which therapist attempted treatment was not included as a covariate due to the high number of non-

treatment events by unknown therapists. The second model included the therapist as a covariate but excluded all sessions for which an unknown therapist attempted the treatment. Other covariates included in the modeling were: patient age, patient gender, patient diagnosis, and day of the week on which treatment was scheduled. The sessions for which data were missing in the categories of therapist reduced the total number of sessions included for the second model to 1012. Descriptive results and the first model reflect data from 1084 encounters.

RESULTS

The non-treatment rate for all scheduled, second sessions was 15.04%. Among these non-treatment events, therapist documentation indicated 26% were due to the patients' medical condition, 15% were due to the patients' refusal to participate, and 11% were due to insufficient staffing in the physical therapy department. Notably, over 39% of non-treatment occurrences did not have documentation on the tracking card indicating the reason for the missed session (Figure 1).

Figure 5. Proportion of scheduled sessions resulting in non-treatment, grouped by therapist-documented reasons for the non-treatment.



Individual therapists had non-treatment rates ranging from zero, to 20%; the busiest therapist, with 176 scheduled sessions, had a non-treatment rate of 6.82%. Also of note, the tracking cards did not indicate which therapist attempted treatment in 37.9% of non-treatment events (Table 3).

Table 3. Non-treatment rate for each therapist ordered from highest non-treatment rate to lowest non-treatment rate.

Therapist #	Treatment		Non-treatment Rate
	No	Yes	
Unknown	54	18	75.0%
13	1	4	20.0%
11	9	38	19.2%
7	15	65	18.8%
20	13	62	17.3%
16	1	5	16.7%
5	6	42	12.5%
15	7	49	12.5%
3	8	57	12.3%
12	7	55	11.3%
1	11	96	10.3%
2	6	56	9.7%
17	1	11	8.3%
6	4	50	7.4%
4	12	164	6.8%
18	1	14	6.7%
14	1	17	5.6%
23	1	19	5.0%
10	1	19	5.0%
8	2	39	4.9%
9	0	7	0.0%
22	0	25	0.0%
19	0	5	0.0%
21	0	1	0.0%
24	0	2	0.0%

For all session 2 scheduled sessions, Sunday had the poorest non-treatment rate (26.26%) and Tuesday had the best (6.98%) (Table 4); however, when encounters were

removed for which no therapist was listed, the highest non-treatment rate based on the day of week was Monday instead of Sunday (Table 5).

Table 4. Non-treatment rate based on day of the week for all scheduled second sessions.

Day	Treatment		Non-treatment Rate
	No	Yes	
Sunday	47	132	26.26%
Monday	25	98	20.33%
Tuesday	9	120	6.98%
Wednesday	23	141	14.02%
Thursday	20	167	10.70%
Friday	24	154	13.48%
Saturday	15	109	12.10%
Total	163	921	15.04%

Table 5. Non-treatment rate based on day of the week for scheduled second sessions with a known therapist.

Day	Treatment		Non-treatment Rate
	No	Yes	
Sunday	14	130	9.72%
Monday	21	97	17.8%
Tuesday	9	117	7.14%
Wednesday	19	137	12.18%
Thursday	18	165	9.84%
Friday	18	153	10.53%
Saturday	10	104	8.77%
Total	109	903	10.77%

Mean patient age within each diagnosis group and according to treatment or non-treatment is presented in Table 6. There was no clear pattern of non-treatment based on age and diagnosis with 5 diagnosis categories having younger patients more frequently missing treatment and 4 categories in which the non-treatment group was older.

Table 6. Age characteristics of patients by diagnosis and treatment success for all scheduled second sessions.

Diagnosis	Treatment	Age			
		Mean	SD	Min	Max
Cardiovascular	No	69.9	16.0	29	97
	Yes	72.6	15.5	18	99
Pulmonary	No	75.6	12.5	42	95
	Yes	70.7	12.9	29	96
Neurological	No	60.7	18.6	16	95
	Yes	69.7	15.7	24	93
Gastrointestinal	No	69.4	10.2	46	84
	Yes	73.6	12.7	27	99
Musculoskeletal	No	70.9	18.6	13	89
	Yes	67.7	16.9	10	97
Oncological	No	74.7	13.9	50	88
	Yes	63.7	17.0	11	85
Genitourinary	No	60.4	17.3	26	82
	Yes	70.3	15.9	16	97
Infectious disease	No	61.6	18.2	38	82
	Yes	65.9	19.9	14	94
Other	No	67.1	12.8	33	91
	Yes	73.2	12.4	31	93

Both models (with and without therapist as a covariate) revealed that none of the covariate categories were significantly associated with non-treatment overall; however, there were significant differences within categories when comparing days of the week as well as when comparing patient diagnosis. Results from both models for the covariates ‘day of the week’ and ‘diagnosis’ are presented in Tables 7 and 8.

For model 1 (not including therapist) an odds ratio of 0.350 (95% confidence interval (CI) = .14 to .87), comparing non-treatment between Sunday and Tuesday indicates a significantly better non-treatment rate on Tuesday. Thus, it can be said that when controlling for patient age, patient gender, and patient diagnosis, the odds of non-

treatment for a scheduled session on Tuesday were 65% less than the odds of non-treatment on Sunday.

Table 7. Results from Model 1. Values for day of the week were adjusted by patient age, patient gender, and patient diagnosis. Diagnosis values were adjusted by day of the week on which treatment was scheduled, patient age, and patient gender.

Day	OR	95% Confidence Interval	
		Lower	Upper
Sunday		Reference	
Monday	1.195	0.552	2.584
Tuesday	0.350	0.141	0.867
Wednesday	0.680	0.321	1.439
Thursday	0.498	0.227	1.093
Friday	0.590	0.276	1.261
Saturday	0.380	0.155	0.930
Diagnosis			
Cardiovascular		Reference	
Pulmonary	1.493	0.765	2.907
Neurological	0.877	1.845	0.417
Gastrointestinal	1.037	0.513	2.096
Musculoskeletal	0.609	0.288	1.290
Oncological	1.471	0.538	4.016
Integumentary	0.716	0.085	6.024
Genitourinary	0.678	0.272	1.686
Infectious Dz	1.435	0.421	4.878
OBGYN	3.215	0.222	47.619
Neonatal	0.223	0.010	4.878
Endocrine	0.314	0.021	4.673
Other	1.252	0.605	2.584

For model 2 (including therapist), an odds ratio of 3.06 comparing Monday to Tuesday (95% (CI) = 1.30 to 7.21) also revealed a significantly better non-treatment rate on Tuesday. Stated another way, the odds of non-treatment for a session scheduled on Monday were 3.06 times the odds for one scheduled on Tuesday when controlling for therapist, patient age, patient gender, and patient diagnosis.

Table 8. Results from Model 2. Day of the week values were adjusted by therapist, patient age, patient gender, and patient diagnosis. Diagnosis values were adjusted by therapist, day of the week on which treatment was scheduled, patient age, and patient gender.

Day	OR	95% Confidence Interval	
		Lower	Upper
Sunday		Reference	
Monday	2.294	0.929	5.681
Tuesday	0.751	0.274	2.058
Wednesday	1.395	0.576	3.378
Thursday	0.997	0.396	2.506
Friday	1.026	0.41	2.571
Saturday	0.889	0.307	2.571
Diagnosis			
Cardiovascular		Reference	
Pulmonary	1.859	0.926	3.731
Neurological	0.756	0.323	1.773
Gastrointestinal	1.096	0.515	2.331
Musculoskeletal	0.651	0.288	1.471
Oncological	1.524	0.55	4.237
Integumentary	0.705	0.083	5.952
Genitourinary	0.612	0.215	1.736
Infectious Dz	1.381	0.358	5.319
OBGYN	2.890	0.2	41.667
Neonatal	<0.001	<0.001	>999.99
Endocrine	<0.001	<0.001	>999.99
Other	1.548	0.726	3.300

Considering non-treatment rates for patients with different diagnosis, unadjusted values are presented in Table 9. For model 1 (not including therapist) an odds ratio of 2.45 (95% CI = 1.11 to 5.40), comparing non-treatment rates between patients with pulmonary and musculoskeletal diagnosis indicates a significantly better non-treatment rate for patients with musculoskeletal conditions. Again stated another way, when controlling for patient age, patient gender, and patient diagnosis, the odds of non-treatment for a person with a pulmonary diagnosis were 2.45 times the odds of non-treatment for a patient with a musculoskeletal diagnosis.

Table 9. Non-treatment rates for all scheduled second sessions by patient diagnosis.

Diagnosis	Treatment		Non-treatment Rate
	No	Yes	
Cardiovascular	23	163	12.37%
Pulmonary	27	92	22.69%
Neurological	17	91	15.74%
Gastrointestinal	21	101	17.21%
Musculoskeletal	17	218	7.23%
Oncological	6	32	15.79%
Genitourinary	9	71	11.25%
Infectious disease	5	22	18.52%
Other	24	129	15.69%
Total	163	921	15.04%

From model 2 (including therapist), the non-treatment rate of patients with a pulmonary diagnosis had estimated odds ratios of 2.46 (CI = 1.02 to 5.92), 2.86 (CI = 1.25 to 6.54), and 3.04 (CI = 1.05 to 8.78) when compared to neurological, musculoskeletal and genitourinary/renal diagnosis respectively. Stated another way, the estimated odds of non-treatment for a session scheduled with a patient having pulmonary diagnosis was 3.04 times the estimated odds for one scheduled with a patient having a musculoskeletal diagnosis, when controlling for therapist, patient age, patient gender, and day of the week.

DISCUSSION

This study helps to describe non-treatment in the acute hospital setting. The overall non-treatment rate for the second scheduled visit was 15.04%. This rate was similar to previous studies that reported rates of 15.3%, 15.6%, 15.9% and 26.5%.^{21,65} The unadjusted data on non-treatment rates based on day of the week showed Sunday having the poorest treatment rate and Tuesday having the best treatment rate. However,

when the sessions without a known therapist were removed, Monday had the poorest treatment rate. Patients with pulmonary diagnosis had the highest rate of non-treatment. Additionally, "Unknown," "Medical condition" and "Refusal" were the most common therapist documented reasons for non-treatment.

Modeling non-treatment, when only including sessions with a known therapist, did not show any variable group to be predictive of a non-treatment event overall. While there were significant differences in the non-treatment rates when comparing different days of the week and different patient diagnosis, patient age, gender, diagnosis, day of the week, as well as which therapist attempted treatment, did not significantly predict non-treatment events overall. There are two likely reasons for this finding. First, there may be variables that were not measured directly enough in this study that would more strongly predict non-treatment. Second, in these data there were a large number of non-treatment events that could not be included in the model, as there was no documented therapist with which to associate the attempt. Given the large range of therapist non-treatment rates, it is likely that more accurate or detailed information about the therapists would help better predict non-treatment.

The results from this study regarding therapist documented reasons for non-treatment are also comparable to those in a previous study by Young et al.⁶⁵ In their study, "Medical Condition," "Refusal" and "Scheduling Conflict" were consistently the highest reasons for non-treatment. "Medical Condition" and "Refusal" were often reasons given for non-treatment in this study, but "Unknown" was the most common. This is likely due to therapists in this study frequently not reporting a reason if no treatment occurred, while therapists in their study were required to document a reason. However, the wide range in therapist non-treatment rates in this study suggests that different therapists are able to influence these apparently patient centered factors. This conclusion is supported in another study.⁶⁵

As previously mentioned, results from this study indicate that overall categories of patient age, diagnosis, day of the week, and gender do not predict a non-treatment event. Another study attempting to predict participation in outpatient cardiac rehabilitation did report that older patients and female patients tended to participate less than their younger, male counterparts.⁷⁹ They found that women were 55% less likely to participate than men, and persons 70 years or older were 77% less likely to participate than persons younger than 60. The authors, however, attributed this finding to a lower rate of physician referrals for females and elderly persons to cardiac rehabilitation. Different hospitals may still wish to consider the potential for age and gender to impact participation in physical therapy.

The results in this study did not show that the therapist who attempted treatment had a significant impact on non-treatment rate. However, in educational research it has been demonstrated that a teacher's expectations of how students will perform may influence that student's behavior.^{80,81} It would seem reasonable that a physical therapist's expectations of their patient may also affect patient participation. A therapist's preconceived notion about a patients' willingness to participate has the potential to influence the outcome. In this study a large proportion of non-treatment events were not attributable to a specific therapist due to missing documentation on the tracking cards. This likely influenced the results and made it impossible to detect a difference between therapists and their effect on non-treatment.

Not finding a significant result for predicting non-treatment based on therapist could be an example of a Type II error, failing to detect a difference when one really does exist. Almost 34% of the non-treatment events could not be attributed to a specific therapist and the known range of non-treatment rates among therapists was less than 5% to 20%. These two findings would strongly suggest that the therapist does have an

effect on non-treatment but this effect could not be detected in these data. The influence of different therapists on non-treatment needs further study.

One aim of this study was to create a model to predict non-treatment; however, the two models only explained about 5% of the variation in non-treatment events. The large number of non-treatment events, missing data regarding the therapist that attempted treatment, help to explain this low value. There may also be other factors influencing non-treatment such as physical therapist age, gender and experience, patient and therapist expectations, values and beliefs, patient or therapist motivation, cognition levels, objective ratings of the severity of patients' medical conditions, and environmental factors such as lighting and room size.

The days of the week having the lowest and highest treatment rates were surprising based on the inclusion or exclusion of sessions where the therapist was unknown. Weekend days would be expected to have the highest non-treatment rates since they is the most common days for physical therapy departments to be understaffed.^{39,74} In this hospital, the manager estimated that total therapist hours on Sunday were 34% below the average for the rest of the week. However, Monday had the lowest treatment rate among known therapists. This points to weekend therapists having a large effect on the hospital non-treatment rate. Additionally, it should be remembered that this rate is for the second visit only, and third, fourth, or fifth scheduled sessions may have different rates.

The fact that the non-treatment rate on Tuesday was so much lower than average, when unknown therapists were or were not included, was somewhat unexpected; however, according to a manager's estimate, the total number of therapist hours worked on Tuesday was likely higher than the average for other days by 6%. This would be expected to reduce non-treatment caused by low staffing. It may also have

provided therapists peace of mind knowing that they had the time they needed to see all their patients and more effort could be applied to each scheduled encounter.

One challenge in this study was the interpretation of handwritten documentation. As previously described, some judgments had to be made regarding the prescribed frequency of treatment for certain patients and the categorization of diagnoses. While many patients were easily classifiable into one of the diagnosis groups, this was not always true. Using the admit diagnoses listed on the tracking cards reduced specificity and ignored consideration of secondary diagnoses. However, the level of detail available on the tracking cards used for the study did not allow for more specific information to be included about patient condition.

Because these data were gathered from one hospital, the generalizability to other hospitals and settings may be limited. This was a suburban community hospital and other hospitals therapist and patient populations would be different. Additionally, only a patient's second scheduled treatment was available for analysis. According to a department manager, patients at this hospital had an average of five scheduled treatments and not an insignificant number of patients had ten or more scheduled treatments. Only including the second scheduled visit likely influenced these findings. If analysis for all visits were conducted, different results may have been obtained.

CONCLUSIONS

For this study, the second session non-treatment rate was 15.04%. Patients seen on Tuesday had the lowest rates of non-treatment while those seen on Sunday had the highest rates of non-treatment. Also, patients with a musculoskeletal diagnosis were less likely to experience non-treatment than patients with other diagnosis. Implementing measures to improve treatment rates based on day of the week or patient diagnosis may improve overall treatment rates. Good documentation of treatment outcome, successful

or not, is needed in order to better describe the non-treatment phenomenon. Future research measuring other factors that could influence non-treatment is needed to better predict events of non-treatment.

CHAPTER 4

Patient and Therapist Factors affecting participation in Physical Therapy in the Acute Hospital Setting

Abstract: Recent research demonstrates the benefits of early and continued physical therapy for patients in the acute hospital. Despite these known benefits, non-treatment regularly occurs. Most reported rates for this non-treatment phenomenon are in the range of 1 in 7 to 1 in 5 scheduled therapy sessions. Understanding non-treatment with more clarity with regard to when and why it occurs is fundamental to future interventions to reduce it and provide patients with needed services. The purpose of this study was to describe non-treatment and associated attributes of the patient, physical therapist and environment on its occurrence at a single suburban community hospital. The average patient received just over 6 therapy sessions. The therapists at this hospital participating in the study were equally gendered, mostly non-white, and worked full time at this hospital. The non-treatment rate among different therapists ranged from 5.4% to 23.2%. The non-treatment rate was 1.3% on the first scheduled session and was nearly 20% over the next 20 scheduled sessions. Over 30% of non-treatment events were not attributable to a specific therapist. Patients were much less likely to experience non-treatment if scheduled for therapy on Tuesday or if they were in the hospital for a musculoskeletal condition. Sunday had a particularly high rate of non-treatment. The frequently missing information regarding which therapist was associated with non-treatment events made it difficult to determine the significance of therapist attributes on those events. Hospital policies for weekend therapy staffing should be evaluated in light of the high rate of non-treatment on Sunday. Future research should obtain data on treating therapist for all instances of non-treatment.

INTRODUCTION

There are known benefits for patients when physical therapists are involved in the care of hospital inpatients.^{2,11,32,37,41,44,56,82} Patient's length of stay in the hospital is reduced if they receive physical therapy, particularly if their illness is critical and the therapy begins early.^{12,18,41,47,48,51,52,66} Patient's experience less frequent readmission to the acute hospital when they have physical therapy during the original stay.⁸³⁻⁸⁵ Patients also have less disability following discharge from the acute hospital when physical therapy is part of their care. It is obvious that the benefits for hospital inpatients from physical therapy can only be realized when treatment is actually provided.

The reasons for patients to not receive prescribed physical therapy are only beginning to be explained.⁶⁵ Patient attributes, such as the medical condition that led to their hospitalization may explain some of the reason for non-treatment. External factors, such as the day of the week on which therapy is scheduled, may also explain part of why non-treatment occurs. Additionally, the attributes of the therapist attempting to provide the treatment may also influence the non-treatment phenomenon.

In addition to patients missing out on beneficial therapy when non-treatment occurs, the cost to the hospital and the entire health care system is increased. It takes time for a physical therapist to attempt treatment of a patient whether that attempt results in care or not.²¹ Paying physical therapists to attempt, but not provide treatment to patients, has long-term effects on the health care costs of patients that must be cared for longer and for conditions that may have been avoided.

The purpose of this study was to further explore the phenomenon of non-treatment through a survey of the treating therapists about their attributes, examining all of the scheduled visits between therapists and patients, and modeling the attributes of the encounter from the patient, therapist, and environment against the outcome of treatment being provided or not.

METHODS

Facility and Subjects

Data were collected retrospectively from the charting at a suburban hospital in the Southwest United States. This was a 454-bed hospital with a physical therapy staff consisting of 8 full-time and 16 per diem therapists, 2 full-time physical therapy assistants (PTA), and 3 full-time aides. Weekday staffing typically required 6 PTs, 2 PTAs and 2 aides. Weekends saw a 20-35% reduction in therapist-hours; weekends were also 70%-80% staffed by per diem therapists and 20%-30% regular full time therapists that would then have a different day off during the week. The typical Medicare patient had an average LOS of 4.3 days in this facility. From physical therapist documentation, data were obtained on 1252 patients scheduled for 6246 sessions. These patients aged from newborn to 99 years old with a mean age of 68.83 and SD 18.603. There were significantly fewer 45.2% (566) males than 54.8% (686) females (χ^2 11.502(1) $p=0.001$). Inclusion criteria were that patients be admitted to the hospital and have at least two scheduled physical therapy as an inpatient; there were no exclusion criteria. The University of Nevada, Las Vegas institutional review board, approved the study.

The provision of physical therapy services at this hospital was directly organized by a lead physical therapist. This therapist arrived before the others to organize and allocate patients at the beginning of each day. Referrals for new patients came to the physical therapy department through an electronic notification system from each nursing unit. Each physical therapist was assigned approximately eight patients per day with a mix of treatment and evaluation sessions. Once these morning assignments were made each therapist decided how to organize and schedule their patients for the day. During the day, new evaluations were given to the therapist working in the area of that patient.

The department used a paper 'card' to track each patient. These cards were not part of the medical record but were used for note taking throughout a patient's stay. Information on the front of the card included patient demographic and evaluation information such as diagnosis and goals. The back of the card included brief notation of the daily care provided to the patient. Therapists at the hospital were encouraged to keep the cards updated to facilitate ease of communication between treating therapists, but the formal medical record was always the ultimate location for information about patient management and the cards did not contain all the information of the full medical record.

Data Collection and Interpretation Procedures

The research team was composed of individuals that are not affiliated with the hospital; one faculty member and three graduate students. These four individuals performed all data extraction and analysis. The lead inpatient therapist at the hospital was consulted for information about hospital process and procedure. The lead inpatient therapist was not directly involved in data extraction, analysis, or manuscript preparation.

The hospital risk management department would not allow the research team access to the formal medical record, but would allow access to the handwritten therapist-generated cards, previously described. Data for this study were extracted from these cards. In addition to descriptive statistics, regression modeling was performed with scheduled session outcome (treated or not) as the dependent variable with several independent variables described below.

Overall non-treatment rates were calculated by dividing the total number of visits that did not result in treatment by the total number of scheduled treatment sessions. For each patient, the plan of care may have included twice or three times daily scheduled treatment. Occasionally the documentation did not clearly separate these different

sessions occurring in a single day. When this occurred, and it was not clear what had happened, the patient was not included for analysis.

The therapist-documented reason for each event of non-treatment was also collected. If there was no reason for non-treatment specified, or no documentation when a session was scheduled, the reason was coded as “Unknown.” “Refusal” was used when it was clear the patient refused treatment for that encounter. In cases where documentation indicated the patient refused treatment due to their condition, the failed encounter was coded as “Medical condition” rather than “Refusal.” If a medical hold was placed on a patient and documented, those encounters were also counted as “Medical condition.” If a patient was noted to be unavailable due to additional testing or treatments with other health care providers, the non-treatment event was categorized as “Scheduling conflict.” “Insufficient staff” was used when either it was stated as such on the record or when the therapist documentation indicated a high patient load or not having enough time to see all patients. Other infrequently used categories were “Already discharged” and “Patient death.”

Patient diagnosis was determined by the primary medical diagnosis. If multiple diagnoses were listed, the diagnosis thought to most likely contribute to the patient’s current condition was used. For example, a patient with a diagnosis of chest pain may have been experiencing musculoskeletal or gastrointestinal symptoms rather than cardiovascular.⁶³ Such instances were coded after review of as much information from the documentation as possible to obtain confidence by the research team. Any diagnoses that could not be clearly classified with the charted information were classified as “Other.”

Surveys were collected from all treating therapists that consented to participate in the study. These surveys asked demographic questions as well as questions that might relate to their non-treatment rate (see Appendix). The purpose for the study was

described to the therapists by the primary investigator during a staff meeting at the hospital and paper surveys were distributed and collected at the end of the meeting. The lead inpatient therapist for the department attempted to collect surveys from any therapists not present at the meeting. There were 15 therapists that participated in the study, 7 men and 8 women; they were between 25 and 54 years old with an average age of 38.1 years. The remaining results of the survey can be seen in the results.

Data Analysis

All data were analyzed using SPSS*. Descriptive statistics included rates of non-treatment for different tracked variables, calculated by dividing the number of non-treatment events and dividing by the total number of scheduled events. Generalized Estimating Equations (GEE) were used to model treatment outcome (yes or no, binary logistic model) for scheduled sessions. This is a statistical method for dealing with repeated measurements of subjects followed longitudinally, without biasing the parameters when the number of measurements for each subject is unequal.⁸⁶⁻⁸⁸ The models employed an unstructured correlation matrix. The Factors were patient gender, patient diagnosis, day of the week on which the session was scheduled and the Covariate was patient age. All 4 independent variables were placed into the model for main effects and the quasi-likelihood function was set to 'kernel'. Two models were created: one excluded a single patient that was scheduled for 113 therapy sessions and the other excluded the 5 patients with more than 40 scheduled therapy sessions. Due to the high number of non-treatment events by unknown therapists therapist variables were not entered into the model. Finally, the first visit of a physical therapist with a patient in this setting typically is not recorded until it is successful, so the instances of documented non-treatment for a first session were rare and represented extreme cases. Because of

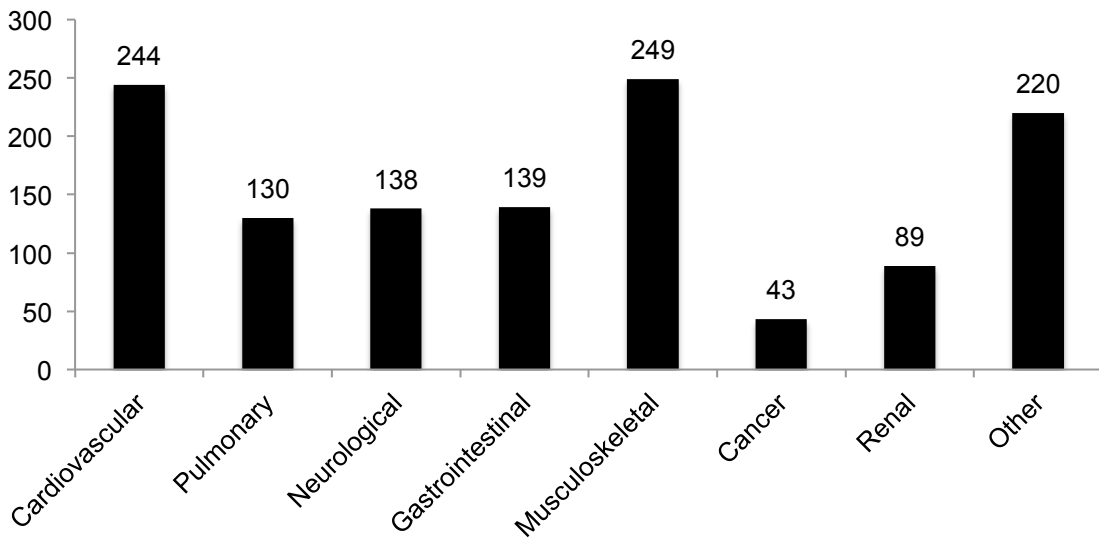
* IBM SPSS Statistics for Macintosh, Version 22.0. Armonk, NY: IBM Corp.

this, the first session in any patient's episode of care was often excluded from analysis or reported separately in the results for non-treatment.

RESULTS

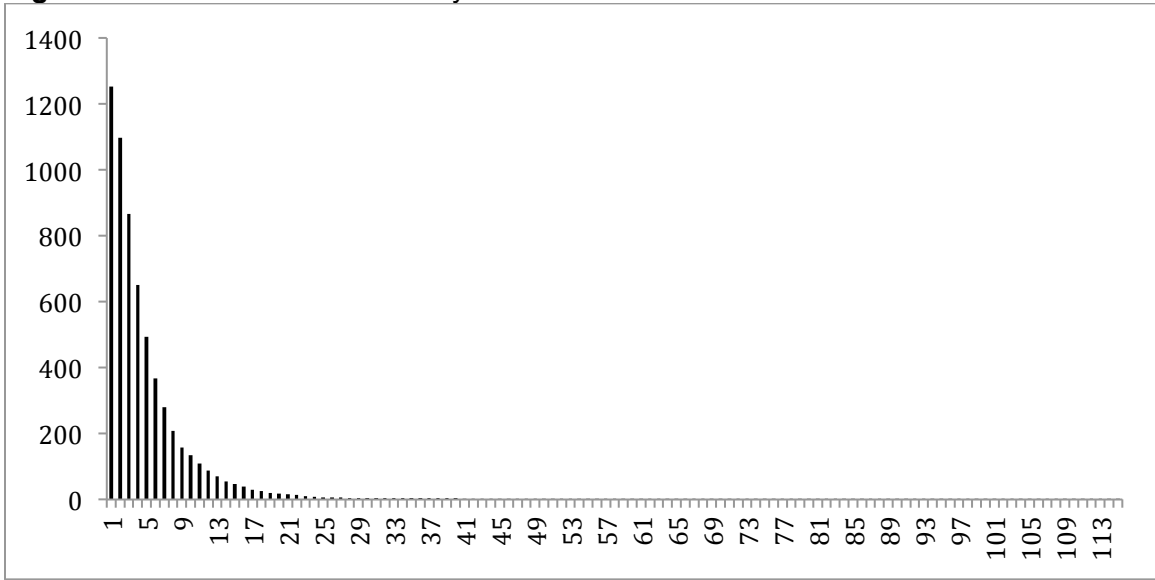
The number of patients within each diagnosis group can be seen in Figure 6. The categories with the most patients were Cardiovascular (244 19.5%) and Musculoskeletal (249 19.9%) while Cancer (43 3.4%) and Renal (89 7.1%) had the least.

Figure 6. Number of patients within each diagnosis group.



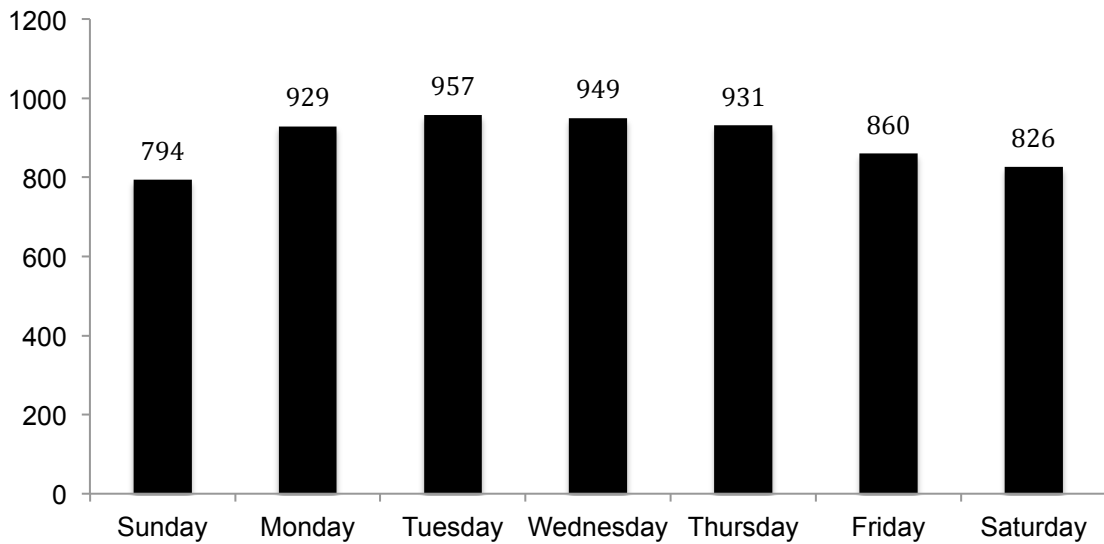
Patients had between 1 and 113 scheduled sessions. Session 23 is the last session that had at least 10 scheduled encounters; session 27 is that last session with more than 5 scheduled encounters. The 5 patients with 40 or more sessions were 3, 15, 253, 577, and 1085. Only one patient had more than 55 scheduled sessions; this was patient 1085. The average number of scheduled sessions per patient was 6.01.

Figure 7. Scheduled encounters by session number.



The number of scheduled sessions for each day of the week can be seen in Figure 8. Tuesday had the most scheduled sessions with 957 and Sunday had the least scheduled sessions with 794. The number of scheduled sessions by day of the week was not equal across days, $X^2=28.407$, $p<0.001$

Figure 8. Number of scheduled sessions by day of the week.



Therapist survey results

Results from the therapist survey can be seen in Tables 10 and 11. Two of the therapists were African American, 6 Caucasian, and 7 Asian/Pacific Islander. Therapists had 12.1 average years of experience overall, and 7.2 years of experience in the acute hospital. Two of the therapists were physical therapy assistants and had associates degrees; the remaining 13 therapists were licensed Physical Therapists, but 6 were bachelors trained (BSPT), 2 were masters trained (MSPT), and 5 were doctorally (DPT) prepared; despite the difference in education level, the survey question about how prepared they felt to practice in this inpatient setting averaged 6.3/7 and the lowest anyone scored themselves was 5/7. Additionally there was no association between education and income, Spearman's ρ 0.074, $p=0.801$. Just more than half (8) of the therapists were full time employees and the remaining 7 worked as per diem employees, this resulted in employees working an average of 30 hours per week.

Table 10. Physical therapist survey results (continuous variables).

	N	Range	Mean	SD
Age	15	25-54	38.13	7.36
Experience	15	1-21	12.13	6.32
AC* experience	15	0.5-21	7.20	5.22
Hours worked	15	8-40	30.27	12.93
Units billed	15	4-40	29.07	9.39
Evaluations	13	0-18	12.69	5.55
Tech use	15	0-5	2.03	1.41
Preparedness	15	5-7	6.29	0.85

*AC – Acute Care; Experience in years; hours worked is per week, units billed is per shift, evaluations is per week, tech use is hours per shift, preparedness is a 1-7 Likert scale where 1 is no confidence and 7 is total confidence.

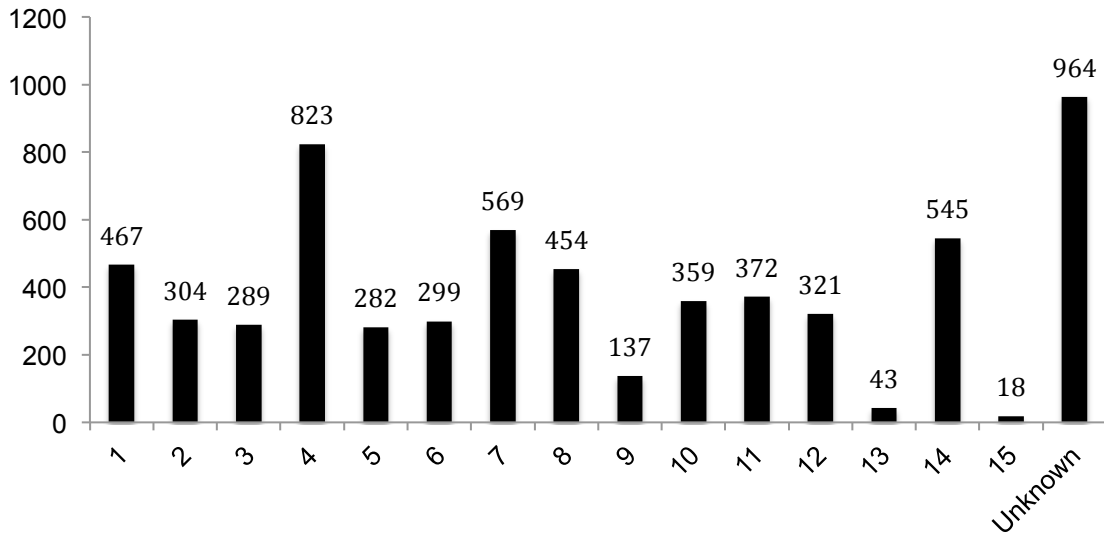
Table 11. Physical therapist survey results (categorical variables).

	Count	Percent
Gender		
Male	7	46.7
Female	8	53.3
Race		
African American	2	13.3
Caucasian	6	40.0
Asian/Pacific Islander	7	46.7
Income		
\$35k-\$49k	2	13.3
\$50k-\$74k	5	33.3
\$75k-\$99k	6	40.0
\$100k+	1	6.7
Terminal Degree		
Associates	2	13.3
Bachelors	6	40.0
Masters	2	13.3
Doctorate	5	33.3
Employment Status		
Full Time	8	53.3
Per Diem	7	46.7
Shift Start Time		
6am	2	13.3
6:30am	2	13.3
7am	5	33.3
8am	2	13.3
8:30am	1	6.7
9am	1	6.7
Technician's used		
Yes	14	93.3
No	1	6.7

The 15 therapists that completed surveys provided 84.6% of the scheduled visits in the sample; unknown therapists provided the remaining 15.4% of scheduled visits.

The number of scheduled sessions for the participating therapists ranged from 18 to 823 with a mean of 352.13 scheduled visits per therapist.

Figure 9. Scheduled visits for each therapist.



Non-treatment

Within the 6246 total scheduled sessions there were 995 instances of non-treatment representing 15.9%. Individual patient non-treatment rates ranged from 0% to 100%. The subject with the greatest number of scheduled sessions, subject 1085, had a non-treatment rate of 36.3% and the 5 subjects that were scheduled for 40 or more sessions had a combined non-treatment rate of 32.4%.

The non-treatment rate based on session number ranged from 1.3% on session 1 to 100% on several of the later sessions where only patient 1085 was seen. The average non-treatment rate for sessions 2 through 23 (76.9% of all scheduled sessions) was 19.1% (4801 scheduled sessions, 915 instances of non-treatment). For sessions beyond 23, the average non-treatment rate was 32.4%.

Figure 10. Frequency of session outcome; 'yes' for treatment and 'no' for non-treatment.

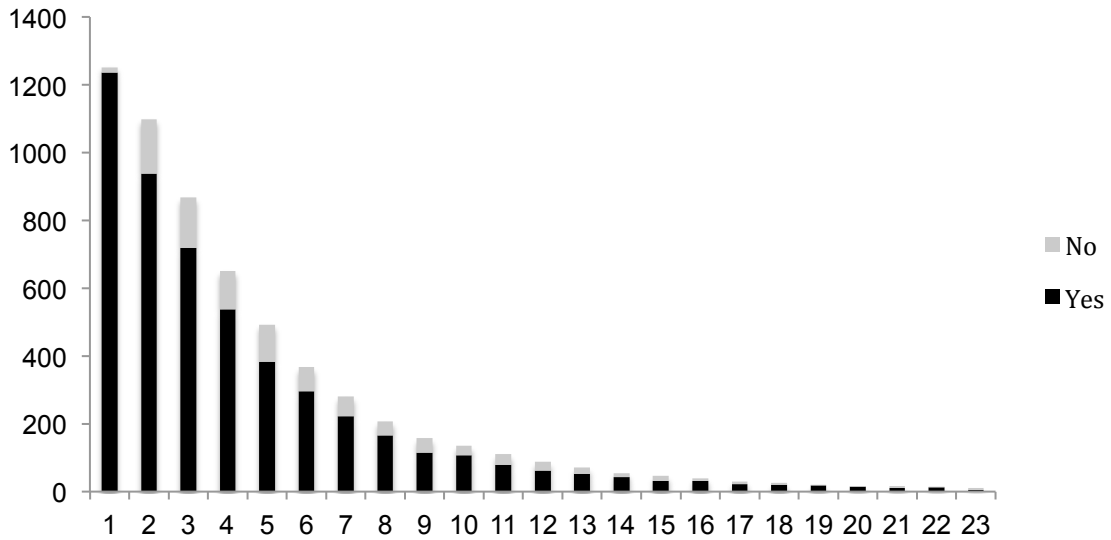
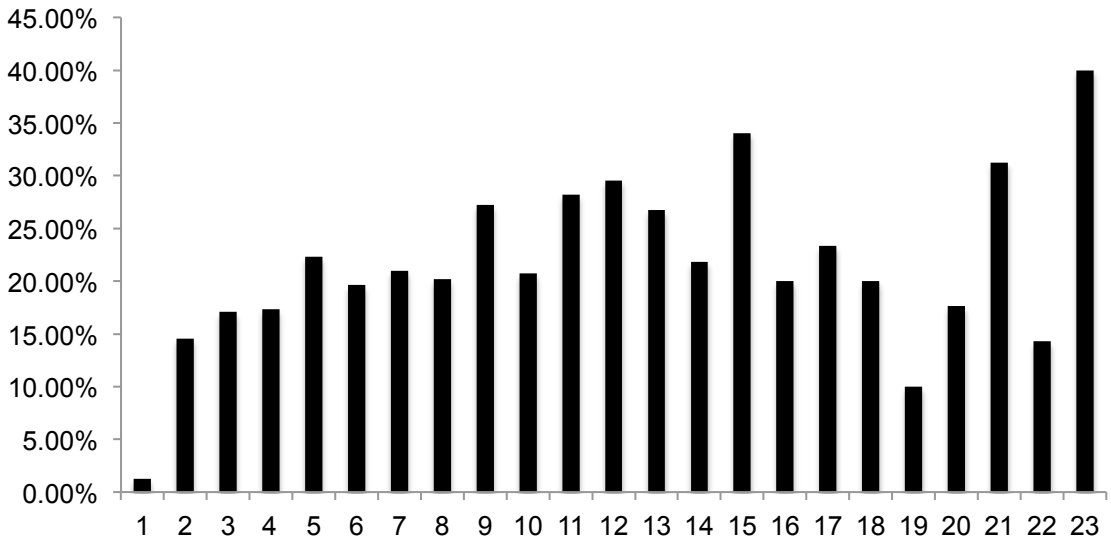


Figure 11. Non-treatment rate by session number.



For all sessions, the non-treatment rate of therapists ranged from 5.4% to 23.2%.

Among the 995 total instances of non-treatment, unknown therapists accounted for 31.6%; the next closest single therapist contributed 13.3% of non-treatment sessions. Table 12 shows the non-treatment data by therapist for all sessions while Table 13 shows the same data when the first session is not included. The values were similar

between these two tables, likely due to the small number of non-treatment events on session 1.

Table 12. Therapist non-treatment event counts and rates.

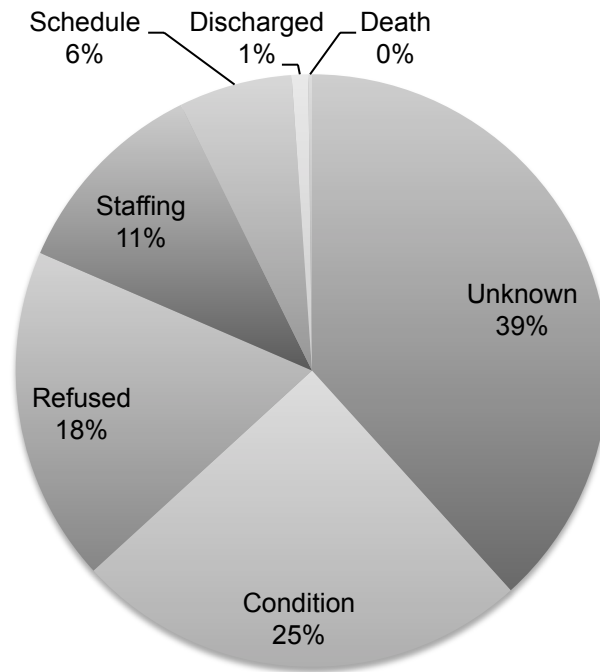
Therapist	Total Scheduled Sessions	Non-Treatment Sessions	Non-Treatment Rate	Proportion of all Non-Treatment
1	467	54	11.56%	5.43%
2	304	30	9.87%	3.02%
3	289	33	11.42%	3.32%
4	823	53	6.44%	5.33%
5	282	47	16.67%	4.72%
6	299	16	5.35%	1.61%
7	569	132	23.20%	13.27%
8	454	57	12.56%	5.73%
9	137	20	14.60%	2.01%
10	359	60	16.71%	6.03%
11	372	36	9.68%	3.62%
12	321	27	8.41%	2.71%
13	43	4	9.30%	0.40%
14	545	111	20.37%	11.16%
15	18	1	5.56%	0.10%
Unknown	964	314	32.57%	31.56%

Table 13. Non-treatment rate for therapists excluding session 1.

Therapist	Total Scheduled Sessions	Non-treatment Sessions	Non-Treatment Rate	Proportion of all non-treatment
1	326	53	16.26%	5.41%
2	196	30	15.31%	3.06%
3	246	33	13.41%	3.37%
4	649	52	8.01%	5.31%
5	263	46	17.49%	4.70%
6	217	16	7.37%	1.63%
7	473	132	27.91%	13.48%
8	357	57	15.97%	5.82%
9	87	18	20.69%	1.84%
10	346	60	17.34%	6.13%
11	296	36	12.16%	3.68%
12	241	26	10.79%	2.66%
13	33	4	12.12%	0.41%
14	446	105	23.54%	10.73%
15	15	1	6.67%	0.10%
Unknown	803	310	38.61%	31.66%

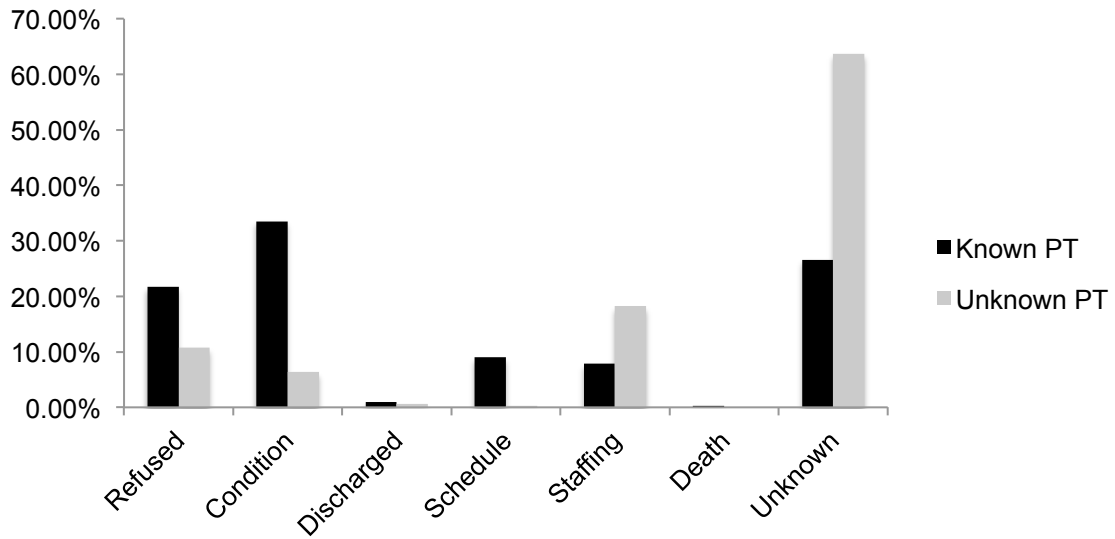
The therapist-documented reasons for non-treatment can be seen in Figure 12. The category with the largest proportion (38.3%) of non-treatment events did not have a documented reason followed by *condition*, *refused*, and *staffing* being the next three largest categories.

Figure 12. Therapist documented reason for non-treatment.



There were large differences in the therapist-documented reasons for non-treatment events when comparing known and unknown therapists. Non-treatment by a known therapist was more often attributed to patients' refusal or patients' condition than it was for unknown therapists. Whereas, it was much more frequent for non-treatment events by unknown therapists to be for unknown reasons or attributed to low staffing than it was for known therapists (Figure 13).

Figure 13. Therapist documented reason for non-treatment for known and unknown therapists.



All of the non-treatment rates for the diagnosis categories were nearly 20% or more, except for musculoskeletal which was just over 10%. The non-treatment rate based on diagnosis (excluding session 1) ranged from 10.8% for Musculoskeletal to 26.6% for Cancer (Figure 14). When separating non-treatment rates by diagnosis into known and unknown therapists the rates were similar but not always exactly the same. The largest differences in non-treatment rates occurred between patients with musculoskeletal (unknown therapists higher) and other (known therapists higher) diagnosis categories (Figure 15).

Figure 14. The non-treatment rate based on diagnosis (excluding session 1).

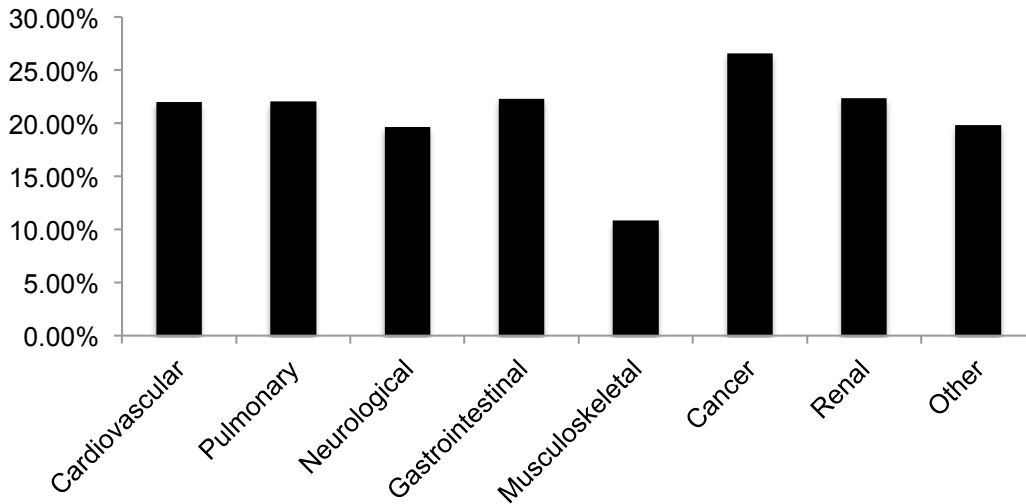
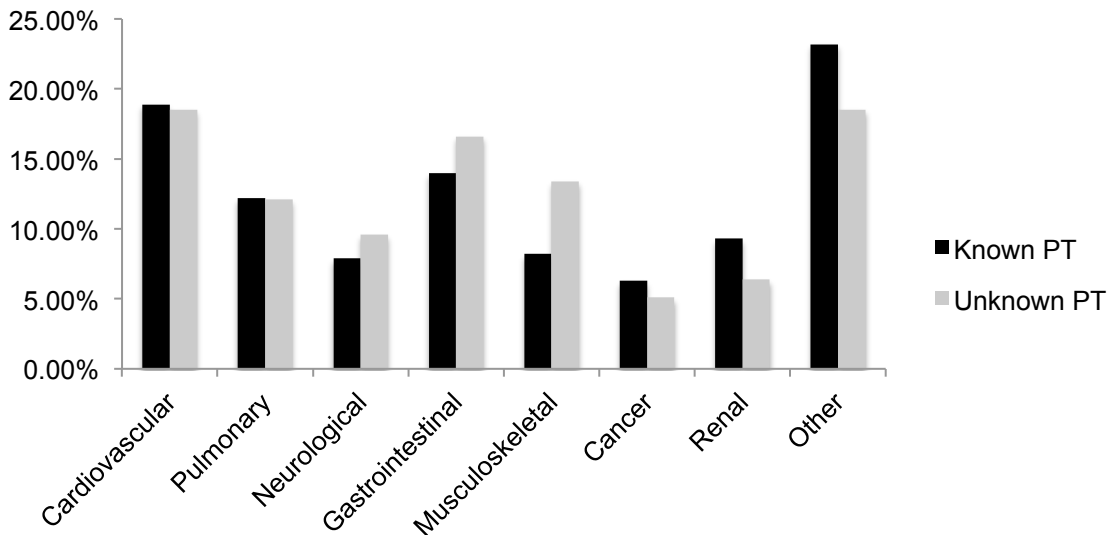


Figure 15. The proportion of non-treatment events, based on diagnosis, for known and unknown therapists.



The non-treatment rate based on day of the week (excluding session 1) ranged from 12.9% on Tuesday to 33.9% on Sunday (Figure 16). Saturday and Sunday were the only days that had a non-treatment rate of more than 20%; however, Friday was very close at nearly 19.9%. There were large differences in the non-treatment rate when

looking at sessions by known and unknown therapists. On most days, known therapists had the higher non-treatment rate; however, Saturday and Sunday both had the reverse pattern, with unknown therapists accounting for the majority of non-treatment events on those days (Figure 17).

Figure 16. Non-treatment rate based on day of the week (excluding session 1).

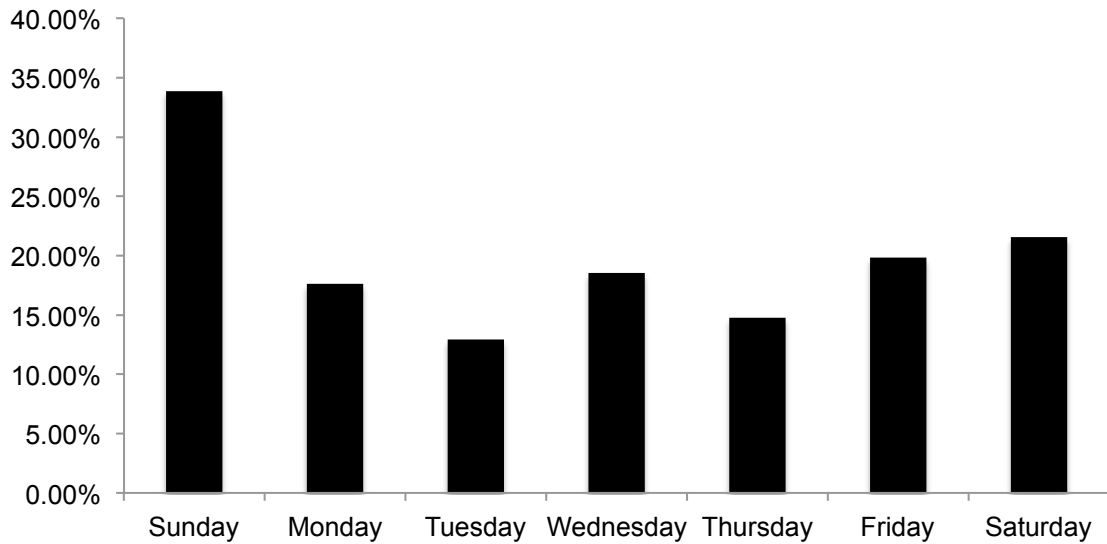
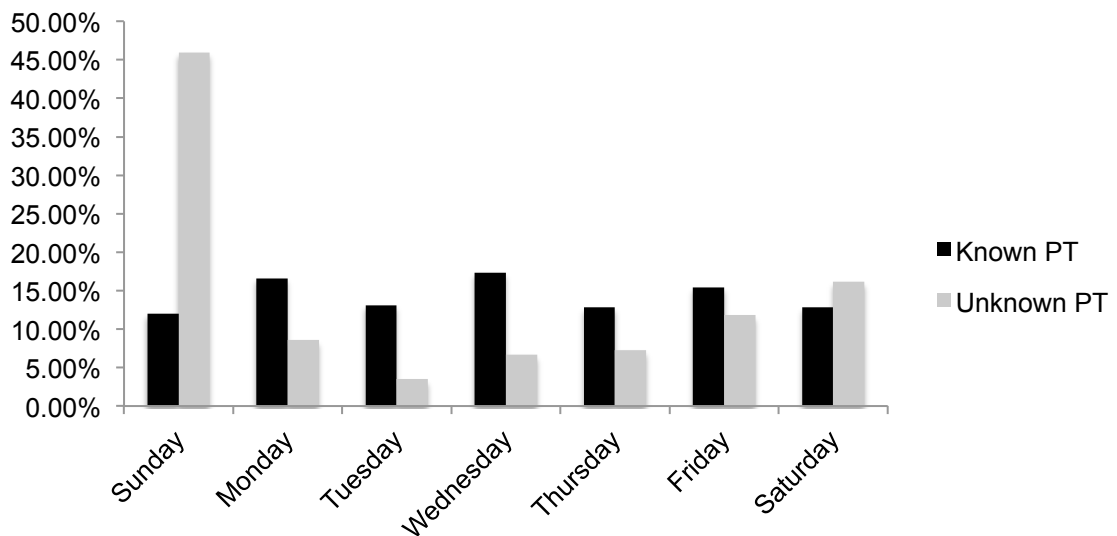


Figure 17. The proportion of non-treatment events, based on day of the week, for known and unknown therapists.



Modeling

Two models are presented in Table 14 and in both, participation in the scheduled therapy session was the binary dependent variable and patient gender, patient diagnosis, day of the week on which the session was scheduled, and patient age were the predictors. Additionally, both models excluded the first scheduled session with any patient. Model 1 included all patients except for patient 1085 and all scheduled patient visits after the first. Model 2 included all patients except for patient's 3, 15, 253, 577, and 1085 and all scheduled patient visits after the first.

Patient gender was associated with greater odds of non-treatment in Model 1 but not Model 2. In Model 1 men had 33% greater odds of non-treatment compared to women. Regarding patient diagnosis, in Model 1, the odds of non-treatment for someone with a diagnosis other than musculoskeletal were always significantly higher than that of a patient with a musculoskeletal diagnosis. The worst case was for patients with a gastrointestinal diagnosis; these patients had 3.4 times the odds of experiencing non-treatment when compared to patients with a musculoskeletal diagnosis. In Model 2 the same was true for all diagnoses except for renal; patients with renal diagnoses were not significantly more likely than patients with musculoskeletal diagnosis to experience non-treatment.

Considering the day of the week on which therapy was scheduled, in Model 1 patients scheduled for therapy on Friday or Sunday had significantly greater odds of non-treatment than a patient scheduled for therapy on Tuesday. In fact, patients scheduled for therapy on Sunday had nearly 3 times the odds of non-treatment compared to people scheduled for therapy on Tuesday. In Model 2 all days, except for Thursday, had greater odds of non-treatment than did Tuesday. Again, Sunday was the

day on which non-treatment was most likely to occur, the odds being over 3.3 times that of the odds for non-treatment on Tuesday.

Table 14. Multivariate models using Generalized Estimating Equations.

	Model 1			Model 2		
	Sig.	Exp(B)	95% CI	Sig.	Exp(B)	95% CI
Gender						
Male	0.01	1.33	1.06-1.67	0.31	1.12	0.90-1.39
Female	Reference					
Diagnosis						
Cardiovascular	0.00	2.39	1.62-3.54	0.00	2.29	1.55-3.38
Pulmonary	0.00	2.69	1.77-4.09	0.00	2.65	1.76-3.99
Neurological	0.00	2.18	1.38-3.45	0.00	2.14	1.36-3.36
Gastrointestinal	0.00	3.35	1.92-5.85	0.00	2.50	1.68-3.71
Cancer	0.00	2.92	1.73-4.94	0.00	2.80	1.55-5.08
Renal	0.00	2.46	1.53-3.95	0.63	1.16	0.64-2.12
Other	0.00	1.89	1.24-2.87	0.00	1.91	1.26-2.90
Musculoskeletal	Reference					
Day of Week						
Sunday	0.00	2.93	2.21-3.90	0.00	3.32	2.47-4.47
Monday	0.59	0.72	0.22-2.35	0.03	1.42	1.04-1.93
Wednesday	0.54	1.17	0.71-1.93	0.00	1.66	1.23-2.22
Thursday	0.52	1.10	0.82-1.47	0.10	1.31	0.95-1.79
Friday	0.00	1.78	1.29-2.46	0.01	1.60	1.15-2.21
Saturday	0.41	1.26	0.73-2.18	0.00	1.71	1.24-2.36
Tuesday	Reference					
Age	0.01	0.99	0.99-1.00	0.29	1.00	0.99-1.00
	QIC*	4749.702		QIC*	4482.585	
	QICC*	4663.638		QICC*	4458.265	

Model 1 – Excluding subject #1085 and session #1

Model 2 – Excluding subject #'s 3, 15, 253, 577, 1085 and session #1

*Quasi Likelihood under Independence Model Criterion

*Corrected Quasi Likelihood under Independence Model Criterion

DISCUSSION

The purpose of this study was to further explore the phenomenon of non-treatment by examining all scheduled visits between therapists and patients whereas only the second session had been previously studied. This study also included a survey

of treating therapists to examine their attributes for potential contribution to the non-treatment phenomenon.

As was previously suspected, the non-treatment rate for the first documented session between a therapist and patient was very different than the other scheduled visits. The non-treatment rate of the first scheduled session in this study was less than 2% while the rate on sessions 2-20 ranged from 14.5% to 34%. It did appear that the non-treatment rate was increasing from sessions 2-15 and then became extremely variable thereafter. This is likely due to the diminishing number of scheduled sessions with patients beyond 15. Session number can be seen as a proxy for hospital length of stay (LOS), which in this study was not available. When LOS was added as a variable in the model it did show that non-treatment was significantly less likely in visits 2-23 than it was for sessions beyond 23. The small sample of subjects included in the data with more than 23 sessions made confidence in this result weak and so it was not included in the final models.

In previously published reports of non-treatment rates there was no attempt to describe the rate as it varied between sessions and must have included the first scheduled session.^{21,65} It is possible that patients who need to be in the hospital for longer than an average LOS are too ill for therapy more often than patients with shorter stays. It is also possible that the patients with longer stays are approached with less urgency for therapy participation than patients with shorter stays. More research is needed to examine this relationship.

Patients with musculoskeletal diagnosis had the lowest non-treatment rate in this study. In these data, the odds for patients with diagnosis other than musculoskeletal to experience non-treatment when compared to patients with a musculoskeletal diagnosis were significantly influenced by a small number of patients. Patients with unusually long hospitalization can clearly have a strong influence on data analysis of this type.

Hospitals that specialize in the treatment of other conditions like stroke centers or oncology centers may see very different results than were seen in this general suburban community hospital.

In this study, Sunday was a particularly problematic day when it comes to non-treatment. Not only was the non-treatment rate much higher than other days, but also the vast majority of the non-treatment events could not be attributed to a specific therapist. This hospital, like many, hires its regular full-time therapists to primarily work Monday through Friday. Weekend coverage is managed by hiring part time or per diem therapists for most of the weekend work and filling in with regular full-time therapists that then have a different day off during the week. At this hospital Sunday's are staffed by 70%-80% per diem therapists and it would appear that they account for most of the non-treatment events on Sunday and most of the 'unknown' therapists; however, it is not known how often full-time therapists neglected to document their association with a non-treatment event. For this reason including any of the therapist variables in the modeling could not be done with confidence. Access to the full medical record would have allowed the research team to know which therapists attempted care in all cases.

A simple solution to the difficulty associated with staffing physical therapists on Sunday would be to reduce the number of patients put on the Sunday schedule. The physical therapist is the health care provider deciding how many therapy sessions a patient needs per week. Establishing a plan of care for 5 or 6 days per week could eliminate the issue with staffing and non-treatment on Sunday. This solution is not recommended for 2 reasons. First, the addition of weekend physical therapy has been shown to provide benefits in functional outcomes, discharge destination, LOS, and prevention of secondary complications.^{34,47,53,54,56} Second, early intervention for patients with critical illness or patients in critical care units has been shown to reduce LOS in the critical care units and prevent secondary complications.^{33,35,42,58,84,89,90} For these reasons

other solutions to the weekend staffing and non-treatment phenomenon should be sought.

The potential and expected impact of physical therapist characteristics on non-treatment events could not be fully explored in this study. The therapist surveys did provide an interesting portrait of the clinicians providing care at this hospital; however, the missing therapist documentation for such a large proportion of non-treatment events did not allow for the association between these therapist variables and non-treatment to be calculated. Future research should seek data sets that capture all therapists associated with non-treatment events. The results of this study are also limited by data coming from only one hospital. Despite a large sample size over several months of time these data can only be used to explain non-treatment at similar hospitals. Future research at hospitals of different scope and purpose need to be investigated.

CONCLUSIONS

Non-treatment of hospital inpatients for scheduled physical therapy is problematic for patients, hospitals, and the health care system. The rate of non-treatment subsequent to the first scheduled session may be more than 30% higher than rates that include the first visit. Patient diagnosis may play a role in the frequency of non-treatment events. Weekend days, particularly if staffing is different from weekdays, are especially prone to non-treatment. The known benefits of early and ongoing physical therapy should support future research to understand and reduce the phenomenon of non-treatment.

CHAPTER 5

SUMMARY, SIGNIFICANCE, AND FUTURE STUDIES

It would seem that scheduled physical therapy sessions for hospital inpatients would always occur. The patients are staying in the hospital, the physician and physical therapist have agreed that therapy is needed and the outpatient issues of appointment cancellation or not showing for appointments do not exist. Limited published evidence exists beyond that presented in this dissertation that, in fact, scheduled physical therapy in the acute hospital regularly results in non-treatment.^{21,65} The occurrence of scheduled therapy sessions that result in non-treatment varies widely by patient, therapist, or calendar but averages at least 1 in 5.

In this dissertation, it can be seen that the therapist-documented reason for non-treatment may not be the best explanation for why scheduled therapy sessions result in non-treatment. In chapter 2 it was reported that therapists were asked to reduce non-treatment due to patients refusing to participate. It was certainly anticipated that some of those sessions would then result in treatment being provided by a more encouraging, persuasive therapist; however, the non-treatment was simply recategorized to avoid what had become an undesirable explanation.

Acute hospital inpatients do not go to the hospital to receive physical therapy. They all have other medical needs requiring that level and type of care. Sometimes those medical needs are due to very serious, life threatening, illness or injury. It is reasonable that occasionally such patients would not be physically able, or medically appropriate, to engage in exercise. In this dissertation the patients medical condition was not only a common therapist documented reason for non-treatment, it was also independently predictive of non-treatment in statistical models. However, a growing body

of evidence indicates that even this should rarely be a reason to eliminate the skillful provision of therapist led exercise and activity.^{42,83,91}

Staffing and scheduling of therapists to provide the 7-day-a-week coverage that is required in the acute hospital is an ongoing challenge, but one with known benefits.^{34,54,92-94} Wage and labor laws in the US prevent therapists from working at their place of primary employment for more than 40 hours per week without being paid overtime wages. In order to control wage costs, most hospitals instead use part time or per diem therapists to cover these hours. Some hospitals have their therapists work non-traditional workweeks to provide weekend coverage including 7-days on followed by 7-days off. It is not known from the data in this dissertation, the cause for the increased non-treatment rate on certain days, particularly Sunday. Two hospital policies likely contribute; first, the hours worked by all therapists combined is less than other days; second, most of the therapists are per diem employees that work full time somewhere else and come to the hospital on weekends for extra money.

Comparisons between hospitals with traditional staffing models like the ones in this dissertation, with those who provide therapy at more consistent levels and with more consistent therapists on all days, would provide valuable insight into the importance of staffing on non-treatment. One study showed no differences between the day of the week on which a patient was admitted and the number of days between admission and a first session with a physical therapist. In that same study however, postponed or canceled sessions were significantly associated with the number of days from admission to the first session with a physical therapist and, comorbidities increased the time it took for patients to be treated by a physical therapist.¹⁷ Most of the acute care hospitals in the Intermountain Health Care (IHC) system of Utah have a 7-day on 7-day off staffing model for their therapists. Efforts to involve them in this research are ongoing.

The verbal and non-verbal communication of the therapist when approaching a patient for scheduled therapy sessions is an area of likely influence on participation, but has not been explored or described. Qualitative research studies that involved listening and watching therapists attempt to initiate a therapy session would provide valuable insight into aspects of the non-treatment phenomenon difficult to capture with quantitative measures. Personality of the therapist and how that interacts with the patient is also a potential effector of non-treatment. Personality types among physical therapists have been reported, but not recently, and not as they relate to non-treatment in the acute hospital.⁹⁵⁻⁹⁹

This dissertation is strengthened by the large data sets for the three studies. The values described for non-treatment in all chapters along with the odds of non-treatment presented in chapters 3 and 4 can be interpreted with confidence. All three of these studies, however, came from limited access to all of the variables of interest. In chapter 2 the data did not have the detail to allow for evaluation of individual patients or therapists. It was clear that one patient and one therapist were represented by each encounter but how many therapists and how many patients contributed to those encounters was not. Additionally, in the data for chapters 3 and 4 the therapist for any scheduled encounter with a patient was often not identified when the scheduled session resulted in non-treatment. Data from surveyed therapists does offer other hospitals the ability to compare their staff, but could not be associated with the proportion of non-treatment.

There are public health policies that can be considered based on the results of these studies. Most physical therapists entered the profession with the desire to help people recover from disability and illness; they also expect to be compensated for this work. Most hospitals pay their physical therapists for the number of hours they spend at the hospital. This financial incentive distances the therapist from their initial motivation to

help people; the therapist is paid for treatment and non-treatment time the same. Coupling remuneration to the physical therapist with treatment but not non-treatment would help to reestablish the connection between the financial motivation and the desire to help people, since that help cannot be provided through non-treatment.

The current reimbursement model in acute care hospitals is one in which the payer provides the hospital a fixed amount for a patient stay based on the admitting diagnosis of the patient and not on the care the is required. It is then left to the hospital to manage that money to both optimize care for patients and maintain profitability. Hospital allocation of more resources to attract physical therapists to provide treatment on weekends would likely be a good investment.^{47,51-54,56,94} Additionally, hospitals could offer physical therapists a financial incentive for providing treatment on weekend days which would not be available for non-treatment or on other days.

Productivity measurement for physical therapy clinicians in the acute hospital has traditionally been a calculation of hours spent in direct patient care divided by hours worked. At the same time this has not been directly tied to reimbursement of the treating clinician. While I have suggested that this may be a solution for the non-treatment observed on Sundays in this dissertation there are concerns with this type of measure and incentive. The quality of the therapy is not addressed and the incentive for false billing is enhanced. Currently the Acute Care Section of the American Physical Therapy Association has a task force working on a productivity measure based on value. Value in health care can be thought of in terms of the benefit to the patient, or the outcome, divided by the cost of providing that care.

Another public health opportunity that can come from this work is direct patient education. Materials given to patients when admitted to an acute hospital explaining the benefits of physical therapy and their rights to access those services, regardless of their diagnosis or day of the week, could also significantly contribute to the appropriate

provision of services to all patients on all days of the week. When patients, and families or caregivers of patients, advocate for their healthcare needs those needs are often better addressed.

Education materials should describe what physical therapy services are, as misconceptions exist about what physical therapy is and where it is provided. Materials could also generally explain why physical therapy may be helpful for people in the acute hospital. Patients and families could then be encouraged to ask their doctor if physical therapy is appropriate for them during their hospitalization and if therapy on the weekends would also be appropriate.

In conclusion, this dissertation provides evidence that non-treatment occurs frequently among patients that have been previously identified as needing physical therapy services. There is strong evidence that patient diagnosis, staffing, and scheduling effect the frequency with which non-treatment occurs. There is also evidence that different therapists, even with similar patients and schedules, have very different proportions of non-treatment. More work is needed to understand the role of the individual therapist on non-treatment and to develop strategies to reduce non-treatment of patients by physical therapists in the acute hospital.

APPENDIX

Therapist Survey

Name: _____ Age: _____ Gender: _____

Ethnicity (circle one): Hispanic Not Hispanic

Race (circle one): American Indian Asian/Pacific Islander African American
White

Income (circle one): 0-\$34,999 \$35,000-\$49,999 \$50,000-\$74,999 \$75,000-\$99,999 \$100,000+

1. How many years experience do you have as a physical therapist?

2. What is your terminal clinical degree? (circle one) Bachelors, Masters, or DPT

For the next set of questions answer only regarding acute care employment

3. What is your current employment status (ie., FT, PT, PRN . . .)

4. How long have you worked in this setting? Years _____ / Months

5. How many hours do you work in the course of an average workweek?

6. What is the average length of your shift?

7. What time(s) of day do you typically work?

8. On average how many PT units do you bill per shift?

9. How many evaluations do you perform in an average week?

10. Do you have access to PT Techs? Yes No
11. If so, how many hours per day do you work with a Tech?

12. What types of tasks do your techs perform?

13. Does your current health limit you in any way from performing your work as a therapist? (circle one) Yes No
14. If yes how?

15. How well do you feel your entry-level education prepared you for a job in acute care? (where 1 is not at all prepared and 7 is very prepared)
1 2 3 4 5 6 7

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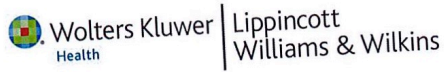
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95. Rovezzi-Carroll S, Leavitt R. Personality characteristics and expressed career choice of graduating physical therapy students. *Phys. Ther.* 1984;64(10):1549-1552.
96. Lysack C, McNevin N, Dunleavy K. Job choice and personality: a profile of Michigan occupational and physical therapists. *J. Allied Health* 2001;30(2):75-82.
97. Coyne C. Understanding PT, PTA, and Patient Personality Types. *PT Mag.* 2004;12(4):1-8. Available at: <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Understanding+PT,+PTA,+&+Patient+Personality+Types#0>. Accessed October 15, 2014.
98. Rezler AG, Buckley JM. A comparison of personality types among female student health professionals. *J. Med. Educ.* 1977;52(6):475-477.
99. Bezner JR, Boucher BK. The influence of personality type on decision making in the physical therapy admission process. *J. Allied Health* 2001;30(2):83-91.

CURRICULUM VITAE

Daniel L. Young, PT, DPT

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EDUCATION

- University of Nevada, Las Vegas - Las Vegas, Nevada
 - PhD(c), Epidemiology & Biostatistics - 2010-present
- Creighton University - Omaha, Nebraska
 - DPT, Doctor of Physical Therapy - 1999-2002
 - Also awarded a Health Services Administration Certificate - 2002
- Southern Utah University - Cedar City, Utah
 - BS, Bachelor of Science in Biology - 1992-1999

ACADEMIC APPOINTMENTS

- Associate Professor - Department of Physical Therapy, School of Allied Health Sciences, Division of Health Sciences, University of Nevada, Las Vegas (7/2013 to present)
 - Teaching the following Courses:
 - DPT 727 Evidence-Based Clinical Practice II
 - DPT 735 Functional Training and Acute Care
 - DPT 742 Clinical and Pathological Physiology
 - DPT 757 Wound Care
 - DPT 772 Physical Therapy Administration
 - DPT 793 Seminar
- Assistant Professor - Department of Physical Therapy, School of Allied Health Sciences, Division of Health Sciences, University of Nevada, Las Vegas (8/2007 to 6/2013)
 - Teaching the following Courses:
 - DPT 721 Advanced Topics
 - DPT 735 Functional Training and Acute Care
 - DPT 742 Clinical and Pathological Physiology
 - DPT 748 Pharmacology in Physical Therapy
 - DPT 752 Physical Agents and Electrotherapy
 - DPT 757 Wound Care
 - DPT 772 Physical Therapy Administration
 - DPT 787 Integrated Rehabilitation
 - DPT 793 Seminar
- Assistant Clinical Professor - Department of Physical Therapy, School of Pharmacy and Health Professions, Creighton University (April 2006 – July 2007)
- Assistant Lab Instructor - Department of Physical Therapy, School of Pharmacy and Health Professions, Creighton University (2004 – July 2007)
 - Assisting in the following labs:
 - PTD 324 Physical Therapy Interventions I
 - PTD 328 Motor Control and Motor Learning
 - PTD 448 Neuromuscular Physical Therapy I
 - PTD 449 Cardiovascular, Pulmonary and Integumentary Physical Therapy I
 - PTD 558 Neuromuscular Physical Therapy II
 - PTD 559 Cardiovascular and Pulmonary Physical Therapy II

UNIVERSITY SERVICE

- Faculty Senator, School of Allied Health Sciences, Sept 2010 to present
- Faculty Appeals Committee Chair, School of Allied Health Sciences, 2013 to present
- Bylaws Committee Chair, School of Allied Health Sciences Aug 2011 to Aug 2013
- Bylaws Committee, School of Allied Health Sciences Aug 2007 to Aug 2011
- Admissions Committee, Department of Physical Therapy, Jan 2012 to present
- Academic Review Committee Chair, Department of Physical Therapy, Jan 2012 to present
- Curriculum Committee, Department of Physical Therapy, Jan 2012 to present
- Admissions Committee Chair, Department of Physical Therapy, Aug 2008 to Jan 2012
- Admissions Committee, Department of Physical Therapy, Aug 2007 to Aug 2008
- Assessment Committee, Department of Physical Therapy, Aug 2008 to Aug 2013
- Bylaws Committee Chair, Department of Physical Therapy, Jan 2012 to Jan 2013

PROFESSIONAL CLINICAL WORK EXPERIENCE

- Intensive Care Staff Therapist - Creighton University Medical Center, 601 North 30th Street, Omaha, Nebraska 68131 (5/2006 - 7/2007)
- Lead Inpatient Therapist - Creighton University Medical Center, 601 North 30th Street, Omaha, Nebraska 68131 (5/2004 - 5/2006)
- Staff Therapist - Creighton University Medical Center, 601 North 30th Street, Omaha, Nebraska 68131 (5/2002 - 5/2004)

PEER-REVIEWED JOURNAL PUBLICATIONS

1. Young DL, Chakravarthy D, Drower E, Reyna R. Skin Care Product Evaluation in a Group of Critically Ill, Premature Neonates: A Descriptive Study. Accepted to *JWOCN* planned for print November 2014
2. Kawi J, Schuerman S, Alpert P, Young DL. Self-management and Exercise in Overweight and Obese Older Women with Knee Osteoarthritis. *Clin Nurs Res*. 2014 Jul 30. pii: 1054773814544167. [Epub ahead of print]
3. Young DL, Borris-Hale C, Falconio-West M, Chakravarthy D. A Single Long-Term Acute Care Hospital Experience with a Pressure Ulcer Prevention Program. *Rehabil Nurs*. 2014 Sep 15. doi: 10.1002/rnj.178. [Epub ahead of print]
4. Young DL, Chakravarthy D. A controlled laboratory comparison of 4 topical skin creams moisturizing capability on human subjects. *J Wound Ostomy Continence Nurs*. 2014 Mar-Apr;41(2):168-74. doi: 10.1097/WON.0000000000000011.
5. Young DL, Chakravarthy D, Mirkia K. Evidence for the Validity of the Medline Pressure Ulcer Prevention Program (mPUPP). *Journal of Acute Care Physical Therapy*. 2012 3(2):211–216.
6. Young DL, Shen JJ, Estocado N, Landers MR. Financial impact of improved pressure ulcer staging in the acute hospital with use of a new tool, the NE1 Wound Assessment Tool. *Advances in Skin & Wound Care*. 2012 Apr;25(4):158-166.
7. Landers MR, Durand C, Powell S, Dibble L, Young D. Development of a scale to assess fear-avoidance behavior due to falling: the fear of falling avoidance beliefs questionnaire (FFABQ). *Physical Therapy Journal*. August 2011; 91(8): 1253-1265

8. Young DL, Arata R, Enerson M, Johnson C. Rates and Reasons for patient non-participation in physical therapy in the acute care setting. *PTJ-PAL*. 2011; 11(3): J10-J18
9. Young DL, Schuerman SE, Flynn K, Hartig K, Moss D, Altenburger E. Reliability and Responsiveness of an 18 Site, 10-g Monofilament Examination for Assessment of Protective Foot Sensation. *Journal of Geriatric Physical Therapy*. 34(2):95-98, April/June 2011.
10. Puentedura E, Hurt K, Meissner M, Mills J, Young DL, Landers MR. Immediate effects of lumbar spine manipulation on the resting and contraction thickness of transversus abdominis in asymptomatic individuals. *JOSPT*. 2011; 41(1):13-21.
11. Young DL, Estocado N, Landers MR, Black J. A pilot study providing evidence for the validity of a new tool to improve assignment of NPUAP stage to pressure ulcers. *Advances in Skin & Wound Care*. 2011; 24(4):168-175.
12. McWhorter JW, Landers M, Young D, Puentedura E, Hickman R, Brooksby C, Liveratti M, Taylor L. Knee Extension Isometric Torque Production Differences Based on Verbal Motivation Given to Introverted and Extroverted Female Children. *Physiother Theory Pract*. 2011 Aug; 27(6):422-8. Epub 2010 Sep 2.
13. Landers MR, McWhorter JW, Young DL, Schuerman S, Hickman R. Employer funding and time off for physical therapists toward formal continuing education in states with and without a mandate for continuing education. *Health Policy and Administration Journal*. 2010; 10(1): J1-J8
14. Young DL, Wallmann HW, Poole I, Threlkeld AJ. Body weight supported treadmill training at very low treatment frequency for a young adult with incomplete cervical spinal cord injury. *NeuroRehabilitation*. 2009;25(4):261-270.

PUBLISHED PEER-REVIEWED ABSTRACTS AND POSTERS

- Curren D, Young DL, Chakravarthy D. Standardization of Skin Care Products for OhioHealth. Clinical Symposium on Advances in Skin & Wound Care. Las Vegas, Nevada, September 2014
- Young DL, Jensen C, Goodrich D, Shan G, Physical Therapy Non-Treatment Events in an Acute Hospital: a Descriptive Study. APTA Combined Sections Meeting. Las Vegas, Nevada, January 2014
- Young DL, Borg J, Johnston C, Lucke M, Sinclair J, Estocado N. Validation of a tool for improved pressure ulcer staging by the non-expert in the live patient. APTA Combined Sections Meeting. Las Vegas, Nevada, January 2014
- Tran F, Young DL, Vicencio M, Coon S, Reliability and validity of a tool to improve wound assessment. APTA Combined Sections Meeting. Las Vegas, Nevada, January 2014
- Berry K, Meyer D, Young DL. Implementation of a Pressure Ulcer Prevention Program (PUPP) at two Urban Hospitals. WOCN Annual Conference. Seattle, WA, June 2013
- Young DL, Chakravarthy D, Borris-Hale C. A single long-term acute care hospital experience with the Medline Pressure Ulcer Prevention Program. APTA Combined Sections Meeting. San Diego, CA, January 2013
- Berry K, Meyer D, Young DL. Implementation of a Pressure Ulcer Prevention Program (PUPP) at two Urban Hospitals. Annual Clinical Symposium on Advances in Skin & Wound Care. Las Vegas, NV, October 2012
- Young DL. Single faculty creation and use of podcasts with iTunes integration to teach pathophysiology from a faculty website. APTA Combined Sections Meeting. Chicago, IL, February 2012

- Young DL, Chakravarthy D. A comparison of 4 products in ability to moisturize skin. APTA Combined Sections Meeting. Chicago, IL, February 2012
- Young DL, Estocado N, Landers MR, Black J. A pilot study providing evidence for the validity of a new tool to improve assignment of NPUAP stage to pressure ulcers. APTA Combined Sections Meeting 2011 in New Orleans, LA (given the Wound Management SIG Research Award)
- Landers MR, Durand C, Powell S, Dibble L, Young D. Development of a scale to assess fear-avoidance behavior due to falling: the fear of falling avoidance beliefs questionnaire (FFABQ). APTA Combined Sections Meeting 2011 in New Orleans, LA
- Young DL, Arata R, Enerson M, Johnson C. Rates and Reasons for patient non-participation in physical therapy in the acute care setting. APTA Annual Conference 2010.
- Puentedura E, Hurt K, Meissner M, Mills J, Young DL, Landers MR. A real-time ultrasound examination of the immediate effects of lumbar spine manipulation on the contraction of transversus abdominis in asymptomatic subjects. APTA Annual Conference 2010.
- Young DL, Schuerman SE, Flynn K, Hartig K, Moss D, Altenburger E. Establishment of minimal detectable change, inter-rater, and intra-rater reliability of the 5.07 monofilament aesthesiometer. APTA Combined Sections Meeting 2010
- McWhorter JW, Landers MR, Young DL, Brooksby C, Liveratti M, Purtell A, Taylor L. The effects of verbal motivation on isometric torque production in pre-adolescent females with differing personality types. APTA Combined Sections Meeting 2010
- Young DL, Wallmann HW, Poole I, Threlkeld AJ. Body weight supported treadmill training at very low treatment frequency for a young adult with incomplete cervical spinal cord injury. Abstract published at Combined Sections Meeting of the APTA. 2009
- Landers MR, Hichman RA, Young DL, Schuerman SE, McWhorter JM. Time off and employer funding for physical therapists toward formal continuing education in states with and without a mandate for continuing education. *Physical Therapy Journal* Available at: http://www.apta.org//AM/abstracts/pt2008/abstractsPt.cfm?m_id=17393
- Harms N, Young DL. Physical Therapy Impact on Length of Stay in Intensive Care: A Retrospective Analysis. CSM 2006, San Diego, CA.

RESEARCH GRANTS

- Young DL, Estocado N. Pressure Ulcer Photodocumentation Integration into the Electronic Medical Record. CTR-IN, 2013, \$50,000. *not funded*
- Young DL, Estocado N. Development of and reliability and validity testing of a smartphone application for physician assessment and documentation of pressure ulcers. UNLV, 2012, \$22,168, *not funded*
- Young DL, Estocado N, St. Pierre-Snyder B. Implementation of an evidence-based assessment and documentation method for improved pressure ulcer identification, care, and costs. CMS - Innovation Challenge, 2012, \$16,370,789.00, *not funded*
- Schuerman S, Kawi J, Alpert P, Young DL. Self-management and Quality of Life of Overweight/Obese Women with Knee Osteoarthritis. UNLV, 2012, \$24,451, *funded*

- Mercer J, Dufek J, Tandy D, Young DL. Role of Muscle Activity During Water Locomotion for Sufferers of Osteoarthritis. R03 - NIH, 2010, \$202,034, *not funded*

RESEARCH IN PROGRESS

- Amei A, Xu J, Young DL, Clark S, Zhao J, Shan G. A modified Friedman test for randomized complete block designs.
- Jinnouchi S, Girouard T, Young DL, Tandy R, Mercer JA. Investigation of arch taping technique: Shock attenuation during landing. Submitted to *Journal of Athletic Medicine* February 2014
- Shan G, Kang L, Young DL. A new powerful nonparametric rank test for the ordered alternative problem. Submitted to *Journal of Statistical Computation and Simulation* Jan 2014
- Shan G, Amei A, Young DL. Efficient testing procedures for simultaneously assessing sensitivity and specificity of two diagnostic tests with a gold standard. Submitted to *Statistics in Medicine* October 2013
- Berry K, Meyer D, Young DL. Implementation of a Pressure Ulcer Prevention Program (PUPP) at two Urban Hospitals. Submitted to *Nursing Management* February 2014
- Young DL, Tran F, Vicencio M, Coon S. Reliability and Validity of a Tool to Improve Wound Assessment. Submitted to *Advances in Skin & Wound Care* December 2013
- Young DL. Podcasted lectures in a blended pathophysiology course; pedagogical impact on students and faculty.
- Young DL, Moonie S, Olsen C, Van wagoner A, McGarvey D. Non-participation Rates in Physical Therapy among Acute Hospital In-Patients, an Analysis of patient and therapist Variables.

PRESENTATIONS

- Young DL, Estocado N. Effects of Electronic Medical Record Implementation on Pressure Ulcer Documentation and Workflow. AMRPA Annual Medical Rehabilitation Education Conference. Fernandina Beach, FL, September 2013
- A comparison of 4 products in ability to moisturize skin. APTA Combined Sections Meeting Platform Presentation. Chicago, IL, February 2012
- The Neuropathic Foot, Considerations for Wound Management. NPTA Chapter Meeting, January 8, 2008.
- Physical Therapy in Pain Management, co-presenter with Josh Richling, PT, DPT, OCS to Senior Partners Group, Omaha, NE, 2006
- Physical Therapy Impact on Length of Stay in Intensive Care: A Retrospective Analysis. Continuing education, Creighton University Medical Center Physical Therapy Department. 4/2006
- Harms N, Young DL. Physical Therapy Impact on Length of Stay in Intensive Care: A Retrospective Analysis. Platform presentation, APTA Combined Sections Meeting, 2006.
- Diabetes and exercise, co-presenter with Natalie Harms, PT, GCS to Senior Partners Group, Omaha, NE, 2006
- Physical Therapy Impact on Length of Stay in Intensive Care: A Retrospective Analysis, Combined Sections Meeting of the APTA, 2006
- Rehabilitation Grand Rounds, Integumentary Management of the Critically Ill Patient, Creighton University Medical Center in conjunction with Creighton University, 2006

- Living Your Values in the Workplace, Cardoner at Creighton University, 2006
- Manual Muscle Testing: A Component of the Physical Exam, Co-presenter with Josh Richling at Neurology Grand Rounds, Creighton University Medical Center, 2005
- Annual Pain Management Conference: Pain Syndromes & Management, Panel member representing PT on the topic of the team approach to pain management, co-presenter in breakout session titled OT and PT in chronic pain syndromes, Omaha, NE, 2005
- Rehabilitation Grand Rounds, Early Mobility in the Critically Ill Patient, Creighton University Medical Center in conjunction with Creighton University, 2005 (Discussant)
- Multidisciplinary Grand Rounds Panel Member, 2003-2005
- Customer Service Training for new employees at Creighton University Medical Center, 30 min presentation once per month, 2002-2004

PROFESSIONAL EXPERIENCE / SERVICE

- Public Relations Committee Chair, Acute Care Section, American Physical Therapy Association, Oct 2012 - present
- Nevada State Physical Therapy License #2200, 2007 - present
- Fall Reduction Committee Member, Creighton University Medical Center, 2006
- Nebraska Student Special Interest Group Liaison to the NPTA, 2005 – 2007
- Curriculum Committee Member, Creighton University Physical Therapy Department, 2005 – 2006
- Interviewer, Creighton University Physical Therapy Department, 2004 – 2006
- Clinical Instructor for multiple Physical Therapy students
- American Physical Therapy Association Member, 1999 – present
- Nebraska State Physical Therapy License #2143

CONTINUING EDUCATION

- American Physical Therapy Association Combined Sections Meeting. Las Vegas, NV, February 2014. 15 hours
- American Physical Therapy Association Combined Sections Meeting. San Diego, CA, January 2013. 20 hours
- American Physical Therapy Association Combined Sections Meeting. Chicago, IL, February 2012. 20 hours
- American Physical Therapy Association Combined Sections Meeting. New Orleans, LA, February 2011. 20 hours
- Concussion and mild traumatic brain injury: update 2010. Cantu R, Guskiewicz K, Nowinski C, Whitney SL. February 18, 2010. 2 hours
- Mobilizing patients with femoral catheters in ICU: clinical considerations. Perme C. February, 2010. 1.5 hours
- Teaching in an E-learning age: using web-based blended learning and 3D virtual environments to facilitate student learning. Carlson C, Kluding P, Krauss J, Pellerito JM, Pociask FD, Subus C, Talley SA. February 18, 2010. 3.75 hours
- Endurance in the neurologic rehab population: assessment, intervention, and outcome measures. Bartlo P, Jocoy A. February 19, 2010. 2 hours
- Power training for aging adults: it's not just for athletes. Puthoff ML. February 19, 2010. 1.5 hours
- Fibromyalgia: fact or fiction? Louw A. February 20, 2010. 3 hours
- Keys to implementing early activity in the ICU. Cooper JJ, Jewkes JG, Spuhler V. February 12, 2009. 3 hours

- An interdisciplinary approach to physical therapy education in acute care using standardized patients and human patient simulators. Kegelmeyer DA, Kloos AD, Thomas EM. February 12, 2009. 2 hours
- Using federal databases in physical therapy research. Chevan J, Johnson M, Lefebvre KM. February 12, 2009. 2 hours
- Translating evidence into practice for acute care interdisciplinary fall prevention. Chism S, Gorman SL, Taniguchi NT. February 11, 2009. 3 hours
- Exploring opportunities for change and improvement in acute care physical therapy: lessons from the science of health care improvement. Ghazinouri R, Michaud Y, Ovitt DW, Parker MM, Smith J. February 11, 2009. 3 hours
- Early ICU physical therapy is associated with shortened hospital length of stay for acute respiratory failure. Goad A, Harry BJ, Morris PE, Taylor KM, Thompson C. February 11, 2009. 0.5 hours
- The continuum of care for people with lifelong disabilities: understanding the issues and forging new pathways for physical therapists. Brunstrom-Hernandez J, Connolly BH, Massery M, O'Shea R, Hamilton E. February 10, 2009. 2 hours
- Laser and LED/SLED use in rehabilitation: a systematic review of the literature. Posy RE. February 10, 2009. 1 hour
- Electrothermal modalities heavyweights - ultrasound and diathermy: revisit and update. Chan, CCK. February 10, 2009. 3 hours
- American Physical Therapy Association Combined Sections Meeting. San Diego, CA, February 2006. 25 hours
- American Physical Therapy Association Combined Sections Meeting. Nashville, TN, February 2004. 25 hours
- Bodyweight supported gait training. Immanuel Hospital. 2002. 8 hours

MANUSCRIPT REVIEWER

- Archives of Physical Medicine and Rehabilitation, 2010-2012
- Physiotherapy Research International, 2012
- Journal of NeuroEngineering and Rehabilitation, 2012
- Health Education & Behavior, 2013
- Rehabilitation Nursing Journal, 2013
- Biological Research for Nursing, 2013
- Journal of Novel Physiotherapies, 2013

PROFESSIONAL MEMBERSHIP

- Member American Physical Therapy Association (2000 – present)
- Member Nevada Physical Therapy Association (2007 – present)