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### Prediction of Discharge Destination from Initial Physical Therapy Assessment using the Physical Assessment Key (PAK)

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PREDICTION OF DISCHARGE DESTINATION  
FROM INITIAL PHYSICAL THERAPY ASSESSMENT  
USING THE PHYSICAL ASSESSMENT KEY (PAK)

by

Wendy L. Chung & Kimberley A. Vieten

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A Publishable Paper in Lieu of a Thesis in  
Partial Fulfillment of the Requirements for the  
Degree Doctor of Physical Therapy

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June 1998

Each person whose signature appears below certifies that this publishable paper in their opinion is adequate, in scope and quality, as a publishable paper in lieu of a thesis for the degree Doctor of Physical Therapy.

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## TABLE OF CONTENTS

	<b>Page</b>
1. Abstract .....	1
2. Review of the literature .....	2
3. Purpose of the study .....	3
4. Methods .....	4
5. Subjects .....	4
6. PAK score .....	4
7. Data Analysis .....	4
8. Results .....	5
9. Discussion .....	10
10. References .....	13
11. Appendix A .....	15

## LIST OF TABLES

<b>Tables</b>	<b>Page</b>
1.1. Frequencies of population descriptors by discharge destination.....	6
1.2. Means and standard deviations of population descriptors .....	6
2. Duncan's multiple comparison after ANOVA .....	7
3. Discriminate analysis of all four discharge destinations with predictors being initial PAK score, age and family support .....	8
4. Discriminate analysis of all four destination groups with predictors being initial PAK score, age and diagnosis.....	9
5. Discriminate analysis of groups divided into home or Rehab/SNF according to the actual discharge destination with predictors being initial PAK score, and family support .....	9
6. Discriminate analysis of groups divided into home or Rehab/SNF according to the PT's recommendations with predictors being initial PAK score, age and family support .....	10

## ABSTRACT

# PREDICTION OF DISCHARGE DESTINATION FROM INITIAL PHYSICAL THERAPY ASSESSMENT USING THE PHYSICAL ASSESSMENT KEY (PAK)

by

Wendy L. Chung

Kimberley A. Vieten

The purpose of this study was to determine if a patient's discharge destination could be predicted by information available upon the physical therapy initial evaluation using the Physical Assessment Key (PAK). There were 141 subjects (58 male, 83 female) included in this study and their ages ranged from 19 to 89 years (mean age=57.1 years). Each subject was given a PAK score on the day of the initial physical therapy evaluation and on the day of discharge from the hospital. The PAK evaluates a patient in the areas of transfer activities, self-care activities, locomotion and excretion management. A patient was discharged to one of four discharge destinations: home independent, home with physical therapy, skilled nursing facility, or rehabilitation. A significant difference was found in the initial PAK score means of those discharged to rehabilitation and those discharged to the other three discharge destinations. The initial PAK score was the most significant predictor of a patient's discharge destination.

Key Words: Prediction, Discharge, Destination, Physical, Assessment

“The cost of health care, the debate over national health reform, and the growing emphasis of managed care are compelling clinicians to evaluate the value added by their services and to prioritize their use of resources.”<sup>1</sup> Studies have shown that planning for discharge early in a patient’s hospital admission will decrease the cost and increase reimbursement.<sup>2,3,4,5</sup> In order for early discharge to occur most efficiently, each discipline must be involved with the discharge planning.<sup>2,6,7,8</sup> Evans and Hendricks<sup>4</sup> have shown that discharge planning can decrease length of stay (LOS) in the hospital, which could lead to more efficient patient care and decreased costs.<sup>3,9</sup>

Focusing on a patient’s potential for recovery is necessary in order to plan for a patient’s discharge. Often healthcare providers focus instead on the severity of the patient’s disability.<sup>10</sup> From clinical experience in acute care, several factors including age, past medical history, type of insurance, patient/family preference, physician preference and cognitive deficits have been leading determinants in a patient’s discharge destination. Functional ability and patient potential can also be determinants in discharge destination. Thorngren et al.<sup>11</sup> and Cedar et al.<sup>7</sup> attempted to utilize functional variables such as ability to walk two weeks after surgery, living with someone, and good general health in the determination of discharge destination. However, these variables were not clearly defined and are subject to various interpretations.

Examples of studies involving discharge planning include Chung’s<sup>13</sup> use of the Post-Anesthesia Discharge Scoring System (PADDs) in ambulatory surgery and Stineman’s et al.<sup>10</sup> discussion of the importance of developing a diagnostic tool or index that combines findings from multiple disciplines for functional recovery in adult



rehabilitation patients. In Chung's study, commonly observed physical signs were used to determine home readiness. In Stineman's study the index used was the RAM (Recovery ADL and Mobility) which combined and summarized the data from various disciplines into a single variable. This test was used to help determine the patient's course of care for different discipline needs while they were in the hospital. Additionally, the test compared how the patient presented and the possible results to the actual outcomes.<sup>10</sup> Using this test, a patient's hospital course can be planned from the day of admission, which will result in decrease in the cost and length of stay. Patients with myocardial infarctions were studied by Parsons et al.<sup>12</sup> to determine what factors would enable a patient to be discharged earlier from the hospital and provide an indicator of survival. Factors found to be most significant in this study included pulse rate, age, symptoms and significant past medical history.

In the inpatient setting, physical therapy is a specialty well suited to evaluate the functional capabilities of patients. The Physical Assessment Key (PAK) portion of Lohman's Outcomes Specialty Systems/Software, or L.O.S.S. was found to have a significant correlation between the score an acute care patient was given on the day they were discharged from the hospital and the discharge destination of that patient.<sup>14</sup> The purpose of our study was to determine if a patient's discharge destination could be predicted by information available upon the physical therapy initial evaluation using the Physical Assessment Key.

## **Methods**

### ***Subjects***

For the period from January 28, 1998 to March 20, 1998, patients receiving physical therapy in the acute care setting at Loma Linda University Medical Center were assessed and given a PAK score by one tester on the day of his/her initial physical therapy evaluation and again on the day of their last physical therapy treatment before they were discharged from the hospital.

Informed consents approved by Loma Linda Institutional Review Board were obtained from each patient. The following data were collected from the patient's chart: age, gender, diagnosis, duration of hospital stay, duration of physical therapy, whether or not the patient has family support, type of insurance, discharge destination and initial and final level PAK score. Patients were discharged to one of four destinations: home independent, home with physical therapy, rehabilitation (Rehab), or a skilled nursing facility (SNF).

### ***PAK Score***

A patient is evaluated in the areas of transfer activities, self-care activities, locomotion, and excretion management. Scoring of an individual is based on their level of independence from 0=patient is unable to perform the task to 6=patient is independent performing the task (Appendix A). A patient's PAK score can range from 0 to 108 points.

### ***Data Analysis***

A one-way ANOVA was used to compare the means of the initial PAK score

among the four groups determined by discharge destinations. In addition, the ANOVA was repeated for subgroups determined by diagnosis. To determine which variables were the most significant predictors of discharge destination, a stepwise discriminant analysis was performed using the following independent variables: initial PAK score, age, diagnosis, whether or not the patient has family support, type of insurance, length of hospital stay, length of physical therapy, and gender.

## **Results**

One hundred and forty seven patients participated in this study. Out of the 147 subjects, 141 subject's information (58 male and 83 female) were used in the data analysis. One subject was discharged to another hospital rather than one of the four designated destinations, three subjects were discharged before a final PAK score could be assigned, and two subjects were not yet discharged from the hospital when the data collection period came to an end.

The subjects in this study are described in Tables 1.1 and 1.2. Subjects were classified into one of six diagnostic categories: orthopaedics (n=69), neurological (n=29), trauma (n=8), vascular (n=6), oncology (n=15), and general (n=14). Eighty-four percent of the sample had family support, which was determined by whether the patient lived with family or alone. The majority of patients had Medicare insurance (n=45). Eighteen had LLUHC insurance, while the other 77 had a variety of insurances. The mean duration of hospital stay was 8.7 days (SD=7.2) while the mean length of physical therapy was 5.1 days (SD=4.8). The mean initial PAK score was 67.4 (SD=16.6) while the mean final PAK score was 84.2 (SD=16.5). The majority of subjects were discharged home

independent (n=75) and the smallest number of patients went to Rehab (n=6).

**Table 1.1** *Frequencies of population descriptors by discharge destination.*

	Home Independent	Home with Physical Therapy	Rehab	SNF	Total
Destination at Discharge	74	29	6	32	141
Recommendation of PT	75	30	10	26	141
Family Support					
Yes	65	28	5	20	118
No	9	1	1	12	23
Gender					
Male	32	12	5	9	58
Female	42	17	1	23	83
Insurance					
Medicare	14	12	3	16	45
LLUHC	3	6	3	9	21
Other	57	11	6	7	81
Diagnosis					
Ortho	32	1	0	19	69
Neuro	18	5	0	6	29
Trauma	4	2	2	0	8
Vascular	2	0	3	1	6
Oncology	11	2	1	1	15
General	7	2	0	5	14

**Table 1.2** *Means and standard deviations of population descriptors.*

	Mean	Standard Deviation
Age	57.1	17.1
Duration of Hospital Stay	8.7	7.2
Duration of Physical Therapy (days)	5.1	4.8
PAK Score		
Initial	67.4	16.6
Final	84.1	16.5

One way ANOVA showed a significant difference between initial mean PAK scores ( $p < 0.0001$ ) among the four discharge destinations. Duncan's multiple comparison following the one-way ANOVA (Table 2) showed that there was a significant difference in the initial mean PAK score between the group that was discharged to Rehab (mean=39.7) and the other three groups, but no significant difference was found between the group discharged to a SNF (mean=57.0) and the group discharged home with physical therapy home (mean=66.0). Likewise, no significant difference was found between the group discharged home with physical therapy (66.0) and the group discharged home independent (mean=74.7). When looking at the final mean PAK scores, a significant difference was found between the groups discharged to Rehab (mean=48.8), a skilled nursing facility (mean=71.2) and home (mean=90.2), but no significant difference was found to distinguish between those discharged home with physical therapy (mean=86.8) and those discharged home independent (mean=91.6).

**Table 2.** *Duncan's multiple comparison after ANOVA.*

Discharge Destination	N	Initial Score	Final Score
Rehabilitation	6	39.7 <i>a*</i>	48.8 <i>a</i>
Skilled Nursing Facility	32	57.0 <i>b</i>	71.2 <i>b</i>
Home with PT	29	66.0 <i>b, c</i>	86.8 <i>c</i>
Home Independent	74	74.7 <i>c</i>	91.6 <i>c</i>

*\*Groups with different letters are significantly different ( $p < 0.05$ )*

Four separate stepwise discriminate analyses were performed to predict the patient's destination at discharge (Tables 3, 4, 5 and 6). Each used the independent

variables of initial PAK score, age, diagnosis, duration of hospital stay, duration of physical therapy, type of insurance, whether or not the patient had family support and the patient's gender. In the first analysis (n=141), data from all patients were entered and predictions were made as to discharge destination to home, home with PT, rehab or SNF. From analysis I (Table 3), 59.6% of all patients were correctly classified as to their discharge destination. The significant factors that determined where the patient would go in this analysis were (in order of entry into the prediction equation) initial PAK score, age and family support.

**Table 3.** Discriminant analysis (n=141) of all four discharge destinations with predictors being initial PAK score, age and family support.

Actual Group	n	Predicted Group Membership			
		Home Independent	Home with PT	Rehab	SNF
Home Independent	74	<b>50</b> 35.5%	16 11.3%	4 2.8%	4 2.8%
Home with PT	29	10 7.1%	<b>14</b> 9.9%	2 1.4%	3 2.1%
Rehab	6	0 0.0%	0 0.0%	<b>5</b> 3.5%	1 0.7%
SNF	32	2 1.4%	9 6.4%	6 4.3	<b>15</b> 10.6%

In analysis number two (n=125), the participants who had no change in their initial and final score because of being discharged on the same day as the initial evaluation, were dropped from the analysis. From analysis II (Table 4), 57.6% were classified correctly as to discharge destination. The significant factors determining destination in this analysis were (in order of entry into the prediction equation) initial PAK score, age and diagnosis.

with PT and Rehab/SNF but the destinations used were according to the physical therapist's recommendation. And again, the proportions of subjects which went to each of the destination classifications was specified to the computer. From analysis IV (Table 6), 85.1% were correctly classified. Initial PAK score, age, and family support were (in order of entry into the prediction equation) predictors of destination in this analysis.

**Table 6.** *Discriminant analysis (n=141) of groups divided into home or Rehab/SNF according to the PT's recommendations with the proportion of subjects which went to each destination specified to the computer with predictors being initial PAK score, age and family support.*

Actual Group	n	Predicted Group Membership	
		Home	Rehab/SNF
Home	105	<b>90</b> 63.8%	15 10.6%
Rehab/SNF	36	6 4.3%	<b>30</b> 21.3%

## Discussion

As health care workers, we are very aware that one of the biggest challenges facing the medical field today is how to give high quality focused treatment that results in reduced costs and a smoother transition to day of discharge and discharge itself. Our study comes out of the need to address this challenge.

This study was done to determine if a patient's discharge destination could be predicted by information available upon the patient's initial physical therapy evaluation. The results showed that the best predictor of a discharge destination was the initial PAK score. While it is possible to predict whether a patient is going home or not, predicting whether a patient will be discharged to rehab or ECF is more difficult. It is also more

difficult to predict whether a patient will go home with physical therapy, or home independent.

From a clinical standpoint an early idea of discharge destination is important to know because of the impact it could have on health care costs. Because this study showed that the initial PAK score was the best predictor of destination, discharge planning can and should be initiated sooner. An initial assessment which includes this type of PAK score would be beneficial to add to each patient's physical therapy evaluation in the hospital and should involve the entire team of personnel that are working on the patient's initial assessment. This will ensure a smoother transition towards the date of discharge for all that are involved in the planning process. As a result of earlier discharge planning, physical therapy treatment and training can be focused to the patient's specific needs from the initial evaluation day. The patient can also be instructed more clearly on the course of their care while in the hospital, which in turn can help to decrease the anxiety experienced by the patient. Thus, there can be resultant decreased healthcare costs, shortened length of stay, more effective care of the patient, and the family can begin to arrange how or where the patient will be cared for following discharge from the hospital. Using an assessment key such as the PAK will assist with the formulation of an objective discharge protocol. This will ensure that a patient's discharge destination will be based on objective data and functional ability rather than any one disciplines preference as to the patient's discharge destination.

This study had limitations since subjects were limited to those who were cognitively aware and the majority of diagnoses were from orthopaedics and neurology.



In the future, it would be beneficial to have more variety with subjects from different areas. Further research in this area is recommended using the discriminate analysis to predict discharge destination at time of initial evaluation. This could be done by a patient being given a PAK score on the day of their initial physical therapy evaluation and using the PAK score to predict where the patient should be discharged to, according to the prediction equation. It is our hope that in the future there will be physical assessment keys to assess each patient in the hospital and decrease any of the problems or stressors that are associated with planning a patient's discharge from the hospital.

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Appendix A

<b>L.●S.S.™ MULTI-DISCIPLINARY ASSISTANCE KEY: DISABILITY INDICES</b>	
<b>Physical Assistance Key</b>	
<b>Blue Cross of California Suggested Ratings:</b>	
<b>0</b>	<b>Unable: Patient is unable to complete the task with or without assistance of one person.</b>
<b>1</b>	<b>Maximum Assistance: Patient completes the task with limited participation and most of the effort coming from another person.</b>
<b>2</b>	<b>Moderate Assistance: Patient completes the task with equal effort of one person and the participation of the patient.</b>
<b>3</b>	<b>Minimal Assistance: Patient completes the task by supplying more than 50% of the effort.</b>
<b>4</b>	<b>Supervision Required: Patient completes the task but requires verbal cues, preparation, and monitoring for occasional physical assistance to complete the task safely.</b>
<b>5</b>	<b>Independent with Device: Patient completes the entire task including preparation without physical assistance but requires the use of a device.</b>
<b>6</b>	<b>Independent without Device: Patient completes the entire task including preparation without physical assistance or use of a device.</b>
<b>N</b>	<b>No Basis for Rating: Severity rating not applicable to this particular disability, or unable to specify or observe, nor is information available from other sources.</b>

Transfer Activities		ICIDH WHO	INITIAL Date: / /	INTERIM Date: / /	INTERIM Date: / /	DISCHARGE Date: / /
<input type="checkbox"/>	Supine to/from Sit	D46.0				
<input type="checkbox"/>	Stand to/from Bed	D46.2				
<input type="checkbox"/>	Stand to /from Toilet/BSC	D32.0				
<input type="checkbox"/>	Stand to/from Chair/WC	D46.1				
<input type="checkbox"/>	Stand to/from Tub	D33.0				
Self-Care Activities		ICIDH WHO	INITIAL Date: / /	INTERIM Date: / /	INTERIM Date: / /	DISCHARGE Date: / /
<input type="checkbox"/>	Self-Feeding	D38				
<input type="checkbox"/>	Self-Toileting	D30				
<input type="checkbox"/>	Bathing: <input type="checkbox"/> Tub <input type="checkbox"/> Shower	D33/2				
<input type="checkbox"/>	Self-Grooming	D34				
<input type="checkbox"/>	Self-Dressing -Lower	D35.1				
<input type="checkbox"/>	Self-Dressing -Over Arms	D35.2				
<input type="checkbox"/>	Self-Dressing -Over Head	D35.3				
Locomotion		ICIDH WHO	INITIAL Date: / /	INTERIM Date: / /	INTERIM Date: / /	DISCHARGE Date: / /
<input type="checkbox"/>	Flat Terrain: <input type="checkbox"/> Amb <input type="checkbox"/> WC	D40				
<input type="checkbox"/>	Uneven Terrain: <input type="checkbox"/> Amb <input type="checkbox"/> WC	D41				
<input type="checkbox"/>	Stair Climbing	D42				
<input type="checkbox"/>	Disturbance of Balance	D58				
Excretion Management		ICIDH WHO	INITIAL Date: / /	INTERIM Date: / /	INTERIM Date: / /	DISCHARGE Date: / /
<input type="checkbox"/>	Faecal Management	D31.3				
<input type="checkbox"/>	Urinary Management	D31.4				
<input type="checkbox"/>	Physical Assistance Total Score:		___ / 108	___ / 108	___ / 108	___ / 108