

Memorandum (May 16, 2023)

To: Alliance for Physical Therapy Quality and Innovation

From: Mark Desmarais, Yamini Kalidindi, and Rachel Kramer

Subject: Impact of Physical Therapy on Opioid Use and Hospitalizations Post-Fall in Medicare FFS Patients

We were engaged by APTQI to study whether and how the use of physical therapy (PT) might benefit Medicare patients who suffer fall-related injuries. We analyzed patients who suffered fall-related injuries and compared those who did and did not receive physical therapy in the post-fall period. We tracked these patients for 18 months following their initial fall. This memorandum presents our results.

Key Findings

- PT Users were 50% less likely to visit the emergency room or be hospitalized for a follow-up injury in the 6 months following their initial fall.
- They remained less likely to visit the ER or be hospitalized for a follow-up injury in the 7-18 months post-fall.
- The relative odds of ER and hospitalization were lowest for the patients who had >30 PT sessions.
- We estimate that increased PT use by 100 beneficiaries prone to falls could result in an offsetting reduction in total healthcare spending of as much as **\$61,400-\$91,900**.
- PT users were also 39% less likely to use opioids in the 6 months following their initial fall.
- PT users remained less likely to use opioids for the 6-18 month post-fall period.

Data Used

2016-2019 100% FFS Medicare Claims Data including inpatient, short-term nursing facility (SNF), home health agency (HHA), physician claims (carrier), hospital outpatient, and Part D data.

Cohort Selection

Since pathology of the musculoskeletal system is one of the most common risk factors for falls and chronic pain, we focused our study on that specific population. The cohort was defined as Medicare FFS beneficiaries with musculoskeletal conditions in 2017 and first half of 2018 that were not receiving active treatment. To ensure that they were not receiving active treatment, we required a 6-month washout period – i.e., the beneficiary should not have received any treatments for the musculoskeletal conditions in the inpatient, SNF, HHA, physician claims (carrier), or hospital outpatient settings for the prior 6 months.

The musculoskeletal conditions that were included in the cohort selection were as follows:

- Hip/Pelvic Fracture
- Osteoporosis With or Without Pathological Fracture
- Parkinson's Disease and Secondary Parkinsonism
- Rheumatoid Arthritis/Osteoarthritis
- Mobility Impairments
- Cerebral Palsy
- Fibromyalgia
- Multiple sclerosis
- Muscular Dystrophy
- Vertigo

Most conditions were identified using the chronic condition warehouse (CCW) algorithm when the algorithm was available.

We required patients to be continuously enrolled in Medicare FFS for 18 months following the initial index claim (first musculoskeletal claim after a 6-month washout period) to ensure that we were measuring the outcomes consistently for the 18-month follow up period.

Treatment Variable

The main treatment variable of interest for this study was whether a patient received outpatient PT in the 6-month period following the index date. Part B data (including carrier and hospital outpatient data) were used in identifying outpatient physical therapy users. We also created different indicators for PT use based on the number of PT sessions – 1-3 sessions, 4-6 sessions, 7-10 sessions, 11-20 sessions, 21-30, >30 sessions.

Demographics/Control Variables

We obtained patient demographics for the year of the index date using the MBSF data. The demographics controlled for our analysis included: age, gender, race, and dual eligibility status. We also created condition indicators for different cancers (that have CCW algorithms) and controlled for them in our analysis because prior research indicates that having cancer precludes some patients from receiving treatment for musculoskeletal conditions. Further, since one of our main outcomes for this study is injuries, and prior falls are a strong indicator of future falls, we identified patients with documented risk of Falls (using CPT II ‘1101F’) and controlled for fall risk.

Outcomes Studied

The outcomes of interest were:

- 1) Hospitalizations from injuries (Yes/No)
- 2) ED visits related to injuries (Yes/No)
- 3) Hospitalizations or ED visits related to injuries (Yes/No)
- 4) Part D Opioid Use (Yes/No)
- 5) Number Part D Opioid Claims
- 6) Part D Opioid Spending
- 7) Part A Total Payments
- 8) Part B Total Payments (excluding payments for PT)
- 9) Part A and Part B Total Payments (excluding Part B payments for PT)

All outcomes were created for three different follow-up periods: 6-month follow up period after index date, 6-12 months follow up period after index date, and 12-18 months follow-up period after index date.

Analysis

We ran regression models for all outcomes over three different follow-up periods, controlling for demographic variables, and using different treatment groups: PT users, PT users that used 1-3 PT sessions, PT users that used 4-6 sessions, users that used 7-10 sessions, users that used 11-20 sessions, users that used 21-30, users that used >30 sessions. The control group was always non-PT users in all our analysis. We used logistic regression models for binary outcomes such as injury related hospitalizations and ED visits, and Part D opioid use. For all continuous outcomes, we used linear regression models.

Results

Outcomes	Regression Type	PT Users	
		Odds Ratio (Logistic)/Coeff (Linear Regression)	p-value
Injury Related Hospitalization - Yes/No (6 month follow-up)	Logistic	0.50	<.0001
Injury Related Hospitalization - Yes/No (6-12 month follow-up)	Logistic	0.89	<.0001
Injury Related Hospitalization - Yes/No (12-18 month follow-up)	Logistic	0.93	<.0001
Injury Related ED Visits - Yes/No (6 month follow-up)	Logistic	0.50	<.0001
Injury Related ED Visits - Yes/No (6-12 month follow-up)	Logistic	0.87	<.0001
Injury Related ED Visits - Yes/No (12-18 month follow-up)	Logistic	0.89	<.0001
Injury Related Hospitalization or ED - Yes/No (6 month follow-up)	Logistic	0.50	<.0001
Injury Related Hospitalization or ED - Yes/No (6-12 month follow-up)	Logistic	0.88	<.0001
Injury Related Hospitalization or ED - Yes/No (12-18 month follow-up)	Logistic	0.90	<.0001
Opioid			
Use (6 month follow-up)	Logistic	0.61	<.0001
Use (6-12 month follow-up)	Logistic	0.88	<.0001
Use (12-18 month follow-up)	Logistic	0.91	<.0001
Average number of prescriptions (6 month follow-up)	Linear Regression	0.14	<.0001
Average number of prescriptions (6-12 month follow-up)	Linear Regression	0.02	<.0001
Average number of prescriptions (12-18 month follow-up)	Linear Regression	0.01	<.0001
Average Drug Spending (6 month follow-up)	Linear Regression	-5.59	<.0001
Average Drug Spending (6-12 month follow-up)	Linear Regression	-7.27	<.0001
Average Drug Spending (12-18 month follow-up)	Linear Regression	-7.24	<.0001

We found that overall PT users were 50% less likely to have an injury related hospitalization and 50% less likely to have an injury related ED visit in the 6 months following their initial fall. We found that this effect diminished in the following 12 months, with PT users being 11% less likely to be hospitalized in months 7-12 and 7% less likely to be hospitalized in months 13-18. Similarly, the effect on ED visits declines with time, with PT users 13% less likely to visit the ED in months 7-12 and 11% less likely to visit the ED in months 13-18.

With respect to Opioid use, we find that PT users are 39% less likely to use opioids during the first 6 months post-fall. They remain 12% less likely to use opioids in months 7-12 and 9% less likely to use opioids in months 13-18. Because opioids themselves tend to be less expensive, the spending reduction associated with this decrease is minimal.

Healthcare Utilization Reductions as a Result of PT Intervention

Opioid use has well documented negative effects on patients, including opioid use disorder (OUD), diversion of medication, and over 500,000 deaths in the US since 2000. While we found that PT use is associated with reduced demand for opioids, we did not find this reduction in use translated to meaningful decreases in opioid spending. Policymakers could consider the positive externalities associated with reduced opioid use resulting from increased use of PT rather than focusing on budgetary savings.

A reduction in the use of hospital services, either in the ED or during inpatient stays, produced more dramatic reductions in healthcare spending. Elderly patients visit the ER an average of 40-63 times per 100 patients.¹ Thus given our findings regarding PT use and the resulting decrease in ER visits, we might expect 100 additional PT users to result in 5-7 fewer emergency department visits per year. At a conservative estimate of \$530 in cost per ED visit², we might assume that for every 100 additional PT users, ED hospital costs might be reduced by approximately \$2,650-3,710.

Similarly, Medicare patients have approximately 21 hospital stays per 100 beneficiaries.³ Approximately 40% of these hospitalizations are fall-related. Thus given our results above, an additional 100 patients receiving PT post-fall could produce an approximate decrease of 4-6 inpatient stays per year. At an average cost of \$14,700 per inpatient stay⁴, we would thus expect an increase of 100 post-fall PT users to reduce the cost of their hospital utilization by \$58,800-\$88,200.

Conclusion

Taken together, we estimate that per 100 additional beneficiaries prone to falls receiving PT, we would expect to see a reduction in total healthcare spending of approximately \$61,400-\$91,900.

¹ <https://www.cdc.gov/nchs/products/databriefs/db452.htm>

² <https://hcup-us.ahrq.gov/reports/statbriefs/sb268-ED-Costs-2017.jsp>

³ <https://www.kff.org/medicare/state-indicator/medicare-service-use-hospital-inpatient-services>

⁴ <https://hcup-us.ahrq.gov/reports/statbriefs/sb262-Medicare-Advantage-Costs-2009-2017.jsp>