USE OF PHYSICAL AND OCCUPATIONAL THERAPISTS FOLLOWING STROKE AND RISK OF REHOSPITALIZATION

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BACKGROUND & OBJECTIVE

- Approximately 80 percent of stroke survivors have some degree of motor impairment following stroke.

- Early contact with a therapist and more intense therapy (e.g., number of visits/time) promotes better recovery for stroke survivors and may decrease the risk of hospital readmission and other adverse healthcare events.

- While a modest body of literature exists on the use and effectiveness of therapists for patients who transition from the acute to institutional post-acute setting (i.e., inpatient rehab facility, skilled nursing facility) following stroke, less is known about the transition to post-acute care in the community (i.e., home or outpatient setting).

OBJECTIVE: To examine the relationship between the use of physical and occupational therapists (PTs & OTs) in the first 30 days following discharge home after stroke and subsequent re-hospitalizations.

METHODS

- **Data Source**: 20% random sample of Medicare claims (2010-2013)

- **Study Design & Cohort:** Retrospective cohort design. We identified beneficiaries hospitalized for stroke (ischemic or hemorrhagic) who were discharged home & survived the first 30 days (N=23,413). We established a 6 month baseline period, a 30 day exposure period, and a 60 day follow-up period. (Figure 1)

FIGURE 1—STUDY DESIGN
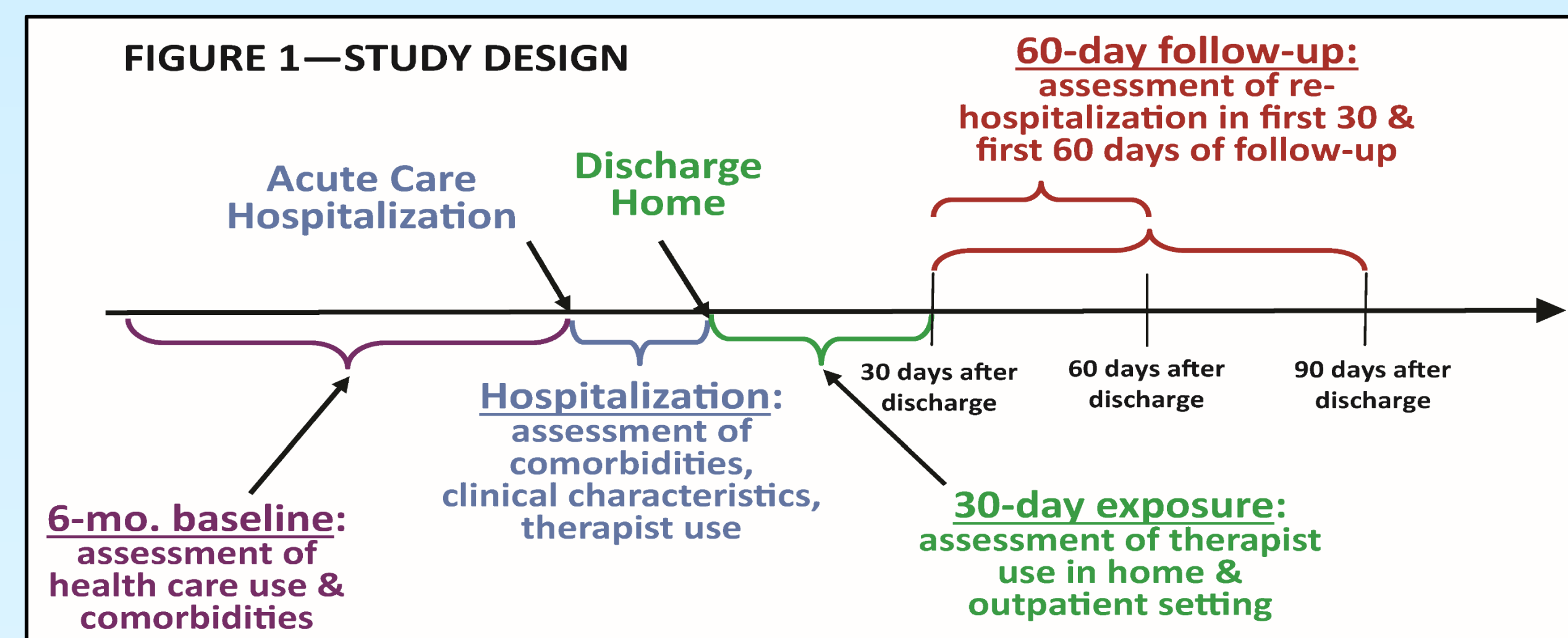
- **Exposure: 1) therapist use (PT &/or OT)**: categorized as in home, in outpatient setting, no use; **2) therapy intensity:** # of visits categorized as 1-3, 4-6, 7-9, 10 or more visits; **3) timing of therapy:** number of days to visit categorized as 1-2, 3-4, 5-6, 7-14, >14 days for home health visits & 1-3, 4-7, 8-14, &>14 days for outpatient visits.

- **Outcomes:**
  - Re-hospitalization in 1st 30 days of follow-up (i.e., 31-60 days after discharge)
  - Re-hospitalization in 1st 60 days of follow-up (i.e., 31-90 days after discharge)

- **Baseline Covariates:** demographics, proxy variables for functional status, comorbidities, health care use.

- **Hospitalization Covariates:** stroke type, procedures, ICU/CCU use, length of stay, use of therapy, comorbidities.

- **Analysis:** Multivariate logistic regression analyses, clustering on hospital and utilizing robust standard errors. Analyses were conducted for the overall sample and for relevant subgroups.

RESULTS

Table 1 – Select Covariates & Outcome Measures Stratified by Therapist Use (N=23,413)

	No Therapist Use (59.2%)	Therapist Use in Home (29.5%)	Therapist Use in Outpatient Setting (9.9%)	Therapist Use in Home & Outpatient Setting* (1.2%)
Baseline Covariates				
Mean (SD) age, y	76.7 (7.3)	79.9 (7.8)	75.8 (6.7)	79.4 (7.3)
Male (%)	46.0	33.7	50.0	41.9
Race (%) White	82.5	76.0	87.8	86.6
Black	10.2	15.2	7.0	8.2
Hispanic	2.7	3.9	1.6	2.1
Other	4.6	4.9	3.6	3.1
Dual eligible (%)	25.3	34.1	14.1	21.6
Wheelchair use (%)	1.3	2.9	0.8	3.8
Assistive device use (%)	1.4	2.6	1.2	1.7
Falls/difficulty walking (%)	3.3	7.4	5.3	5.8
Hospitalized (%)	16.9	24.3	16.3	23.7
PT/OT use – outpatient (%)	7.8	9.0	20.3	29.2
PT/OT use – home (%)	5.5	19.6	3.8	16.2
Hospitalization Covariates				
Stroke type: hemorrhagic	12.0	12.4	10.5	12.4
ischemic	88.0	87.6	89.5	87.6
Mean (SD) length of stay	3.4 (2.9)	4.6 (4.1)	3.3 (2.9)	4.1 (3.2)
Mean (SD) comorbidities	5.3 (3.7)	6.6 (4.2)	5.0 (3.5)	6.2 (4.3)
Received PT	66.5	90.6	87.2	89.7
Received OT	45.3	62.6	68.7	63.2
Outcomes				
Hospitalization (1st 30 days of follow-up)	5.9	7.4	5.0	5.5
Hospitalization (1st 60 days of follow-up)	10.0	13.0	8.0	11.0

*categorized as therapist use in home for analytic purposes

Table 2 – Adjusted[1] Odds Ratios for the Effect of Therapist Use on Rehospitalization

Sample	Exposure Therapist Use[2]	Hospitalized 1st 30 days of follow-up Odds Ratio	95% CI		p-value	Hospitalized 1st 60 days of follow-up Odds Ratio	95% CI		p-value
Overall sample (N=23,413)	Home	1.03	0.90	1.17	0.69	1.09	0.99	1.20	0.08
	Outpatient	0.87	0.71	1.07	0.19	**0.81**	**0.68**	**0.95**	**0.01**
Black (N=2,652)	Home	0.84	0.59	1.20	0.34	1.00	0.75	1.32	0.97
	Outpatient	0.82	0.36	1.83	0.63	1.07	0.60	1.90	0.83
White (N=19,003)	Home	1.08	0.93	1.24	0.32	1.11	1.00	1.24	0.06
	Outpatient	0.85	0.68	1.06	0.14	**0.76**	**0.64**	**0.91**	**0.002**
Dual eligibility (N=6,244)	Home	0.87	0.70	1.09	0.24	1.01	0.85	1.21	0.88
	Outpatient	0.62	0.35	1.11	0.11	0.76	0.49	1.20	0.24
Male (9,995)	Home	0.89	0.73	1.09	0.28	1.02	0.87	1.20	0.78
	Outpatient	0.87	0.66	1.15	0.33	0.83	0.66	1.03	0.09
Female (13,418)	Home	1.10	0.93	1.30	0.26	1.11	0.98	1.27	0.11
	Outpatient	0.86	0.63	1.17	0.33	**0.77**	**0.60**	**1.00**	**0.04**
Ischemic Stroke (20,613)	Home	1.02	0.89	1.17	0.74	1.08	0.97	1.19	0.17
	Outpatient	0.92	0.74	1.14	0.44	**0.82**	**0.69**	**0.97**	**0.02**
Hemorrhagic Stroke (2,756)	Home	1.01	0.70	1.44	0.97	1.15	0.86	1.55	0.35
	Outpatient	0.47	0.22	1.04	0.06	0.62	0.35	1.12	0.11

[1]adjusted for baseline & hospitalization covariates; [2] referent is NO THERAPIST USE

Table 3 – Adjusted[1] Odds Ratios for the Effect of Therapist Visits on Rehospitalization (N=9,535)

	Hospitalized 1st 30 days of follow-up Odds ratio	95% CI	p-value	Hospitalized 1st 60 days of follow-up Odds ratio	95% CI	p-value
1 – 3 visits	1.00	---	---	1.00	---	---
4 – 6 visits	0.96	(0.76 – 1.22)	0.75	1.07	(0.89 – 1.29)	0.45
7 – 9 visits	0.87	(0.69 – 1.10)	0.23	1.00	(0.82 – 1.20)	0.96
≥ 10 visits	1.07	(0.85 – 1.37)	0.55	1.03	(0.85 – 1.26)	0.75

[1]adjusted for baseline & hospitalization covariates and therapy setting (i.e, home or outpatient).

Table 4 – Adjusted[1] Odds Ratios for the Effect of Time to Start of Therapy on Rehospitalization, Stratified by Setting

	Days to 1st visit	Hospitalized 1st 30 days of follow-up Odds ratio	95% CI	p-value	Hospitalized 1st 60 days of follow-up Odds ratio	95% CI	p-value
Home Health Visits (N=6,915)	1 – 2 days	0.88	(0.56-1.35)	0.55	0.89	(0.63-1.25)	0.49
	3 – 4 days	0.76	(0.50-1.16)	0.19	0.77	(0.55-1.07)	0.12
	5 – 6 days	0.73	(0.47-1.11)	0.14	0.80	(0.58-1.12)	0.20
	7 – 14 days	0.84	(0.55-1.29)	0.43	1.00	(0.98-1.02)	0.80
	>14 days	1.00	---	---	1.00	---	---
Outpatient Visits (N=2,340)	1 – 3 days	0.99	(0.47-2.08)	0.98	0.97	(0.55-1.71)	0.92
	4 – 7 days	1.23	(0.66-2.32)	0.50	0.97	(0.59-1.61)	0.92
	8 – 14 days	1.01	(0.54-1.86)	0.99	0.90	(0.56-1.45)	0.66
	> 14 days	1.00	---	---	1.00	---	---

[1]adjusted for baseline & hospitalization covariates and number of visits.

DISCUSSION & CONCLUSIONS

- Relative to stroke survivors who received no therapy, those who received outpatient therapy were less likely to be hospitalized in the first 60 days of follow-up. A similar trend, though non-significant, was observed for hospitalization in the first 30 days of follow-up.

- While the point estimates were imprecise, there was
  - suggestion of a dose-response relationship for 1-9 therapy visits and risk of rehospitalization in the first 30 days of follow-up.
  - suggestion that home health therapy starting 3-6 days after discharge home decreased the risk of rehospitalization relative to those who received therapy more than 14 days after discharge.

- Although the sample size for this analysis was relatively large overall, it was underpowered for some of the subgroup analyses and for the visits and time to therapy analyses due to the low prevalence of rehospitalization and the relatively low use of therapy.

- Further work is needed to understand the role of therapists in reducing hospitalization and downstream healthcare costs following stroke.