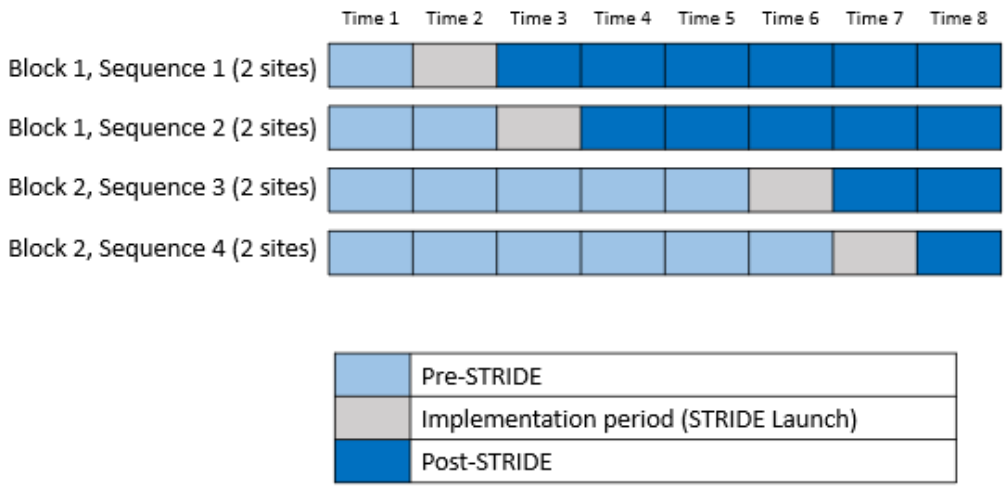
Supplementary Material*

Hastings SN, Stechuchak KM, Choate A, et al. Effects of implementation of a supervised walking program in Veterans Affairs hospitals: a stepped-wedge, cluster randomized trial. Ann Intern Med. 6 June 2023. [Epub ahead of print]. doi:10.7326/M22-3679

* This supplementary material was provided by the authors to give readers further details on their article. The material was not copyedited.

Online Supplement Table of Contents

Supplement Figure 1: SW-CRT block design with 6-month delay in recruitment between block 1 and block 2; *light blue* indicates pre-STRIDE periods, *gray* indicates implementation period (STRIDE launch), *dark blue* indicates post-STRIDE periods. Time periods are 90 days in length.



STATISTICAL ANALYSIS PLAN

Sample size

Although two primary outcomes were pre-specified, discharge to a skilled nursing facility (SNF) was considered the primary clinical outcome and LOS was considered a primary service outcome, therefore, sample size was based solely on the patient-level analyses evaluating the impact of STRIDE on the clinical binary outcome discharged to a SNF. Initially, the sample size calculation was done assuming a complete stepped-wedge design using the Hussey and Hughes (1) method with 8 hospitals and five 3-month assessment periods with a baseline discharge rate to nursing home of 20% and intracluster correlations (ICC) ranging from 0.02 to 0.06 for patients within the same hospital. A total sample of 2000 patients (~250 per hospital, 50 per 3-month interval) resulted in ≥80% power with an alpha of 0.05 to detect a 10% decrease in discharges to SNF. However, we conducted an updated power calculation that is presented in the main paper to incorporate the implementation period as well as the delay in enrollment of block 2 hospitals and the addition of the 2 assessments periods to account for this delay (2).

Methods

We followed a cross-sectional incomplete stepped-wedge design, including outcomes from a patient's first eligible hospitalization that occurred in pre- or post-STRIDE time periods; excluding outcomes when first eligible hospitalization occurred during the implementation period for a hospital (**Supplement Figure 1**). The churn rate (1- the proportion of overlapping individuals in a cluster) as defined in Li et al. (3) including all eligible hospitalizations was 79% where a churn rate of 100% is indicative of a cross-sectional design.

All models included fixed-effects for treatment and time interval; a time-varying treatment indicator variable of 0 for pre-STRIDE time periods for a hospital and 1 for the post-STRIDE time periods and dummy coded indicator variables for time were used to represent the 8 time periods. The standard model included a random effect for hospitals, the Hooper (4) model included random effects for hospital and hospital by time interaction, the Kasza and Forbes (5) model included a time by hospital random effect and for treatment effect heterogeneity a random effect for hospital by treatment was added. Akaike Information Criteria (AIC) was used to select the best fit model (6). In the final selected models, we included patient-level covariates for sociodemographics, baseline health conditions, and characteristics of the eligible hospitalizations. Linearity assumption for continuous covariates was assessed using restricted cubic splines. Intraclass correlation coefficients (ICC) were calculated using variance estimate(s) from generalized linear mixed effect models and for binary outcome assumed residual variance of $\pi^2/_3$ (34).

To examine the potential impact of including both baseline patient covariates and covariates from the hospitalization, we fit 4 different models for discharge to a SNF (binary outcome) of those with first hospitalization during pre- and post-STRIDE implementation time periods. For all models generalized linear mixed effect models with

a logit link and binomial distribution were fit using Proc GLIMMIX with the quadrature estimation method and were the standard Hussey and Hughes model including a random intercept for hospital (correlation within hospital was constant over time). Models included fixed-effects for treatment and time interval; a time-varying treatment indicator variable of 0 for pre-STRIDE time periods for a hospital and 1 for the post-STRIDE time periods and dummy coded indicator variables for time were used to represent the 8 time periods. Model 1 included no additional covariates, Model 2 included the baseline covariates, Model 3 included all covariates (both baseline patient and hospitalization covariates), and Model 4 included baseline and hospitalization covariates excluding having physical therapy (PT) from the hospitalization covariates.

As methods for handling repeated binary or count outcomes in an incomplete design (7) are not readily available or could not be fit, we conducted sensitivity analyses to evaluate the potential impact of not including all eligible hospitalizations that occurred during the pre- and post-STRIDE periods (e.g., multiple hospitalizations for a patient). When trying to fit generalized linear mixed effect model using PROC GLIMMIX including multiple hospitalizations and accounting for the within subject correlations (random intercept only) in addition to the random effect for hospital, PROC GLIMMIX will not run the model because the model is too large; this is the case even when assuming a normal distribution for the outcome. In the first sensitivity analysis, we fit the selected generalized linear mixed model using PROC GLIMMIX including all eligible hospitalizations without adjusting for the within-patient correlation. In a second set of sensitivity analyses, we fit a general linear mixed model using PROC HPMIXED, assuming a normally distributed outcome for both the binary and count outcomes accounting for the repeated within-patient correlation (8). HPMIXED in SAS is a procedure specifically designed to cope with estimation problems involving a large number of fixed effects, a large number of random effects, and/or a large number of observations. Our strategy was then to use PROC HPMIXED to fit the model assuming a normal distribution to understand the impact of including multiple hospitalizations on both the mean difference between pre- and post-STRIDE and standard errors. The first step in the process was to fit the general linear mixed model using PROC HPMIXED to the first hospitalization only for the primary outcome discharge to a SNF as was done for our primary analysis to compare to the generalized linear mixed effect model fit using PROC GLIMMIX. For all outcomes, we then fit general linear models including all covariates.

Missing data

As our outcomes were assessed in the electronic health record (EHR), missing outcome data was not an issue, however, we did have missing data in a few covariates that case deleted n=674 patients from main analyses including covariates (approximately 5% of patients) – inferential results including covariates dropping the n=674 were similar to model results that included all subjects with no covariates.

Primary and Exploratory Outcome Model Selection Results

For both binary outcomes, discharge to a SNF and having at least one inpatient fall, the standard Hussey and Hughes (1) model including a random intercept for hospital was

the best fit model (correlation within hospital was constant over time). Models included both baseline patient covariates and covariates from the hospitalization, with a restricted cubic spline fit for albumin to account for potential nonlinearity of relationship with the logit of outcome; the linearity assumption was reasonable for all other continuous covariates (age, JEN Frailty Index, and Nosos). For the count outcome length of stay (LOS), the Kasza and Forbes (5) model with hospital by time random effects with autoregressive structure (correlation within a hospital decays over time) was the best fit model. The model was fit with both baseline patient covariates and covariates from the hospitalization and the linearity assumption was reasonable for all continuous covariates.

Supplement Table 1. Patient Characteristics of all Hospitalizations during Pre- and Post-STRIDE Implementation Time Periods (excluding hospitalizations in the implementation period)		
Eligible hospitalizations		
	Pre-STRIDE (n = 8167)	**Post-STRIDE** (n = 9070)
Baseline sociodemographic and health		
Mean age (SD), *y*	72.8 (8.8)	73.0 (8.6)
Male, *n (%)*	7954 (97.4)	8762 (96.6)
Black race,* *n (%)*	2418 (30.1)	2468 (27.9)
Hispanic/Latino ethnicity,* *n (%)*	435 (5.4)	157 (1.8)
Social vulnerability,† *n (%)*	1719 (21.0)	1834 (20.2)
Rural residence,* *n (%)*	971 (11.9)	1869 (20.6)
Mean functional status, JEN Frailty Index*‡ (SD)	6.8 (1.9)	6.7 (1.9)
Mean chronic disease burden, Nosos score* (SD)	7.2 (4.8)	7.4 (4.8)
Depression,† *n (%)*	3604 (44.1)	4076 (44.9)
Dementia,† *n (%)*	1503 (18.4)	1678 (18.5)
Hospitalization characteristics		
Mean nutritional status, albumin (SD)*§	3.3 (0.6)	3.2 (0.6)
Hospital diagnoses, *n (%)*		
Chronic heart failure	2626 (32.2)	3374 (37.2)
Stroke	564 (6.9)	549 (6.1)
Diabetes	3744 (45.8)	4169 (46.0)
Cancer	1648 (20.2)	1760 (19.4)
Delirium on admission, *n (%)*	643 (7.9)	782 (8.6)
Bedrest order, *n (%)*	278 (3.4)	417 (4.6)
Order for benzodiazepines, *n (%)*	825 (10.1)	964 (10.6)
Physical therapy, *n (%)*	3970 (48.6)	5029 (55.4)

STRIDE = Assi**ST**ed Ea**R**ly Mob**I**lity for Hospitalize**D** V**E**terans.

* Missing data. observations removed from denominator in percentage calculations. (Number missing in pre-STRIDE, number missing in post-STRIDE): Black race (135, 217); Hispanic/Latino ethnicity (106, 162); rural residence (1, 2); JEN Frailty Index (1, 5); Nosos (0, 1); nutritional status, albumin (134, 149).

† Assessed in the 2 years before hospital discharge.

‡ Score (possible range 0-13) calculated from diagnosis codes in Veterans Affairs and Centers for Medicare & Medicaid Services data files in the year before hospitalization.

§ Result from albumin test closest to admission date during hospitalization. If no test during the hospitalization was available, the closest albumin test to the admission date in the 365 days prior was used.

Supplement Table 2. Patient characteristics and having at least one STRIDE walk for all eligible hospitalizations during Post-STRIDE Implementation Time Period		
	n (%) with STRIDE walk [N = 574]	**n (%) without STRIDE walk [N = 8496]**
Baseline sociodemographic and health		
Mean age (SD), *y*	74.4 (9.5)	72.9 (8.6)
Gender		
Male	553 (6.3)	8209 (93.7)
Female	21 (6.8)	287 (93.2)
Black race*		
Yes	98 (4.0)	2370 (96.0)
No	471 (7.4)	5914 (92.6)
Hispanic/Latino ethnicity*		
Yes	8 (5.1)	149 (94.9)
No	561 (6.4)	8190 (93.6)
Social vulnerability†		
Yes	94 (5.1)	1740 (94.9)
No	480 (6.6)	6756 (93.4)
Rural residence*		
Yes	183 (9.8)	1686 (90.2)
No	391 (5.4)	6808 (94.6)
Mean functional status, JEN Frailty Index*‡ (SD)	7.0 (1.8)	6.7 (1.9)
Mean chronic disease burden, Nosos score* (SD)	7.4 (4.8)	7.3 (4.8)
Depression†		
Yes	261 (6.4)	3815 (93.6)
No	313 (6.3)	4681 (93.7)
Dementia†		
Yes	136 (8.1)	1542 (91.9)
No	438 (5.9)	6954 (94.1)
Hospitalization characteristics		
Mean nutritional status, albumin (SD)*§	3.4 (0.6)	3.2 (0.6)
Hospital diagnoses		
Chronic heart failure		
Yes	202 (6.0)	3172 (94.0)
No	372 (6.5)	5324 (93.5)
Stroke		
Yes	29 (5.3)	520 (94.7)
No	545 (6.4)	7976 (93.6)
Diabetes		
Yes	252 (6.0)	3917 (94.0)
No	322 (6.6)	4579 (93.4)
Cancer		
Yes	124 (7.0)	1636 (93.0)
No	450 (6.2)	6860 (93.8)
Delirium on admission		
Yes	82 (10.5)	700 (89.5)
No	492 (5.9)	7796 (94.1)

Bedrest order		
Yes	20 (4.8)	397 (95.2)
No	554 (6.4)	8099 (93.6)
Order for benzodiazepines		
Yes	68 (7.1)	896 (92.9)
No	506 (6.2)	7600 (93.8)
Physical therapy		
Yes	439 (8.7)	4590 (91.3)
No	135 (3.3)	3906 (96.7)

STRIDE = Assi**ST**ed Ea**R**ly Mob**I**lity for Hospitalize**D** V**E**terans.

* Missing data. Black race (217); Hispanic/Latino ethnicity (162); rural residence (2); JEN Frailty Index (5); Nosos (1); nutritional status, albumin (n = 149).

† Assessed in the 2 years before hospital discharge.

‡ Score (possible range 0-13) calculated from diagnosis codes in Veterans Affairs and Centers for Medicare & Medicaid Services data files in the year before hospitalization.

§ Result from albumin test closest to admission date during hospitalization. If no test during the hospitalization was available, the closest albumin test to the admission date in the 365 days prior was used.

SENSITIVITY ANALYSES RESULTS

Model results including different subsets of covariates

In descriptives for covariates shown in **Supplement Table 7**, patients that were discharged to a SNF were older, male gender, not Black race, not Hispanic, more frail, had higher disease burden, and had higher rates of dementia. Patient hospitalizations with a discharge diagnosis of stroke, dementia on admission, bedrest order, and having any PT during a hospitalization had higher rates of discharge to a SNF.

Results for discharge to a SNF outcome on first hospitalization for models fit with no covariates and different subsets of covariates are shown in **Supplement Tables 3-4 and Supplement Figure 2**. In the model with no covariates (Model 1), odds of discharge to nursing facility were lower among eligible patients hospitalized in post-STRIDE time periods (odds ratio [OR] 0.77; 95% CI 0.64,0.93) compared to pre-STRIDE. Adjusting for having PT in a hospitalization and albumin levels had the largest effect on shifting the odds ratio somewhat lower – when we removed both covariates having PT and albumin the odds ratio for post-STRIDE was 0.75 (similar to the model with no covariates (Model 1) and Model 2 that excludes hospitalization covariates); if we only ~~remove~~ having PT (Model 4) the odds ratio was 0.69. In the final model (Model 3), including all covariates the odds of discharge to a SNF were lower among eligible patients hospitalized in post-STRIDE time periods (OR 0.62; 95% CI 0.50,0.77) compared to pre-STRIDE.

Having PT during a hospitalization was a strong predictor of being discharged to a nursing facility; in the final model with all covariates (Model 3), the odds of being discharged to a SNF were 8 times larger for patients having PT during hospitalization compared to those having no PT during a hospitalization (**Supplement Table 3**). In an exploratory analysis in the subset of first hospitalizations that occurred in pre-STRIDE time periods only, the odds of being discharged to a nursing facility were 7.4 times higher for patients that had PT during their hospitalization compared to those that did not (similar to what was found in Model 3). The overall inference for the effectiveness of STRIDE on discharge to a SNF was similar in Models 1-4, with a somewhat stronger odds ratio when including a covariate for PT during hospitalization and estimated rates of discharge to skilled nursing were shifted slighter lower for both pre-STRIDE and post-STRIDE (**Supplement Tables 34 and Supplement Figure 2** for comparison of OR and associated 95% CI for pre-STRIDE vs. post-STRIDE).

All eligible hospitalizations

In the first set of sensitivity results, fitting a GLIMMIX model to all eligible hospitalization without adjusting for the within patient correlation and with no covariates (**Supplement Table 5**), inferential results were similar to the model fit to first hospitalization only with no covariates with a slight attenuation of effectiveness.

In exploring using HPMIXED with a normal distribution fit to the primary analysis with first hospitalization only and no covariates, inferential results, and estimated rates of discharge to a SNF for pre- and post-STRIDE were similar (**Supplement Table 5**). The inferential results including all eligible hospitalizations with HPMIXED adjusting for the within patient correlation and no covariates were similar to HPMIXED results with first hospitalization only with a slight attenuation of the effect. There was minimal impact to the estimated means and standard errors including adjustment for within-patient correlation.

For the primary outcome discharge to home, using the standard Hussey and Hughes (1) including all hospitalizations in the pre- and post-STRIDE periods and all covariates without adjusting for the within-patient correlation, odds of discharge to a SNF were lower among eligible patients hospitalized in post-STRIDE time periods (OR 0.7; 95% CI 0.6,0.8) compared to pre-STRIDE and similar to results including first hospitalizations only (**Supplement Table 6a**). A model fit using a general linear mixed model, assuming a normally distributed outcome and accounting for the repeated within-patient correlation, yielded similar inferential results (**Supplement Table 6b**). Sensitivity results for primary outcome LOS and exploratory outcome having at least one inpatient fall are shown in **Supplement Tables 6a** and **6b**.

Supplement Table 3. Results from generalized linear mixed models fit using GLIMMIX for discharge to a SNF binary outcome of those with first hospitalization during Pre- and Post-STRIDE Implementation time periods								
	Model 1* (n = 12 863)		**Model 2† (n = 12 439) ‖**		**Model 3‡ (n = 12 189) ‖**		**Model 4§ (n = 12 189) ‖**	
	OR [95% CI]	**p-value**	**OR [95% CI]**	**p-value**	**OR [95% CI]**	**p-value**	**OR [95% CI]**	**p-value**
Post-STRIDE	0.77 [0.64,0.93]	0.007	0.76 [0.62,0.93]	0.007	0.62 [0.50,0.77]	<.0001	0.69 [0.56,0.85]	0.0006
Baseline sociodemographic and health								
Age, *y*	/		1.05 [1.04,1.05]	<.0001	1.04 [1.03,1.04]	<.0001	1.05 [1.05,1.06]	<.0001
Male	/		0.91 [0.68,1.21]	0.53	0.89 [0.65,1.21]	0.45	0.86 [0.63,1.16]	0.31
Black race‖	/		1.02 [0.90,1.16]	0.77	1.01 [0.88,1.16]	0.87	0.98 [0.86,1.16]	0.79
Hispanic/Latino ethnicity‖	/		0.81 [0.60,1.08]	0.15	0.74 [0.54,1.01]	0.056	0.81 [0.60,1.09]	0.17
Social vulnerability¶	/		1.28 [1.12,1.46]	0.0003	1.27 [1.10,1.46]	0.001	1.30 [1.14,1.50]	0.0001
Rural residence‖	/		0.83 [0.72,0.95]	0.0086	0.85 [0.74,0.99]	0.034	0.86 [0.75,0.99]	0.036
Functional status, JEN Frailty Index‖**	/		1.08 [1.04,1.11]	<.0001	1.01 [0.97,1.04]	0.69	1.06 [1.02,1.09]	0.0009
Chronic disease burden, Nosos score‖	/		1.04 [1.03,1.05]	<.0001	1.03 [1.01,1.04]	<.0001	1.03 [1.02,1.05]	<.0001
Depression¶	/		0.94 [0.85,1.05]	0.29	0.98 [0.87,1.10]	0.74	0.99 [0.88,1.10]	0.83
Dementia¶	/		2.48 [2.21,2.79]	<.0001	2.02 [1.75,2.32]	<.0001	2.14 [1.87,2.45]	<.0001
Hospitalization characteristics								
Nutritional status (albumin)††	/		/		0.78 [0.66,0.92]	0.004	0.70 [0.60,0.83]	<.0001
Chronic heart failure	/		/		0.70 [0.62,0.79]	<.0001	0.70 [0.63,0.79]	<.0001
Stroke	/		/		1.70 [1.43,2.04]	<.0001	2.10 [1.74,2.46]	<.0001
Diabetes	/		/		1.03 [0.93,1.15]	0.56	1.07 [0.97,1.19]	0.20
Cancer	/		/		0.86 [0.75,1.00]	0.043	0.81 [0.71,0.93]	0.0023
Delirium on admission	/		/		1.36 [1.14,1.61]	0.001	1.53 [1.29,1.80]	<.0001
Bedrest order	/		/		2.04 [1.62,2.57]	<.0001	2.13 [1.71,2.66]	<.0001

Order for benzodiazepines	/	/	1.24 [1.05,1.47]	0.013	1.23 [1.05,1.45]	0.013
Physical therapy	/	/	8.29 [7.16,9.59]	<.0001	/	/

* Model 1 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with no covariates

† Model 2 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates only

‡ Model 3 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates and hospitalization covariates (primary model)

§ Model 4 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates and hospitalization covariates excluding having PT

||Observations removed due to missing data. Black race (217); Hispanic/Latino ethnicity (162); rural residence (2); JEN Frailty Index (5); Nosos (1); nutritional status, albumin (149).

¶ Assessed in the 2 years before hospital discharge.

** Score (possible range 0-13) calculated from diagnosis codes in Veterans Affairs and Centers for Medicare & Medicaid Services data files in the year before hospitalization.

†† Result from albumin test closest to admission date during hospitalization. If no test during the hospitalization was available, the closest albumin test to the admission date in the 365 days prior was used.

Supplement Table 4. Estimated rates of discharge to a SNF from generalized linear mixed models for those with first hospitalization during Pre- and Post-STRIDE Implementation time periods

MODEL	Pre-STRIDE Estimated Mean; 95% CI	Post-STRIDE Estimated Mean; 95%CI
MODEL 1*	0.20; [0.15,0.26]	0.16; [0.12,0.21]
MODEL 2†	0.17; [0.12,0.23]	0.13; [0.09,0.19]
MODEL 3‡	0.13; [0.09,0.19]	0.08; [0.06,0.13]
MODEL 4§	0.17; [0.12,0.24]	0.12; [0.08,0.18]

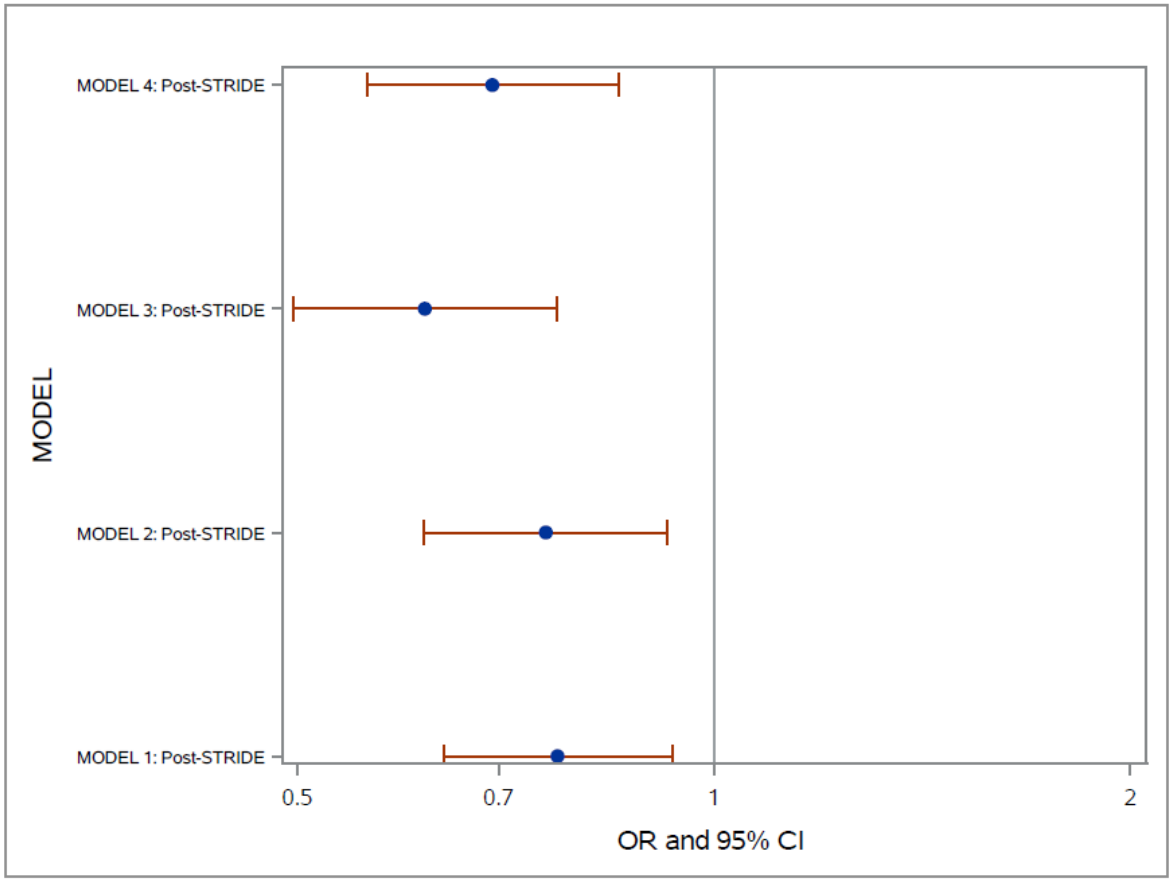
* Model 1 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with no covariates

† Model 2 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates only

‡ Model 3 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates and hospitalization covariates (primary model)

§ Model 4 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates and hospitalization covariates excluding having PT

Supplement Figure 2. Plots of Odds Ratios and associated 95% Confidence Intervals for Post-STRIDE vs. Pre-STRIDE from generalized linear mixed model fit using PROC GLIMMIX to discharge to a SNF outcome for first hospitalization for Model 1*, Model 2†, Model 3‡ (Primary Model), and Model 4§. Vertical line represents odds ratio of 1.



* Model 1 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with no covariates

† Model 2 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates only

‡ Model 3 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates and hospitalization covariates (primary model)

§ Model 4 is generalized linear mixed model fit with binomial distribution and logit link using PROC GLIMMIX using quadrature method for estimation with baseline covariates and hospitalization covariates excluding having PT

Supplement Table 5. Sensitivity Results from generalized linear mixed model fit using PROC GLIMMIX and general linear models using PROC HPMIXED (normal distribution) to discharge to a SNF outcome with no covariates

	First Hospitalization Only (n = 12 863)		
MODEL	**Pre-STRIDE Estimated Mean (N = 6722)**	**Post-STRIDE Estimated Mean (N = 6141)**	**Estimated Difference Post - Pre; 95% Confidence Interval; p-value**
Generalized linear mixed model (binary distribution), no covariates	0.20; [0.15,0.26]	0.16; [0.12,0.21]	0.77 (0.64,0.93); p=0.0074
General linear mixed model (normal distribution), no covariates	0.21; [0.16,0.26]	0.17; [0.12,0.22]	-0.04 (-0.06,-0.01); p=0.01
	All Eligible Hospitalizations (n = 17 237)		
	Pre-STRIDE Estimated Mean (N = 8167)	**Post-STRIDE Estimated Mean (N = 9070)**	**Estimated Difference Post - Pre; 95% Confidence Interval; p-value**
Generalized linear mixed model (binary distribution), no covariates	0.20; [0.15,0.25]	0.17; [0.12,0.22]	0.82 (0.70,0.97); p=0.021
General linear mixed model (normal distribution), no covariates	0.21; [0.15,0.26]	0.18; [0.13,0.23]	-0.03 (-0.05,-0.01); p=0.018

Supplement Table 6a. Primary and exploratory outcome effects: Sensitivity Results from generalized linear mixed model fit using PROC GLIMMIX to outcomes including all eligible hospitalizations in pre- and post-STRIDE periods without adjusting for within patient repeated hospitalizations and including all covariates*†

	All Eligible Hospitalizations (n = 16 432)*		
Outcome	**Pre-STRIDE Estimated Mean; 95% CI**	**Post-STRIDE Estimated Mean; 95%CI**	**Estimated Difference Post vs. Pre; 95% CI; p-value**
Discharge to a SNF	0.14 [0.10, 0.20]	0.10 [0.07, 0.15]	OR=0.7 (0.6,0.8); p<0.0001
Length of stay (days)	6.9; [6.4,7.3]	6.9; [6.5,7.4]	RR=1.0 (0.9 ,1.1); p=0.80
Inpatient fall	0.016; [0.009,0.029]	0.013; [0.007,0.024]	OR=0.8 (0.5,1.3); p=0.40

Supplement Table 6b. Primary and exploratory outcome effects: Sensitivity Results from general linear mixed model fit using PROC HPMIXED (normal distribution) to outcomes including all eligible hospitalizations in pre- and post-STRIDE periods - random effect for hospital and patient within hospital and including all covariates *†

	All Eligible Hospitalizations (n = 16 432)*		
Outcome	**Pre-STRIDE Estimated Mean; 95% CI**	**Post-STRIDE Estimated Mean; 95%CI**	**Estimated Difference Post vs. Pre; 95% CI; p-value**
Discharge to a SNF	0.22 [0.16, 0.27]	0.17 [0.12, 22]	-0.04 (-0.07,-0.02); p<0.0001
Length of stay (days)	7.2; [6.8,7.7]	7.2; [6.7,7.7]	-0.01 (-0.34,0.33); p=0.97
Inpatient fall	0.024; [0.013,0.036]	0.021; [0.010,0.032]	-0.003 (-0.011,0.005); p=0.47

* Models include all hospitalization for a patient that occurred in pre- and post-STRIDE period with n=805 case deleted due to missing covariates (n=16 432). Covariates include: age at admission, gender, race, Hispanic/Latino ethnicity, social vulnerability, rural residence, functional status (JEN Frailty Index), chronic disease burden concurrent score (Nosos), depression diagnosis, dementia diagnosis, nutritional status (albumin), chronic heart failure, stroke, diabetes, cancer, delirium on admission, bedrest order during hospitalization, order for benzodiazepines during hospitalization, and physical therapy during stay.

† n=283 missing albumin (134 pre-STRIDE; 149 post-STRIDE); n=352 missing race (135; 217); n=268 missing Hispanic/Latino ethnicity (106; 162); rural residence (1,2); JEN Frailty Index (1,5); Nosos (0, 1).

Supplement Table 7. Patient characteristics and hospitalization discharge status of those with first hospitalization during Pre- and Post-STRIDE Implementation Time Periods		
	n (%) Discharged to a SNF [N = 2353]	**n (%) Discharged to home [N = 10 510]**
Baseline sociodemographic and health		
Mean age (SD), *y*	77.0 (9.6)	72.0 (8.4)
Gender		
Male	2285 (18.4)	10 155 (81.6)
Female	68 (16.1)	355 (83.9)
Black race*		
Yes	570 (15.7)	3061 (84.3)
No	1713 (19.2)	7231 (80.8)
Hispanic/Latino ethnicity*		
Yes	68 (15.0)	386 (85.0)
No	2245 (18.4)	9955 (81.6)
Social vulnerability†		
Yes	443 (18.6)	1942 (81.4)
No	1910 (18.2)	8568 (81.8)
Rural residence*		
Yes	386 (17.8)	1788 (82.2)
No	1967 (18.4)	8719 (81.6)
Mean functional status, JEN Frailty Index*‡ (SD)	7.0 (1.8)	6.3 (1.9)
Mean chronic disease burden, Nosos score* (SD)	7.3 (4.6)	6.3 (4.4)
Depression†		
Yes	984 (18.4)	4353 (81.6)
No	1369 (18.2)	6157 (81.8)
Dementia†		
Yes	859 (37.6)	1425 (62.4)
No	1494 (14.1)	9085 (85.9)
Hospitalization characteristics		
Mean nutritional status, albumin (SD)*§	3.1 (0.6)	3.3 (0.6)
Hospital diagnoses		
Chronic heart failure		
Yes	650 (16.3)	3332 (83.7)
No	1703 (19.2)	7178 (80.8)
Stroke		
Yes	272 (31.2)	600 (68.8)
No	2081 (17.4)	9910 (82.6)
Diabetes		
Yes	1039 (18.1)	4696 (81.9)
No	1314 (18.4)	5814 (81.6)
Cancer		
Yes	435 (17.7)	2018 (82.3)

No	1918 (18.4)	8492 (81.6)
Delirium on admission		
Yes	441 (42.1)	607 (57.9)
No	1912 (16.2)	9903 (83.8)
Bedrest order		
Yes	149 (27.3)	396 (72.7)
No	2204 (17.9)	10114 (82.1)
Order for benzodiazepines		
Yes	255 (19.8)	1033 (80.2)
No	2098 (18.1)	9477 (81.9)
Physical therapy		
Yes	2083 (31.8)	4466 (68.2)
No	270 (4.3)	6044 (95.7)

STRIDE = Assi**ST**ed Ea**R**ly Mob**I**lity for Hospitalize**D** V**E**terans.

* Missing data: Black race (288); Hispanic/Latino ethnicity (209); rural residence (3); JEN Frailty Index (5); Nosos (1); nutritional status, albumin (257).

† Assessed in the 2 years before hospital discharge.

‡ Score (possible range 0-13) calculated from diagnosis codes in Veterans Affairs and Centers for Medicare & Medicaid Services data files in the year before hospitalization.

§ Result from albumin test closest to admission date during hospitalization. If no test during the hospitalization was available, the closest albumin test to the admission date in the 365 days prior was used.

SAS code for fitting generalized linear mixed model fit using PROC GLIMMIX to discharge to a SNF outcome for first hospitalization (MODEL 3)

```
title "FINAL with all covariates, Hussey and Hughes Model w/o
BLOCK restricted cubic spline for albumin continuous
covariates";
proc glimmix data=audata method=quad;
 class BLOCK IndexSta3N time(ref="0") post_imp (ref="0")
TIME_3month Gender(ref="F") LATINO_ADMIN;
 effect splalbumin=spline (AlbuminNumericalValue / details
naturalcubic basis=tpf(noint) knotmethod=percentiles(3));

 model DISCHARGE_HOME (ref="1") = post_imp time
LATINO_ADMIN
RACEB
Gender
BedRestFlag_YES
CANCER_FLAG
CVA_FLAG
DELIRIUM
DM_FLAG
HF_FLAG
HaveBenzoMedsStay
HaveDEM_2YR
HaveDEPR_2YR
HaveSOCIALVUL_2YR
HospHasPT
URBAN
AGE_AT_ADMIN
splalbumin
MCVA_JFI
NOSOS_CURRENT_C /solution cl dist=binary link=logit;
 random intercept/ subject=IndexSta3N gcorr;
 estimate "Pre vs. Post" post_imp 1 -1 / exp cl;
 lsmeans POST_IMP / ilink cl;
run;
```

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