

ORIGINAL RESEARCH

Factors Associated With Discharge to Home Versus Discharge to Institutional Care After Inpatient Stroke Rehabilitation



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Abstract

Objective: To examine sociodemographic and clinical characteristics independently associated with discharge home compared with discharge to a skilled nursing facility (SNF) after acute inpatient rehabilitation.

Design: Retrospective cohort study.

Setting: Three tertiary accredited acute care rehabilitation facilities.

Participants: Adult patients with stroke (N=2085).

Interventions: Not applicable.

Main Outcome Measures: Not applicable.

Results: Of 2085 patients with stroke treated at 3 centers over a 4-year period, 78.2% (n=1631) were discharged home and 21.8% (n=454) discharged to an SNF. Findings from a multivariable logistic regression analysis indicated that patients were less likely to be discharged home if they were older (odds ratio [OR], .98; 95% confidence interval [CI], .96–.99), separated or divorced (compared with married; OR, .61; 95% CI, .48–.79), or with Medicare health insurance (compared with private insurance; OR, .69; 95% CI, .55–.88), or had dysphagia (OR, .83; 95% CI, .71–.98) or cognitive deficits (OR, .79; 95% CI, .77–.81). The odds of being discharged home were higher for those admitted with a higher motor FIM score (OR, 1.10; 95% CI, 1.09–1.11). The following were not associated with discharge disposition: sex, race, prestroke vocational status, availability of secondary health insurance, number of days from stroke onset to rehabilitation facility admission, stroke type, impairment group, cognitive FIM on admission, other stroke deficits (aphasia, ataxia, neglect, or speech disturbance), stroke complications of hyponatremia or urinary tract infection, or comorbid conditions.

Conclusions: One in 5 patients with stroke were discharged to an SNF after inpatient rehabilitation. On admission, several sociodemographic and clinical characteristics were identified that could be considered as important factors in early discussions for discharge planning.

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The incidence of stroke has been relatively consistent at 795,000 new or recurrent strokes per year over the last decade.^{1,2} In contrast, because of early, coordinated interventions, stroke survival has significantly improved and is now <130,000 deaths per year.^{2,3} This reflects a 38.5% decrease in the relative rate of stroke deaths from 2000 to 2010.^{1,3,4} Although this is a great success story, the downside is that more stroke survivors are living longer with disability. Stroke remains the leading cause of long-term disability in adults.⁴ A close look at the stroke population with

disability reveals minor impairment in 25%, moderate to severe impairment in 40%, and discharge to institutional care in 10%.⁵

In addition to the impairment caused to the patient, stroke is very costly. These costs include the burden of care placed on the family and caregivers. There are also financial costs that the individual stroke survivor and the society bear. These involve the loss of productivity as well as the cost of care provision. In 2010, the cost of stroke in the United States approached \$73.7 billion, making stroke one of the most expensive chronic diseases.^{1,6} The national burden is anticipated to reach \$240 billion by 2030.¹ On an individual basis, Taylor et al⁷ reported in 1996 that the average lifetime cost of stroke surpassed \$100,000 with nursing

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home cost of care comprising 17.5% of the total. In 2009, this cost was further evaluated in a critical review of the literature by Luengo-Fernandez et al,⁸ who reviewed 120 articles from 15 countries. When focusing only on the United States, they reported that the cost ranged from \$7309 to \$146,149. A 2012 Canadian study⁹ reported similar levels of expenditure for Canadian stroke survivors, with an average annual cost of \$107,883 for disabling strokes.

In light of the significant level of disability and the rising costs of care, discharging the patient home is highly desirable. Inpatient stroke-directed rehabilitation has been shown to positively affect the probability of home discharge.¹⁰⁻¹² It has been postulated that the improved effect is through a comprehensive interdisciplinary approach that minimizes medical complications, initiates neuro-cognitive stimulation, and optimizes training of the patient and caregivers.^{10,11} In addition, from a personal preference perspective, patient surveys confirm that up to 85% of patients preferred to be discharged to their home environment.¹³ Studies evaluating discharge disposition suggest that 54.2% to 64.1% of stroke survivors are discharged from acute care rehabilitation to another inpatient setting.¹⁴⁻¹⁶ As suggested previously, admission to an acute stroke rehabilitation program can increase the probability of returning home after a stroke.¹⁰⁻¹² Studies of discharge disposition from acute inpatient rehabilitation settings report a wide range from 62% to 99% for home disposition.^{12,17,18}

There is little information on which specific patient characteristics can be used to predict a home versus institution disposition from inpatient rehabilitation.¹⁹⁻²⁴ The purpose of this study was to examine sociodemographic and clinical characteristics independently associated with discharge home compared with discharge to a skilled nursing facility (SNF) after acute inpatient rehabilitation.

Methods

Design and setting

This retrospective observational study includes patients treated at 3 inpatient acute care rehabilitation centers in southeastern United States. The 3 centers are part of a self-supporting, public, not-for-profit health care provider system with a network of almost 800 care locations including academic medical centers, hospitals, physician practices, surgical and rehabilitation centers, home health agencies, nursing homes, and hospice and palliative care. The study was approved by the institutional review board of the provider organization and the data coordinating center.

Participants

There are 85 impairment group codes that represent conditions requiring rehabilitation. The impairment group codes are used to generate rehabilitation impairment categories (RICs).²⁵ RIC codes are the first level of classification in inpatient rehabilitation facilities for payment based on case mix. An RIC code of 1 indicates stroke cases with a diagnosis of cerebral ischemia due to vascular

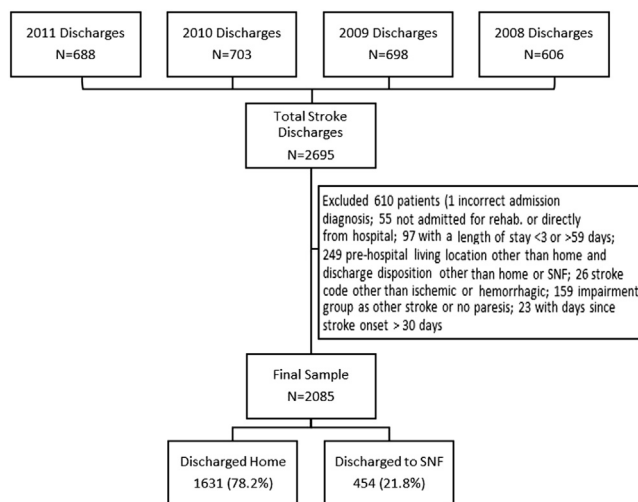


Fig 1 Study sample of the stroke population.

thrombosis, embolism, or hemorrhage. Patients with an RIC code of 1 were selected for this retrospective study. A total of 2695 patients with an RIC code of 1 were admitted over a 4-year period (2008–2011) at 1 of the 3 acute inpatient rehabilitation facilities (fig 1). The stroke volume per site remained constant for each of the 4 years.

The 3 facilities—2 urban and 1 rural in location—belonged to the same stroke rehabilitation program and conformed to a uniform set of stroke rehabilitation practice guidelines and data documentation. Preliminary analysis revealed that there was no difference in discharge disposition by site for all 4 years or by year. The site, location of care (urban vs rural), and year of patient discharge were not included as variables in further analyses.

Data collection

Data were collected retrospectively through abstraction of data from eRehabData.²⁶ eRehabData is an inpatient rehabilitation outcomes software system that serves as an online patient assessment approach offered to inpatient rehabilitation providers by the American Medical Rehabilitation Providers Association.²⁶

The patient sociodemographic and clinical variables were selected on the basis of the literature, preliminary screen, and clinical expertise. A review of the literature revealed the following variables that could assist in predicting disposition: the FIM, particularly the motor FIM²⁷⁻³¹; stroke severity, most often measured by the National Institutes of Health Stroke Scale³²⁻³⁴; racial background^{22-24,35}; age at stroke onset^{17,36}; marital status³⁰; and insurance.³⁷ The team of clinicians and researchers further evaluated the data available for variable selection. Stroke physicians, resident physicians, research scientists, research coordinators, research assistants, and biostatisticians met face to face and held asynchronous discussions to examine the value of each variable for this study.

Sociodemographic variables selected for this study included age, sex, race, marital status, prestroke living arrangement, employment status, and health insurance. Clinical variables selected included preexisting comorbidities, number of days from stroke onset to inpatient rehabilitation facility admission, stroke type, impairment on rehabilitation admission, motor and cognitive

List of abbreviations:

CI	confidence interval
OR	odds ratio
RIC	rehabilitation impairment category
SNF	skilled nursing facility

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