

# Effect of a Restorative Model of Posthospital Home Care on Hospital Readmissions

Mary E. Tinetti, MD,\* Peter Charpentier, MPH,\* Margaret Gottschalk, PT, MS,† and Dorothy I. Baker, PhD, RNC\*

**OBJECTIVES:** To compare readmissions of Medicare recipients of usual home care and a matched group of recipients of a restorative model of home care.

**DESIGN:** Quasiexperimental; matched and unmatched.

**SETTING:** Community, home care.

**PARTICIPANTS:** Seven hundred seventy individuals receiving care from a large home care agency after hospitalization.

**INTERVENTION:** A restorative care model based on principles adapted from geriatric medicine, nursing, rehabilitation, goal attainment, chronic care management, and behavioral change theory.

**MEASUREMENTS:** Hospital readmission, length of home care episode.

**RESULTS:** Among the matched pairs, 13.2% of participants who received restorative care were readmitted to an acute hospital during the episode of home care, versus 17.6% of those who received usual care. Individuals receiving the restorative model of home care were 32% less likely to be readmitted than those receiving usual care (conditional odds ratio = 0.68, 95% confidence interval = 0.43–1.08). The mean length of home care episodes was  $20.3 \pm 14.8$  days in the restorative care group and  $29.1 \pm 31.7$  days in the usual care group ( $P < .001$ ). Results were similar in unmatched analyses.

**CONCLUSION:** Although statistical significance was marginal, results suggest that the restorative care model offers an effective approach to reducing the occurrence of avoidable readmissions. It was previously shown that the restorative model of home care was associated with better functional recovery, fewer emergency department visits, and shorter episodes of home care. This model could be

incorporated into usual home care practices and care delivery redesign. *J Am Geriatr Soc* 60:1521–1526, 2012.

**Key words:** readmissions; restorative care; home care

Almost 20% of Medicare beneficiaries are readmitted to an acute hospital within 30 days of discharge.<sup>1,2</sup> Readmissions increase healthcare costs and lower patient satisfaction.<sup>3,4</sup> Several provisions of the Affordable Care Act focus on reducing avoidable hospital readmissions.<sup>5</sup> For example, Section 3026 provides funding for testing models to improve care transitions, Section 3025 mandates reduction in Medicare payments to hospitals based on the rate of 30-day readmissions, and Section 3022 requires accountable care organizations to submit performance data related to readmissions and care transitions.<sup>5</sup> The Centers for Medicare and Medicaid Services and other agencies in the Department of Health and Human Services are working to identify causes of readmission and to disseminate programs that are effective at reducing avoidable readmissions.<sup>6</sup>

Older age, multiple chronic conditions, and functional limitations are all factors associated with risk of readmission after discharge from an acute hospital stay.<sup>7,8</sup> One-quarter to one-half of hospitalized older persons experience functional loss during hospitalization, and only one-third recover to prehospital levels of functioning by 3 months.<sup>9–11</sup> These individuals are at particularly high risk of adverse outcomes, including hospital readmission.<sup>7,8</sup>

Interventions targeting the hospital discharge process, transitions in care, care coordination, self-management, medication management, and management of specific diseases have been shown to reduce hospital readmissions.<sup>5,12–22</sup> Many older adults with multiple chronic conditions and functional limitations receive home care services from a Medicare-qualified home care agency after an acute hospital stay. The association between functional

From the \*Department of Medicine, Yale School of Medicine, New Haven, Connecticut; and †Rehabilitation Services, Yale-New Haven Hospital, New Haven, Connecticut.

Address Correspondence to Mary E. Tinetti, Gladys Phillips Crofoot Professor of Medicine and Public Health, Department of Internal Medicine, Section of Geriatrics, Yale School of Medicine, P.O. Box 208025, New Haven, CT 06520. E-mail: mary.tinetti@yale.edu

DOI: 10.1111/j.1532-5415.2012.04060.x

limitations and risk of readmissions suggests that enhancing functional recovery during episodes of receipt of home care services may offer an additional strategy for reducing the risk of hospital readmission.

The development of a restorative model of home care was previously described, and the effect of this model on older adults receiving an episode of home care from a large home care agency in Connecticut was reported.<sup>23,24</sup> In that study, which included home care recipients admitted from home, skilled nursing facilities (SNFs), inpatient rehabilitation, and an acute hospital, individuals receiving restorative care were more likely to remain home, less likely to visit an emergency department (ED), and more likely to improve in basic and instrumental activity of daily living (ADLs) functioning and mobility than recipients of usual home care services.<sup>24</sup> These better outcomes were in spite of shorter duration of home care episodes.<sup>24</sup> The aim of the current study was to compare the frequency of hospital readmissions of recipients of usual home care and the restorative model of home care after an acute hospitalization.

## METHODS

### Setting and Participants

Participants were individuals receiving home care from a large home care agency in Connecticut. The branch office closest to the investigators served as the restorative care office, and the remaining five offices of the agency served as the usual care offices. All six offices operated under the same administration. Staff at all six offices received the same training in agency policies and procedures. The Yale School of Medicine human investigations committee approved the study.

Eligibility for the original study included age 65 and older; receipt of an episode of nonhospice Medicare-covered home care between November 1, 1998, and April 30, 2000; absence of severe cognitive impairment that would impede ability to participate; and not requiring total assistance with care.<sup>24</sup> Random assignment of participants was not possible because of geographic considerations and because individuals needed to be assigned to the next available home care staff. Because the agency staff provided the restorative model of care, an office could not have restorative and usual care participants. Individual prospective matching ensured that participants in the two groups were comparable at baseline.<sup>25</sup> A computerized algorithm matched participants from the restorative and usual care offices according to age (within 5 years), gender, race, self-care (basic) activities of daily living (ADLs) function at admission to home care, cognitive status, start date for home care, and whether the participant was admitted to home care following an acute hospitalization.

The 864 participants from the original study who were admitted to home care after discharge from an acute hospital were eligible for the current study. Four participants who died during their home care episode and 90 (10%) for whom the discharge location from home care was unknown were excluded. The study sample of 770 participants included 341 matched pairs and 88 additional participants included in the unmatched analysis but whose

match died or had missing outcome data. The agency's nursing, physical therapy, occupational therapy, and home health aide (HHA) staff provided care through all six offices under the approval of participants' physicians.

### Restorative Care

The development and implementation of the restorative care strategy is summarized here and described in detail elsewhere.<sup>23</sup> The restorative care model was based on principles adapted from geriatric medicine, nursing, rehabilitation, goal attainment, chronic care management, and behavioral change theory.<sup>26-34</sup> The aim was to reorient home care teams from primarily treating diseases and "taking care of" patients toward working together to maximize function. A multidisciplinary work group of expert home care clinicians familiarized staff with the goal of optimizing patient function, developed methods to assess ADLs and quantify increments of improvement, and focused staff on developing individual functional goals with patients and linking interventions to patients' goals. In developing and testing the restorative care model, Plan-Do-Study-Act cycles<sup>35</sup> were followed to operationalize the concept of assessing and maximizing functional independence within episodes of home care; identify structural, process, and attitudinal barriers that impede maximizing functional independence; identify and pilot test solutions to these barriers, refining the approach based on feedback; and implement and test the model with all staff.

The investigators had developed the interventions targeting physical impairments and ADLs in previous home-based programs.<sup>29,36-38</sup> The treatment plan included various combinations of exercise; behavioral change; self-management; environmental adjustments and adaptive equipment; training and counseling of participant, family, and caregivers; and medication adjustments. A self-care progress report, in which each ADL was divided into subtasks,<sup>37</sup> helped to clarify goals, establish a baseline, standardize assessment, clarify care responsibility of providers, and track progress.<sup>23</sup>

Important elements of the restorative model are displayed in Table 1. The nurses, physical therapists, and

**Table 1. Important Elements of the Restorative Model of Home Care**

Development and implementation of a unified plan of care based on goal attainment
Establishment of goals based on input from the individual, family, and home care staff; agreement on the process for reaching these goals
Reorganization of the home care staff from individual care providers into an integrated, interdisciplinary team with shared goals
Reorientation of the focus of the home care team from primarily treating diseases and "taking care of" patients toward maximizing self-care function
Clarification of roles and responsibility of providers
Standard assessment of patients; self-care progress report; track progress toward reaching goals
Treatment plans targeting physical impairments and tasks of daily living; behavioral changes; environmental adjustments and adaptive equipment; counseling and support; training of patient, family, and caregivers; and medication adjustments

HHAs who worked at the intervention office implemented the restorative model. Agency staff who participated in designing the model trained and oversaw these providers. Although different combinations of home care staff were involved for each participant, they reorganized each time from individual care providers into integrated, interdisciplinary teams with shared goals. The goals were established collaboratively with the participant, family, and home care staff.<sup>23</sup> The self-care progress report was started at the time of admission and left in the home to communicate one consistent plan of care between the participant, home care staff, and any other caregivers.

### Usual Home Care

No attempt was made to change home care practices in the usual care offices. Although the nurses and therapists made efforts to communicate regularly, their care plans were developed independently. The HHAs performed or helped the participant perform basic and instrumental ADLs.

### Descriptive and Outcome Data

All descriptive and outcome data were ascertained using the Outcome and Assessment Information Set (OASIS) version B.<sup>39</sup> The Centers for Medicare and Medicaid Services mandates OASIS for all individuals receiving Medicare services from home care agencies. OASIS must be completed on admission to home healthcare services, transfer to another site of care (e.g., hospital), resumption of care (after a hospital stay), follow-up (at least 60 days), discharge from home health care, and death.<sup>40</sup> Outcome of the episode of home care was dichotomized as remaining at home or readmission to an acute hospital.

### Analysis

Differences in participant characteristics between the matched restorative and usual care groups were assessed using the McNemar test for binary variables and the paired *t*-test for continuous variables. In the primary analysis, pairwise differences in hospital readmission were investigated using conditional logistic regression.<sup>41</sup> Logistic regression, using the entire sample, was used to test the robustness of the matched results. In this confirmatory unmatched analysis, demographic, medical, and functional factors (Table 3) that may confound the relationship between the restorative effect and readmissions were controlled for.

## RESULTS

Participant characteristics at the start of the home care episode are reported in Table 2 according to restorative model versus usual care offices. Characteristics are provided for all participants who had been hospitalized before admission to home care and then for the subset of matched pairs. Individuals receiving restorative and usual care were well matched on demographic characteristics, cognition, baseline function, reason for hospitalization, and chronic conditions.

**Table 2. Characteristics of Home Care Recipients Cared for Using the Restorative Model and Usual Home Care**

Baseline Characteristics	Restorative Model		Usual Care	
	All (n = 410)	Matched Pairs (n = 341)	All (n = 360)	Matched Pairs (n = 341)
Age, mean ± standard deviation	77.4 ± 6.7	77.4 ± 6.5	77.0 ± 6.7	77.4 ± 6.5
Male, n (%)	191 (47)	159 (47)	168 (47)	159 (47)
Nonwhite, n (%)	15 (4)	12 (4)	14 (4)	12 (4)
Impaired cognition, n (%)	60 (15)	52 (15)	55 (15)	52 (15)
Dependence in >1 self-care activity of daily living, n (%)	211 (51)	161 (47)	171 (48)	161 (47)
Lived alone, n (%)	111 (27)	94 (26)	113 (31)	106 (31)
Depressed mood, n (%)	64 (16)	53 (16)	65 (18)	60 (18)
Reason for hospitalization, n (%)				
Heart failure or other cardiac	110 (27)	87 (25)	94 (27)	94 (27)
Pneumonia or respiratory	64 (16)	57 (17)	47 (13)	46 (13)
Stroke or other neurological	11 (3)	10 (3)	11 (3)	10 (3)
Other <sup>a</sup>	90 (22)	76 (22)	74 (21)	65 (19)
Chronic conditions, n (%)				
Cardiac	288 (70)	233 (68)	247 (69)	236 (69)
Respiratory	90 (22)	82 (24)	63 (18)	61 (18)
Diabetes mellitus	89 (22)	73 (22)	90 (26)	84 (26)
Neurological	29 (7)	24 (7)	25 (7)	23 (7)
≥ 2 of these categories of chronic conditions	227 (55)	189 (55)	208 (58)	200 (59)

<sup>a</sup> Gastrointestinal, diabetes mellitus, urinary tract infection, injury, musculoskeletal, dehydration, anemia, deep venous thrombosis.

For the matched pairs, 13.2% of restorative model participants were readmitted to an acute hospital during the episode of home care, versus 17.6% of usual care participants. According to the conditional regression analysis, participants receiving the restorative model of home care were 32% less likely to be readmitted than those receiving usual care (odds ratio (OR) = 0.68, 95% confidence interval (CI) = 0.43–1.08) (Table 3). Results were similar in the unmatched analyses (adjusted OR = 0.71, 95% CI = 0.47–1.06) (Table 3).

## DISCUSSION

The restorative model of home care was associated with approximately one-third fewer readmissions than usual care. Participants receiving restorative care also had shorter lengths of home care episodes than recipients of usual home care. It was previously reported that restorative care was also associated with greater recovery in function, fewer ED visits, and marginally fewer nursing,

**Table 3. Readmissions of Medicare Beneficiaries Receiving Restorative and Usual Home Care**

Type of Analysis	n/N (%)		P-Value	Multivariate Odds Ratio (95% Confidence Interval) <sup>a</sup>
	Restorative Care	Usual Care		
Matched pairs (n = 341 pairs) <sup>b</sup>	45/341 (13.2)	60/341 (17.6)	.10	0.68 (0.43–1.08)
Unmatched analysis (n = 770 participants)	53/410 (12.9)	62/360 (17.2)	.09	0.71 (0.47–1.06)

<sup>a</sup> Conditional logistic used for matched analysis and logistic regression for unmatched analysis. Matching factors were age, sex, race, self-care in basic activity of daily living (ADL) function at admission to home care, date of home care episode, and length of home care episode. Unmatched multivariate analysis adjusted for age, sex, race, living alone, functional status (number of basic and instrumental ADL dependencies), cognitive impairment, depression, reason for hospitalization, number of chronic conditions, and length of the home care.

<sup>b</sup> Mean lengths of home care episodes were  $20.3 \pm 14.8$  (interquartile range 11–24) and  $29.1 \pm 31.7$  (interquartile range 13–34) days in the restorative and usual care groups, respectively (Student  $t = 4.644$ ,  $P < .001$ ).

physical therapy, and HHA visits.<sup>24</sup> The implementation of the restorative care model by the home care staff rather than by research staff supports the feasibility of integrating the model into episodes of home care.

Previous interventions that have been shown to be effective at reducing readmissions have focused on improving the hospital discharge process or the transition from hospital to home.<sup>5,12–19</sup> Other interventions have addressed management of diseases or prevention of events such as medication error.<sup>20,21,42</sup> Restorative care complements these strategies.

As with all practice change interventions, the mechanisms of effect probably were multiple. Attitudinal change on the part of home care staff and recipients and improved functional performance from the training and from systematic assessment probably contributed. These results corroborate those of the Outcome-based Quality Improvement demonstration project, in which hospitalization rates for home care recipients decreased more than 20% over 3 years.<sup>43</sup> Using continuous quality improvement methods, the authors regularly fed back functional and other outcome data to home care agencies, suggesting that the systematic assessment of functional outcomes contributed to reduced hospitalization.<sup>43</sup>

As with most care models, the restorative model is not appropriate for all home care recipients. To focus on individuals who were likely to benefit, individuals who were completely functionally dependent or were very cognitively impaired were excluded. The exclusion of very frail and cognitively impaired individuals probably at least partially explains the lower readmission rate seen in this study than the national Medicare average of 27% for home care recipients.<sup>44</sup>

This study has limitations. It involved a single home care agency. Although there was a mix of urban and sub-

urban, most participants were white. There have been small replications;<sup>45</sup> broader replication in diverse settings is warranted. The possibility cannot be excluded that the shorter length of the home care episode accounted for some of the differences in readmission rates, but it is unlikely that this is the total explanation because episode length was accounted for in analyses and because the restorative model recipients ended their episodes more functionally capable than usual care recipients. The study was conducted several years ago. Although eligibility for Medicare-covered home care remains the same, there have been payment and regulatory changes. For example, implementation of the prospective payment system for episodes of home care occurred in 2000, during this study, and was accounted for in the matching algorithm.<sup>46</sup> Recent efforts to improve the quality of home care and to focus on functional outcomes may have led to interval changes in usual home care practices.<sup>22</sup> Although institution of more functional-based quality measures might have resulted in better attention to function, Home Health Compare still shows that only approximately half of home care recipients improve in activities such as bathing, walking, and transferring from bed.<sup>44</sup> These results suggest that the restorative model will benefit current home care recipients.

Neither the participants nor staff was randomized to receive restorative care, raising the possibility of bias and confounding. Bias was minimized by prospective matching of participants in the restorative care and usual care offices and by controlling for other confounders of readmission in multivariate analysis, although the possibility of unmeasured confounding cannot be eliminated. Readmission rates before the study were not available, but the duration of home care episodes were similar in the year before the study albeit markedly shorter in the restorative care than the usual care group during the study.<sup>24</sup> The possibility cannot be excluded that more restorative than usual care recipients were rehospitalized after the home care episode, but this is unlikely because restorative care recipients completed home care more functionally capable than usual care recipients. Location after the home care episode was missing for 10% of the eligible sample. A higher number of usual care than restorative care participants had missing home care discharge location. Finally, the small sample size resulted in marginal statistical significance (i.e., the CIs included 1).

Results of this study have practice and policy implications. The reduction in hospital readmissions and ED visits, coupled with shorter episodes of home care, support the cost-effectiveness of the restorative model. The average cost of a readmission was \$7,200 in 2005.<sup>4</sup> The 15 fewer readmissions in the restorative than usual care group translates to \$108,000 in 2005 Medicare dollars saved in the study sample. More than 18% of the almost 14 million hospital admissions of Medicare beneficiaries in 2008 incurred a readmission within 30 days.<sup>1,2</sup> Even a modest reduction in readmissions or ED visits in the subset of home care recipients who are cognitively and functionally able to participate in the restorative model would result in substantial Medicare savings.

The restorative care model is an efficient use of existing resources. The nurses, therapists, and HHAs already

care for these participants. Restorative care would not require adding or superimposing additional services but rather would entail realigning the activities of the existing home care staff.

This realignment is beneficial to the home care workforce, particularly the HHAs. The Institute of Medicine and others have recommended enhancing work satisfaction and career advancement of HHAs.<sup>47</sup> Training and certification in restorative care offers such an opportunity. Evolution to an active role for HHAs in facilitating self-care and functional recovery will require supervision and monitoring by nurses, physical therapists, or occupational therapists. These professionals are already involved in the home care episode, so there would not be additional expenses.

Restorative care could be integrated into emerging models of care delivery such as accountable care organizations and medical homes. Bundled payments also offer opportunities to improve care and outcomes during hospitalization and the posthospital period. Emerging care-delivery innovations, which focus on continuity, coordination, and integration across providers and settings, increasingly make home care processes and outcomes the responsibility of all healthcare providers.

The enhanced functional recovery seen with the restorative model would bestow several benefits upon older adults. The lower risk of readmission would alleviate the spiraling functional decline seen with recurrent hospitalizations. The improved functioning would decrease or delay the need for long-term care services at home or in SNFs, additional sources of healthcare savings. Enhanced self-care abilities also lessen the care burden on family and other informal caregivers.

The restorative model offers a potentially effective approach to reducing the occurrence of avoidable readmissions, particularly in older adults with multiple conditions and functional limitations, a group at high risk of readmission. The restorative model bestows benefits on patients, caregivers, and home care providers while reducing avoidable healthcare utilization. This model could be incorporated into usual home care practices and care delivery redesign.

## ACKNOWLEDGMENTS

**Conflict of Interest:** The editor in chief has reviewed the conflict of interest checklist provided by the authors and has determined that the authors have no financial or any other kind of personal conflicts with this paper.

This project was supported by a grant from the AARP/Andrus Foundation, Yale Claude D. Pepper Older Americans Independence Center Grant P30 AG021342 from the National Institute on Aging, and the MacArthur Foundation.

**Author Contributions:** Study concept and design: Mary E. Tinetti, Peter Charpentier, Dorothy I. Baker. Acquisition of subjects and data: Margaret Gottschalk and Dorothy I. Baker. Analysis and interpretation of data: Peter Charpentier. Drafting or revising manuscript for important intellectual content: Mary E. Tinetti, Peter Charpentier, Margaret Gottschalk, Dorothy I. Baker. Approval of final version to be published: Mary E. Tinetti, Peter Charpentier, Margaret Gottschalk, Dorothy I. Baker.

**Sponsor's Role:** None of the funding organizations had any say in the design, methods, subject recruitment, data collections, analysis, or preparation of the manuscript.

## REFERENCES

- Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. *N Engl J Med* 2009;360:1418–1428.
- Wier LM, Barrett ML, Steiner C et al. All-cause readmissions by payer and age, 2008. HCUP Statistical Brief #115. June 2011 [on-line]. Rockville, MD: Agency for Healthcare Research and Quality. Available at <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb115.pdf> Accessed July 7, 2011.
- Medicare Payment Advisory Commission. A path to bundled payment around a rehospitalization. In: Report to the Congress: Reforming the Delivery System. Washington, DC: MedPAC 2005, pp 83–103.
- Medicare Payment Advisory Commission. Promoting Greater Efficiency in Medicare: Report to Congress. Washington, DC: MedPAC 2007.
- Naylor MD, Aiken LH, Kurtzman ET et al. The care span: The importance of transitional care in achieving health reform. *Health Aff (Millwood)* 2011;30:746–754.
- Improving care transitions [on-line]. Available at <http://www.healthcare.gov/center/programs/partnership/safer/transitions> Accessed August 20, 2011.
- Garcia-Perez L, Linertova R, Lorenzo-Riera A et al. Risk factors for hospital readmissions in elderly patients: A systematic review. *QJM* 2011;104:639–651.
- Marcantonio ER, McKean S, Goldfinger M et al. Factors associated with unplanned hospital readmission among patients 65 years of age and older in a Medicare managed care plan. *Am J Med* 1999;107:13–17.
- Boyd CM, Landefeld CS, Counsell SR et al. Recovery of activities of daily living in older adults after hospitalization for acute medical illness. *J Am Geriatr Soc* 2008;56:2171–2179.
- Inouye SK, Wagner DR, Acampora D et al. A predictive index for functional decline in hospitalized elderly medical patients. *J Gen Intern Med* 1993;8:645–652.
- Sager MA, Rudberg MA, Jalaluddin M et al. Hospital Admission Risk Profile (HARP): Identifying older patients at risk for functional decline following acute medical illness and hospitalization. *J Am Geriatr Soc* 1996;44:251–257.
- Jack BW, Chetty VK, Anthony D et al. A reengineered hospital discharge program to decrease rehospitalization: A randomized trial. *Ann Intern Med* 2009;150:178–187.
- Balaban RB, Weissman JS, Samuel PA et al. Redefining and redesigning hospital discharge to enhance patient care: A randomized controlled study. *J Gen Intern Med* 2008;23:1228–1233.
- BOOSTing care transitions resource room [on-line]. Available at [http://www.hospitalmedicine.org/ResourceRoomRedesign/RR\\_CareTransitions/CT\\_Home.cfm](http://www.hospitalmedicine.org/ResourceRoomRedesign/RR_CareTransitions/CT_Home.cfm) Accessed July 7, 2011.
- Koehler BE, Richter KM, Youngblood L et al. Reduction of 30-day post-discharge hospital readmission or ED visit rates in high-risk elderly medical patients through delivery of a targeted care bundle. *J Hosp Med* 2009;4:211–218.
- Coleman EA, Smith JD, Frank JC et al. Preparing patients and caregivers to participate in care delivered across settings: The care transitions intervention. *J Am Geriatr Soc* 2004;52:1817–1825.
- Coleman EA, Parry C, Chalmers S et al. The care transitions intervention: Results of a randomized controlled trial. *Arch Intern Med* 2006;166:1822–1828.
- Naylor MD, Brooten D, Campbell R et al. Comprehensive discharge planning and home follow up of hospitalized elders. *JAMA* 1999;281:613–620.
- Boult C, Reider L, Leff B et al. The effect of guided care teams on the use of health services: Results from a cluster-randomized controlled trial. *Arch Intern Med* 2011;171:460–466.
- Rich MW, Beckham V, Wittenberg C et al. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *N Engl J Med* 1995;333:1190–1195.
- Hospital to home. Reducing readmissions. Improving care transitions [on-line]. Available at <http://h2hquality.org> Accessed July 7, 2011.
- Best practice intervention packages. Home Health Quality Improvement (HHQI) National Campaign [on-line]. Available at <http://www.homehealthquality.org/hh/default.aspx> Accessed July 7, 2011.
- Baker DI, Gottschalk M, Eng C et al. The design and implementation of a restorative model for home care. *Gerontology* 2001;41:257–263.

24. Tinetti ME, Baker D, Gallo WT et al. Evaluation of restorative care versus usual care for older adults receiving an acute episode of home care. *JAMA* 2002;287:2098–2105.
25. Makuch RW, Zhang Z, Charpentier PA et al. Prospective individual matching: Covariate balance and power in a comparative study. *Stat Med* 1998;17:1517–1526.
26. Bradley EH, Bogardus ST Jr, Tinetti ME et al. Goal setting in clinical medicine. *Soc Sci Med* 1999;49:267–278.
27. Rockwood K, Stolee P, Fox RA. Use of goal attainment scaling in measuring clinically important change in the frail elderly. *J Clin Epidemiol* 1993;46:1113–1118.
28. Joyce BM, Rockwood KJ, Mate-Kole CC. Use of goal attainment scaling in brain injury in a rehabilitation hospital. *Am J Phys Med Rehabil* 1994;73:10–14.
29. Tinetti ME, Baker DI, McAvay G et al. A multifactorial intervention to reduce the risk of falling among elderly people living in the community. *N Engl J Med* 1994;331:821–827.
30. Pryor GA, Myles JW, Williams DR et al. Team management of the elderly patient with hip fracture. *Lancet* 1988;1:401–403.
31. Adams CE, Wilson M. Enhanced quality through outcome-focused standardized care plans. *J Nurs Adm* 1995;25:27–34.
32. Lorig K. Self-management of chronic illness: A model for the future. *Generations* 1993;17:11–14.
33. Von Korff M, Gruman J, Schaefer J et al. Collaborative management of chronic illness. *Ann Intern Med* 1997;127:1097–1102.
34. Prochaska JO. Assessing how people change. *Cancer* 1991;67(Suppl 3): 805–807.
35. Berwick DM. Developing and testing changes in delivery of care. *Ann Intern Med* 1998;128:651–656.
36. Tinetti ME, Baker DI, Gottschalk M et al. Home based multicomponent rehabilitation program for older persons after hip fracture: A randomized trial. *Arch Phys Med Rehabil* 1999;80:916–922.
37. Tinetti ME, Baker DI, Gottschalk M et al. Systematic home-based physical and functional therapy for older persons after hip fracture. *Arch Phys Med Rehabil* 1997;78:1237–1247.
38. Koch M, Gottschalk M, Baker DI et al. An impairment and disability assessment and treatment protocol for community-living elderly persons. *Phys Ther* 1994;74:286–298.
39. Shaughnessy PW, Crisler KS, Schlenker RE et al. Outcomes across the care continuum: Home health care. *Med Care* 1997;35(Suppl 11):NS115–NS123.
40. General Accounting Office. Medicare home health care: OASIS data use, cost, and privacy implications. January 2001 [on-line]. Available at <http://www.gao.gov/new.items/d01205.pdf> Accessed August 20, 2011.
41. Holford TR, Bracken MB, Eskenazi B. Log-linear models for the analysis of matched cohort studies. *Am J Epidemiol* 1989;130:1247–1253.
42. Meredith S, Feldman P, Frey D et al. Improving medication use in newly admitted home healthcare patients: A randomized controlled trial. *J Am Geriatr Soc* 2008;50:1484–1491.
43. Shaughnessy PW, Hittle DF, Crisler KS et al. Improving patient outcomes of home health care: Findings from two demonstration trials of outcome-based quality improvement. *J Am Geriatr Soc* 2002;50:1354–1364.
44. Home health compare [on-line]. Available at <http://www.medicare.gov/HomeHealthCompare/search.aspx> Accessed December 2, 2011.
45. Nadash P, Feldman PH. The effectiveness of a “restorative” model of care for home care patients. *Home Healthc Nurse* 2003;21:421–423.
46. Home health prospective payment system [on-line]. Available at <https://www.cms.gov/HomeHealthPPS/> Accessed July 7, 2011.
47. Institute of Medicine. *Retooling for an Aging America: Building the Health Care Workforce*. Washington, DC: The National Academies Press, 2008.