Effect of an Innovative Medicare Managed Care Program on the Quality of Care for Nursing Home Residents

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Purpose: We sought to assess the quality of care provided by an innovative Medicare+Choice HMO targeted specifically at nursing home residents and employing nurse practitioners to provide additional primary care over and above that provided by physicians. The underlying premise of the Evercare approach is that the additional primary care will reduce the rate of untoward events and reduce the use of hospitals. Four aspects of quality were assessed: mortality, preventable hospitalizations, quality indicators derived from the Minimum Data Set, and change in functioning. Design and Methods: The care provided by Evercare was compared with that for two control groups: (a) other residents in the same homes not enrolled in Evercare and (b) residents in homes in the same geographic area that did not participate in Evercare. Data came from various sources, including the Minimum Data Set. Utilization was based on Medicare data for controls and United Healthcare data for Evercare residents. Survival analysis was used to estimate mortality rates. Various risk adjustment methods were applied to the quality indicators. Results: The hazard rates of mortality were significantly lower for Evercare residents than for other residents in the same nursing homes. Evercare residents had fewer preventable hospitalizations; the difference was significant for one control group. The rates of quality indicators and functional change were equivalent. Implications: Evercare, with its use of nurse practitioners, represents a model that can provide more efficient care that is of at least comparable quality.

Key Words: Nurse practitioner, Preventable hospitalization, Quality indicators, Managed care

In theory, managed care was supposed to both improve quality and save costs. It would achieve the former by encouraging more effective care and eliminating that which was unnecessary and possibly harmful. To the extent that managed care means less care, at least some of this reduction may be harmful. The literature is mixed in its assessment of the effects of managed care on Medicare beneficiaries in general (Hellinger, 1998; Kane, 2000; Retchin et al., 1992). Little information is available about the most vulnerable people in this group, that is, nursing home residents.

Evercare is a specific Medicare+Choice managed care product, which differs from other such products in that it specifically targets long-stay residents in nursing homes (i.e., those who have stayed at least 3 weeks and are thus expected to no longer need postacute care). Under Evercare, the managed care liability is limited to Medicare-covered services. The company is under no obligation to offer services beyond those mandated by Medicare benefits, but it does have the option to provide additional services. For example, Evercare does not pay for nursing home care per se, except to the extent that it addresses items covered by Medicare, such as skilled nursing days, but it does offer special payments to the nursing homes for keeping patients who might otherwise need to be hospitalized (such stays are called Intensive Service Days). These payments are designed to cover the presumed additional staffing costs associated with caring for the patients in the nursing home.

Although it operates as a managed care program, attempting to limit the use of expensive services, the
The hallmark of the Evercare approach is the use of nurse practitioners (NPs) in addition to primary care physicians. The NP Evercare employees monitor the enrolled clientele regularly and work with their physicians to intervene quickly if issues arise. The NPs are intended to supplement, not supplant, the care give by the residents’ primary care physicians. Each NP must work out a comfortable working relationship with the primary care physicians with whom he or she interacts. The degree of delegation varies, but most NPs assume a substantial role in monitoring care.

The use of these NPs does not diminish the active participation of the physicians in the care of the nursing home residents, however. Indeed, Evercare pays the physicians for services not usually reimbursed by Medicare. Other data suggest that there are actually more physician visits with this program than with control programs (Kane, Keckhafer, Flood, Bershadsky, & Siadaty, 2003). The NPs work directly with the residents, monitoring their conditions and responding to changes. In some instances they convey new information to the primary care physicians, but many have been delegated the responsibility to act on their own, especially in crises, contacting the doctor later.

Much of the NPs’ time is spent working with nursing home staff and talking to residents’ families (Kane, Flood, Keckhafer, & Rockwood, 2001). The NPs are not supposed to displace the work of the nursing home nursing staff; however, in their role as primary care providers, the NPs do spend time training the nursing staff, especially the aides, in how to make better observations and how to provide better care. Each NP has a caseload of approximately 100 residents who are usually located in one or two nursing homes (Kane & Huck, 2000).

A federally mandated evaluation of the Evercare program revealed that it serves a population of enrollees that are generally similar to those not so covered, except that Evercare enrollees are more likely to suffer from dementia. The patterns of activities of daily living (ADL) dependencies among Evercare patients assessed at a point in time were similar to those of two control groups, as was the burden of care borne by families; however, families of Evercare enrollees were more satisfied with services than were families in traditional programs (Kane, Flood, Keckhafer, Bershadsky, & Lum, 2002).

The analysis of service utilization showed that Evercare managed a large number of persons in the nursing home who would otherwise have been hospitalized. The effect of this management strategy was to reduce the number of hospital admissions and hospital days, thereby saving large amounts of money for Evercare. Most other areas where managed care might be expected to reduce services did not show any paring back. Mental health and podiatry utilization was as frequent or more frequent for Evercare residents than for the controls. However, Evercare residents received significantly less physical therapy than controls (Kane et al., in press). If Evercare thus represents an efficient mode of providing medical care for nursing home residents, a related question arises about the effects of such care patterns on the quality of care.

Whereas a substantial amount of work has examined the effects of managed care on the care of older persons (Giffin, 1996; Hellinger, 1998; Retchin & Brown, 1990a, 1990b, 1991; Retchin, Brown, Yeh, Chu, & Moreno, 1997; Retchin, Clement, & Brown, 1994; Retchin et al., 1992), less attention has been directed to the effects of managed care on the quality of nursing residents’ care. The results of studies of the quality of nursing home care have been inconsistent. Some point to relationships between staffing levels and care (Bliesmer, Smayling, Kane, & Shannon, 1998; Cherry, 1991; Cohen & Spector, 1996; Kramer & Fish, 2001; Sainfort, Ramsay, Ferreira, & Mezghani, 1994). Part of the inconsistency can be traced to the variation in study designs and quality measures among these studies. Some reports have suggested that using NPs has a favorable effect on nursing home care outcomes (Burl, Bonner, Rao, & Khan, 1998; Kane et al., 1989; Shaughnessy, Kramer, Hittle, & Steiner, 1995). Again, the designs and measures of quality vary extensively. This article uses several lenses to assess the impact on quality of care attributable to the Evercare model.

Methods

To investigate possible effects on quality, we used four approaches. First, we examined mortality rates between the study groups. Second, we examined the rate of preventable hospitalizations among Evercare and control enrollees. Third, we used data derived from the mandated Minimum Data Set (MDS), which is routinely completed on all nursing home residents. Researchers at the University of Wisconsin Center for Health Services Research and Administration (CHSRA) created a series of quality indicators (QIs) designed to capture quality issues germane to nursing home residents (Zimmerman et al., 1995). The Centers for Medicare and Medicaid (CMS) is currently reporting some of these measures as part of a public awareness campaign. We applied these QIs to the matched sample population of Evercare enrollees and control residents. Fourth, we traced the course of ADL changes over time as measured by the MDS to compare Evercare and control samples.

The analyses used a sample of Evercare-covered residents and two control groups to address issues around selection bias. One control group was drawn from residents in the same nursing homes as the Evercare residents but who opted not to join Evercare (referred to as control-in persons). The other control group came from residents of other...
nursing homes in the same area that did not participate in the Evercare program (referred to as control-out persons).

The eligible control facilities consisted of licensed nursing homes within the demonstration project site counties or adjacent counties. Facilities were removed from the experimental population if there were insufficient residents currently enrolled in Evercare to allow for selection of the resident survey sample. Facilities were eliminated from both control and experimental groups if more than 30% of the residents were enrolled in another NP-based capitated program. Eligible control facilities consisted of those who had no Evercare contract in place, were not in the process of negotiation with Evercare, and were not in Evercare’s short-term marketing plans. In most other respects other than the presence of Evercare, the care in the experimental and control homes was the same, as was the resident composition (Kane et al., 2002).

Within each site, the facility population was stratified on the basis of profit status and size. Some size and profit cells were not populated for both control and experimental facilities. However, to the extent that cells were populated, control facilities were randomly selected for recruitment from each cell. When a control facility consented to participate, an experimental facility was randomly selected for recruitment from the matching experimental population cell. When a facility declined to participate in the study, a replacement was recruited from the same cell whenever available, or from the most similar available if the same was not available.

Our sample design called for involvement of up to 10 facilities in which Evercare was active and 10 control facilities at each of the five sites. The full complement of 10 experimental and 10 control facilities participated at three sites: Boston, Colorado (Boulder and Colorado Springs), and Tampa. In two sites we did not get full cooperation from the potential control homes, although we approached a large number. In Baltimore, we approached 45 potential control homes but our final participant count at the end of the resident data-collection phase was 8 experimental and 8 control facilities. In Atlanta, we contacted 34 homes and could get only 6 to agree to participate, leaving 6 experimental facilities and 6 control facilities. Because of concerns about possible selection bias, we compared the characteristics of the participating nursing homes by using Online Survey, Certification, and Reporting (OSCAR) data. The samples were similar for occupancy level and ownership by a multifacility corporation. Reviewing the number of deficiencies identified by the state survey agencies did not reveal a pattern of either better or worse situations in the facilities with which EverCare has contracted. Similarly, reviewing the nursing facility population characteristics reported at the time of the last state surveys, in 1999 and early 2000, did not reveal a pattern of better or worse resident conditions among the participating Evercare and control facilities (Kane et al., 2002).

In each home that agreed to be in the study, a census of all residents was completed. From this list all Evercare residents were identified; the date of enrollment into Evercare was a separate fact. In the analysis, we also included as Evercare participants those residents who were controls at the time of the census but enrolled after the census. Each Evercare resident was matched to a control person on the basis of the date of entry into the nursing home. For controls in nonparticipating facilities, nursing homes were matched and then persons. Each matched control person was given a virtual Evercare enrollment date corresponding to that of their Evercare match. A match based on more variables than length of stay was attempted. However, the small number of participating control facilities at some sites impeded the effort. The final analysis sample included 44 Evercare home and 44 control homes.

Mortality

We calculated the monthly mortality rates for Evercare and each control group from the time of the census. Survival was calculated for the three groups from the date of census or the virtual Evercare enrollment date if that occurred after census. Adjustors used in the analysis were age, sex, White or non-White race, Phillips ADL score, Cognitive Performance Scale (CPS) score, and presence or occurrence of diabetes, hip fracture, congestive heart failure, chronic obstructive pulmonary disease, stroke, or cancer. The ADL, CPS, and diagnosis information was taken from the MDS. When more than one MDS record was available, the one collected the closest to the virtual Evercare enrollment date and less than 3 months after enrollment was used. To compare the survival of the three samples, we used a Cox proportional hazards model. To handle left-truncation, we used the counting process style of Andersen and Gill (1982).

Preventable Hospitalizations

In order to examine the effect of primary care in reducing hospitalizations, we identified those hospitalizations and Intensive Service Days (ISDs) considered preventable, such as those caused by bacterial pneumonia, dehydration, hypertension, and urinary tract infections. An ISD is not viewed as comparable with a hospitalization but is used to indicate the occurrence of an event that would otherwise have led to a hospitalization. The analysis of preventable hospitalizations was based on utilization data from United Health Care for the Evercare enrollees and from Medicare for the controls. The rate of hospitalizations per member per month was calculated
each month and averaged over the study period, which extended 12 months before and 15 months after the census. Hospitalizations and ISDs were selected on the basis of claims with the primary diagnosis among the ambulatory care sensitive conditions, as classified by Billings (Billings, Anderson, & Newman, 1996) and the corresponding ICD-9-CM codes.

**Quality Indicators**

To create the MDS record set for analysis for each person in the study, we chose the nonreadmission assessment that was closest to 6, 12, and 18 months after (virtual) Evercare enrollment. Assessments that were within 30 days before or after the target date were considered for inclusion. This process resulted in 996 control-in, 1,400 control-out, and 399 Evercare persons with 6-month assessments; 918 control-in, 1,467 control-out, and 606 Evercare with 12-month assessments; and 855 control-in, 1,490 control-out, and 664 Evercare with 18-month assessments. MDS records were available for the period between June of 1998 and December of 2000.

We calculated QI measures on the selected assessments on the basis of the algorithms developed by Zimmerman (Zimmerman et al., 1995). Although the Zimmerman approach allowed for only a few risk adjustments, we opted to test two approaches to case-mix adjustment. We created a comprehensive set of adjustors that included potentially clinically relevant variables and a more reduced model that eliminated any variable that might conceivably be under the nursing home’s control and hence should not be adjusted away. The table in the appendix (available from the first author upon request) lists the adjustors used in the models. The table is arranged to show the variables used in the minimal model (i.e., those used in both models) and the additional variables used in the comprehensive model.

To reduce problems with endogeneity, we used lagged variables for ADLs in several instances. That is, we used the value of the ADL measures from a nonreadmission assessment 31–100 days prior to the assessment under consideration. If more than one assessment fell into this window, the most recent assessment was used.

With a few exceptions, values for the adjustors came from the same assessment as the QI measure. Not all diagnoses are collected on the quarterly assessment. If a diagnosis was missing, the value from the most recent prior assessment with that field was used. History of resolved ulcers and demographic information were treated similarly. Medicaid status was determined based on whether a Medicaid per diem was indicated as a payment source on the assessment being examined or on any prior assessment. This method assumed that people rarely leave Medicaid even if Medicaid is temporarily not paying for nursing home costs.

We analyzed the data as three separate cross-sectional studies. Once this database was prepared, we performed logistic regressions. For each QI measure and each time period, we carried out a separate logistic regression by using the comprehensive list plus dummy variables identifying the control-in and the control-out persons. We repeated the same process by using the minimal adjustors plus the dummy variables defining study groups, and again by using the dummy variables with no adjustors. Six regressions were carried out on each of the 24 quality indicators (three sets for the Evercare–control–in comparisons, one using the comprehensive adjustors, one using the minimal adjustment, and one using no adjustment except study group; and three for the Evercare–control–out comparisons). Because the matched sample was used for the analysis, length of nursing home stay was similar in the three groups.

For each regression model, betas were obtained independently for the adjustors and for the study group variables. For ease of interpretation the betas attached to the study group variables were transformed into hazard ratios (HRs). An HR greater than 1 indicates that one is more likely to see that QI in the Evercare group than in the control group, and an HR less than 1 indicates that one is less likely to see that QI in the control group. Because one does not wish to have a QI, HRs greater than 1 indicate that Evercare is superior in this instance and HRs less than one indicate that the control group is performing better. Because multiple comparisons were performed, Bonferroni corrections were applied.

**Change in ADL Levels**

To calculate the change in ADL levels over time, we examined pairs of MDS assessments that were separated in time by 6, 12, or 24 months. We included all assessments other than discharge and readmission assessments in the analysis, and we grouped assessments into pairs. We considered all assessments plus or minus 30 days from the target date for pairing. If more than one assessment fell into this 60-day window, we used the assessment closest to the ideal timing. If two assessments were equally distant from the ideal timing, we used the assessment after the ideal date.

Only assessments from the matched population were included. Additionally, both assessments had to be after the (virtual) Evercare enrollment, and the second of the matched pair of assessments had to occur after the date of the census that was used to establish the original study sample. An individual could contribute multiple pairs to the analysis. For example, if a resident had an assessment at 1, 3, 6, 9, and 12 months, she or he would have three 6-month pairs and one 12-month pair. We used an ADL
scoring approach that was developed for use with the MDS: Phillips’ ADL scale (Phillips et al., 1997). The scale essentially counts the level of dependence in each of six ADLs recorded on the MDS. We calculated change scores by subtracting the prior measure from the latter measure. Thus a positive score indicates that a resident got more severe (or worse) in that measure over the intervening time. At the same time, we also calculated the changes in the measure of cognition developed for the MDS, the CPS (Morris et al., 1994). These changes, too, are interpreted to mean that a higher number implies a poorer outcome.

Adjustment was used in order to test for significance. In testing differences in CPS levels between assessments, we used the same set of adjustors used for the QI of new diagnosis of cognitive impairment. In addition to the comprehensive adjustment variables listed in the appendix (available from the first author upon request), the starting CPS level was added as a series of dummy variables. Similarly for Phillips ADL change, adjustment consisted of starting ADL level and the comprehensive adjustors from the QI of decline in late loss ADLs. For both analyses the adjustors came from the first assessment. Similar to the manner in which it was handled for QI adjustment, diagnosis information was taken from previous assessments if it was missing in the assessment being examined.

Results

Mortality

Figure 1 shows the adjusted survival curve for the Evercare sample and the two control groups after the census period. In the adjusted model to estimate the risk of death, the control-in sample has an HR of 1.09 compared with that of Evercare (higher mortality rate), and the control-out sample has an HR of .92, slightly smaller than that of Evercare ($p = .013$). The Evercare rate was significantly less than that for the control-in group, but the difference with the control-out group was not.

Preventable Hospitalizations

As seen in Table 1, when the hospital admission and ISD rates are combined, the rates of preventable admissions for the Evercare sample are lower than that for either control group. The difference between Evercare and the control-in group is not significant, but the difference with the control-out group is significant. Thus it appears that the differences in care pattern do not result in Evercare residents’ suffering a greater number of preventable hospitalizations or similar events (as reflected in ISDs).

Quality Indicators

Table 2 shows the results of the several comparisons of QIs at the three time intervals between the Evercare enrollees and the two control groups. Among the 72 comparisons (three time periods for each of 24 QIs) between Evercare and controls chosen from the same nursing homes for the comprehensive adjustment model, only 4 were significant (before the Bonferroni correction). Evercare enrollees had more QI flags in regard to depression, multiple medications, and behavioral symptoms affecting others, but they had fewer QI flags with regard to not having a toileting plan. There were some differences in results depending on the extent of risk adjustment, but the patterns were overall quite uniform.

The extent of the differences between Evercare and the residents in the other nursing homes is more striking. Of the 72 analyses for the comprehensive adjustment group, significant differences were found in 10. Of these, 6 favored the controls (i.e., depressive symptoms, use of antidepressants, prevalence of urinary tract infections, behavioral symptoms, nine or more medications, and antipsychotic medication use) and 4 favored Evercare (i.e., toileting plan, catheters, pressure ulcers, and weight loss). Again, the patterns were generally comparable.
| Quality Indicator                        | CI 6 months | CI 12 months | CI 18 months | Control-in (residents from the same nursing homes as Evercare) CI 6 months | Control-in (residents from the same nursing homes as Evercare) CI 12 months | Control-in (residents from the same nursing homes as Evercare) CI 18 months | Evercare (control-out residents from matched nursing homes) CI 6 months | Evercare (control-out residents from matched nursing homes) CI 12 months | Evercare (control-out residents from matched nursing homes) CI 18 months | Comprehensive Risk Adjustment | Minimal Risk Adjustment | No Adjustment |
|----------------------------------------|-------------|--------------|--------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| New fractures                          | 0.20        | 2.04         | 4.29         | 0.53                                                                       | 1.55                                                                      | 2.70                                                                       | 0.54                                                                       | 0.97                                                                       | 0.97                                                                       | 0.97                                                                       | 1.70                                                                       | 0.97                                                                       | 0.97                                                                       |
| Prev. of falls                          | 0.91        | 1.08         | 1.00         | 0.91                                                                       | 1.09                                                                      | 0.99                                                                       | 1.03                                                                       | 1.01                                                                       | 0.94                                                                       | 1.01                                                                       | 0.89                                                                       | 1.01                                                                       | 1.01                                                                       |
| Behavioral symp. affecting others      | 0.80        | 0.78         | 0.80         | 1.04                                                                       | 1.05                                                                      | 0.82                                                                       | 0.80                                                                       | 0.80                                                                       | 0.75                                                                       | 0.82                                                                       | 0.80                                                                       | 0.75                                                                       | 0.75                                                                       |
| Symp. of depression                    | 0.66*       | 0.50**       | 0.69*        | 0.56**                                                                     | 0.90                                                                      | 0.71                                                                       | 0.55**                                                                     | 0.70*                                                                     | 0.56**                                                                     | 0.88                                                                       | 0.87                                                                       | 0.75                                                                       | 0.55**                                                                     | 0.75                                                                       |
| Depression without AD therapy          | 0.67        | 0.74         | 0.60**       | 0.81                                                                       | 0.76                                                                      | 0.67                                                                       | 0.51*                                                                     | 0.74                                                                       | 0.59*                                                                     | 0.77                                                                       | 0.85                                                                       | 0.76                                                                       | 0.55*                                                                     | 0.72                                                                       |
| Use of 9+ different meds               | 0.78        | 0.74*        | 0.80         | 0.80                                                                       | 0.80                                                                      | 0.86                                                                       | 0.88                                                                       | 0.79*                                                                     | 0.78*                                                                     | 0.85                                                                       | 0.86                                                                       | 0.95                                                                       | 1.03                                                                       | 0.79*                                                                     |
| Incid. of new diagnosis of CI          | 1.04        | 1.56         | 1.24         | 1.71                                                                       | 1.80                                                                      | 1.06                                                                       | 0.93                                                                       | 1.50                                                                       | 1.20                                                                      | 1.73                                                                       | 1.83                                                                       | 0.96                                                                       | 1.12                                                                       | 1.33                                                                       |
| Prev. of bladder or bowel incontinence | 1.04        | 0.84         | 0.89         | 1.12                                                                       | 0.99                                                                      | 1.09                                                                       | 0.99                                                                      | 0.99                                                                       | 1.23                                                                       | 1.10                                                                       | 1.25                                                                       | 1.10                                                                       | 0.93                                                                       | 1.10                                                                       |
| Occ. incontinence without a toileting plan | 1.40*     | 2.22***      | 1.05         | 1.52**                                                                     | 0.81                                                                       | 1.50**                                                                     | 1.48*                                                                     | 2.17**                                                                     | 1.53**                                                                     | 0.85                                                                       | 1.50**                                                                     | 1.48*                                                                     | 2.17**                                                                     | 1.12                                                                       |
| Prev. of indwelling catheters          | 1.22        | 1.48         | 1.47         | 1.69*                                                                     | 1.08                                                                       | 1.32                                                                      | 1.58                                                                       | 1.89*                                                                     | 1.72*                                                                     | 1.06                                                                       | 1.25                                                                      | 1.65                                                                       | 1.73*                                                                     | 1.70*                                                                     |
| Prev. of fecal impaction               | 0.91        | 1.17         | 1.50         | 2.05                                                                      | 0.80                                                                       | 0.61                                                                      | 1.03                                                                       | 1.26                                                                      | 1.19                                                                       | 0.00                                                                       | 0.62                                                                      | 2.01                                                                       | 2.15                                                                       | 1.54                                                                       |
| Prev. of UTIs                          | 0.88        | 0.82         | 0.70         | 0.71*                                                                     | 0.77                                                                       | 1.30                                                                      | 0.93                                                                       | 0.93                                                                      | 0.73                                                                       | 0.72*                                                                     | 0.81                                                                       | 1.25                                                                      | 0.90                                                                       | 0.71*                                                                     |
| Prev. of weight loss                   | 0.82        | 1.03         | 1.02         | 1.01                                                                      | 0.85                                                                       | 1.49*                                                                     | 1.08                                                                       | 1.16                                                                      | 1.08                                                                       | 0.98                                                                       | 0.84                                                                       | 1.34                                                                      | 1.17                                                                       | 1.17                                                                       |
| Prev. of tube feeding                  | 0.95        | 1.03         | 1.19         | 1.28                                                                      | 1.36                                                                       | 1.46                                                                      | 1.20                                                                       | 1.29                                                                      | 1.42                                                                       | 1.33                                                                       | 1.46                                                                       | 1.33                                                                       | 1.39                                                                       | 1.37                                                                       |
| Prev. of dehydration                   | 2.80        | 2.16         | 3.06         | 1.68                                                                      | 1.17                                                                       | 0.73                                                                      | 2.24                                                                       | 2.17                                                                      | 2.42                                                                       | 1.74                                                                       | 0.81                                                                       | 0.59                                                                      | 1.20                                                                       | 1.43                                                                       |
| Prev. of bedfast residents              | 0.60        | 0.61         | 1.24         | 1.31                                                                      | 1.28                                                                       | 1.34                                                                      | 0.84                                                                       | 0.84                                                                      | 1.26                                                                       | 1.27                                                                       | 0.92                                                                       | 1.00                                                                      | 0.87                                                                       | 0.86                                                                       |
| Incid. of decline in late loss ADLs    | 0.86        | 0.76         | 1.01         | 1.35                                                                      | 0.78                                                                       | 0.95                                                                      | 0.91                                                                       | 0.77                                                                      | 1.06                                                                       | 1.44                                                                       | 0.77                                                                       | 0.96                                                                      | 0.91                                                                       | 1.27                                                                       |
| AP use with no PR conditions           | 0.77        | 0.67*        | 0.96         | 0.85                                                                      | 0.92                                                                       | 0.70*                                                                     | 0.75                                                                       | 0.61*                                                                     | 0.91                                                                       | 0.76                                                                       | 0.92                                                                       | 0.70*                                                                     | 0.75                                                                       | 0.61*                                                                     |
| AP use with no PR conditions           | 0.91        | 1.25         | 0.92         | 1.22                                                                      | 1.03                                                                       | 1.13                                                                      | 0.92                                                                       | 1.27                                                                      | 0.91                                                                       | 1.23                                                                       | 1.03                                                                       | 1.15                                                                      | 0.87                                                                       | 1.33                                                                       |
| Hypnotic use more than 2x in the past week | 1.34     | 1.69         | 1.52         | 1.75                                                                      | 1.33                                                                       | 1.48                                                                      | 1.34                                                                       | 1.75                                                                      | 1.45                                                                       | 1.66                                                                       | 1.47                                                                       | 1.50                                                                      | 1.31                                                                       | 1.88                                                                       |
| Daily physical restraints              | 0.86        | 0.84         | 0.86         | 0.94                                                                      | 0.81                                                                       | 0.85                                                                      | 0.71                                                                       | 0.74                                                                      | 0.78                                                                       | 0.88                                                                       | 0.83                                                                       | 0.88                                                                      | 0.70                                                                       | 0.73                                                                       |
| Prev. of little or no activity         | 1.25        | 1.03         | 1.14         | 1.09                                                                      | 1.23                                                                       | 0.93                                                                      | 1.12                                                                       | 1.03                                                                      | 1.12                                                                       | 1.02                                                                       | 1.10                                                                       | 0.90                                                                      | 1.12                                                                       | 1.03                                                                       |
| Prev. of Stage 1–4 PUs                 | 1.22        | 1.65         | 0.78         | 1.119                                                                     | 0.96                                                                       | 1.36                                                                      | 1.20                                                                       | 1.53                                                                       | 0.86                                                                       | 1.163                                                                      | 0.95                                                                       | 1.02                                                                      | 1.25                                                                       | 1.49*                                                                     |

Notes: Statistically significant findings are in bold type. CI = control-in (residents from the same nursing homes as Evercare); CO = control-out (residents from matched nursing homes); Prev. = prevalence; Symp. = symptoms; AD = antidepressant; Incid. = incidence; CI = cognitive impairment; Occ. = occasional; UTIs = urinary tract infections; ADLs = activities of daily living; AP = antipsychotic; PR = psychotic-related; PUs = pressure ulcers. Hazard ratios (HRs) compare rate of QIs in Evercare to controls; HR > 1 favor Evercare; HR < 1 favor Evercare. *p < .05; **p < .01; ***p < .001.
across adjustment strategies but some variations were noted. When Bonferroni corrections are applied, none of the differences are retained.

Functional Change

The patterns of change over time in ADL and CPS scores are shown in Table 3. After adjustment, there were no differences between Evercare and either control group in any of the three time intervals for either the CPS or the Phillips ADL measure. The table also shows the betas from the regressions that were run predicting change in the change scores. These betas represent how different the change score of each control group is from the omitted reference group (in this case Evercare) after adjustment. According to this analysis, change scores for the adjusted control groups are never more than 0.05 different than the change scores of the adjusted Evercare group. None of these betas is significant.

Discussion

Overall, the quality picture is mixed. Whereas the decreases in preventable hospitalizations or equivalent events suggest a positive effect from more intensive primary care, there are no significant changes in overall functioning and a fairly even record with regard to the QIs. The latter two analyses must be interpreted in light of the large number of comparisons made. When Bonferroni adjustments for multiple comparisons are used, the statistical differences disappear. Thus, we conclude that the differences in quality of care between Evercare and control residents are not dramatically different.

Whereas Evercare’s active use of NPs to provide more intensive primary care was associated with a modest (but statistically significant in one comparison) reduction in adverse events that would ordinarily lead to hospitalization, the same effect was not seen with hospitalization rates overall.

The pattern of differences in the analysis of QIs showed a minority of areas where there were significant differences between Evercare and the two control groups. When the differences occurred, they seemed to distribute fairly evenly in favor of either Evercare or the control group. Once again the extent of differences was greater with the control group from other nursing homes. The pattern of much greater differences between Evercare and the external control groups suggests that any possible Evercare effect may have been diffused across the entire nursing home staff. If the NPs did succeed in training the nursing home staff to provide better care that was captured in the QIs, the extent of difference between the Evercare and control residents in the same home would be lessened. Alternatively, the other control homes may have had a higher level of care because they were volunteers for the study. Those homes that agreed to participate may represent homes with better quality. We attempted to test this possibility by examining the limited data on quality available from the national OSCAR files posted on the web, but we found no differences between the Evercare and control homes on the parameters listed (Kane et al., 2002).

Many of the QIs were designed to reflect the quality of nursing care more than primary care, and hence they may not have been as susceptible to Evercare. However, when we attempted to classify the QIs on the basis of their primary care content, there was no difference in the patterns for the QIs judged to reflect primary care interventions more. Making this distinction proved quite difficult for many QIs. For example, the use of psychoactive medications clearly depends on a primary care provider’s prescribing them, but the demands of nursing staff may trigger such a prescription.

The pattern of change over time in ADLs showed no significant differences between Evercare and the external nursing home control for the analyses at 6, 12, and 24 months. Although one might have hoped that the NPs might have been more aggressive in encouraging rehabilitation, this proved not to be the case. Indeed, another analysis showed that the levels

<table>
<thead>
<tr>
<th>Time</th>
<th>Evercare</th>
<th>Control In</th>
<th>Control Out</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n M SD</td>
<td>n M SD</td>
<td>n M SD</td>
</tr>
<tr>
<td>6 months apart</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in CPS score</td>
<td>11,152</td>
<td>0.15 0.73</td>
<td>7,635 0.15 0.75 0.008</td>
</tr>
<tr>
<td>Change in Phillips ADL score</td>
<td>11,162</td>
<td>0.79 2.80</td>
<td>7,645 0.71 2.97 0.032</td>
</tr>
<tr>
<td>12 months apart</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in CPS score</td>
<td>8,297</td>
<td>0.29 0.90</td>
<td>5,524 0.28 0.92 0.001</td>
</tr>
<tr>
<td>Change in Phillips ADL score</td>
<td>8,304</td>
<td>1.50 3.62</td>
<td>5,531 1.43 3.84 0.033</td>
</tr>
<tr>
<td>24 months apart</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in CPS score</td>
<td>3,194</td>
<td>0.51 1.12</td>
<td>2,130 0.50 1.12 0.040</td>
</tr>
<tr>
<td>Change in Phillips ADL score</td>
<td>3,194</td>
<td>2.76 4.48</td>
<td>2,135 2.52 4.78 −0.012</td>
</tr>
</tbody>
</table>

Notes: None of the differences is statistically significant. ADL = activities of daily living; CPS = Cognitive Performance Scale.
of rehabilitative services provided under Evercare were considerably less than those provided to the controls (Kane et al., 2003). The failure to find a pattern of differences in the change in cognitive scores is not surprising. The only expected effect on cognition might be caused by misuse of medications, which is hinted at in the QIs.

In summary, there are no sizeable differences in the quality of care provided under the aegis of Evercare compared with the controls. Although one might have hoped that the presence of NPs would improve care, this does not seem to be the case. One optimistic finding in this regard is the lower rate of preventable hospital admissions (including the ISDs). This pattern suggests that the increased primary care provided by the NPs might have had a positive effect in preventing some untoward events.

From a policy perspective, one might ask what Evercare should be expected to achieve. Is delivering comparable quality in the face of major impacts on the use of hospitals adequate? How should consumers’ reactions be factored into the overall assessment of quality? When these results are examined in the context of the earlier studies on the effects on utilization and satisfaction, one might conclude that the overall picture favors Evercare. The active use of NPs is positively viewed by family members. It seems to be associated with fewer hospitalizations and shorter hospital stays when they do occur. Although the enhanced primary care activity provided by NPs does not prevent events requiring hospitalization, it does seem to prevent some events that are most sensitive to primary care attention.

The Evercare model suggests that NPs can play an effective role in managing nursing home residents, but more effective use of these NPs is possible. Much of the NPs’ time was devoted to activities other than direct patient care (Kane et al., 2001). The NPs could be trained to monitor residents’ clinical status more actively and to intervene more aggressively when a deterioration is noted (Kane, 1998). However, such a shift in role would require the active support of the primary care physicians. Evercare should be viewed as work in progress. One would hope that it, and other Medicare+Choice managed care programs for nursing home residents, will continue to explore ways in which better primary care can be shown to both provide better quality and save money.

Given the problems encountered in recruiting control facilities, some concerns may still remain about possible selection bias in the difference between Evercare and control nursing homes. The overall design allows for comparisons within the same homes as well as across homes. The lack of major patterns of differences when the two control groups were used should provide some support to the argument against such a bias, in addition to the direct comparisons made with the OSCAR data.

Ultimately the question about whether care like this saves money for the Medicare program will depend on the way price for such care is set. Medicare’s savings do not accrue from internal efficiencies, which produce profit for the managed care company, but from the capitation rate that is negotiated. Although there is some evidence of substantial internal cost savings from other studies conducted as part of this larger evaluation, it is not clear whether these savings should be considered when the price of care is negotiated with the Medicare program.

References


Received October 8, 2002
Accepted April 28, 2003
Decision Editor: Linda S. Noelker, PhD

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**Editor Nominations**

**Journal of Gerontology: Medical Sciences**

The Gerontological Society of America’s Publications Committee is seeking nominations for the position of Editor of the *Journal of Gerontology: Medical Sciences*.

The position will become effective January 1, 2005. The Editor makes appointments to the journal’s editorial board and develops policies in accordance with the scope statement prepared by the Publications Committee and approved by Council (see the journal’s masthead page). The Editor works with reviewers and has the final responsibility for the acceptance of articles for his/her journal. The editorship is a voluntary position. Candidates must be dedicated to developing a premier scientific journal.

Nominations and applications may be made by self or others, but must be accompanied by the candidate’s curriculum vitae and a statement of willingness to accept the position. **All nominations and applications must be received by May 1, 2004.** Nominations and applications should be sent to the GSA Publications Committee, Attn: Jennifer Campi, The Gerontological Society of America, 1030 15th Street, NW, Suite 250, Washington, DC 20005-1503.