

# **Evaluation of the Evercare Demonstration Program Final Report**

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## **EXECUTIVE SUMMARY**

Evercare represents a new approach to providing medical services to long-stay nursing home patients. It offers a capitated package of Medicare-covered services with more intensive primary care provided by nurse practitioners (NPs) to supplement, not supplant, the medical care provided by physicians. The program's underlying premise holds that better primary care will result in reduced hospital use. At the same time, Evercare strives to optimize the health and well-being of the nursing home resident by providing complete, customized care planning, care coordination, and care delivery for frail and chronically ill elderly people living in nursing homes.

In 1997 the University of Minnesota was awarded a contract to evaluate the Evercare demonstration program. Demonstration sites included in this evaluation are: Atlanta, Baltimore, Boston, Colorado (Denver/Colorado Springs), and Tampa.

The following report documents the results of the evaluation project under the contract, and discusses the findings and their implications for potential expansion of the Evercare program. The report provides a description of the methods used in data collection, descriptive analysis of the study population, and analyses from the resident surveys of health status, function and satisfaction, the NP time study and the analysis of hospital utilization.

### **Nurse Practitioner Role**

Because of the central role of the NP in the Evercare model, the use of the NPs' working day was studied. Seventeen NPs employed by Evercare across the five sites participated in a descriptive study based on structured self-reports. They reported time spent over a two-week period and how time was spent on selected cases. The main findings from the nurse practitioner time study were:

- NPs spend about 35% of their working day on direct patient care and another 26% in indirect care activities. Of the latter, 46% of the time was spent interacting with nursing home staff, 26% with family, and 15% with the physicians.
- The mean time spent on a given patient per day was 42 minutes (median 30); of this time 20 minutes was direct care (median 15).
- NPs' activities are varied. Much of their time was spent in communicating with vital parties, an important function that supports the physicians' primary care role and should enhance families' satisfaction with care.

The nurse practitioners in this study were actively engaged in clinical work. They were at each nursing home in their caseload about every second or third day on average. Their caseloads were relatively small. They provided care for the urgent acute problems both during their regular rounds and in response to a request for a special visit to a nursing home. They also saw patients for routine and preventative care, as well as followed patients during the recovery phase after an illness or hospitalization. By simply being present in the facility on such a frequent basis, the NP may develop relationships with nursing home staff that ease the identification of early changes in the nursing home residents' status and monitoring of on-going treatments.

Of their direct care time, about a third of the time was spent responding to changes in patients' condition. This attention is better provided on site than the telephone management that would likely be done by traditional primary physicians. Almost half was spent on routine care or mandatory visits. These visits include both those required to maintain Medicaid eligibility as well as surveillance visits that are not easily reimbursed in the fee-for-service payment mechanism. Thus, the salaried employees of the managed care plan have an opportunity to provide more attention to preventative and early intervention measures in the care of their caseload than in some other NP practice models.

The bulk of the NPs' time in the Evercare program is not spent in direct care. The NPs who provided data for this study spent a large amount of time communicating with others involved in the care and decisions affecting their patients. Much of the time is spent in coordinating care with the various providers from both the medical and nursing home constituencies and communicating with family members. They provide a high level of coordination. This is important work, which complements that of the primary physician. Their activities include regular discussions with the family members. This is undoubtedly a welcome service. Family members often complain about the difficulty in talking to their loved-one's doctor. Evercare nurse practitioners cannot only respond to family members' questions, they can establish rapport that facilitates later decision-making. This active contact with family members appears to be highly valued by the families we contacted in our survey.

The nurse practitioner thus seems to serve as both an extension of physician care, providing medical services and a coordinator/case manager, providing services that are often otherwise neglected. Furthermore, being outside the fee-for-service system allows the Evercare NP to play a time-consuming role in Evercare's commitment to education of nursing home staff through both formal in-service and less formal on-the-job training, with an eye toward payback in more effective care and communication affecting all residents. Thus the concept of using nurse practitioners who are staff of the parent managed care company seems to offer useful potential.

### **Evercare Enrollee Characteristics and Resident and Family Satisfaction**

To assess the effectiveness of Evercare in fulfilling its mission, a quasi-experimental design was used to compare the characteristics of a sample of nursing home residents enrolled in Evercare with two separate control groups: One was chosen from among the residents in the same nursing homes participating in the Evercare program but opting not to join (Control-In).

The second was drawn from nursing homes in the same geographic area that were not participants in Evercare and thus where residents had no opportunity to enroll (Control-Out). By using the two control groups we control for nursing home effects and still address the problem of selection bias. Information was collected by in-person surveys of nursing home residents and telephone surveys of proxies and family members.

Evercare enrollees were compared to the two control groups in terms of basic demographics, physical impairment levels, and the prevalence of dementia and cognitive impairment. We examined some potential measures of quality of care such as unmet needs and resident and family satisfaction with the care each group received. As an HMO, Evercare has a primary goal of controlling costs, and one area where such cost-control can be achieved is the reduction of costly end-of-life care. For this reason, we expected that Evercare might be more aggressive in promoting the use of advance directives and therefore included attention to their use in our evaluation.

The main findings from the resident and family surveys of health status, function and satisfaction are:

- In general the Evercare and control groups were similar, but the Evercare sample had more dementia and less ADL disability.
- Family members in the Evercare sample expressed greater satisfaction with several aspects of the medical care their relatives received compared to controls.
- Residents' satisfaction was comparable to controls.
- There was no difference in experience with advance directives between Evercare and control groups.

Overall, the picture of the nursing home residents in the facilities participating in the evaluation is consistent with national data. The mean age is almost 85. Over three-fourths are

female. About 45% rate their health as fair or poor. The most prevalent problems are arthritis, vision, hypertension, and dementia. About half were not able to respond directly and required a proxy respondent.

However, there are a few differences among the study groups, especially comparing Evercare enrollees to the Control-Out group. The Control-Out group has higher proportion of white residents, and fewer residents with dementia. The Evercare sample of respondents had a higher proportion of persons making three or more errors on the mental status test than the Control-In residents.

The residents responding on their own were more likely than proxies to report pain. Conversely, disability level among residents needing proxies was reported considerably higher than for those who responded on their own. The Evercare sample differed significantly from the controls on only a few elements. Fewer Evercare respondent residents needed help in transferring than either control group. Additionally, the disability level for feeding was lower for the Evercare respondents than for the Control-In group. Among those requiring proxies, the only difference was found in dressing, where the Control-In group was less disabled than the Evercare sample.

In exploring residents' reports of unmet needs and any adverse consequences of not receiving timely care for that domain, few differences were found. Evercare residents had higher levels of unmet need in transferring and adverse effect of falling.

With regard to how they viewed the available services, the pattern of results suggests a number of areas where the Evercare sample was significantly different from the controls. Evercare family and resident respondents were more likely to report having vision and hearing checked than other residents in the same facilities. Controls in non-Evercare homes were more likely to report medical personnel responding quickly to illness than Evercare residents.

However, families of Evercare residents were more likely to report quick medical response than families of controls in the same facilities. Families said Evercare residents were seen often enough to treat problems more than families of either control groups. They were also more likely to identify one person as being in charge of the care. The greatest difference was the response to the question about physicians spending enough time with the residents. Both Evercare enrollees and their families reported more satisfaction than did either control group. More Evercare families reported residents being treated with respect than family members of either control group and more Evercare residents reported being treated with respect by nursing home personnel. More Evercare residents said that physicians explained information understandably than the Control-In residents, but the opposite pattern was seen comparing to the Control-Out residents. Among the family responses, however, the overall satisfaction was greater in the Evercare sample than either control group. The families of the Control-In residents rated satisfaction with medical care higher than either the Evercare sample or the Control-Out sample. Evercare respondents also reported more confidence that they would be hospitalized when needed compared to controls in the same nursing homes. They were likewise more likely to recommend their doctor and their nursing home than the Control-In residents.

In the use of advance directives, there were only a few significant differences. Among residents' responses, Evercare clients were less likely to have living wills and slightly more likely to have felt pressured into establishing advance directives than the Control-In sample.

Since many of the controls homes originally approached to participate chose not to, there is good reason to suspect that the control homes represent better care overall than that found in the Evercare homes, or at least that there is a favorable selection bias at the home level. To that extent, the comparison within Evercare homes is especially useful; it raises the issue of whether there is a selection effect among those who opted for Evercare.

In an effort to test the possibility that there were real differences between the Evercare and control homes, we examined data from the most comparably dated round of state surveys for facilities participating in our study did not identify differences among the facilities that would support an impression of better or worse care within Evercare or non-Evercare facilities as a whole.

### **Hospital Utilization**

Utilization data from Medicare and United Healthcare (the parent corporation for Evercare) were analyzed to measure the effect of Evercare on hospital care. Again, Evercare enrollees were compared to two sets of controls: nursing home residents in the same nursing homes who did not enroll in Evercare (Control-In) and residents of nursing homes that did not participate in Evercare (Control-Out). Patterns of use were assessed by calculating the monthly use rate for each group and reporting the average monthly rate. Adjustments were made to correct for age, race, and gender. Because the groups differed in terms of the rate of cognitive impairment, an analysis was performed that stratified on this variable.

The major findings from this study were:

- The incidence of hospitalizations was twice as high among control residents as Evercare residents (4.63 and 4.67 per 100 enrollees per month vs. 2.43 in the 15 months following census,  $p < .001$ ).
  - This difference was accounted for by Evercare's use of Intensive Service Days (ISDs), whereby the nursing homes were paid an extra fee to handle cases that might otherwise need to be hospitalized.
  - The same pattern held for preventable hospitalizations (0.80 and 0.86 vs. 0.28,  $p < .001$ ).
- Moreover, when hospital and ISD admissions are combined, Evercare patients had significantly fewer events than did those in the other control nursing homes.

- These patterns held when residents were stratified by cognitive status.
- The Evercare patients were seen more by their physicians than either control group (86.72 visits per 100 enrollees per month vs. 70.49 and 66.54,  $p < 0.001$ ).
- The rate of Emergency Room use by Evercare enrollees was half that of control residents (3.37 visits per 100 enrollees per month vs. 6.28 and 7.46,  $p < 0.001$ ).
- For most mental health care Evercare enrollees receive at least as much or more attention as the control groups from a range of providers, the one exception is non-physician mental health specialists.
- Evercare enrollees received more podiatry care than control residents (27.43 visits per month per 100 enrollees vs. 18.44 and 22.04,  $p < 0.001$ ).
- Physical, occupational, and speech therapies are provided to less than one-half as many Evercare patients as Controls (1.12 persons treated per 100 enrollees per month vs. 2.99 and 2.32,  $p < 0.001$ ).

We concluded that the use of active primary care provided by NPs affects both the rate of untoward events and the way such events are managed, allowing cases to be managed with fewer hospital days. On average using a NP saved about \$88,000 a year in reduced hospital use.

The pattern of utilization suggests that Evercare has been successful in controlling hospital use, but the predominate method has been by responding to the needs for hospital care differently. They have substituted nursing home care for hospital care on both the front and back ends, using ISDs to induce nursing homes to treat some patients without a transfer and discharging others from hospitals back to the nursing homes earlier than controls. There is no indication that Evercare was able to reduce the incidence of events that traditionally required hospitalization despite the greater use of primary care. The rate of patient attention represented by the sum of generalist physician and NP visits was over twice that received by controls. This

difference in hospital use cannot be attributed to the preponderance of demented clients, because the pattern holds for all levels of cognitive impairment. The lower rate of ER use among Evercare enrollees can be interpreted as either a sign of fewer serious events or a tendency to manage some of those in the nursing home.

The hospitalization rate after an ISD was very similar to that for re-hospitalizations, suggesting that using ISDs was not associated with any greater risk of complications than admitting patients to the hospital. The ISDs seem to be used to manage appropriate problems. Pneumonia is highly represented in ISD use. Over one-third (34.2%) of the ISD admissions were for pneumonia, compared to 7.5% of Control-In hospitalizations, 11.7% of Control-Out hospitalizations, and 6.5% of Evercare hospitalizations. No surgical cases were managed through ISDs. Presumably those managed through ISDs were more stable. Although we cannot correct for case mix, we do know that the admission rate after an ISD was modest, suggesting few serious complications from using this approach to care. At the same time, if the Evercare hospitalizations represent cases with illness severity equal to or greater than that hospitalized in the control group, we might expect to see a greater readmission rate. Yet, the Evercare readmission rate was similar to the controls for the first seven days after discharge and lower for the 1-14 day readmission period.

Evercare shows little evidence of limiting the use of other services or substituting less trained providers. There is some evidence that specialists were used less often. The greater attention to dementia care reflects the patient composition, but for other mental health care Evercare patients were less likely to receive treatment from traditional professionals, especially specialists, and this difference was not made up by an increase in services from NPs identified as mental health professionals. However, each Evercare site has developed a system providing consultative resources for the NP to assist with conducting needs assessments, medication

management, and making appropriate referrals in the mental health arena. Since these resources to the NPs do not flow through the administrative claims data set available for analysis, they are not quantified for comparison here. Assessing the impact of the difference in mental health care management in terms of patient outcome is limited by data available and the scope of this study. Rates of hospitalizations for mental health diagnoses, which are classified as preventable, did not show a higher rate for the Evercare population and hence would not support a concern for undertreatment in the nursing home.

In one area, podiatry, Evercare patients got more attention than controls. This reversal was likely attributable to the heavy pressure placed by podiatry providers and perhaps by the intrinsic demand for this service by the patients.

It appears that the Evercare approach saves hospital costs. Because we do not have information on the actual financial operations of this program we can only speculate about the overall financial efficiency. Using the data for the post census period, if we assume that a hospital day costs about \$1000 and an ISD costs about \$425, then Evercare is saving about \$193,000 per 100 enrollees annually. An NP, who costs about \$90,000 a year (with fringe benefits), can manage a caseload of about 85 patients. Thus, without considering the other administrative costs involved, we can calculate that the use of NPs accounts for an annual savings of about \$188,000 per NP.

Admittedly, this calculation, which does not reflect the total savings from Evercare's managed care approach, makes sense only in the context of a per diem hospital reimbursement approach, but that is the predominant pattern currently used by Evercare. In a DRG situation, the savings would accrue only from avoiding hospitalizations, which was also accomplished (about 2 fewer admissions per 100 enrollees per month). It appears that the strategy of using NPs to

provide more intense primary care to nursing home residents allows a more efficient way to provide crisis care, but does not prevent the crisis itself.

### **Quality of Care**

The quality of nursing home care as well as specific patient outcomes may be affected by the Evercare presence in the nursing homes. The Evercare NP has the potential to affect the patient outcome positively through at least two routes. First, the added Evercare NP direct patient care and care coordination may be expected to result in better outcomes at the individual patient level. Secondly, the Evercare NP may also impact the facility's care delivery system by providing nursing home staff with formal or informal in-service training or the development of protocols that are then implemented for all residents in the facility.

To investigate these effects, resident assessment records from the Minimum Data Set (MDS) are being analyzed. The major measures of quality we are using are the CHRSA quality indicators (QIs) to which we applied risk adjustment. We tested the effects of two sets of adjusters, one comprehensive and one minimal. The results are quite comparable. Few of the QIs showed any significant differences across the Evercare and control groups. When they did, the pattern did not favor either group.

Nor was there any significant difference in mortality rates, or in the rate of change in ADLs as reflected in the MDS data. The only place where we detected any quality difference was in the rate of preventable events noted earlier; that pattern favored the Evercare cases for at least one comparison.

### **Cost**

We explored the relationship between what Medicare pays Evercare and the actual or projected costs in two ways. First, we compared the actual costs for the control groups to what Evercare would be paid under the current AAPCC arrangement. Second, we applied the new

technique, HCC, which uses diagnoses as the basis for risk adjustment, to both Evercare and control data.

In both cases the Medicare system for capitated payments to nursing home residents resulted in an overpayment. In the first case, we estimate that the payments are roughly one and a half times what the comparable costs under fee-for-service would be. In the second case, the payments for both Evercare and controls was substantially higher than the actual costs, but the Evercare payment was less excessive. However, because the Evercare HCC was based on Evercare records and the control HCCs were based on Medicare records, we cannot be sure if the difference is due to actual costs or different data sources.

### **Conclusion**

The Evercare program meets its objectives of reducing hospital admissions while providing quality and coordinated care to the nursing home resident. While the number of hospitalizations were reduced, indications of quality and patient satisfaction showed Evercare enrollees to receive care at least equal to that received by the control in both Evercare homes and homes not affiliated with Evercare. As the Evercare program continues to mature, it offers promise for continued reduction in unnecessary hospitalization. The use of Intensive Service Days provides an opportunity for residents to be treated in the nursing home without the disruption of travel to a hospital for a large segment of illness events.

In summary, Evercare is a successful innovation, which has achieved many of its promises, but it is expensive. Although the use of NPs appears to save money for Evercare through reduced hospitalizations, the costs of the program to Medicare are substantially higher than what such care would cost in the fee-for-service market. Nor does the newly proposed HCC approach to calculating capitated payments appear to help.

## **INTRODUCTION**

Evercare began as a program of United Health Care in Minneapolis, Minnesota, in 1986 to address the special needs of elderly nursing home residents and continues today as an affiliate of UnitedHealth Group. Evercare currently provides a series of programs that vary by market across the 15 states in which it operates.

Evercare was licensed as a Medicare capitated insurance product under a HCFA demonstration waiver in 1994. As a Medicare contractor, the program provides the benefits available under Part A and Part B of Medicare. Part A coverage includes hospital care, emergency care, and limited skilled nursing facility coverage. Part B coverage includes medical care, special therapies, and durable medical equipment.

While Evercare was introduced in Minnesota in the 1980s as an option for enrollees of the Share Health Plan and for Arizona as a part of the Arizona Health Care Cost Containment System, its major growth has come subsequent to its approval by HCFA (now CMS) for its demonstration waivers. Initial demonstration sites were opened in Atlanta and Phoenix in July 1995, Maryland and Massachusetts in October 1995, Tampa in April 1996, and Colorado in September 1997.

Evercare represents a new approach to providing medical services to long-stay nursing home patients. It offers a capitated package of Medicare-covered services with more intensive primary care provided by nurse practitioners that supplement, not supplant, usual medical care. The program's underlying premise holds that better primary care will result in reduced hospital use. At the same time, Evercare strives to optimize the health and well-being of the nursing home resident by providing complete, customized care planning, care coordination, and care delivery for frail and chronically ill elderly people living in nursing homes.

The use of NPs in delivering primary care to nursing home patients is not new. An early demonstration showed that a primary care team that included a nurse practitioner as a part of the primary care team improved the outcomes of nursing home care (Kane, Jorgensen, Teteberg, & Kawahara, 1976). Since then NPs have been shown to contribute positively to the care of nursing home residents when they function as employees of the facilities (Kane, Garrard, Buchanan et al., 1989);(Kane, Garrard, Buchanan et al., 1989);(Kane, Garrard, Skay et al., 1989);(Garrard et al., 1990);(Kane et al., 1988) and as employees of independent physician practices (Kane et al., 1991);(Burl, Bonner, Rao, & Khan, 1998);(Farley, Zellman, Ouslander, & Reuben, 1999);(Reuben et al., 1999). They have improved measures of both the process of care (Garrard et al., 1990);(Burl et al., 1998);(Reuben et al., 1999) and the outcomes (Kane et al., 1991). The Evercare model represents a third approach: the NPs are employees of the HMO.

In the Evercare strategy, more intensive primary care is provided by using salaried NPs, who work directly with enrolled nursing home residents under the general direction of the residents' primary care physicians, who must agree to work in this model. The NPs provide primary care but the original primary care physicians continue to assume ultimate responsibility and must see their patients at least every 60 days. The MDs are paid at least as well under Evercare as under conventional Medicare; indeed some services such as team meetings and family consultations not covered by Medicare are covered by Evercare

Much of the regular information on the residents' health status comes from the NPs. They closely oversee residents' conditions and educate nursing home staff about better ways to provide care. They keep the physicians apprised about changes in patients' conditions and either implement care directly or obtain authority from the responsible physician. The NPs also

coordinate the communication with family members regarding the patients' care and changes in condition.

The program is marketed to the nursing home residents and their involved family members after the resident has made the move to the nursing home. This may come at the time of choosing a new care team to provide care at the nursing home or it may come as a recommendation of the care team currently providing for the resident's care, or it may come as strictly a cold-call sales approach. Once the resident is enrolled in the Evercare program, they become a part of the caseload for a specific Evercare participating physician and a nurse practitioner who coordinates the care for the Evercare enrollees at that nursing home.

In 1997 the University of Minnesota was awarded a contract to evaluate the Evercare demonstration program. Demonstration sites included in this evaluation are: Atlanta, Baltimore, Boston, Colorado (Denver/Colorado Springs), and Tampa.

This report documents the results of the evaluation project under the contract, and discusses the findings and their implications for potential expansion of the Evercare program. The report provides a description of the methods used in data collection, descriptive analysis of the study population, and analyses from the resident surveys of health status, function and satisfaction, the nurse practitioner time study, and the analysis of hospital utilization.

Data was collected for the evaluation in three different modalities: surveys, case studies, and analysis of secondary data. This report is organized into sections based in large part on the data sources in order to aid the reader in tracking the relevant source and methods as the findings are presented and discussed.

The major approach to data collection relies on a combination of case studies of the Evercare sites, resident and family surveys, and analysis of secondary data on both Evercare

clients and controls. Case studies were used to derive much of the information on the context and operation of Evercare. Structured interviews were conducted of nursing home residents and their families. If residents were unable to complete the interview, a family or staff proxy was used. A sample of NPs completed a time study survey. Secondary data includes utilization data from Medicare and United Health Care, and the Minimum Data Set.

The evaluation relies on a quasi-experimental design. Random assignment was not feasible. A simple before and after analysis would not suffice because the changes in status expected in nursing home patients over time and the external historical changes in the nursing home environment would have imposed many limitations, whether the unit of analysis was the patient or the home.

Two control groups are used. One control group uses non-enrolled residents from nursing homes contracting with Evercare (Control-In). The second control group is drawn from nursing homes in the same area that are not participating in Evercare (Control-Out). We included in this sample both homes that have been approached by Evercare and declined to participate and those that were not approached by Evercare. By using two control groups, we can examine potential selection bias and control for differences attributable to the effect of specific nursing homes. The experimental population consisted of those residents in facilities with Evercare contracts who were themselves enrolled in Evercare.

## **DEMONSTRATION PROGRAM IMPLEMENTATION OVERVIEW**

During the first year of the evaluation, project staff visited each demonstration site. Project staff met with each site's leadership team including the executive directors, medical directors, development directors, clinical directors, and sales managers between January and

June of 1998. The purpose of these visits was to 1) get a better sense of the context of the operation and how it differs from the general model, 2) gather information about how Evercare is implemented and the particular issues faced by the site, 3) identify logistical problems that need to be addressed in designing the sampling and the data collection, and 4) establish rapport with Evercare staff. Topics covered included marketing/eligibility criteria, capitation rates, management information systems, enrollment/disenrollment, physicians, NPs, nursing homes, service package, roles of PCP and NP in controlling access, NP as care planner/case manager, provider training, and quality assurance. Data describing the program at that time is included as Appendix 1.

A second series of site visits was conducted in the third year of the evaluation. The purpose of these visits, between March and May 2000, was to obtain in-depth subjective and objective information from the site leadership team about the status of the demonstration program in their respective locations, changes in their environments over the past two years and their efforts to manage the changes, and their perspective on the future opportunities of the program. The meetings were structured to cover the same range of topics at each site while allowing the respondents to describe the activities, issues, and opportunities unique to their locale. Data describing the program at this time is included as Appendix 2. The information received from these site visits combined with information obtained from Evercare corporate management is reported and discussed below.

A central premise of the Evercare model is that an investment in better primary care will pay dividends through reduced hospitalizations. To achieve this higher level of primary care intensity Evercare employs a cadre of nurse practitioners (NPs) who work in addition to, or more accurately, in cooperation with, the residents' primary care physicians. These NPs are to provide

regular contact with the residents and the nursing home staffs. The NPs are to see each patient at least once each month on a planned basis. This visit should include a review of the patient's current status, recent changes in the patient or their care, and preparation of appropriate information for the monthly physician visit. The NP coordinates the information for the physician and participates in those visits so as to ensure continuity of care and provision of complete information to the physician. Also, because of the NPs being in each facility so frequently and having a small number of facilities for which they are responsible, they are theoretically available both to respond to problems early in their course and to provide preventive oversight by monitoring the status of their patients. NPs can also oversee care when it is needed, allowing more residents to be treated in the nursing home rather than being sent to the hospital. The NPs have regular contact with the nursing home staff because they are in each nursing home so frequently, and this may provide them with opportunities to provide informal in-service training. Additionally, as needs are identified for specific nursing homes or to support Evercare site initiatives, such as a quality improvement goal, the nurse practitioner assigned to the nursing home or one of their colleagues will conduct formal in-service training for the nursing home staff.

As a condition of participating in the Evercare program, the primary care physicians are expected to see each of their patients in the nursing home each month. The physicians continue to be paid on a fee-for-service arrangement for these visits at rates that are at least as high as those paid by Medicare. In addition, the physicians are paid a premium for making emergency visits to the nursing home and for the time they spend in family or care-planning conferences and other activities not routinely covered by Medicare.

Furthermore, the Evercare model strives to reduce the need to transfer residents to hospitals in an attempt to reduce the stress on the elderly patient, as well as contain costs. By paying an additional payment over and above standard nursing home charges, Evercare pays to increase the capacity of the nursing home to care for residents who might otherwise have transferred to a hospital to obtain a higher level of care, such as closer monitoring and the use of intravenous therapy. These “intensive service days” (ISD) payments are intended to reimburse the nursing homes for the added personnel costs involved in this care. However, it is necessary for the nursing home to establish the higher clinical capacity in advance of the specific patient need, and hence Evercare works with the nursing homes to increase the systemic clinical capacity prior to the enrollment of Evercare patients in the facility.

The initial Evercare program was developed in the Twin Cities (but that site is not part of the demonstration because Minnesota does not allow for-profit HMOs). The original plan used geriatric nurse practitioners (GNPs) as primary care providers. These GNPs had continuous access to advice from a geriatrician who worked under contract to Evercare. When Evercare enrolled a client, this team provided the care for that person. Evercare has since expanded, as a demonstration program to six additional metropolitan areas: Atlanta, Baltimore, Boston, Colorado (Denver and Colorado Springs), Arizona (Phoenix), and Tampa/St. Petersburg. The original Evercare model was modified when it was replicated due to the more difficult market environment in the subsequent locations. In order to enroll clients, Evercare needed to work through existing physicians. Physicians with large nursing home practices were offered an opportunity to work with Evercare. The physicians continued as the enrolled patients’ PCPs and were supplemented with the support of Evercare nurse practitioners. Additionally, because of the difficulty in recruiting GNPs in many sites, Evercare shifted to using NPs rather than GNPs. In

some cases, the contracted PCPs already had NPs or physician assistants (PAs) working for them to provide nursing home coverage. In those situations, the PCP contract was extended to include payment for the NP or PA.

In a further variation, the Phoenix model uses a subcapitation from a traditional TEFRA HMO. Because of the differing dynamics of that arrangement, the Phoenix site was deemed not comparable for the purposes of this evaluation and therefore it was not included.

The actual marketing of Evercare is done through the nursing homes. Once the contract with the nursing home is established, the product is marketed to the residents using federally approved materials. To be efficient, Evercare needs to recruit enough residents per nursing home to shape the home's practices and to justify having a NP spend substantial time in that home. The homes are targeted on the basis of the physicians' pattern of services and their receptivity to the Evercare model. Evercare is more likely to achieve its needed penetrance in a nursing home if it contracts with homes where the medical care is concentrated among a small number of physicians who are willing to work with Evercare. Because the model calls for providing care in the nursing home that might otherwise have resulted in a hospital transfer, nursing homes must have the capability of providing more intensive services. The order of procurement varies. In some instances, the homes are contacted first and major physicians identified. In other cases, the physician contact leads to discussion with the homes.

The Evercare Demonstration Program has continued to mature and is well supported by the corporate infrastructure. By centralizing administrative operations and the burden for their development and providing a point of consolidation and synthesizing of learning, the central corporate office allows the site staff to focus on delivering patient care and most effectively interacting with the local markets.

At the same time, each location has assessed its needs and allocated its resources in varying manners to address what may be perceived as similar demands. This provides a greater set of experiences, which are then shared with the staff at the other sites through regular scheduled communications.

The Evercare Demonstration Program has matured in several ways that position it well for effectiveness. The program has both a strong information system and the expertise to use the information for program improvement. The program is supported by both a real-time Patient Data System (PDS) and a retrospective claims system (COSMOS) which are accessible by site staff to study and manage care and cost drivers. This data has allowed program staff to identify characteristics of Nurse Practitioners (NPs), physicians, and facilities that have higher than expected utilization or costs. Furthermore, as staff has gained experience with the data, they have become more focused on identifying where they can and cannot impact cost so their effort is maximized.

The program has now been in operation long enough to also accumulate sufficient history and volume to yield meaningful reports with trends and comparisons. This type of reporting is a cornerstone to discussions with primary care providers regarding patterns that indicate incomplete understanding or use of the Evercare model. Such meetings with providers on their specific caseload and issues were reported as resulting in both cost savings and improved care.

The distribution of hospital admission day and time has been analyzed by site staff to identify opportunities to improve continuity of care and reduce unnecessary hospitalizations. Because the findings were different at varying sites, this analysis supported local program decisions as varied as removing evening NP on-call coverage to the implementation of 7-day, 24-hour NP coverage.

The gate-keeping role within Evercare has changed over time as information has become available indicating that there were no significant cost savings from the process of restricting access. This is consistent with the broader UHC policy and outcome analysis.

As each site has unique markets and independent budget accountability, the sites have developed varying staffing patterns in an effort to most effectively serve their locale. Therefore, in Atlanta, for example, they piloted the provision of 24 hour, 7 day a week NP coverage to meet the needs of a few specific nursing homes. Based on the success, they chose to expand the coverage to serve 70% of the facilities. Here the on-call staff receives reports from the regular daytime NPs regarding actions anticipated and the status of patients requiring follow-up monitoring. The on-call staff then both receives crisis calls and pro-actively calls the nursing homes on weekends to keep care going. Similarly, the Baltimore site has 24 hour, 7-days-a-week coverage. On the other hand, the Tampa site discontinued evening and night coverage after determining that it was not financially feasible and that it did not affect hospital admission decisions.

Similarly, the number of NPs assigned to a single nursing home varies by site. The Denver site assigns two NPs to each nursing home whenever possible so that the NPs can become familiar with each other's patients to facilitate coverage during absences. Atlanta strives to put two NPs in each facility, especially where the facility or physician are new to Evercare and intensive initial work is involved. Boston and Tampa assign a single NP per facility as long as the enrollment is within the NP's caseload size. Baltimore uses just a single NP per facility, and specifically changed back to this staffing pattern after attempting to use two NPs in facilities where they hoped the extra personnel would be beneficial, but instead found it confusing to residents and their families.

The Evercare corporate office provides and controls certain central functions in order to achieve economies of scale and ensure comparability. The data collection and reporting systems are all designed and managed at the corporate level. Starting in spring of 2000, a project team was working to provide a hand-held platform for the patient medical record and other tools used by the NP. The quality improvement program has been centralized to provide the opportunity to pool and compare data across sites. This balances local ownership with greater power from the data. Thus, all sites are working with the same set of quality initiatives. A couple of sites supplement these with initiatives addressing local needs.

One area of responsibility that has been decentralized from the corporate offices is the response to patient dissatisfaction. Patients and their families are provided with the central toll-free number to voice concerns. However, the resolution of complaints, appeals, grievances, and provider-relations issues is done at the individual sites. The tracking of these issues is a part of the quality improvement process.

As the program has become more established, plans for growth have become a higher priority in Evercare's strategic planning. Each site has expanded into additional contiguous counties since the initial demonstration site application. As Table 1 shows, each site has grown in terms of number of facilities contracted and the number of enrollees. The potential for future program growth within the nursing home population at these sites varies. As of April 2000, the Denver site was nearing the maximum potential in terms of number of facilities within its current geographic region, with no apparently attractive geographic expansions. Atlanta and Tampa were evaluating geographic areas that may or may not involve satellite offices or non-contiguous counties. The Boston area had sufficient growth potential in facilities that had not yet been approached to join the program, including those staffed by physician groups who are amenable

to participating with Evercare. Baltimore, likewise, had facilities within its current area that may provide further growth.

**Table 1. Evercare Program Growth by Site**

	Atlanta	Boston	Baltimore	Tampa	Denver
Program Start Date	7/1/95	11/1/95	12/1/95	4/1/96	9/1/98*
# of Facilities 2/1/1998	34	50	37	44	15*
# of Facilities 4/1/2000	40	72	54	65	41
Enrollment 2/1/98	1200	1760	1902	862	482
Enrollment 4/1/2000	2035	2952	2285	1450	1674
Average Enrollment/Facility 4/1/2000	51	41	42	22	41

\*Enrollment began 6/1/98, services began 9/1/98.

In addition to growing the program as currently structured, in several sites it had become apparent that examining modifications to the product and target population was important. Evercare was evaluating the opportunities and needs to serve the populations in assisted living facilities. Other community based elderly populations are also an option for expanding services. The challenges in designing such a delivery model include the need to identify funding for case management and coordinating access and delivery of care for a mobile population. Additionally, there has been consideration of marketing the NP as case manager on a fee-for-service basis to non-Evercare residents of nursing facilities. While this product is not well aligned with the Evercare program philosophy, there were needs in some facilities in Maryland that Evercare could choose to meet with such an approach.

The employment, training and retention of Nurse Practitioners is critical to the quality and financial feasibility of the Evercare program. Consistently the site directors reported that the success of the facility and patient relationships was a function of the nurse practitioner's communications with the facility staff. The next most important communication link was between the nurse practitioner and the collaborating physician. In both situations, it is reportedly

important for the NP to have sufficient contact in order to communicate the premise and the benefits of the program consistently and frequently for the facility staff or physician to understand the NP role and fully utilize it. As Table 2 shows, the intensity of the relationships varies within each site and across sites. Where Evercare has contracts with NPs who are employees of the physicians or physician groups, the NP tends to have a much smaller caseload of Evercare patients while having other patients with other payment arrangements. Success in achieving the same utilization patterns with the contract NPs as with the employed NPs reportedly varies with their physician group and their respective overall commitment to the Evercare model. Where the contract NPs or their collaborating physicians have relatively few Evercare patients, it was reported that deviations from the model were more frequent and due to lack of familiarity. At the same time, the contract NP whose caseload is only partially Evercare does not as thoroughly take on the same relationship building and educational roles with the nursing homes as the full-time Evercare employee. The target caseload size for the Evercare NPs is between 80 and 100 patients. Actual caseloads vary beyond this range, especially at sites that use contract NPs.

**Table 2. Nurse Practitioner Workload and Relationships by Site (April 2000)**

	Atlanta	Boston	Baltimore	Tampa	Denver
# of NH with caseloads	40	72	54	65	41
Current Enrollment	2035	2952	2285	1450	1674
Average enrollment/facility	51	41	42	22	41
# of NPs	22	66	31	31	20
Average (range) caseload/NP	93 (64-126)	45 (1-109)	74 (33-117)	47 (1-89)	84 (47-110)
Average # (range) of facilities assigned /NP	2.3 (1-5)	2.3 (1-10)	1.77 (1-3)	2.7 (1-6)	2.55 (1-4)
Average # (range) of NP's assigned/NH	1.28 (1-2)	1.97 (1-6)	1.04 (1-3)	1.29 (1-3)	1.29 (1-2)
Ave # (range) of physicians that NP works with	5.3 (2-10)	4.38 (1-13)	6.9 (1-12)	4.32 (1-12)	5.4 (1-10)

The recruitment of qualified NPs was reportedly achievable in current markets in each site. However, some sites have better feeder programs to draw from through relationships with NP training programs than others. Several sites have been able to hire NPs who included a preceptorship with Evercare in their training, which naturally provides a strong understanding of the fit between the position and the NP prior to the employment decision. Similarly, some locales have a higher population of geriatric NPs than others, and so their employment varies by site.

The orientation and continuing development of NPs once hired by Evercare has been a focus of attention within the corporation. Formal and informal mentoring programs have been established, varying by site. Two sites include activities in the nursing facility as a part of the interview process. Continued structured information sharing and training is done through monthly team meetings and monthly events at the central office that include an educational component.

The organizational structure and makeup for the site staff has changed significantly since start-up. A new position of Clinical Service Manager (CSM) has been created, expanding the previous role of the clinical team leader. The role of the CSM is as a supervisor for a team of approximately six NPs, with hiring and training responsibility. The CSM also takes a key role in communication with the nursing home management staff. Additionally, an extended NP classification has been added which is used in varying ways. Typically this person is an experienced NP who can work as a mentor or assist with the more extensive work of bringing a new facility into the program or implementing improvements in a challenged facility. The management positions for marketing and business development have been consolidated at some sites as staff has changed.

At the same time, a greater emphasis has been placed on provider relations, with the creation of a new position of Network Manager. This role will include contracting and supporting the relationships with nursing homes, physicians, and ancillary providers.

Site staff unanimously reported that one of the greatest determinants of effectiveness of the Evercare model was how well the physicians understood the model and their use of the NP in the care team. Furthermore, site staff indicated that they had consistently found that the physicians with lower volume of patients and less contact with the NPs had less effective utilization according to their data. The threshold at which the physicians have sufficient contact with the Evercare program to remember the process and the benefits was reported to be in the range of 20 to 40 patients, varying with the source. To improve the efficiency of their operation, Evercare strives to concentrate their enrollment in nursing homes where they can achieve a saturation effect. Ideally they would like to enroll at least 50% of the residents. Their primary strategy for achieving this is to work with physicians who have a majority of patients in a given home; these are often also the medical directors. In this way they can work with a smaller number of homes and physicians more intensively. As Table 3 shows, the majority of physicians at each site have 30 or fewer Evercare patients. Hence the Network Manager may be a key contact supplementing the work of the NP in communicating the program to the physicians.

**Table 3. Patient Volume Distribution for Physicians at Each Site (April 2000)**

	Atlanta	Boston	Baltimore	Tampa	Denver
# of physicians with Evercare patient caseloads	62	161	135	76	38
With 1-10 patients	24%	43%	50%	55%	32%
With 11-30 patients	42%	40%	36%	28%	32%
With 31-100 patients	31%	16%	13%	16%	26%
With > 100 patients	3%	2%	1%	1%	11%
Average # (range) of NPs coordinating with each physician	1.83 (1-9)	1.68 (1-7)	1.60 (1-7)	1.61 (1-7)	3.05 (1-13)

The medical director for Evercare varied by site from a part-time to a full-time role. Their responsibilities included development of protocols, consulting to NPs on specific cases, and guidance of primary care physicians in the philosophy and successful use of the Evercare model and NP role.

Thus, the Evercare Demonstration Program has displayed flexibility to adapt to or utilize a variety of environments, resources, and cultures. Each site reported being financially viable and stable with its current enrollment base and providers by the start of the 2000 calendar year. However, future growth will bring different challenges at each site, such as achieving sufficient penetration within a nursing facility in Florida to achieve the economies of scale anticipated and make the practice impacts that are desired, or developing products to expand the population served in Colorado.

## **HOW EVERCARE NURSE PRACTITIONERS SPEND THEIR TIME**

### **Introduction**

Although nurse practitioners have provided primary care to nursing home residents for over 25 years both as nursing home employees and as part of external primary care practices (Kane et al., 1976);(Kane, Garrard, Skay et al., 1989);(Kane et al., 1991), more emphasis has been given to this role of late. Especially under the aegis of managed care, nurse practitioner-physician teams have been effectively used to provide more continuing care to this often-underserved population (Burl et al., 1998);(Reuben et al., 1999). Despite the growing importance of nurse practitioners (NPs) in providing primary care to nursing home residents, surprisingly little is known about just what they do.

Evercare uses nurse practitioners (NPs) to augment the basic provision of primary care services. Under the Evercare model NPs work in a different employment arrangement; as

employees of the managed care company they are assigned to work with specific nursing homes. They must negotiate their roles in supporting the efforts of the residents' primary care physicians who continue to be paid by Evercare on a fee-for-service basis. The Evercare model is based on the premise that more aggressive primary care management will offset its costs by reducing hospital use. The NPs are intended to provide closer observation of residents' status, to respond quickly to changes, to work with nursing staff to facilitate care and to communicate with family members to keep them apprised of the residents' status. Because the NP plays a central role in the Evercare approach, it seemed important to understand better how these professionals spend their time.

Evercare NPs work almost exclusively in the nursing homes, spending little time at the central office. They are largely on their own, interacting with patients, nursing home staff, primary care physicians, and Evercare supervisors as circumstances dictate. Most NPs working with Evercare patients are Evercare employees and see only Evercare patients; however, when Evercare contracts with physicians who employ NPs, in some instances they also pay the latter as contractors. NPs employed by Evercare have a defined caseload, which they monitor regularly. They serve as a combination of case manager and primary care provider. They are available to support the physicians of record for each case. The physicians continue to be paid for their services by Evercare on a fee-for-service basis regardless of how much care the NP provides. The role of NPs in direct care provision depends on the relationship they have established with the patient's primary care physician. For the most part, the NPs are the professionals in regular contact with the patients. They contact the primary care physicians when a change in status occurs. In some cases they are empowered to act autonomously (within some bounds); in other instances they must obtain the physician's approval before acting.

In this section we describe how employee NPs' time is spent within the Evercare program based on information collected via daily activity logs.

## **Methods**

The original goal was to collect daily activity log information from four nurse practitioners employed by Evercare at each of the five sites in the evaluation, Atlanta, Baltimore, Boston, Denver/Colorado Springs, and Tampa. The contracted NPs, who worked directly for private physician groups, were not included in this data collection effort. We randomly contacted 20 of the 48 NPs who had previously participated in qualitative interviews to see whether they would also be willing to complete daily activity logs. The 48 had been randomly selected from the 123 NPs employed by Evercare at the five sites. Four of the NPs approached were not eligible to participate because they had been promoted to positions in which they no longer saw patients or no longer worked for Evercare. One additional NP declined to participate. These five were replaced randomly from the list of NPs at the same sites. Participants were offered reimbursement of up to \$100 based on the number of daily logs that were returned.

## **Data Collection**

Participating NPs were asked to complete logs of their activities for a two-week period, using a Monday-Friday workweek. After accounting for planned leaves and vacations, participating NPs were randomly assigned to a two-week block within a two-month period in the spring of 2000. Care was taken to ensure that information was collected at the beginning, middle, and end of the months to capture the variation in workload resulting from new enrollments effective on the first of each month.

Of the 20 NPs recruited to complete the daily logs, 15 returned logs for all 10 days of the data collection period, two returned a portion of the forms, and three did not return any forms. This resulted in a total of 167 days of data.

A data collection tool was developed for this study to capture information regarding how the NPs time is distributed across patients and with whom they interact in the care of the patients. Given the administrative burden already present in the NPs role and the risk of a document not being completed contemporaneously if too burdensome, a balance between respondent convenience and detail of data was sought. Therefore, categories of response were defined in terms that flowed from the existing environment of the Evercare NPs. The instrument was reviewed and piloted prior to implementation by two Evercare NPs at a site not included in the evaluation. The form was revised in response to this review to facilitate ease of data recording and to clarify response categories. The data collection instrument had four parts. The first part, consisting of background information on the NPs, was filled out once. (The N for this portion of data is 17 NPs.) The other three parts were completed daily. (The N for this portion of data is 167 days.)

The data elements from the daily portion included 1) general information on the number of patients seen, changes to caseload, number of facilities visited, as well as items summarizing work after 5 pm, 2) a time grid in which the NP indicated activities performed in 15 minute increments, and 3) information on direct and indirect care contacts on a patient seen at a time assigned by the study team for that day. The assigned time changed each day and was indicated on the form.

In the first type of daily data, time grids, NPs were asked to place check marks indicating what types of activities they performed from 8 am to 5 pm. A nine-hour grid was used to account

for different start times. The 167 nine-hour days can yield a possible 6,012 15-minute increments. However, no option was checked for 88 periods (a missing rate of 1.5%). Results for this data are described as proportions of the total collected time (N=88,860 minutes, i.e., 5,924 \* 15).

Time grid options were described as Direct Care (interacting with patient, check-ups, reviewing charts, monitoring, etc.). Indirect Care (interaction with families, consultation with colleagues, doctors, therapists, etc.), and Administrative (paperwork, documentation, supervisor contact, Evercare contact, etc.). Additional categories included Not Working (lunch breaks, off duty, etc.), Traveling, and Other. If necessary, subjects could indicate that they participated in more than one activity in a 15-minute time frame. When this occurred, it was assumed that an equal amount of time was spent on each activity. For example, if two activities were checked, 7.5 minutes was assigned to each. Overall, NPs indicated that they did more than one type of activity in 23.7% of the 15-minute increments. The mean number of activities was 1.28.

In the second type of daily data, participants were asked about care provided to a patient they worked on closest to a time indicated on the form. The designated time varied from day to day and ranged from early morning to late afternoon. Information is available for 162 days. On five days, participants indicated that they did not work on any patients or otherwise failed to complete the questions. Participants were asked about the nature of the work performed for each arbitrarily chosen patient. Further information was solicited if either direct or indirect care was given. If direct care was given, NPs were asked to categorize the visit. The categories offered were based on how visits were classified within the Evercare system. Choices included routine visits, visits required by regulation, and visits to update patient information in preparation for physician rounds (called pre-rounding). Additionally, Evercare breaks urgent/unplanned visits into two categories depending on whether they require a trip to another nursing home.

If the work on the arbitrarily chosen patient involved indirect care, the NP was asked with whom they interacted about the patient and the length of that interaction. Subjects could speak to multiple persons about the patient. These multiple conversations could occur simultaneously (in a conference, for example) or sequentially.

### **Analysis**

The analysis of this data consists of simple frequencies. The N varies based on the nature of the data being examined. The definition of N ranges from the number of NPs, to the number of workdays, to minutes worked, to the number of patient visits involving direct care, to the number of visits involving indirect care.

### **Results**

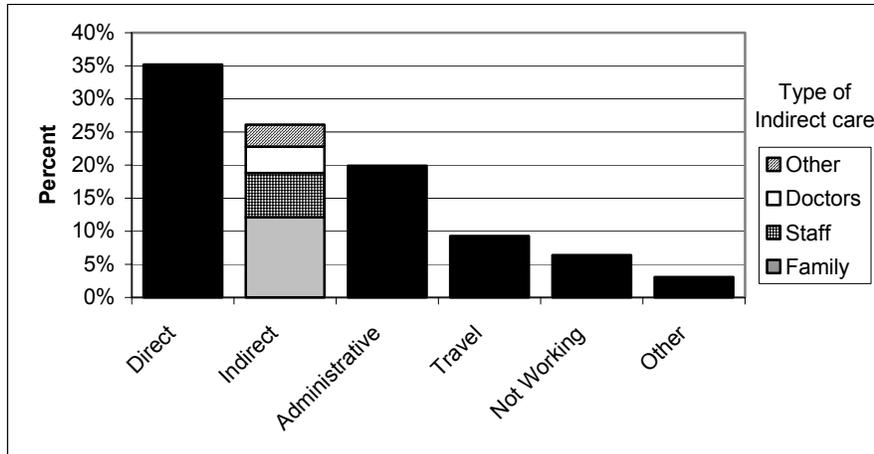
The NPs participating in this study appear to represent the diversity of the NPS employed by Evercare. The 17 participating NPs had been certified as NPs for an average of 5 years (median: 3 years, range 8 months to 15 years) and had been working for Evercare for an average of 1.91 years (median: 1.5 years, range 8 months to 4 years). Nine of the NPs had unlimited prescribing ability; 5 were limited to non-narcotics; and three had no prescribing authority. (The extent of prescribing authority varied by location and reflected the states' nurse practice acts.) All of the subjects worked exclusively on patients enrolled in the Evercare capitated managed care program and at Evercare-contracted homes. They covered between two and five homes each, with an average of 3.41 homes. Initial caseload of Evercare patients averaged  $84.2 \pm 22.82$  (range 47 – 128).

Data was received on NP activities for a total of 167 days. The mean number of patients seen per day was  $8.92 \pm 6.24$  (median: 8.00, range 0 – 39). No patients were seen on a total of 10 days. NPs were also asked whether they worked on but did not see patients. The mean number of

additional patients was  $4.32 \pm 3$  (median: 4, range 0-13). Combined, an average of 13.2 patients were seen or otherwise worked on in a day. No patients were seen or worked on for five separate days, due to full-day meetings or similar events. The average number of nursing homes visited per day was 1.90. Of 167 days, 32.2% involved visits to one home, 42.5% involved visits to two homes, and 23.4% involved visits to three or more homes. (No nursing home visits were made on the remaining 1.9% of days.)

All homes covered by the participating NPs were visited at least once in the data collection period. The mean number of times each home was visited was  $4.76 \pm 3.04$ . Of the 62 distinct homes visited by participating NPs in the two-week data collection periods, 11 (17.7%) received only one visit, and 15 (24.2%) received 8 or more visits in the 10 days data collection period. Four homes were visited by two of the participating NPs (on separate days). As mentioned above, NPs were asked how many homes they covered at the start of the data collection period. Eight of the 17 indicated that they had visited more homes during the two-week period reported than this initial number would suggest. This could occur through a new home being added to the NP's caseload, covering for a sick/vacationing NP colleague, or another reason.

Figure 1 shows distribution of the 5,924 15-minute segments captured by the time grid. The bulk of NP time was spent on direct care (35.2%). The second most common task was indirect care (26.1%). Interactions with nursing home staff accounted for 46.4% of time spent in indirect care (12% of time overall). Interactions with family constituted 26% of indirect time (7% overall) and interactions with doctors represented 15% of indirect time (4% overall). The third most common activity consisted of administrative work (19.9%). About 15% of recorded time was spent traveling or not working.



**Figure 1: Percent of Time Spent on Various Activities**  
N=88,860 minutes

The time grid allowed participants to fill out information for a 9-hour day and indicate whether they worked through lunch. Among the 160 days that had information on at least 8 hours, participants worked an average of 8.4 hours per day. Participants indicated that they worked all 9 hours on the grid on 23% of days, excluding time worked after 5 pm.

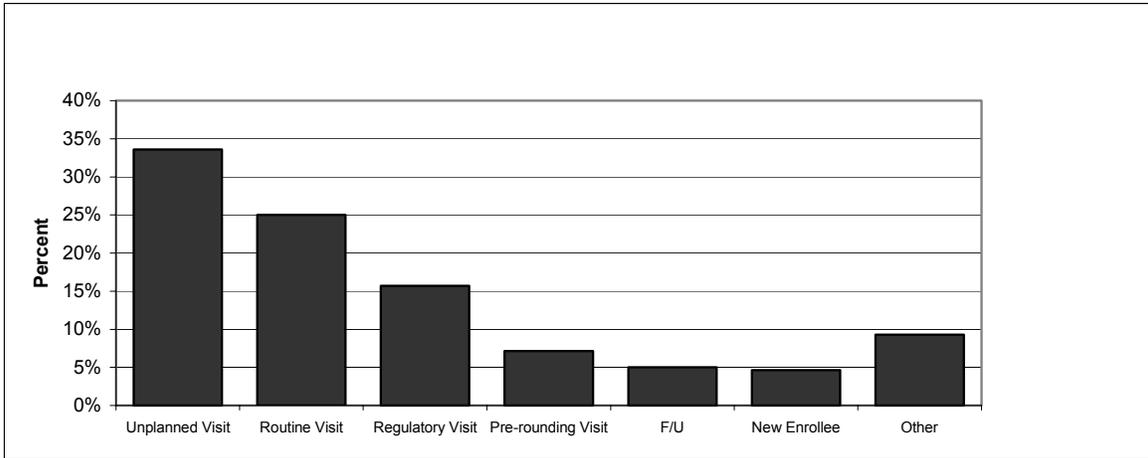
NPs were also questioned about their work activities after 5 pm. Work after 5 pm was reported for 84 days (50.3%) by 15 of the 17 NPs. Administrative work was indicated for 57 days (68% of days when overtime worked), indirect care was indicated for 48 days (57%), and direct care was indicated for 24 days (29%).

The different sites had different incidences of overtime work and different on-call policies. On-call policies ranged from NPs leaving their beepers on to a scheduled rotation for evening and night coverage. At one site, after hours work was reported for 93% of days. This site accounted for 20 of the 28 days that participating NPs were on call after hours. Activities not related to being on call occurred on 70% of days at this site. At the other sites, after hour work occurred on 15%, 40%, 52%, and 60% of days reported. Weekend on-call coverage was not a

part of this study because weekend coverage varied substantially by site and was in the pilot phase in some cases.

The last section of the data collection instrument consisted of questions about the patient seen or worked on the closest to a given time of day. Information was available for patients on 162 days. NPs were asked for the total amount of time spent on the randomly selected patient. This could include direct care, indirect care, or other work done on behalf of the patient. The mean number of minutes was  $42.19 \pm 30.04$  (median: 30, range 0-165 minutes). Overall, work on 129 patients (80.1%) involved both indirect and direct care. An additional 18 patients (11.2%) received only indirect care, and 14 (8.7%) received only direct care. One case was classified as “other.”

Further details were solicited on patient contacts involving direct care, provided either alone or in conjunction with indirect care. The mean amount of time spent on direct care was  $20.79 \pm 14.12$  minutes (median: 15, range 1-100 minutes). The distribution of types of direct care visits is shown in Figure 2. The most common type of direct care was an unplanned/urgent visit. Unplanned visits include both “change of condition visits” consisting of an unplanned visit within the nursing home the NP was in at that time (25.7% of direct care sessions), and “urgent visits” defined as visits requiring a special trip to the nursing home (8%). Routine, planned visits account for 25.0% of direct care visits. An additional 15.7% of visits were also routine, but were distinguished because they were made expressly to meet Medicare and Medicaid regulatory requirements rather than following a specific clinical problem. Pre-rounding visits were made to ensure that current information and issues are prepared for the physicians’ visits. The 28 (18.9%) cases in the “other” category included two subgroups with more than two members: 13 follow-up visits after hospitalization, urgent visit or intensive service days and six new enrollee history and physicals. Type of visit information was missing for three direct care patients.

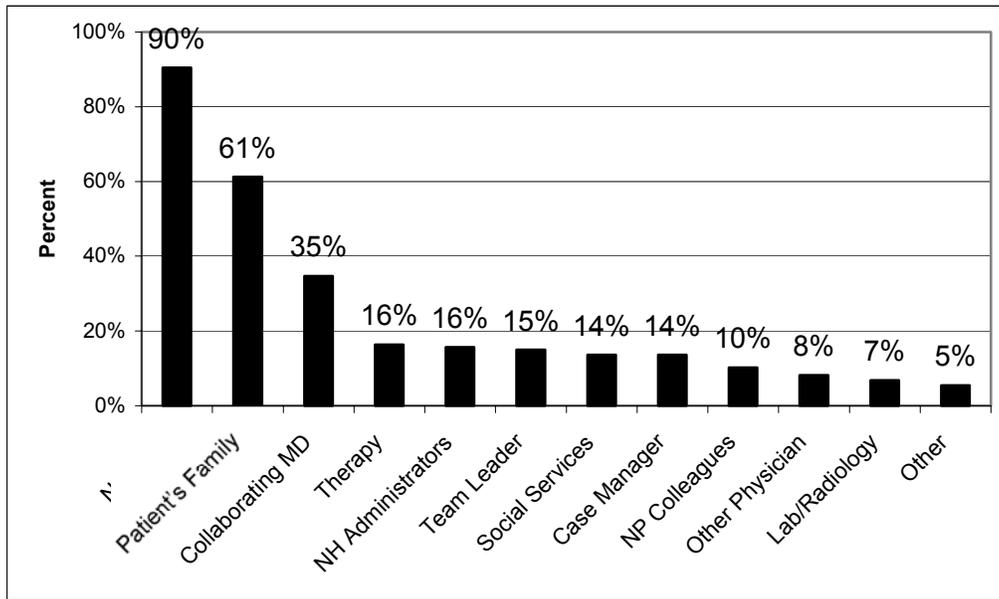


**Figure 2: Type of Visit When Direct Care Provided**  
 N=140 patients with direct care visits

Indirect care of patients often involved consultation with more than one class of person. The mean number of contacts per patient was 2.9. Only 12.3% of cases involving indirect care involved a consultation with just one type of person.

Figure 3 shows who was contacted for the 147 indirect care patient events. The vast majority of indirect care consultations involved nursing home staff (90%). Family members were contacted for 61% of all patients receiving indirect care. The patient's physician (referred to as collaborating physician by Evercare) was contacted for 35% of patients who received indirect care. NPs with prescribing authority (either full or non-narcotics) consulted with the collaborating MD slightly more than NPs with no prescribing authority. However, the difference in rates per patient was not significant but the difference among NPs was,  $p < .05$ .

Among patient work involving indirect care, the amount of time spent in any patient-specific consultations ranged from 2 to 180 minutes with a mean of 28.5 minutes. This potentially reflects visits with more than one type of person. Interactions with nursing home staff lasted an average of 13 minutes. Contacts with families lasted for an average of 7.4 minutes.



**Figure 3: Frequency of Contacts with Various People When Indirect Care Provided**  
 N=147 patients provided with indirect care

### **Discussion**

The nurse practitioners in this study were actively engaged in clinical work. They got to each nursing home in their caseload about every second or third day on average. Their caseloads are relatively small. They provided care for the urgent acute problems both during their regular rounds and in response to a request for a special visit to a nursing home. They also saw patients for routine and preventative care, as well as followed patients during the recovery phase after an illness or hospitalization. By simply being present in the facility on such a frequent basis, the NP may develop relationships with nursing home staff that ease the identification of early changes in the nursing home residents' status and monitoring of on-going treatments.

Of their direct care time, about a third of the time was spent responding to changes in patients' condition. This attention is better provided on site than the telephone management that would likely be done by traditional primary physicians. Almost half was spent on routine care or mandatory visits. These visits include both those required to maintain Medicaid eligibility as

wells as surveillance visits that are not easily reimbursed in the fee-for-service payment mechanism. Thus, the salaried employees of the managed care plan has an opportunity to provide more attention to preventative and early intervention measures in the care of their caseload than in some other NP practice models.

The bulk of the NPs' time in the Evercare program is not spent in direct care. The NPs who provided data for this study spent a large amount of time communicating with others involved in the care and decisions affecting their patients. They provided a high level of coordination. This is important work, which complements that of the primary physician. These activities include regular discussions with the family members that allow the development of a rapport and understanding. Active contact with family members is likely one of the major reasons why Evercare families express more satisfaction with the care their family member receives than do controls (Kane, Flood, Keckhafer, Bershadsky, & Lum, 2002). Furthermore, being outside the fee-for-service system allows the Evercare NP to play a time-consuming role in Evercare's commitment to education of nursing home staff through both formal in-service and less formal on-the-job training, with an eye toward payback in more effective care and communication affecting all residents.

The concept of using nurse practitioners who are employed by the parent managed care company is promising. These nurses spend only about half their time in direct patient care. Much of the rest of the time is spent in coordinating care with the various providers from both the medical and nursing home constituencies and communicating with family members. The latter is undoubtedly a welcome service. Family members often complain about the difficulty in talking to their loved-one's doctor. Evercare nurse practitioners can not only respond to family members' questions; they can also establish rapport that facilitates later decision-making. The

nurse practitioner thus seems to serve as both an extension of physician care, providing medical services and a coordinator/case manager, providing services that are often otherwise neglected.

## **RESIDENT CHARACTERISTICS, UNMET NEED, SATISFACTION, AND ADVANCE**

### **DIRECTIVES**

#### **Introduction**

As an HMO, Evercare has competing goals of controlling costs and improving quality. One area where such cost-control can be achieved is the reduction of costly end-of-life care. In general the use of advance directives among older people has been modest (Luptak & Boulton, 1994);(Eleazer et al., 1996). Efforts to promote advance directives may thus be pursued, not only in the ethically admirable name of avoiding futile care, but also as a cost-reducing device (Bursztajn & Brodsky, 1994);(Fate & Kaplan, 1995). For this reason, we expected that Evercare might be more aggressive in promoting the use of advance directives and therefore also included attention to their use in our evaluation.

In order to assess the effectiveness of Evercare in fulfilling its mission, we compared nursing home residents enrolled in Evercare with two separate control groups: One was chosen from among the residents in the same nursing homes participating in the Evercare program but opting not to join. The second was drawn from nursing homes in the same geographic area that were not participants in Evercare and thus where residents had no opportunity to enroll. By using the two control groups we can control for nursing home effects and still address the problem of selection bias. Residents in the control groups received usual medical care, which means they were seen at least as often as mandated and treated for new problems either in the nursing home

or in emergency rooms. The vast majority of this care was fee-for-service. Some of the control residents were treated by physicians who employed NPs.

This section compares the Evercare enrollees to the two control groups in terms of basic demographics, physical impairment levels, and the prevalence of dementia and cognitive impairment. It also examines some potential measures of quality of care such as unmet needs and resident and family satisfaction with the care each group received. Although there have been a number of efforts to measure satisfaction with nursing homes (Zinn, Lavizzo-Mourey, & Taylor, 1993);(Uman, 1995);(Kleinsorge & Koenig, 1991);(Davis, Sebastian, & Tschetter, 1997);(Grau, Chandler, & Saunders, 1995);(Mostyn, Race, Seibert, & Johnson, 2000);(Rantz et al., 1999), less work has been directed to examining satisfaction with the medical care provided to nursing home residents.

## **Methods**

### **Facility Recruitment**

The satisfaction, resource utilization, and quality components of this evaluation rely on a quasi-experimental design. Random assignment was not feasible. A simple before and after analysis would not suffice because the changes in status expected in nursing home patients over time and the external historical changes in the nursing home environment would have imposed many limitations, whether the unit of analysis was the patient or the home.

Therefore two control groups are used. One control group uses non-enrolled residents from nursing homes contracting with Evercare (Control-In). The second control group is drawn from nursing homes in the same area that are not participating in Evercare (Control-Out). We included in this sample both homes that have been approached by Evercare and declined to participate and those that were not approached by Evercare. By using two control groups, we can

examine potential selection bias and control for differences attributable to the effect of specific nursing homes. The experimental population consisted of those residents in facilities with Evercare contracts who were themselves enrolled in Evercare.

Recruitment of nursing homes for participation in the study was a key process in the data collection phase. Our sample design called for involvement of up to ten facilities in which Evercare was active and ten control facilities at each site. The full complement of ten experimental and ten control facilities participated at three sites: Boston, Colorado, and Tampa. In Baltimore, our final participant count at the end of the resident data collection phase was eight experimental and eight control facilities. In Atlanta, six experimental facilities and six control facilities participated.

Obstacles to facility participation presented by administrators may be categorized as either those we could influence and those we could not. Where there was potential for us to influence the obstacle, we pursued it until it was exhausted before replacing the facility in the recruitment pool. These obstacles included such issues as hesitancy about sharing private or confidential data, requirements for corporate or legal staff approval, timelines conflicting with reviews by state agencies or JCAHO, need to get buy-in from the director of nursing, social workers or resident council. Of these, the data privacy concern was by far the most common and most challenging to overcome. Additionally, at one site a large chain of facilities made a corporate decision to not participate due to the perceived resource requirement, and we were unsuccessful in gaining their cooperation. Obstacles that we did not attempt to work around included a facility whose roof was blown off during a hurricane and a pending nursing staff strike at another facility.

An ongoing challenge to the recruitment and retention of facilities was the turnover in nursing home administrators. It was common for us to reach an administrator on their first days or weeks in their current position. Typically an administrator who was new in the facility was not willing to take on even the potential of additional work that might come with participating in any study. It was also common for us to get a commitment for participation from an administrator and then find that they were no longer at the facility when we attempted to contact them subsequently. A replacement administrator required obtaining commitment again. On the other hand, on the two occasions where we obtained commitment from an administrator at one facility, and then found them at another facility scheduled for recruitment, they agreed to participate at the second facility also.

Another challenge to retention of facilities came from the general concerns about data privacy. Once project staff actually attempted to obtain the data from the facility, facility staff beyond the administrator became involved. Where the communication within the facility regarding the project was incomplete, concerns were often raised from staff who challenged the appropriateness of the information release or contact with the residents. Retention of these facilities was not complete, with facilities dropping out of the study at the stage of preparing the facility census and at the time residents were to be contacted.

When a nursing home dropped from the study, it was replaced from the sample pool during the first six months of the field data collection. Replacements were not made after that time. As a result, we completed the survey process with reduced participation in both the Atlanta and Baltimore areas. In Atlanta, difficulties included a large chain whose corporate staff made the decision that they would not participate, lack of trade association support, and a limited number of facilities to recruit that had not been recently approached to join Evercare or were

currently under contract. Nursing home administrators in Baltimore most often cited their short tenure in their position as the reason for refusal to participate. Table 4 shows the response and retention rates for each of the sites.

**Table 4. Nursing Home Participation Rates by Site**

	Atlanta		Baltimore		Boston		Colorado		Tampa	
	Control	Evercare	Control	Evercare	Control	Evercare	Control	Evercare	Control	Evercare
Contacted	34	9	45	10	25	10	18	12	16	15
No response	2	0	7	0	3	0	2	0	0	1
Refused to participate	22	3	29	2	12	0	6	2	5	0
Declined after initially agreeing	4	0	1	0	0	0	0	0	1	4
Participated	6	6	8	8	10	10	10	10	10	10

The eligible facility population consisted of licensed nursing homes within the demonstration project site counties. The control facility population was expanded to include facilities in surrounding counties where necessary. 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 percent of the residents were enrolled in another nurse-practitioner-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.

Within each site, the facility population was stratified based on 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 dropped from the study, a replacement was recruited from the same cell whenever available, or from the most similar available if the same was not available. The profit status and size of facilities participating in the study are shown in Table 5.

**Table 5. Participating Facilities by Profit Status and Size**

	Atlanta		Baltimore		Boston		Colorado		Tampa	
	Control	Evercare	Control	Evercare	Control	Evercare	Control	Evercare	Control	Evercare
Non-Profit										
Under 100 Beds	0	0	0	0	0	1	0	0	0	0
100 – 150 Beds	0	0	1	0	2	1	1	1	0	0
Over 150 Beds	0	0	1	2	1	1	0	0	1	1
For Profit										
Under 100 Beds	0	1	0	0	1	0	1	3	1	0
100 – 150 Beds	5	5	5	5	3	4	6	4	7	8
Over 150 Beds	1	0	1	1	3	3	2	2	1	1

The facility recruitment process involved extensive communication with the nursing home administrators. Brochures describing the evaluation project and letters describing the facilities’ role in the evaluation were mailed to the administrators of the nursing homes selected. These letters were then followed up with telephone contacts with the nursing home administrators. Letters of support were obtained from the respective state’s regulatory agencies and the nursing home associations and referenced in the letters and phone conversations with the administrators. Repeat calls were made until the administrator was reached and had read and considered the information. Once an administrator agreed to participate, a follow-up packet of information was sent to confirm the commitment.

Administrators of the control facilities were invited to participate and every effort was made to assure them that their involvement would not adversely affect their daily operations or consume their constrained resources. However, due to our need to continue interaction with facility staff over several months, it was important that the administrator was committed to the project. Therefore, when they indicated that they did not believe they could participate for

reasons beyond our control, their facility was replaced in the recruitment pool with another facility of a similar size and the same profit status. Administrators of facilities with Evercare contracts were encouraged by the Evercare site directors to participate in the study, and were not as readily replaced in the sample once selected.

Because the recruitment of facilities yielded a smaller participation rate than was our goal, the total number of residents to be selected for the interview process was reduced. See Table 6.

**Table 6. Sample Composition by Site**

Site	Control Facilities Participating	Experimental Facilities Participating	Control Residents in Control Facilities	Control Residents in Experimental Facilities	Experimental Residents in Experimental Facilities	Total Residents to be Surveyed
Atlanta	6	6	60	60	60	180
Baltimore	8	8	80	80	80	240
Boston	10	10	100	100	100	300
Colorado	10	10	100	100	100	300
Tampa	10	10	100	100	100	300
Total	44	44	440	440	440	1320

### Facility Census

Once a facility’s administration agreed to participate, a census of the resident population on a given day was prepared. The census was used in two ways. The analysis of health care utilization and cost savings was based on the population of these homes. Secondly, the census yielded the sample population for the survey respondents. The data elements collected in the census included the resident’s name, date of birth, date of nursing home admission, room number, social security number, Medicare HIC number, and whether they were enrolled in Evercare, another nurse practitioner based capitated program, or neither. This information was obtained from the nursing home records. Ready access to sufficient records varied by facility. Factors influencing our access included the facility’s information systems, the administrator and

other staff's comfort with allowing access to other information that would be available in the same documents, and the amount and type of nursing home staff resource the administrator committed to giving us access.

Our initial plan was to request a census report from each facility. However, administrators soon objected that this would be too time-consuming for the facility, and hence they would choose not to participate rather than commit to this effort. Therefore, we changed to using our field survey staff to go into each facility to prepare the census. The amount of support and completeness of records varied dramatically among facilities. Some facilities provided the census from their automated information systems. Some facilities provided a set of appropriate consolidated documents. Other facilities required review of each chart. However, due to the amount of effort required of the facilities to provide us access to necessary information and the supervision they felt necessary in some situations, we later returned to offering the administrators the option of providing us with the census directly prepared by their internal staff.

Identification of current insurance status and Medicare HIC numbers required significant additional effort in many situations. For example, an automated billing system which uses the current claim number would contain an Evercare ID in the field that otherwise would have held a Medicare HIC. In these cases, finding the Medicare HIC from the facility required review of archived billing records. Evercare administration was used as an alternative and reliable supplemental source of both enrollment and Medicare HICs for their participants.

Completion and verification of the personal identifiers was accomplished through searches of the Medicare enrollment database using the identifiers in our files to cross-match for the missing or inaccurate identifiers. In this manner, we were able to verify the Medicare HIC for 10357 of the 11036 residents in the census population.

## Sample Selection

The survey samples were selected from the census population for each nursing home participating in the study. Residents listed on the census were removed from the sample population prior to the selection if they were less than 65 years old, had been admitted to the nursing home less than 30 days previously, or were enrolled in programs similar to Evercare in the use of nurse practitioners in a capitated plan. Nursing home residents were selected to be interviewed based on their membership in one of three categories: 1) residents who were currently enrolled in Evercare, 2) residents who were living in an Evercare nursing home but who were not enrolled in Evercare (Control-In), and 3) residents who were living in a nursing home that does not participate in the Evercare program (Control-Out).

The selection of the sample differed between Evercare and non-Evercare facilities. In non-participating facilities, ten sample and five replacement cases were generated using a random number generator. If the interviewer was unable to obtain an interview due to refusals, deaths or other circumstances, s/he used the replacement cases in the order given.

In Evercare facilities the methodology was more complex. Residents were divided into two groups: 1) living in the nursing home less than one year, and 2) living in the nursing home more than a year. From within each group, five Evercare participants were chosen at random to be the sample. Two additional Evercare patients were chosen as replacements in case of refusals. For each Evercare sample and replacement, a control was chosen with the closest nursing home admission date, thus forming matched pairs. If an Evercare patient declined to participate, the interviewer would not use that person's matched control. Instead s/he would use the next Evercare/Control pair. When an Evercare interview was performed and then the matched control

refused, an additional list of control replacements was used. The interviewer was instructed to use the control replacement with the closest admission date to the interviewed Evercare patient.

In some nursing homes there were not enough residents in one of the two groups to draw the sample as designed. When this occurred, we attempted to obtain as even a split as possible. For example, if there were only three Evercare residents who were admitted for less than a year, the interviewer would attempt to interview all three. In order to compensate, additional interviews would be performed in the greater-than-a-year group so that the total number would equal ten.

We also interviewed the family member listed as the responsible party for each patient in the sample. We included the family members of those patients who were originally sampled but then excluded because of cognitive problems. They provided proxy information in addition to the family questions. We did not use proxies for satisfaction measures, but rather the family members were asked about their own satisfaction with the care. Families' satisfaction is very important, especially for those nursing home residents who cannot respond for themselves. In assessing families' beliefs it is essential to control for the amount of contact the respondent has had with the resident and the nursing home. Often family members are listed as responsible parties, but visit rarely if at all. Therefore we obtained information on the recency and frequency of contacts for use as covariates. We conducted the family satisfaction interviews by telephone.

Trained interviewers attempted in-person interviews for all residents. However, a substantial number of residents were unable to provide coherent responses and a proxy respondent was used. The first choice for a proxy was a family member who had regular contact with the resident. When such a person was not available, a nursing home staff member was used. For each resident who had an identifiable family member, that person was contacted by phone

and asked a series of questions about their feelings about the care provided. In the instances when that respondent was also a proxy respondent, the two interviews were combined.

Interviewers were recruited and hired from the communities in which the interviews were conducted. Initial training on the resident and family interview process consisted of one week of combined classroom and field instruction at each site. Additional training and quality control, both in person and by telephone, continued throughout the data collection phase. Implementation of the survey process was phased in at the rate of one site per month in order to ensure solid training and supervision of the interview team.

Survey instruments were developed and piloted in the first year of the evaluation contract and the first quarter of the second year. OMB and Human Subjects clearance was obtained for the survey instruments, introductory letters, and release forms during this same period.

The questionnaires used previously tested elements wherever possible. Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs) were assessed in a method that permitted summarizing in a single scale (Finch, Kane, & Philp, 1995). Measures of unmet need, which show the rate at which specific types of care were not provided and the incidence of untoward consequences from not meeting basic care needs were adapted from the work of Allen and Mor (Allen & Mor, 1997). These questions were asked of only those residents who reported relevant ADL dependencies. Cognitive status was assessed using a simple mental status questionnaire, where three or more errors were interpreted as indicating significant cognitive impairment (Pfeiffer, 1975).

The satisfaction questions were designed in parallel in respondent and family member versions. The questions had been successfully used previously (Kane, Weiner, Homyak, & Bershadsky, 2001). Inquiries about satisfaction were posed as dichotomous questions about

whether the various elements occurred. Questions about contact with medical personnel were deliberately posed to combine interactions with physicians or nurse practitioners to allow the same phrasing for all groups. In addition, we asked three summary questions about whether the respondent would recommend the medical care or the nursing home to others and their overall rating of the medical care on a five-point scale.

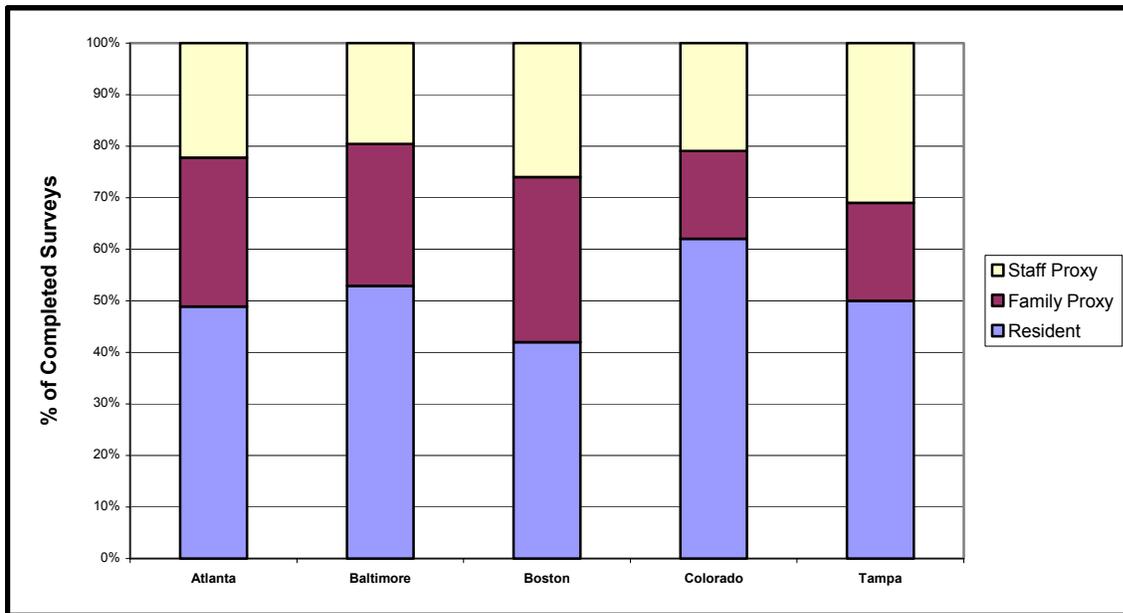
The items in the satisfaction questions were designed to tap a variety of aspects of medical care that included both discrete services and respondent's perceptions about how attentive and responsive the care was. We added a question about nursing home staff care to see if the respondents could distinguish the two aspects of their care. In the absence of an existing scale to address these dimensions we created our own questions. We originally tried a more elaborate Likert response set, but found in pilot testing that we had too many non-responses. Instead, we opted for the simpler dichotomous response set for all but a few rating questions.

Because managed care has an incentive to avoid costly terminal care, we were especially interested in examining the extent of advance directives. In addition to asking about the prevalence, we inquired about any feelings of being pressured to create them and who suggested them.

The personal identifiers of survey respondents were compared to Evercare enrollment records to verify that respondents were correctly classified as experimental or control and to identify their enrollment history. The 21 surveys for respondents who had either enrolled in, or disenrolled from, Evercare in the 30 days prior to their interview were not used. In some instances, where it seemed reasonable, we have pooled the responses from residents and proxies (one or the other for each respondent). In other instances we have kept them separate.

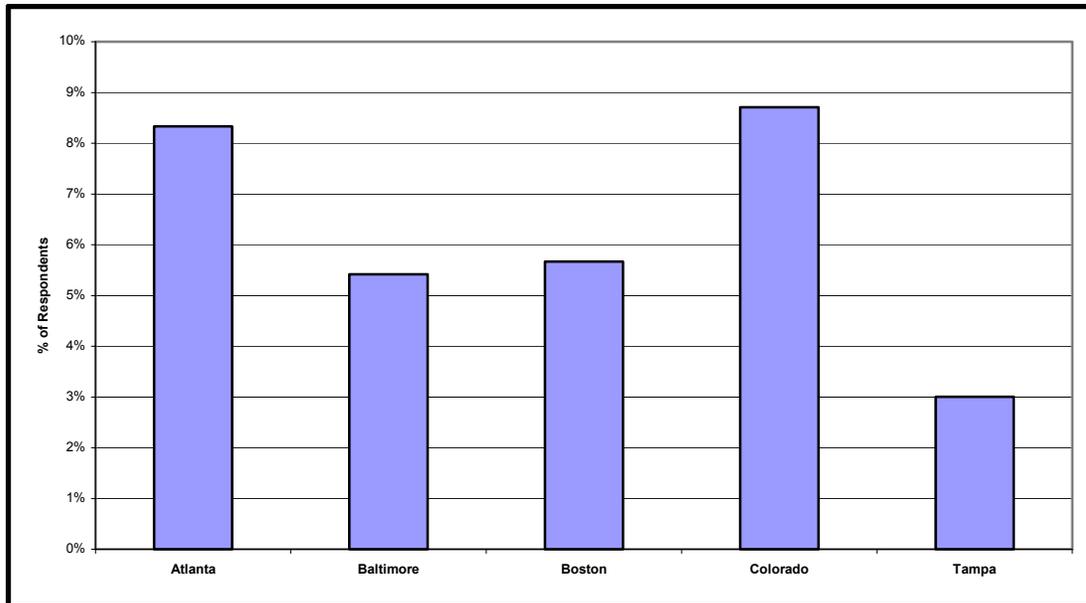
Because we wanted to take advantage of both types of control groups, the results are presented as separate comparisons between the Evercare sample and each control group.

A total of 1906 resident, proxy, and family interviews were completed, representing 440 Evercare residents and 880 non-Evercare control cases. The rate of proxies was approximately 50% in both the control and Evercare samples, with half of the proxy interviews using a staff member. Staff proxies were used when family members were insufficiently aware of the day-to-day capabilities of the resident. We completed 100% of the anticipated number of resident/proxy interviews. We then completed family interviews for 58% of resident and proxy staff interviews. The family interview was not completed when there were no family members who could be located or the family member refused to complete the interview. Figure 4 shows the distribution of respondents and proxies used.



**Figure 4: Resident Interviews Respondent Type**

Interview response rate was strong. The interview refusal rate averaged 6%. Figure 5 shows the pattern by site.



**Figure 5: Resident Interviews Refusal Rate**

### **Statistical Analysis**

Most of the comparisons used chi square tests for non-parametric variables and t tests for parametric variables. However, because differences in the functional and cognitive composition of the groups were detected, multivariate analyses (logistic, or OLS regression models) were employed to correct for demographic (age, sex) and functional and cognitive differences in comparing satisfaction. For the measures of satisfaction a Bonferroni correction was applied to take account of the multiple comparisons (Tukey, 1991).

Information on the characteristics of all participating nursing homes was obtained from the computerized OSCAR (Online Survey, Certification, and Reporting) database.

## **Results**

The final sample included 454 Evercare patients, 407 controls from the same nursing homes, and 433 from matched nursing homes. Within the nursing homes the residents' refusal rate was very low (6%). The 644 proxy responses were almost equally divided between family (49%) and staff (51%), and equally spread among the three groups (50% of Evercare, 50% of Control-In, and 49% Control-Out).

Table 7 shows the demographic and general health status (including self-reported diagnoses) for the three groups of nursing home residents. The results for respondents and proxies are combined. Overall, the picture of the nursing home residents is consistent with national data. The mean age is approximately 85. Over three-fourths are female. About 45% rate their health as fair or poor. The most prevalent problems are arthritis, hypertension, and dementia. About half were not able to respond directly and required a proxy respondent.

In general, the Evercare enrollee sample resembles the controls, but there are a few differences, especially compared to the Control-Out group. The Control-Out group has higher proportion of white residents, and fewer residents with dementia. Although the rate of proxies is equivalent in both the Evercare and Control-In samples, the Evercare sample of respondents had a higher proportion of persons making three or more errors on the mental status test than Control-In residents.

The disability status of the residents is shown in Table 8; respondents are shown separately from those who required proxies. The residents responding on their own were more likely than proxies to report pain. Conversely, disability level among residents needing proxies was considerably higher than for those who responded on their own. The Evercare sample differed significantly from the Control-Out sample on multiple elements. The Evercare sample

was less restricted in walking, and fewer Evercare resident respondents needed help in toileting and transferring than the Control-Out group. Among those requiring proxies, the only difference was found in dressing, where the Control-In group was less disabled than the Evercare sample.

Table 9 explores residents' reports of unmet needs. All those who reported some level of dependency in a given domain were then asked questions designed to indicate any adverse consequences of not receiving timely care for that domain. The overall pattern of unmet need showed Evercare residents with more unmet need than controls in many instances, but the differences were significant only once. Evercare residents reported a significantly higher level of unmet need in transferring.

Residents and family members answered a series of questions about how they viewed the services available to the residents. The residents included only those who could respond. The family members are those of both the responders and the non-responders. Table 10 shows the proportion of persons agreeing, expressed as the mean of the responses.

Even after the Bonferroni correction was applied, the pattern of results suggests that family satisfaction among the Evercare sample was significantly different from the controls. Although there were no significant differences among residents, Evercare nursing home residents rated almost all care satisfaction items higher than Control-In residents. The differences with the Control-Out sample showed no clear pattern.

The family members showed a stronger pattern of differences. In three instances the Evercare families expressed significantly more satisfaction than either group of control families: seen often enough, one person in charge, and spends enough time. The Evercare families were also significantly more satisfied than the Control-Out families with regard to explanations of health problems.

To examine the differences in satisfaction among the groups another way, we created a score based on the number of items where the respondent expressed dissatisfaction and compared the rates using a chi square analysis. The Control-In group had significantly more dissatisfaction items than the Evercare group ( $p=.027$ ), but the difference between the Control-Out and the Evercare group was not significant. For family members, the rate of dissatisfaction was significantly higher for both controls groups compared to the Evercare group ( $p=.002$  for the Control-In and  $p=.004$  for the Control-Out).

Both Evercare residents and families indicated that they were more likely than their corresponding control groups in the same homes to recommend those homes. In predicting whether residents would recommend their nursing home to others, logistic regression suggests that being in an Evercare nursing home is associated with a lower likelihood of recommendation ( $\beta=.896$ ,  $p=.014$ ), but being enrolled in Evercare had a positive effect on that decision ( $\beta=.634$ ,  $p=.001$ ).

This interaction pattern suggests that Evercare homes were not viewed as favorably as the control homes. Since the extent of meeting unmet resident needs for care should reflect the actions of nursing home staff more than that of primary care providers, one would expect a relationship between unmet needs and enthusiasm for a given nursing home. There was a statistically significant association in three of the unmet needs: help with dressing, unable to put on clean clothes, and wet or soiled. In the first two instances the significant relationship was found within the control groups but not Evercare residents. In the last case, just the opposite pattern pertained.

Another approach to looking at the differences involves examining the characteristics of the participating nursing homes using Online Survey and Certification Reporting (OSCAR) data.

Table 11 explores potential differences in these homes. As noted earlier, the control and Evercare facilities had been matched within each demonstration site in the sample selection process based on size, ownership, and for-profit status, and thus were expected to be comparable on these parameters. The samples were also similar for occupancy level and ownership by a multi-facility corporation. Reviewing the number of deficiencies identified by the State survey agencies does 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, does not reveal a pattern of better or worse resident conditions among the participating Evercare and control facilities. None of the differences was statistically significant at the 0.05 level. Two quality indicators (unplanned weight change and behavioral symptoms) were significant at the 0.10 level but the differences ran in offsetting directions.

Because managed care has an incentive to encourage advance directives as a means of controlling the costs of end-of-life care, we asked a series of questions about the use of advance directives. As shown in Table 12, there was very little difference across the samples. Overall, 31% of Evercare residents had an advance directive compared to 28% of Control-In residents and 39% of Control-Out residents. The only difference among the groups appeared in the respondents who indicated that someone had suggested they establish an advance medical directive. Of these people, the Control-Out sample was less likely to report feeling pressure to do so, but there was no difference between Evercare patients and Control-In patients.

**Table 7. Diagnoses and Demographics of Subjects**

**Resident and Proxy Responses Combined**

Item	Evercare	Control-In	EC vs Control-In P value*	Control- Out	EC vs Control- Out P-value*
	(N=454)	(N=407)		(N=433)	
Resident age: Mean (+/-SD)	84.6 (+/-7.56)	83.6 (+/-8.14)	0.06	85.1 (+/-7.53)	0.34
Female	79.5%	76.7%	0.31	80.5%	0.73
White	81.9%	83.6%	0.50	88.7 %	0.0045
Latino	5.7%	4.0%	0.25	4.3%	0.32
Education >Grade 8	72.5%	77.8%	0.21	68.5%	0.23
General health (residents)			0.91		0.26
Excellent	6.6%	6.5%		7.1%	
Very good	16.5%	15.8%		12.0%	
Good	33.5%	31.6%		32.3%	
Fair	29.4%	32.6%		34.9%	
Poor	14.0%	13.5%		13.7%	
Mental status (>3 errors) (residents)	61.5%	46.0%	0.0035	55.7%	0.30
Proxy respondent	49.6%	50.1%	0.87	46.4%	0.34
Arthritis	47.6%	47.0%	0.85	49.3%	0.62
Vision	46.6%	48.9%	0.51	49.2%	0.44
Dementia	44.1%	42.1%	0.56	34.2%	0.0029
Hypertension	40.9%	41.2%	0.93	42.1%	0.72
Hearing	32.2%	33.5%	0.69	32.6%	0.89
Stroke	28.6%	26.1%	0.43	31.8%	0.31
Other heart problems	24.5%	22.1%	0.42	22.2%	0.42
Hip Fracture	22.1%	23.9%	0.55	24.0%	0.52
Diabetes	21.5%	20.8%	0.78	22.8%	0.66
Myocardial infraction	15.9%	14.1%	0.48	16.2%	0.88
Angina/coronary heart disease	15.6%	12.4%	0.18	15.2%	0.87
Other mental health	15.1%	16.4%	0.59	11.7%	0.15
Cancer	15.2%	12.3%	0.22	11.2%	0.08
COPD	12.2%	13.8%	0.50	11.7%	0.82
Parkinsons	6.4%	7.1%	0.67	5.9%	0.77

\* Compared by chi square except for age (t test)

EC = Evercare

COPD = chronic obstructive pulmonary disease

**Table 8. Disability Reported by Residents and Proxies**

Item	% of Residents					% of Proxies				
	Evercare	Control- In	EC vs. EC Control P-Value	Control- Out	EC vs Control- Out P-Value	Evercare	Control-In	EC vs Control-In P-Value	Control- Out	EC vs Control- Out P-Value
	(N=229)	(N=203)		(N=235)		(N=224)	(N=201)		(N=204)	
Moderate/Severe Pain or Discomfort	35.8	34.8	0.83	29.1	0.12	23.1	28.4	0.22	28.1	0.25
Walking (confined to room)	46.2	50.5	0.38	55.7	0.04	69.6	69.7	0.99	74.5	0.26
<b>Activities of Daily Living (ADLs)<sup>†</sup></b>										
Dressing (a little help +)	50.4	53.7	0.49	57.5	0.13	98.2	93.3	0.013	96.5	0.27
Toileting (a little help +)	43.6	47.2	0.45	54.7	0.02	93.1	87.4	0.05	89.3	0.17
Transfer (a little help +)	43.7	43.3	0.94	55.8	0.01	84.9	79.9	0.19	84.8	0.98
Feeding (a little help +)	14	13.9	0.99	20.5	0.06	70.6	62.6	0.09	65.3	0.25
<b>Any ADL</b>	59	63.1	0.38	68.5	0.03	97.8	93.1	0.02	95.6	0.20
<b>Any of the Above</b>	75.1	75.9	0.03	79.2	0.29	97.8	93.6	0.03	97.1	0.64

<sup>†</sup> dichotomized as needing a little help or more and needing no help  
 EC = Evercare

**Table 9. Resident Reports of Unmet Needs  
(asked of only those who reported dependencies)**

Item	Evercare	Control-In	EC vs Control-In P value*	Control-Out	EC vs Control- Out P value
<b>Dressing</b>					
Did not get needed help with dressing	34.8% (40/115) <sup>†</sup>	25.2% (31/123)	0.106	29.8% (39/131)	0.401
Unable to put on clean clothes	26.7% (31/116)	18.7% (23/123)	0.138	19.5% (26/133)	0.179
<b>Toileting</b>					
Did not get needed help with toileting	33.3% (34/102)	28.4% (29/102)	0.449	32.0% (40/125)	0.831
Wet or soiled because no help available	39.0% (39/100)	38.8% (40/103)	0.981	34.7% (42/121)	0.51
Had to wait 20 minutes + wet/soiled	41.3% (43/104)	31.1% (32/103)	0.124	33.9% (41/121)	0.249
<b>Transferring</b>					
Did not get needed help transferring	38.9% (42/108)	25.0% (25/100)	0.032	28.6% (38/133)	0.091
Fell because no help	24.1% (26/108)	19.0% (19/100)	0.375	15.4% (21/136)	0.089
<b>Eating/Drinking</b>					
Did not get needed help eating	32.7% (16/49)	22.9% (8/35)	0.327	23.2% (13/56)	0.281
Hungry because no help	26.5% (13/49)	17.1% (6/35)	0.311	28.6% (16/56)	0.815
Thirsty because no help	26.0% (13/50)	28.6% (10/35)	0.793	31.0% (18/58)	0.564
One or More of the Above	65.2% (92/141)	59.0% (82/139)	0.281	56.3% (99/176)	0.104

\* Significance compared to Evercare sample, where categorical data were analyzed by chi square test:

<sup>†</sup> Numbers in parenthesis are the number of respondents reporting an unmet need divided by those who are at risk for that problem.

EC = Evercare

**Table 10. Resident and Family Satisfaction**

	Residents [Mean (+/-SD)]					Families [Mean (+/-SD)]*				
	Evercare	Control-In	EC vs Control-In	Control-Out	EC vs Control-Out	Evercare	Control-In	EC vs Control-In	Control-Out	EC vs Control-Out
	(N=222)	(N=199)	P Value	(N=228)	P Value	(N=306)	(N=251)	P Value	(N=314)	P Value
Received therapy when needed	0.88 (+/-0.33)	0.86 (+/-0.35)	0.63	0.87 (+/-0.34)	0.78	0.86 (+/-0.35)	0.88 (+/-0.33)	0.50	0.91 (+/-0.29)	0.084
Hearing & vision checked regularly	0.70 (+/-0.46)	0.68 (+/-0.47)	0.77	0.75 (+/-0.43)	0.19	0.79 (+/-0.40)	0.73 (+/-0.44)	0.13	0.78 (+/-0.42)	0.654
Respond quickly if sick	.83 (+/-0.38)	0.82 (+/-0.38)	0.99	0.88 (+/-0.32)	0.11	0.95 +/- (0.22)	0.88 (+/-0.33)	0.0059	0.93 (+/-0.25)	0.5
See often enough to treat problems	0.77 (+/-0.42)	0.74 (+/-0.44)	0.52	0.78 (+/-0.41)	0.69	0.94 (+/-0.23)	0.85 (+/-0.36)*	0.0013	0.86 (+/-0.34)*	0.002048
One person in charge	0.72 (+/-0.45)	0.69 (+/-0.47)	0.55	0.71 (+/-0.46)	0.84	0.83 (+/-0.38)	0.68 (+/-0.47)**	0.00017	0.71 (+/-0.46)*	0.001236
Physician/NP spends enough time with patient	0.77 (+/-0.42)	0.64 (+/-0.48)	0.0046	0.70 (+/-0.46)	0.11	0.91 (+/-0.28)	0.73 (+/-0.44)**	0.0000037	0.73 (+/-0.45)***	0.00000024
Physician/NP treats patient with respect	0.96 (+/-0.19)	0.98 (+/-0.15)	0.36	0.98 (+/-0.15)	0.38	1.00 (+/-0.00)	0.99 (+/-0.12)	0.083	0.99 (+/-0.12)	0.045
NH staff treat patient with respect	0.94 (+/-0.24)	0.90 (+/-0.30)	0.10	0.93 (+/-0.26)	0.50	0.95 (+/-0.21)	0.96 (+/-0.21)	0.94	0.96 (+/-0.20)	0.837
Explain health care problems so Respondent can understand them	0.85 (+/-0.36)	0.73 (+/-0.45)	0.0031	0.89 (+/-0.32)	0.29	0.95 (+/-0.23)	0.88 (0.33)	0.01	0.87 (+/-0.34)*	0.001496
Respondent involved in making decisions	0.72 (+/-0.45)	0.72 (+/-0.45)	0.95	0.75 (+/-0.44)	0.53	0.91 (+/-0.29)	0.92 (+/-0.27)	0.57	0.92 (+/-0.28)	0.662
Physician/NP responsive to Respondent's concerns	0.93 (+/-0.26)	0.90 (+/-0.30)	0.45	0.93 (+/-0.26)	0.91	0.95 (+/-0.22)	0.91 (+/-0.29)	0.07	0.94 (+/-0.23)	0.678
Patients hospitalized when necessary	0.99 (+/-0.12)	0.95 (+/-0.23)	0.04	0.98 (+/-0.14)	0.75	0.98 (+/-0.13)	0.97 (+/-0.18)	0.23	0.98 (+/-0.15)	0.585
Rate Medical Care	3.53 (+/-1.02)	3.47 (+/-1.08)	0.53	3.54 (+/-1.07)	0.97	3.89 (+/-0.91)	3.69 (+/-0.88)	0.012	3.86 (+/-0.89)	0.601
Would recommend NH	0.85 (+/-0.36)	0.75 (+/-0.43)	0.02	0.88 (+/-0.32)	0.36	0.94 (+/-0.23)	0.88 (+/-0.32)	0.016	0.92 (+/-0.27)	0.269
Would recommend doctor	0.86 (+/-0.34)	0.83 (+/-0.38)	0.39	0.91 (+/-0.29)	0.19	0.85 (+/-0.36)	0.81 (+/-0.39)	0.28	0.88 (+/-0.33)	0.485

\* Adjusted for residents' age, gender, ADL score, cognitive status using logit model for satisfaction and recommend (0 = disagree, 1 = agree), and t test for rating of medical care (1 = poor to 5 = excellent)

**Table 11. Characteristics of Participating Facilities and their Residents; as reported at time of most recent state inspections (1999 or 2000)**

	<u>Control</u> Mean ± SD(Range)	<u>Evercare</u> Mean ± SD(Range)	<u>P value*</u>
<b>Facilities:</b>			
Average # of Beds	146.6± 57.1 (77- 388)	140.5±53.5 (82-333)	0.61
Average # of Residents	130.0±48.5 (63-297)	120.2±49.1 (61-330)	0.35
Percentage of Occupied Beds	86.9±10.1 (54-99)	86.0±12.2 (51-99)	0.21
% Medicare Participating	97.7	100	0.32
% Medicaid Participating	97.7	100	0.32
% For Profit	81.8	86.4	0.96
% Chain Owned	86.4	70.5	0.64
Average # of Deficiencies at severity of minimal harm or potential actual harm	3.4±3.4 (0-13)	3.3±3.2 (0-12)	0.89
Average # of Deficiencies at severity of actual harm or greater	0.7±1.8 (0-11)	0.5±0.5 (0-6)	0.59
<b>Residents:</b>			
Average % Very Dependent in Eating	18.7±9.3 (0-38)	20.7±9.6 (3-52)	0.34
Average % Bedfast	6.1±6.2 (0-24)	6.7±6.5 (0-25)	0.654
Average % with Restricted Joint Motion	21.3±15.4 (2-72)	21.2±12.44 (6-56)	0.962
Average % with Restraints	12.8±10.0 (0-38)	11.6±10.0 (0-49)	0.56
Average % with Pressure Sores	7.7±4.2 (2-23)	7.8±3.3 (2-15)	0.99
Average % with Urinary Incontinence	55.0±14.0 (22-88)	59.1±13.0 (28-85)	0.17
Average % with Unplanned Weight Change	8.3±6.0 (0-29) #	6.0±5.5 (0-19)	0.07
Average % with Behavioral Symptoms	26.5±12.4 (1-53) #	32.3±15.6 (0-63)	0.06

\* Significance compared to Evercare sample, where categorical data were analyzed by chi square and continuous data by t test

Source: Medicare: Nursing Home Compare @ [www.medicare.gov/nursing](http://www.medicare.gov/nursing)

**Table 12. Advance Directive Practices**

<u>Item</u>	Residents					Proxies				
	Evercare	Control-In	p-value	Control-Out	p-value	Evercare	Control-In	p-value	Control-Out	p-value
Any of the following Advance Directives	31.2% (62/199) <sup>□</sup>	28.4% (50/176)	0.56	38.8% (76/196)	0.56	55.7% (113/203)	57.4% (109/190)	0.73	61.5% (115/187)	0.24
No CPR	26.6% (51/192)	27.2% (47/173)	0.90	35.5% (65/183)	0.90	52.5% (106/202)	56.1% (106/189)	0.47	58.7% (108/184)	0.22
No ventilator	25.4% (48/189)	23.6% (39/165)	0.70	31.5% (58/184)	0.701	43.3% (84/194)	43.6% (79/181)	0.95	49.1% (85/173)	0.26
No tube feeding	18.1% (34/188)	19.4% (32/165)	0.75	25.3% (46/182)	0.75	26.1% (49/188)	33.7% (61/181)	0.11	30.7% (51/166)	0.33
No infections treated	4.8% (9/187)	1.8% (3/166)	0.12	9.0% (16/177)	0.12	7.0% (13/186)	8.4% (15/179)	0.62	11.1% (19/171)	0.17
No hospital admission	7.3% (14/193)	6.0% (10/167)	0.63	7.5% (14/186)	0.63	7.5% (14/187)	9.8% (17/174)	0.44	10.3% (18/174)	0.34
No surgery	6.8% (13/192)	4.9% (8/164)	0.45	6.5% (12/185)	0.45	6.2% (11/178)	11.6% (20/173)	0.08	8.4% (14/167)	0.43
Anyone suggest living will	27.5% (58/211)	29.3% (54/184)	0.68	33.5% (70/209)	0.68	67.7% (65/96)	68.6% (59/86)	0.90	66.0% (68/103)	0.80
If someone suggested, felt pressure to establish advance directives	17.3% (9/52)	14.9% (7/40)	0.75	2.9% (2/69)**	0.0063	3.1% (2/65)	1.7% (1/59)	0	0.0% (0/66)	0.15

CPR = cardio-pulmonary resuscitation

## **Discussion**

Overall, the Evercare enrollees do not seem very different from those in the control groups, although the Evercare group had more dementia and cognitive impairment than the controls, and less ADL dependency. We specifically used two control groups to approach the issue of selection bias. Each control group brings its own strengths and problems. However, taken together they provide a strong opportunity to guard against selection effects. The Control-In sample would be subject to the same nursing care but would have opted not to join Evercare (and hence be more subject to selection bias). Those in non-participating nursing homes would not have had the opportunity to enroll in Evercare but would be subject to different nursing care from the Evercare sample.

For the most part, the patterns of differences between Evercare and the two control groups are similar, but there are areas where the differences are seen with one control but not the other. These discrepancies make it harder to interpret the importance of the findings. The reader must decide whether to attend to those where either control differed from Evercare or only those where both did.

We were concerned about merging proxy responses with those from residents and did so for only those items that were empirically derived (e.g., functional status). The proxy responses were almost equally divided between family (49%) and staff (51%). No effort was made to compare the patterns of responses by proxy source. The observation that resident reports of disability were lower than those of proxies is consistent with other findings in the literature (Tennstedt, Skinner, Sullivan, & McKinlay, 1992);(Rubenstein, Schairer, Wieland, & Kane, 1984). A recent meta-analysis of proxy responses suggests that proxies are reasonably accurate for items of fact like utilization of services or even ADLs, but they are not reliable to reflect residents' preferences or values around areas like satisfaction (Neumann, Araki, & Gutterman,

2000). Indeed, other work shows that residents and their families have substantial differences in their levels of satisfaction and the importance they place on various items (Levin, 2001).

It is possible that the Evercare residents who were more demented might have made more factual errors in reporting their ADLs and reported greater satisfaction as a result of impaired memory. The analyses of satisfaction were adjusted to address the differences in cognitive status. Moreover, there is growing evidence to suggest that even fairly cognitively impaired respondents can provide useful and reliable information on their care and their preferences (Feinberg & Whitlatch, 2001).

Some of the physicians providing care for the controls likely used the services of NPs. In such cases, the expected extent of the differences between the experimental and control groups would be reduced. Unfortunately we have no information on the rate that this occurred. The model of primary interest, however, is the effect of having a managed care program employ NPs directly to provide primary care and other oversight to nursing home residents.

Because this report is based on cross-sectional data, it is not possible to use functional status or other health measures as outcomes. From the perspective of satisfaction, it appears that the Evercare group perceives a number of benefits from the care they are receiving. Their responses suggest an appreciation for closer attention and coordination of care from their primary caregivers. This was true of the residents and even more so with their families. Further, even though the Evercare model is designed to reduce hospitalizations, the Evercare enrollees were more satisfied that they would be hospitalized when necessary.

Some of the results may at first appear contradictory. For example, the Control-Out group had fewer residents with dementia whereas fewer of the Control-In respondents had 3+ mistakes on the Mental Status Questionnaire (MSQ). The first measure reflects all persons in the study, but the performance measure is based on only responding residents. Thus, many demented

residents had proxy respondents and thus would not have been formally tested for cognition. Since only those who responded personally were tested, it is possible to get a higher error rate among a group that over all had less dementia.

The satisfaction measures were designed to assess satisfaction with the medical care provided. A question about attitudes toward the nursing home was added to assess the extent of a possible halo effect. This possibility was confirmed by the significant correlation between the recommendations for the homes and for the medical care.

Since many of the controls homes originally approached to participate chose not to, there is good reason to suspect that the control homes represent better care overall than that found in the Evercare homes, or at least that there is a favorable selection bias at the home level. To that extent, the comparison within Evercare homes is especially useful; it raises the issue of whether there is a selection effect among those who opted for Evercare.

In an effort to test the possibility that there were real differences between the Evercare and control homes, we examined two other sources of information. The findings from the most comparably dated round of state surveys for facilities participating in our study did not identify differences among the facilities that would support an impression of better or worse care within Evercare or non-Evercare facilities as a whole. The Evercare controls had fewer unmet needs in one area, but there was not a consistent pattern of significant associations between unmet needs and nursing home satisfaction. Thus, this finding may have occurred by chance. The failure to find a consistent difference in the rate of unmet needs fails to support the view that the Evercare nursing homes may have provided poorer services overall, but the effects of Evercare countered this influence and produced a net benefit. Alternatively, the Evercare respondents may have incorrectly assumed the Evercare nurse practitioners were nursing home employees and thus

improved their views of the nursing homes. In addition, the nurse practitioners may have acted as resident advocates, pressing the nursing home staff for more attention for their charges.

There was no evidence that the Evercare program put any pressure on residents or their families to file advance directives. Nor was there any significant difference in the patterns of advance directives.

Taken together, the findings suggest that families appreciate the care Evercare provides to nursing home residents. There is no evidence of the potential pitfalls of restricted services or a stronger push for rationing through advance directives.

### **THE EFFECT OF EVERCARE ON HOSPITAL AND PROVIDER UTILIZATION**

Since one of the primary outcomes anticipated from the Evercare use of Nurse Practitioners (NPs) in the nursing homes and the payment for Intensive Service Days (ISDs) is the reduction of hospitalizations, the rates of hospitalization and conditions for which patients were hospitalized was a key component of the analysis of the Evercare program. The Evercare residents were found to have reduced incidence of hospitalization compared to either control group. When hospitalized, their length of stay was shorter. The ISDs appeared to provide the intermediate level of care between usual nursing home care and hospital care that allowed the nursing home residents to stay in their nursing homes rather than be hospitalized. Thus it may be concluded that the addition of the NP attention to the patients and oversight for their care, combined with the NP's authorization of additional payment to the nursing home in the form of ISD reimbursement, provide the intended outcome for the patient. Our calculations indicate that this model of care also results in a net monetary savings for the care of patients who would otherwise be hospitalized

## **Methods**

Three subsets were selected from the study population. For each Evercare enrollee, a matching resident was selected from the control residents in the same facility (Control-In) and another matching resident was selected from the control facility matched to the Evercare resident's facility (Control-Out) using an algorithm maximizing proximity of nursing home date of admission for each matched pair. Only those residents who were enrolled in both Part A and B Medicare at some time during the study and who were not enrolled in any other HMO, based on Medicare enrollment data, were used in the matched subpopulations.

The number of residents eligible to be considered in each subpopulation varied over time due to several dynamics. Enrollment into the Evercare program was continuous. For the analysis of utilization a "virtual enrollment date" was attributed to each of the matched control residents reflecting the Evercare enrollment date of their respective matched experimental resident cases. Thus, the population from the time of each individual's enrollment or virtual enrollment forward is used, resulting in an accumulation of sample as the introduction of Evercare into each site and initial enrollment into the program progressed. Nursing home residents exited the study population through either death or discharge from the nursing home in which they resided at the time of the census. A small number of residents exited the Evercare subpopulation through disenrolling from the Evercare program. The average Evercare disenrollment rate was 3% per month; almost all of this was due to death.

Data are presented as a comparison of the Evercare sample with each of the control samples (Control-In and Control-Out). Because the eligible study population changed each month, data are reported in terms of persons/month, with a different N for each month for each sample. For example, in each month, the number of hospitalizations per 100 enrollees is calculated as the number of admissions starting in a month divided by the number of persons

enrolled in that month. To report results for longer periods of time the results for each month were added together and divided by the number of months being examined. This is done to provide equal weighting of each month while reflecting the dynamic population and to preserve trends that may be seasonal in nature or the result of experience over time. Because all study subjects had to survive until the census, we divided the time periods before and after the census. Presumably the latter period would be associated with more disease. The data for each individual goes back 12 months from the time they were censused in the nursing home or their virtual Evercare enrollment date. Individuals are followed for 15 months after the months in which they were censused.

Basic descriptive information on the Evercare and control samples was obtained from the Medicare mandated Minimum Data Set (MDS) assessments that are required of all nursing home residents on admission and at subsequent prescribed intervals. When more than one MDS assessment was available during the study interval the earliest report with the relevant information was used. The measure for dementia is the Cognitive Performance Scale (CPS) developed by Morris et al (Morris et al., 1994). The activities of daily living (ADL) dependency level was measured using the ADL scale developed for the MDS (Morris, Fries, & Morris, 1999; Phillips et al., 1997). The prevalence of selected diagnoses was also taken from MDS data. Because MDS requires that only diseases that affect current health or treatment be recorded, some historical diagnoses may be underreported.

Administrative data for transactions involving the study population was obtained from CMS and UHC. The utilization data for the Evercare sample during the period of their enrollment came from the claims records of UHC. The utilization data for the control population and for Evercare enrollees prior to enrollment came from Medicare records. Care was taken to use the same definitions for each type of service to assure comparability across sources.

Hospitalizations and physician visits were defined in terms of standard coding on the respective uniform billing forms. Because the ISD provided by the Evercare program is unique to this program, these services were identified in accordance with instruction from UHC. For both hospitalizations and ISDs, same-day discharges and readmissions were treated as transfers, which did not change the incidence rate.

In order to examine the effect of primary care in reducing hospitalizations, those hospitalizations and ISDs considered preventable, such as pneumonia, dehydration, hypertension, and UTIs were identified. Preventable hospitalizations and ISDs were selected based on 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. Additionally, admissions for discretionary surgical procedures were identified as those where the first or second ICD-9 procedure code on the claim was among the Institute of Medicine's list of referral-sensitive surgeries (Millman, 1993).

Because patients with dementia have been shown to have lower utilization rates (Kane & Atherly, 2000), and the Evercare enrollees included a disproportionately larger number of demented patients than both of the control groups, the effect of this difference was examined. Patients with diagnoses of dementia were identified using multiple sources independently: 1) patients were identified from utilization data based on a corresponding ICD-9-CM code in any of the diagnosis fields on either a hospitalization or physician claim at any time during the study period, 2) patients were identified from MDS assessments using the disease diagnosis categories of Alzheimer's disease, dementia other than Alzheimer's disease, as well as ICD-9-CM codes, on any assessment during the study period, 3) patients were categorized into levels of impairment using the maximum CPS calculated from all MDS assessments during the study period (Morris et al., 1994), 4) self-report of dementia by resident or their families in interviews of a sample of the

population conducted earlier in this study, and 5) greater than five errors on the MMQ administered as part of the same interviews. When our analyses showed that the proportion of dementia cases identified was highest using the CPS, we elected to use that measure to capture dementia.

A variety of methods were used to assess utilization of professional services. The incidence of physician, NP, podiatry, and audiology services was obtained from the provider-based claims with an outpatient place of service. Physician and NP services were identified from claims with office, home, or nursing home visits, or evaluation/management consultation Berenson-Eggers Type of Service (BETOS) codes. BETOS codes were developed by HCFA (now CMS) from Health Care Financing Administration Common Procedure Coding System (HCPCS) procedure codes for classification of physician claims into clinically relevant categories. BETOS definitions were then applied to CPT (Common Procedural Terminology) codes present in the Evercare data. Podiatry and audiology service counts include these BETOS codes as well as specialty-specific CPT codes. Slightly different methodology was used in determining use of therapy services. Institutional claims were examined as well as provider claims. Skilled nursing facility and outpatient institutional claims with speech therapy, occupational therapy, or physical therapy revenue center codes were included. Provider claims with a specialty type of OT/PT/speech therapy or physiotherapy were also included. Unfortunately, the use of revenue center codes meant that the number of physical therapy visits was not available. Payment for services is offered as a proxy for service count. It was assumed that, if a claim included physical therapy charges and the claim spanned multiple months, therapy was received throughout the claim period. Dollars were assigned to a month based on the proportion of the claim period that occurred in that month.

The outpatient treatment of mental disease and dementia was examined in greater depth. We were interested in examining mental health utilization for only those persons who had need of it. In order to determine which patients were in need of mental health services we examined all available sources of information. If a patient had a paid mental health claim from an inpatient, outpatient, or provider source from January 1996 to December 2000, they were included in the denominator. Additionally, the diagnosis fields from Minimum Data Set records were used. A mental health diagnosis from any source placed the person in the denominator for each month even if the diagnosis occurred before admission to the nursing home or after the month in question. Patients were divided into three categories based upon the type of diagnosis: dementia without other mental health diagnoses, dementia and other mental health diagnoses, and other mental health diagnoses with no dementia. Organic brain syndrome was included with dementia for the purposes of this analysis.

To calculate the numerator of qualifying outpatient mental health benefits, provider claims with a primary diagnosis of mental disease or dementia were selected. The place of service requirement was the same as for the measures of provider services. Claims for mental health professionals such as social workers and psychologists were examined, as well as physicians, NPs, and PAs. In addition to the BETOS procedure codes included for regular doctor visits, BETOS-defined psychiatry specialty codes were examined. Depending on provider and procedure code, some mental health visits are also included in the count of physician visits.

Mental health visits were broken into four categories:

- 1) visits to psychiatrically trained physicians (psychiatrists, neurologists, and neurosurgeons)
- 2) visits to non-psychiatrically trained physicians

- 3) visits to psychiatrically trained non-physicians [Only providers with specialized training are allowed to use psychiatry codes. Thus, NPs who used these codes were considered to be psychiatrically trained and their visits were counted in this category along with visits to psychologists and social workers.]
- 4) non-psychiatrically trained NPs and PAs.

Mortality rates could be assessed only subsequent to the census. Because the sample was identified from a cross-sectional census, by definition all residents included had to have survived to the date of the census. Medicare enrollment and death data were obtained from the Medicare enrollment database and HMO enrollment data were obtained from the Medicare GHO files. Enrollment and death data were verified using UHC enrollment files and the MDS.

### **Statistical Analysis**

When testing if observed differences of baseline characteristics between groups were statistically significant, chi-square and t-tests were used. For between-group comparisons of resource utilization, we used a longitudinal extension (Diggle, Liang, & Zeger, 1994) of generalized linear models (Nelder & Wedderburn, 1972) with Poisson and binomial random components (log and logit links, respectively). The robust estimation of standard errors (sandwich estimator) was applied. Whenever possible we used an unstructured correlation matrix. In cases where the model had difficulty converging, we used an exchangeable (compound symmetry) or independent correlation matrix. Risk adjustment was performed for the following 16 variables: age, gender, race, Morris ADL score, diabetes mellitus, cardiac dysrhythmias, congestive heart failure, hypertension, arthritis, hip fracture, dementia (Alzheimer's or other), stroke (CVA, hemiplegia/paresis, TIA combined), Parkinson's disease, anxiety disorder and depression, asthma or emphysema, and active cancer. No interaction term

was used in the model. No multiple-comparisons adjustment was applied. We used Stata (StatCorp, 2001) to fit the models.

## **Results**

Table 13 shows some of the basic descriptors taken from the MDS data for the Evercare sample and the two control groups used in the utilization analysis. The demographic characteristics of the three groups are generally similar. The Evercare sample was more different from the Control-In sample than the Control-Out sample. The Evercare sample was significantly older than the Control-In sample (average age at start of study period of 83.7 versus 81.4,  $p < .001$ ), and more likely to be female (80.3% versus 72.6%,  $p < .001$ ). The Evercare sample had fewer white residents than the Control-Out sample (83.2% versus 91.4%,  $p < .001$ ). The average Cognitive Performance Scale (CPS) score showed the Evercare sample significantly more impaired than the Control-Out sample (3.12 versus 2.80,  $p < .001$ ). The Evercare sample had a higher prevalence of dementia and vision problems than either of the control groups. The Control-In sample also showed a lower prevalence of hypertension and asthma/emphysema than the Evercare sample. The prevalence of other diagnoses was generally comparable across the groups. The monthly mortality rate for the period from April 1, 1999, through December 30, 2000, for the Evercare sample was 2.88%, whereas the rate for the two control groups was 2.66% for those in the same nursing homes and 2.73% for those in the matched nursing homes.

**Table 13. Characteristics of Subjects**

	<b>Evercare (N=1936)</b>	<b>Control-In (N=1123)</b>	<b>Control-Out (N=1745)</b>
Age mean (SD)	83.68 (8.76)	81.44 (11.87) ***	83.98 (9.93)
Female	80.25%	72.57% ***	78.05%
White	83.19%	85.31%	91.35% ***
Medicaid eligible			
<b>Cognitive Performance Scale</b>			
CPS Score mean (SD)	3.12 (1.75)	3.00 (1.87)	2.80 (1.88) ***
<b>ADLs</b>			
Morris ADL Score: mean (SD)	14.84 (8.95)	15.18 (9.19)	14.84 (9.06)
Phillips ADL Score: mean (SD)	13.81 (7.20)	14.02 (7.39)	13.77 (7.27)
<b>Disease Diagnoses</b>			
Diabetes mellitus	19.03%	19.61%	18.71%
Cardiac dysrhythmias	11.04%	11.46%	13.02%
Congestive heart failure	18.34%	16.31%	20.27%
Hypertension	44.22%	39.13%**	47.40%
Arthritis	24.96%	22.23%	26.49%
Hip fracture	8.06%	6.37%	6.88%
Dementia (Alzheimer's or other)	63.60%	55.34% ***	51.46% ***
Stroke (CVA, hemiplegia/paresis, etc.)	22.86%	23.92%	25.85%*
Parkinson's disease	6.79%	7.57%	6.80%
Anxiety disorder and depression	39.94%	40.00%	42.08%
Asthma or emphysema	14.89%	11.94%*	15.50%
Vision	25.36%	20.87%**	22.05%*
Active cancer	6.10%	7.77%	6.48%

**Note:** Each control group was compared to Evercare separately.

\* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$ .

Table 14 shows the utilization patterns for hospital services (including emergency rooms) both before and after the census. In addition to the regular hospital statistics, the specific coverage of nursing home care in lieu of hospitalization (ISD) is shown for the Evercare sample. The same patterns holds for both years. The Evercare sample experiences fewer hospital admissions and uses fewer hospital days. However, when the ISD admissions rate is included, the Evercare admission rate is virtually the same as the controls'; but the total days used by Evercare patients are still fewer. Evercare patients have shorter hospital lengths of stay and the ISD stays are shorter than those for a regular hospitalization. The emergency room (ER) use

parallels that for hospital admissions. The Evercare rate is about half that for the controls.

Although many ER visits were associated with admissions, the rate of ER visits was higher than the admission rate, suggesting that some patients were sent back to the nursing home after their ER visits in all groups. The ER plus ISD rates are still slightly lower than the controls.

**Table 14. Hospital Use: All Admissions**

Rate per Month	Evercare		Control-In		Control-Out	
	12 months before census	15 months after census	12 months before census	15 months after census	12 months before census	15 months after census
Avg. N patients	1,084	1,472	619	831	986	1,350
Avg. number of hospital admissions per 100 enrollees	1.49	2.43	3.41***	4.63***	2.82***	4.67***
Avg. number of ISD admissions per 100 enrollees	1.56	2.42				
Total of avg. number of hospital + ISD admissions per 100 enrollees	3.10	4.85	3.41	4.63	2.82	4.67
Avg. hospital days per 100 enrollees	7.94	13.50	19.20***	31.16***	16.67***	31.33***
Avg. ISD days per 100 enrollees	2.79	3.60				
Total of avg. hospital + ISD days per 100 enrollees	10.89	17.10	19.20***	31.16***	16.67***	31.33***
Avg. hospital LOS	5.33	5.51	5.68	6.71*	5.80**	6.72***
Avg. ISD LOS	1.80	1.49				
Avg. number of ER visits per 100 enrollees	2.58	3.25	5.60***	6.28***	5.08***	7.31***
Avg. number of persons with an ER visit per 100 enrollees	2.46	3.05	5.16***	5.72***	4.66***	6.56***

**Notes:** Each control group was compared to Evercare for the corresponding time interval.

\*= p<0.05, \*\* = p<0.01, \*\*\* = p<0.001.

Risk adjustment was performed for the following 16 variables: age, gender, race, Morris ADL score, diabetes mellitus, cardiac dysrhythmias, congestive heart failure, hypertension, arthritis, hip fracture, dementia (Alzheimer's or other), stroke (CVA, hemiplegia/paresis, TIA combined), Parkinson's disease, anxiety disorder and depression, asthma or emphysema, and active cancer

Table 15 examines the use of hospitals for so-called preventable and discretionary admissions. Because the number of these admissions is small, the data for the full period was pooled. The pattern for preventable admissions differs somewhat from that seen for all admissions. When hospital admission rates and ISD rates are combined, Evercare event rates are lower than those of controls. For the external control group this difference is significant. The

Evercare LOS is slightly less than that of the controls. The admission rate for discretionary surgery is low, but equal across the three groups. Since ISDs would not be used for this purpose, there are none. The LOS was longer for the Evercare sample, but the difference is not significant.

**Table 15. Preventable and Discretionary Hospital Admissions**

Rate per Month	Evercare	Control-In	Control-Out
Avg. N	1,310	744	1,197
<b>Preventable Hospitalizations</b>			
Avg. number of Hospital admissions per 100 enrollees	0.28	0.80***	0.86***
Avg. number of ISD admissions per 100 enrollees	0.42		
Total of avg. number of hospital + ISD admissions per 100 enrollees	0.70	0.80	0.86*
Avg. Hospital days per 100 enrollees	1.31	4.31***	4.85***
Avg. ISD days per 100 enrollees	0.68		
Total of avg. hospital + ISD days per 100 enrollees	1.99	4.31***	4.85***
Avg. Hospital LOS	4.55	5.40 **	5.59***
Avg. ISD LOS	1.68		
<b>Discretionary Surgery</b>			
Avg. number of Hospital admissions per 100 enrollees	0.03	0.03	0.03
Avg. Hospital days per 100 enrollees	0.17	0.16	0.18
Avg. Hospital LOS	6.78	5.83	4.70

**Notes:** Each control group was compared to Evercare.

\* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$

Risk adjustment was performed for the following 16 variables: age, gender, race, Morris ADL score, diabetes mellitus, cardiac dysrhythmias, congestive heart failure, hypertension, arthritis, hip fracture, dementia (Alzheimer's or other), stroke (CVA, hemiplegia/paresis, TIA combined), Parkinson's disease, anxiety disorder and depression, asthma or emphysema, and active cancer

Because the Evercare sample had more patients with dementia and dementia has been shown to be associated with lower hospital use (Kane & Atherly, 2000), hospitalizations were examined while controlling for dementia status. As shown in Table 16, the rate of hospital use among residents was lower with greater cognitive impairment in all three groups. The difference between Evercare and the controls persists within each stratum.

**Table 16. Hospital Use Controlled for Cognitive Status**

<b>Extent of Dementia (CPS-level)</b>		<b>Evercare</b>	<b>Control-In</b>	<b>Control-Out</b>
Intact (0-2)	Average of Hospital Admits/100 enrollees	2.36	5.04***	4.20***
	Average of Hospital Days/100 enrollees	12.91	31.53***	25.65***
	Average of Hospital LOS if admitted	5.41	6.30**	5.97***
Low-mod impairment (3-4)	Average of Hospital Admits/100 enrollees	2.01	3.78***	3.90***
	Average of Hospital Days/100 enrollees	10.09	25.16***	26.47***
	Average of Hospital LOS if admitted	4.97	6.51***	6.62***
Severe impairment (5-6)	Average of Hospital Admits/100 enrollees	1.48	3.18***	3.41***
	Average of Hospital Days/100 enrollees	8.93	20.15***	21.95***
	Average of Hospital LOS if admitted	6.37	6.15	6.18

**Notes:** Each control group was compared to Evercare.

\*= p<0.05, \*\*= p<0.01, \*\*\*= p<0.001.

Risk adjustment was performed for the following 16 variables: age, gender, race, Morris ADL score, diabetes mellitus, cardiac dysrhythmias, congestive heart failure, hypertension, arthritis, hip fracture, dementia (Alzheimer's or other), stroke (CVA, hemiplegia/paresis, TIA combined), Parkinson's disease, anxiety disorder and depression, asthma or emphysema, and active cancer

The use of professional services is shown in Table 17. The Evercare population was considerably more likely to be seen by a Nurse Practitioner or Physician's Assistant than either control group (160.47 visits per month per 100 enrollees compared to 5.05 and 2.67); but these visits did not appear to displace physician visits, which were also higher for Evercare. Evercare recipients were more likely than controls to see a podiatrist (p<0.001). The use of audiologists in Evercare was consistent with the Control-In group but slightly higher than the Control-Out population. Use of occupational, speech, or physical therapy services was significantly less in the Evercare population in terms of expenditures per person.

**Table 17. Professional Visits**

Per Month per 100 Enrollees		Evercare	Control-In	Control-Out
Physician	– Avg. Number of Persons Seen	77.59	56.49 ***	55.72 ***
	– Avg. Number of Visits	86.12	73.42 ***	69.98 ***
NP/PA	– Avg. Number of Persons Seen	83.94	3.45 ***	1.88***
	– Avg. Number of Visits	121.30	4.39 ***	2.54 ***
Podiatry	– Avg. Number of Persons Seen	23.80	18.70 ***	23.57 ***
	– Avg. Number of Visits	24.20	19.19 ***	24.79 ***
Audiology	– Avg. Number of Persons Seen	0.18	0.20	0.13
	– Avg. Number of Visits	0.18	0.20	0.13
PT/OT/Speech Therapy				
	– Avg. Number of Persons Seen	1.03	2.94 ***	2.42 ***
	– Avg. Expenditures in Month	541.76	3,232.83 ***	2,644.22 ***
	– Avg. Cost/Person w/Therapy	524.29	1,067.29 ***	1,090.04 ***

**Notes:** Each control group was compared to Evercare.

\*= p<0.05, \*\*= p<0.01, \*\*\*= p<0.001.

Risk adjustment was performed for the following 16 variables: age, gender, race, Morris ADL score, diabetes mellitus, cardiac dysrhythmias, congestive heart failure, hypertension, arthritis, hip fracture, dementia (Alzheimer's or other), stroke (CVA, hemiplegia/paresis, TIA combined), Parkinson's disease, anxiety disorder and depression, asthma or emphysema, and active cancer

The discrepancy in mental health care is examined in Table 18, which separates care for patients with dementia only from patients with dementia plus another mental health diagnosis and patients with other mental illnesses and no dementia. Because of the potentially confusing effect of NP visits, the table presents visit rates including and excluding them. Evercare patients with dementia and no other mental illness are more likely to be seen in visits with dementia as the primary diagnosis than are either control group, even when NP visits are removed from the numerator. Evercare dementia only patients are also more likely to receive multiple visits for dementia if a visit did occur. As expected, they are much more likely to be seen by a NP or PA than dementia only controls and also by a non-psychiatric MD. In general for each type of mental health problem, Evercare patients got as much or more attention as the controls, with the exception of visits by a non-physician mental health professional (i.e., a psychologist or social worker.)

**Table 18. Outpatient Evaluation/Management or Psychotherapy Visits For Mental Health Diagnoses in Persons with Evidence of Mental Health Disorders**

Average monthly mental health visit rate per 100 enrollees with history of treatment for the relevant diagnoses	Evercare	Control-In	Control-Out
<b>Dementia Only</b>			
Avg # of persons with dementia only in each month	95	77	114
# persons receiving a mental health visit	37.4	9.2***	7.1***
# persons receiving a mental health visit with a non-NP	13.7	8.8	7.0**
# mental health visits (total)	52.0	9.8***	7.9***
# Psychiatrist/Neurologist Visits	0.1	0.1	0.0
# Visits with Non-MD Mental Health professional	0	3.3***	0.9***
# Visits with NP/PA	38.1	0.4***	0.1***
# Visits with Non-Psych MD	13.8	5.9**	6.9**
<b>Dementia and Other Mental Illness</b>			
Avg # of persons with dementia + other mental dx in each month	876	405	626
# persons receiving a mental health visit	47.2	18.0***	16.6***
# persons receiving a mental health visit with a non-NP	22.2	17.5***	16.2***
# mental health visits (total)	71.4	22.3***	22.2***
# Psychiatrist/Neurologist Visits	3.1	0.8***	2.9
# Visits with Non-MD Mental Health professional	1.2	10.1***	8.6***
# Visits with NP/PA	46.9	1.0***	0.5***
# Visits with Non-Psych MD	20.2	10.4***	10.2***
<b>Other Mental Illness (no dementia)</b>			
Avg # of persons with other mental dx (no dementia) in each month	165	165	262
# persons receiving a mental health visit	32.3	15.7***	12.5***
# persons receiving a mental health visit with a non-NP	16.0	15.2	12.4
# mental health visits (total)	55.7	21.5***	18.1***
# Psychiatrist/Neurologist Visits	9.9	3.9*	4.7*
# Visits with Non-MD Mental Health professional	6.7	11.9	7.6
# Visits with NP/PA	29.7	0.7***	0.2***
# Visits with Non-Psych MD	9.6	4.9***	5.7*

**Notes:** Each control group was compared to Evercare.

\* = p<0.05, \*\* = p<0.01, \*\*\* = p<0.001

Risk adjustment was performed for the following 14 variables: age, gender, race, Morris ADL score, diabetes mellitus, cardiac dysrhythmias, congestive heart failure, hypertension, arthritis, hip fracture, stroke (CVA, hemiplegia/paresis, TIA combined), Parkinson's disease, asthma or emphysema, and active cancer

To get some insights into the effect of fewer and shorter hospital stays and the use of ISDs we examined the rate of hospital readmissions and the rate of hospital admissions after ISDs. Of the 940 ISD admissions in the Evercare sample, 38 (4.0%) were hospitalized within 1

to 7 days after ISD discharge and 44 (4.7%) within 1 to 14 days. Sixteen (1.7%) were hospitalized on the same day as they were discharged from ISD. This rate is lower than the rate of first 7-day readmissions to the hospital, which is 5.8% for Evercare, 5.9% for Control-In, and 4.9% for Control-Out. The 1 to 14-day readmission rate was 8.2%, 9.8%, and 9.5%, respectively.

## **Discussion**

The pattern of utilization suggests that Evercare has been successful in controlling hospital use, but the predominate method has been by responding to the needs for hospital care differently. They have substituted nursing home care for hospital care on both the front and back ends, using ISDs to induce nursing homes to treat some patients without a transfer and discharging others from hospitals back to the nursing homes earlier than controls. There is also some indication that Evercare was able to reduce the incidence of events that traditionally require hospitalization and that are associated with the use of primary care. The rate of patient attention represented by the sum of generalist physician and NP visits was over twice that received by controls. This difference in hospital use cannot be attributed to the preponderance of demented clients, because the pattern holds for all levels of cognitive impairment. The lower rate of ER use among Evercare enrollees can be interpreted as either a sign of fewer serious events or a tendency to manage some of those in the nursing home.

Recognizing the paucity of direct measures of quality, some inferences can be made. The hospitalization rate after an ISD was very similar to that for re-hospitalizations, suggesting that using ISDs was not associated with any greater risk of complications than admitting patients to the hospital. The ISDs seem to be used to manage appropriate problems. Pneumonia is highly represented in ISD use. Over one-third (34.2%) of the ISD admissions were for pneumonia, compared to 7.5% of Control-In hospitalizations, 11.7% of Control-Out hospitalizations and 6.5% of Evercare hospitalizations. No surgical cases were managed through ISDs. Presumably

those managed through ISDs were more stable. Although we cannot correct for case mix, we do know that the admission rate after an ISD was modest, suggesting few serious complications from using this approach to care.

Evercare also shows little evidence of limiting the use of other services or substituting less trained providers. The greater attention to dementia care reflects the patient composition, but for other mental health care Evercare patients also received more treatment from most mental health professionals, including specialists.

In one area, podiatry, Evercare patients got more attention than controls. This reversal was likely attributable to the heavy pressure placed by podiatry providers and perhaps by the intrinsic demand for this service by the patients.

It appears that the Evercare approach saves hospital costs. Because we are not privy to the actual financial operations of this program we can only speculate about the overall financial efficiency. Using the data for the post census period, if we assume that a hospital day costs about \$1000 and an ISD costs about \$425, then Evercare is saving about \$193,000 per 100 enrollees annually solely through reduced hospital costs. An NP, who costs about \$90,000 a year (with fringe benefits), can manage a caseload of about 85 patients. Thus, without considering the other administrative costs involved, the use of NPs accounts for a savings of about \$88,000 per NP.

Admittedly, this calculation, which does not reflect the total savings from Evercare's managed care approach, makes sense only in the context of a per diem hospital reimbursement approach, but that is the predominant pattern currently used by Evercare. In a DRG situation, the savings would accrue only from avoiding hospitalizations, which was also accomplished (about 2 fewer admissions per 100 enrollees per month). It appears that the strategy of using NPs to provide more intense primary care to nursing home residents allows a more efficient way to provide crisis care, but does not prevent the crisis itself.

Because this study relies on a quasi-experimental design, there is always a concern about selection bias. Residents and their families who enroll in Evercare may be seeking or willing to receive a different level of service. In general, they receive more service, both in terms of clinical attention (since the work of the NPs is additive to that of the PCPs) and personal attention (the NPs spend a substantial amount of time communicating with family members). It is not clear how well enrollees appreciate the goals of managed care in terms of restricting hospital care. In an earlier survey, there was no indication that Evercare families or residents believed they were being underserved; nor was there any difference in the rate of advance directives (Kane et al., 2002).

## **QUALITY**

The quality of nursing home care as well as specific patient outcomes may be affected by the Evercare presence in the nursing home. The Evercare NP has the potential to affect the patient outcome positively through at least two routes. First, the added Evercare NPs direct patient care and care coordination may be expected to result in better outcomes at the individual patient level. Secondly, the Evercare NP may also impact the facility's care delivery system by providing nursing home staff with formal or informal in-service training or the development of protocols that are then implemented for all residents in the facility.

To investigate these effects, we used four approaches. First, we examined mortality rates between the study groups. Second, we examined the rate of so-called 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) (Zimmerman et al., 1995).

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 from the same MDS data set to compare Evercare and control samples.

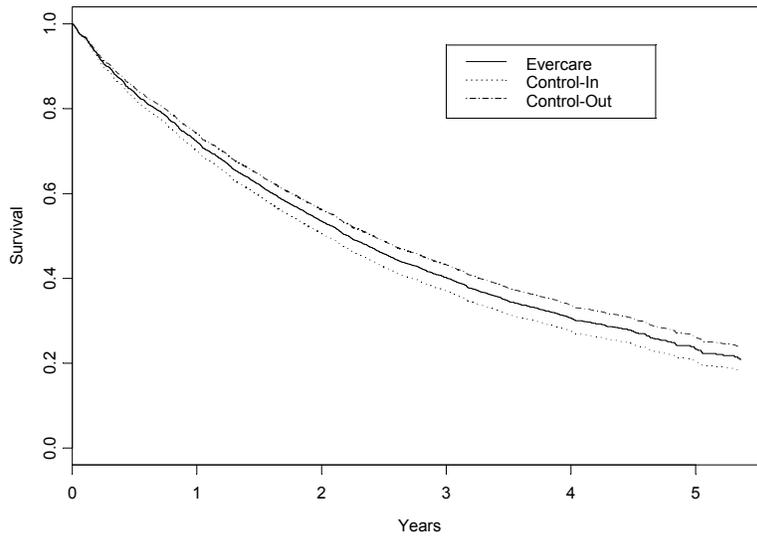
**Mortality**

We calculated the monthly mortality rates for Evercare and each control group from the time of the census. Table 19 shows that the mean mortality rates per quarter are quite comparable.

**Table 19. Monthly Mortality Rates After Census**

	Monthly Death Rates		
	Evercare	Control-In	Control-Out
<b>2nd Quarter 1999</b>	0.03	0.03	0.05
<b>3rd Quarter 1999</b>	0.07	0.08	0.08
<b>4th Quarter 1999</b>	0.18	0.19	0.17
<b>1st Quarter 2000</b>	0.27	0.28	0.28
<b>2nd Quarter 2000</b>	0.30	0.31	0.27
<b>3rd Quarter 2000</b>	0.37	0.38	0.38
<b>4th Quarter 2000</b>	0.62	0.54	0.60

Survival was calculated for the three samples from the date of census or the virtual Evercare enrollment date if that occurred after census. To compare survival of the three samples a Cox proportional hazards model was used. To handle left-truncation we used counting process style of Andersen and Gill (Andersen & Gill, 1982). We adjusted for risk factors: age, gender, education, and race. Figure 6 shows cumulative survival for the three groups.



**Figure 6: Cumulative Survival Curves**

Table 20 shows the adjusted model to estimate the risk of death. The Control-In sample has a hazard ratio (HR) of 1.09 compared to EverCare (higher mortality rate). Control-Out has an HR of .92, slightly smaller than EverCare. Neither of the differences was statistically significant.

**Table 20. Adjusted Mortality Model**

	<b>Hazard Ratio</b>	<b>p-value</b>	<b>Lower 95% CI</b>	<b>Upper 95% CI</b>
Control-In versus Evercare	1.09	0.12	0.98	1.21
Control-Out versus Evercare	0.92	0.1	0.83	1.02

Thus, the life expectancy of the nursing home populations, whether in an Evercare-contracting facility or control facilities, does not appear to be affected by either enrollment in Evercare or the presence of Evercare in the facility.

### **Preventable Hospitalizations**

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 each study year. In order to examine the effect of primary care in reducing hospitalizations, those hospitalizations and Intensive Service Days (ISDs) considered preventable, such as bacterial pneumonia, dehydration, hypertension, and UTIs were identified. Hospitalizations and ISDs were selected based on claims with the primary diagnosis among the ambulatory care sensitive conditions, as classified by Billings (Billings et al., 1996) and the corresponding ICD-9-CM codes. Admissions for discretionary surgical procedures were identified as those where the first or second ICD-9 procedure code on the claim was among the Institute of Medicine's list of referral-sensitive surgeries (Millman, 1993).

As seen in Table 21, when the hospital admission and ISD rates are combined the rates of preventable admissions for the Evercare sample is less than that for either control group. The difference between Evercare and the Control-In is not significant, but the difference with the Control-Out is significant. Thus it appears that the differences in care pattern do not result in Evercare residents suffering an equal or greater number of preventable hospitalizations.

**Table 21. Preventable Hospital Admissions**

<b>Rate per Month</b>	<b>Evercare</b>	<b>Control-In</b>	<b>Control-Out</b>
Avg. N	1310	744	1197
Avg. number of hospital admissions per 100 enrollees	0.28	0.80***	0.86***
Avg. number of ISD admissions per 100 enrollees	0.42		
Avg. number of events (hospital and ISD admissions) per 100 enrollees	0.70	0.80	0.86*

\* p<.05

\*\* p<.01

\*\*\* p<.001

### **Quality Indicators**

To create the MDS record set for analysis, for each person in the study we chose the non-readmission assessment that was closest to six, twelve, and eighteen 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, 1400 Control-Out, and 399 Evercare persons with six-month assessments; 918 Control-In, 1467 Control-Out, and 606 Evercare with twelve-month assessments; and 855 Control-In, 1490 Control-Out, and 664 Evercare with eighteen-month assessments. MDS records were available for the period between June 1998 and December 2000.

QI measures were calculated on the selected assessments based on the algorithms developed by Zimmerman. Although the Zimmerman approach allowed for only a few adjustments, we opted to test two approaches to case-mix adjustment. We created a comprehensive set of adjusters that included all 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. Table 22 lists the adjusters 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 avoid problems with endogeneity, we used lagged variables for ADLs in several instances. That is, we used the value of the ADL measures from a non-readmission 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 this same assessment. 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 a series of three separate cross-sectional studies. Once this database was prepared, a series of logistic regressions was performed. For each QI measure and each time period a separate logistic regression was carried out using the comprehensive list plus dummy variables identifying the Control-In and the Control-Out persons. The same process was repeated using the minimal adjustors plus the dummy variables defining study groups. 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.) Since the match sample was used for the analysis, length of nursing home stay was similar in the three groups.

The beta coefficients were allowed to change freely on each model. For each regression model betas were obtained for the adjustors and for the study group variables. For ease of interpretation the betas attached to the study group variables were transformed into odds ratios.

Odds greater than 1 indicated that one is more likely to see QI<sub>1</sub> in the control group than in Evercare and odds less than 1 indicate that one is less likely to see QI<sub>1</sub> in the control group. Since one does not wish to have a QI, numbers greater than 1 indicate that Evercare is superior in this instance and odds less than one indicate that the control group is performing better. Because multiple comparisons were performed, Bonferroni corrections were applied.

Table 23 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 between Evercare and controls chosen from the same nursing homes for the comprehensive adjustment model only four were significant (before the Bonferroni correction). Evercare enrollees had more QIs in regard to depression, multiple medications, and antipsychotic use, but had fewer QIs with regard to 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 11. Six favored the controls (i.e., depressive symptoms, use of antidepressants, prevalence of urinary tract infections, and antipsychotic use) and five favored Evercare (i.e., toileting plan, catheter, and weight loss). Again the patterns were generally comparable across adjustment strategies but some variations were noted.

**Table 22. Adjustors Used in the Comprehensive and Minimal Risk Adjustment Models**

QI Measure	Variables used in both models	Variables used only in comprehensive model
New fractures  (excludes people with prior diagnosis of fracture)	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Prior Walking: Walk In Room</li> <li>• Prior Walking: Walk in Corridor</li> <li>• Prior Walking: Locomotion on Unit</li> <li>• Prior Walking: Locomotion off Unit</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Hypotension</li> <li>• Hemiplegia/hemiparesis</li> <li>• Paraplegia</li> <li>• Seizure disorder</li> <li>• Cataracts</li> <li>• Glaucoma</li> <li>• Macular degeneration</li> <li>• Hip fracture</li> <li>• Osteoporosis</li> <li>• Pathological bone fracture</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Prior ADL Status: Bed Mobility</li> <li>• Prior ADL Status: Transfer</li> <li>• Prior ADL Status: Dressing</li> <li>• Prior ADL Status: Eating</li> <li>• Prior ADL Status: Toileting</li> <li>• Prior ADL Status: Hygiene</li> <li>• Prior ADL Status: Bathing</li> </ul>
Falls	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Prior ADL Status: Bed Mobility</li> <li>• Prior ADL Status: Transfer</li> <li>• Prior ADL Status: Dressing</li> <li>• Prior ADL Status: Eating</li> <li>• Prior ADL Status: Toileting</li> <li>• Prior ADL Status: Hygiene</li> <li>• Prior ADL Status: Bathing</li> <li>• Prior Walking: Walk In Room</li> <li>• Prior Walking: Walk in Corridor</li> <li>• Prior Walking: Locomotion on Unit</li> <li>• Prior Walking: Locomotion off Unit</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Hypotension</li> <li>• Hemiplegia/hemiparesis</li> <li>• Paraplegia</li> <li>• Seizure disorder</li> <li>• Cataracts</li> <li>• Glaucoma</li> <li>• Macular degeneration</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> </ul>
Behavioral symptoms affecting others	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Depression</li> <li>• Manic depressive (bipolar disease)</li> <li>• Alzheimer's disease</li> <li>• Dementia other than Alzheimer's</li> <li>• Ability to make Self Understood</li> <li>• Ability to Understand Others</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>
Symptoms of depression	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Alzheimer's disease</li> <li>• Dementia other than Alzheimer's</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> </ul>

		<ul style="list-style-type: none"> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>
Depression without antidepressant therapy	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Alzheimer's disease</li> <li>• Dementia other than Alzheimer's</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>
9 or more different medications	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Count of diagnoses</li> <li>• Count of infections</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> <li>• Race/Ethnicity</li> <li>• High school Education</li> </ul>
New diagnosis of cognitive impairment  (Excludes people with prior diagnosis of cognitive impairment)	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Dementia other than Alzheimer's</li> <li>• Parkinson's disease</li> <li>• Transient ischemic attack (TIA)</li> <li>• Anxiety disorder</li> <li>• Depression</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> </ul>
Bladder or bowel incontinence  (Excludes people with catheter, ostomy or who are comatose)	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current Walking: Locomotion on Unit</li> <li>• Cognitive Performance Score (CPS)</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> </ul>
>= Occasional Incontinence without a Toileting Plan		<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> </ul>
Indwelling catheters	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Paraplegia</li> <li>• Quadriplegia</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>
Fecal impaction	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Paraplegia</li> <li>• Quadriplegia</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Hygiene</li> </ul>

		<ul style="list-style-type: none"> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>
Urinary tract infections	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Current Walking: Locomotion on Unit</li> <li>• Cerebrovascular accident (stroke)</li> <li>• Paraplegia</li> <li>• Quadriplegia</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> </ul>
Weight loss	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Cancer</li> <li>• End-stage disease, &lt; 6 months to live</li> </ul>	<ul style="list-style-type: none"> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> <li>• On a planned weight change program</li> </ul>
Tube feeding	<ul style="list-style-type: none"> <li>• Comatose</li> <li>• Cerebral vascular Accident (stroke)</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>
Dehydration	<ul style="list-style-type: none"> <li>• Comatose</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Alzheimer's disease</li> <li>• Pneumonia</li> <li>• Respiratory infection</li> <li>• End-stage disease, &lt; 6 months to live</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>
Bedfast residents	<ul style="list-style-type: none"> <li>• Comatose</li> <li>• End-stage disease, &lt; 6 months to live</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Prior ADL Status: Bed Mobility</li> <li>• Prior ADL Status: Transfer</li> <li>• Prior ADL Status: Dressing</li> <li>• Prior ADL Status: Eating</li> <li>• Prior ADL Status: Toileting</li> <li>• Prior ADL Status: Hygiene</li> <li>• Prior ADL Status: Bathing</li> <li>• Prior Walking: Locomotion on Unit</li> <li>• Paraplegia</li> <li>• Quadriplegia</li> </ul>

Decline in late loss ADLs  (Excludes totally ADL dependent, comatose, and those without prior assessment with ADLs)	<ul style="list-style-type: none"> <li>• Cognitive Performance Score (CPS)</li> <li>• Alzheimer's disease</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> </ul>
Decline in ROM  (Exclude if maximum ROM loss on prior assessment)	<ul style="list-style-type: none"> <li>• Cerebrovascular accident (stroke)</li> <li>• Paraplegia</li> <li>• Quadriplegia</li> <li>• Parkinson's disease</li> <li>• Hemiplegia/hemiparesis</li> <li>• Arthritis</li> <li>• Multiple sclerosis</li> <li>• Cognitive Performance Score (CPS)</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Prior ADL Status: Bed Mobility</li> <li>• Prior ADL Status: Transfer</li> <li>• Prior ADL Status: Eating</li> <li>• Prior ADL Status: Dressing</li> <li>• Prior ADL Status: Toileting</li> <li>• Prior ADL Status: Hygiene</li> <li>• Prior ADL Status: Bathing</li> <li>• Prior Walking: Locomotion on Unit</li> </ul>
Antipsychotic use w/no psychotic/related conditions  (Exclude if psychotic or related condition)		<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Verbally Abusive</li> <li>• Physically Abusive</li> <li>• Socially inappropriate</li> </ul>
Antianxiety /hypnotic use w/no psychotic/related conditions  (Exclude if psychotic or related condition)	<ul style="list-style-type: none"> <li>• Cognitive Performance Score (CPS)</li> <li>• Depression</li> <li>• Anxiety</li> <li>• Manic Depression</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> </ul>
Hypnotic use more than two times in last week	<ul style="list-style-type: none"> <li>• Cognitive Performance Score (CPS)</li> <li>• Frequency of pain</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> </ul>
Daily physical restraints	<ul style="list-style-type: none"> <li>• Physically abusive</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Cognitive Performance Score (CPS)</li> <li>• Alzheimer's disease</li> </ul>
Little or no activity  (excludes comatose)		<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Quadriplegia</li> <li>• Bedfast all or most of the time</li> </ul>
Stage 1- 4 pressure ulcers	<ul style="list-style-type: none"> <li>• Comatose</li> <li>• Current ADL Status: Bed Mobility</li> <li>• Current ADL Status: Transfer</li> <li>• Other Dx: malnutrition</li> <li>• End-stage disease, &lt; 6 months to live</li> <li>• History of resolved ulcers</li> </ul>	<ul style="list-style-type: none"> <li>• Gender</li> <li>• Age</li> <li>• Nursing Home Length of Stay</li> <li>• Medicaid</li> <li>• Bedfast all or most of the time</li> <li>• Current ADL Status: Dressing</li> <li>• Current ADL Status: Eating</li> <li>• Current ADL Status: Toileting</li> <li>• Current ADL Status: Hygiene</li> <li>• Current ADL Status: Bathing</li> <li>• Current Walking: Locomotion on Unit</li> </ul>

**Table 23. Summary of Significant Odds Ratios for both Control Groups Compared to Evercare**

Quality Indicator	Comprehensive Risk Adjustment						Minimal Risk Adjustment						No Adjustment					
	6 months		12 months		18 months		6 months		12 months		18 months		6 months		12 months		18 months	
	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO
New fractures	0.20	0.66	2.04	1.31	4.29	2.91	0.53	0.51	1.55	1.24	2.70	2.39	0.54	0.69	0.97	0.97	0.97	1.70
Prevalence of falls	0.91	0.82	1.08	1.00	0.98	0.94	0.91	0.91	1.09	1.02	0.99	0.93	1.03	0.90	1.01	0.94	1.01	0.89
Behavioral symptoms affecting others	0.80	0.80	0.78	0.80	1.04	1.05	0.82	0.80	<b>0.75*</b>	0.82	1.08	1.07	0.83	<b>0.65**</b>	0.85	<b>0.74**</b>	0.85	0.93
Symptoms of depression	<b>0.66*</b>	<b>0.50**</b>	<b>0.69*</b>	<b>0.56**</b>	0.90	0.75	0.71	<b>0.55**</b>	<b>0.70*</b>	<b>0.56**</b>	0.88	0.78	0.80	<b>0.57</b>	0.75	<b>0.55***</b>	0.75	0.76
Depression without antidepressant therapy	0.67	<b>0.46**</b>	0.74	<b>0.60**</b>	0.81	0.76	0.67	<b>0.51*</b>	0.74	<b>0.59*</b>	0.77	0.85	0.76	<b>0.55*</b>	0.72	<b>0.58*</b>	0.72	0.90
Use of 9 or more different medications	0.78	0.84	<b>0.74*</b>	0.80	0.80	0.83	0.86	0.88	<b>0.79*</b>	<b>0.78*</b>	0.85	0.86	0.95	1.03	<b>0.79*</b>	0.86	<b>0.79*</b>	0.94
Incidence of new diagnosis of cognitive impairment	1.04	0.93	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	1.22	1.33	1.99
Prevalence of bladder or bowel incontinence	1.04	0.94	0.84	0.89	1.12	0.99	1.09	1.09	0.99	0.99	1.23	1.10	1.25	1.10	1.10	0.93	1.10	0.99
Occasional incontinence without a toileting plan	<b>1.40*</b>	<b>2.22***</b>	1.05	<b>1.52**</b>	0.81	<b>1.50**</b>	<b>1.48*</b>	<b>2.17**</b>	1.12	<b>1.53**</b>	0.85	<b>1.50**</b>	<b>1.48*</b>	<b>2.17***</b>	1.12	<b>1.53**</b>	1.12	<b>1.50**</b>
Prevalence of indwelling catheters	1.22	1.48	1.47	<b>1.69*</b>	1.08	1.32	1.58	<b>1.89*</b>	1.61	<b>1.72*</b>	1.06	1.25	1.65	<b>1.73*</b>	<b>1.73*</b>	<b>1.70*</b>	<b>1.73*</b>	1.32
Prevalence of fecal impaction	0.91	1.17	1.50	2.05	0.00	0.61	1.03	1.26	1.19	1.79	0.00	0.62	2.01	2.15	1.54	2.22	1.54	1.00
Prevalence of urinary tract infections	0.88	0.82	0.70	<b>0.71*</b>	0.77	1.30	0.93	0.93	0.73	<b>0.72*</b>	0.81	1.25	0.90	0.93	<b>0.71*</b>	<b>0.68*</b>	<b>0.71*</b>	1.20
Prevalence of weight loss	0.82	1.03	1.02	1.01	0.85	<b>1.49*</b>	1.08	1.16	1.08	0.98	0.84	1.34	1.17	1.17	1.06	0.95	1.06	1.28

Quality Indicator	Comprehensive Risk Adjustment						Minimal Risk Adjustment						No Adjustment					
	6 months		12 months		18 months		6 months		12 months		18 months		6 months		12 months		18 months	
	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO	CI	CO
Prevalence 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	1.45	1.33	1.39	1.37	1.27	1.37	1.31
Prevalence 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	1.66	1.10	1.66	0.44
Prevalence 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	1.20	1.25	1.20	0.99
Incidence 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	0.74	1.27	1.46	1.27	0.86
Antipsychotic use w/no psychotic related conditions	0.77	<b>0.67*</b>	0.96	0.85	0.92	<b>0.70*</b>	0.75	<b>0.61**</b>	0.91	0.76	0.92	<b>0.70*</b>	0.75	<b>0.61**</b>	0.91	0.76	0.91	<b>0.70*</b>
Prevalence of anti-anxiety/hypnotic use	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	0.92	1.26	0.92	1.20
Hypnotic use more than two times in the last 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	1.39	1.74	1.39	1.65
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	0.77	0.85	0.77	0.86
Prevalence 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	1.12	1.02	1.12	0.90
Prevalence of Stage 1-4 pressure ulcers	1.22	1.65	0.78	1.119	0.96	1.136	1.20	1.513	0.86	1.163	0.95	1.02	1.25	<b>1.49*</b>	1.01	1.324	1.01	1.09

Notes: CI = Control-In (residents from the same nursing homes as Evercare)

CO = Control-Out (residents from matched nursing homes)

Odds Ratios compare rate of QIs in Evercare to controls; OR < 1 favor controls; OR >1 favor Evercare

\* p<.05

\*\* p<.01

\*\*\* p<.001

### **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. All assessments other than discharge and readmission assessments were included in the analysis. Assessments were grouped into pairs. All assessments plus or minus 30 days from the target date were considered for pairing. If more than one assessment fell into this 60-day window, the assessment closest to the ideal timing was used. If two assessments were equally distant from the ideal timing, the assessment after the ideal date was used.

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 or 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 has an assessment at 1, 3, 6, 9, and 12 months, she would have three six-month pairs and one twelve-month pair. We used two ADL scoring approaches, both of which were developed for use with the MDS: Morris's ADL scale (Morris & Morris, 1997) and Phillips' ADL scale (Phillips et al., 1997). In both of these measures higher numbers indicate higher severity. Change scores were calculated by subtracting the prior measure from the later 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 Cognitive Performance Score (CPS) (Morris et al., 1994). These changes, too, are interpreted to mean that a higher number implies a poorer outcome.

The patterns of change over time in ADL and CPS scores are shown in Table 24. There were no differences between Evercare and either control group in any of the three time intervals for the CPS or the Morris ADL measure, but the Evercare residents did significantly worse than the Control-Out sample at both six and 12 months in terms of the Phillips ADL measure.

**Table 24. Change in ADL and CPS Scores Over Time**

	Evercare			Control-In			Sig Diff from EC	Control-Out			Sig Diff from EC
	N	Mean	SD	N	Mean	SD		N	Mean	SD	
<u>6 Months Apart</u>											
change in CPS score	11,152	0.15	0.73	7,635	0.15	0.75		11,022	0.16	0.79	
change in Phillips ADL score	11,162	0.79	2.80	7,645	0.71	2.97		11,038	0.70	3.09	p<.05
change in Morris ADL score	11,162	0.99	3.43	7,645	0.90	3.64		11,038	0.92	3.76	
<u>12 Months Apart</u>											
change in CPS score	8,297	0.29	0.90	5,524	0.28	0.92		8,244	0.28	0.97	
change in Phillips ADL score	8,304	1.50	3.62	5,531	1.43	3.84		8,254	1.38	3.82	p<.05
change in Morris ADL score	8,304	1.91	4.45	5,531	1.83	4.70		8,254	1.79	4.69	
<u>24 Months Apart</u>											
change in CPS score	3,194	0.51	1.12	2,130	0.50	1.12		3,236	0.52	1.22	
change in Phillips ADL score	3,194	2.76	4.48	2,135	2.52	4.78		3,238	2.66	4.86	
change in Morris ADL score	3,194	3.45	5.47	2,135	3.17	5.90		3,238	3.42	5.98	

## **CONCLUSION**

The differences in quality of care between Evercare and control residents are not dramatically different. It appears that Evercare's active use of nurse practitioners to provide more intensive primary care was associated with a modest reduction in adverse events that would ordinarily lead to hospitalization. The difference was significant in one of the two comparisons.

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 the Evercare effect may have diffused across the entire nursing home staff.

The pattern of change over time in ADLs showed no significant differences using the Morris scale and significant differences between Evercare and the external nursing home control for the Phillips ADL scale for the analyses at 6 and 12 months, but not at 24 months (when the effective sample was considerably smaller). In this case, Evercare residents fared less well than controls. 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.

Overall, the quality picture is mixed. Any suggestion of a positive effect from more intensive primary care is offset by adverse changes in overall functioning and a fairly even record with regard to the QIs.

## **ANALYSIS OF COST FOR MEDICARE-COVERED NURSING HOME CARE**

### **Estimating the Appropriateness of the AAPCC Approach as the Basis for Capitated**

#### **Payments Under Medicare for Nursing Home Residents**

One direct approach to examining how the current Medicare capitated cost compares with actual costs incurred uses the control cases. The Medicare costs of care for the control nursing home residents in our study who were not enrolled in HMOs were compared to the AAPCC for each of the resident's respective communities. We used two control groups: residents in the same nursing homes as Evercare and residents in matched nursing homes in the same geographic locations. For the purposes of this analysis we combined both groups of controls. With minimal exceptions the sample used in this analysis was the same matched sample that was used in the utilization analysis. First, months where the matched control person was less than 65 years were eliminated. Second, person months were examined based on calendar month not on a specified window around the date of census.

The actual costs for the control residents were compared to what would have been generated if they had been paid under the AAPCC adjusted cell rates for age, gender, Medicaid status, and institutionalism.

We examined the costs under two conditions: 1) including all costs for the time of admission and 2) examining only the costs incurred after the first 21 days of the nursing home stay. This was done for two reasons: 1) Medicare costs driven by SNF care which follows hospitalization are likely to vary the most immediately after nursing home admission, and 2) the Evercare program does not enroll persons until after they have been admitted to the nursing home and have been determined to be long-term residents. However, because only those months that

were after the date of virtual Evercare enrollment the portion of months that fall into this window are small.

As seen in Table 25, the average costs per person per month in the control population in each of the study years is considerably less than what would have been received had that individual been enrolled in a Medicare + Choice HMO such as Evercare. Numbers are shown for both with and without the utilization in the first 21 days of the nursing home stay. After rounding, the numbers for with and without in the first 21 days were identical. When the effects of the first 21 days of the nursing home experience are removed, a situation more comparable to that under Evercare, the ratios are virtually identical. The ratio of actual to capitated cost is around .51 in 1998 and the rises to .69 in 1999 and stays fairly constant after that point. On a month-to-month basis the ratios ranged from .41 to .62 in 1998 and between .57 and .81 in 1999 and 2000.

**Table 25. Comparison of Mean Actual Monthly Costs and Expected AAPCC Payments for Controls: Based on All Expenditures After NH Admission**

<b>Year</b>	<b>Mean \$PMPM &gt; NH admit</b>	<b>Mean \$PMPM &gt; 21 days after NH Admit</b>	<b>Mean AAPCC</b>	<b>Ratios</b>
1998	\$ 495	\$ 495	\$ 976	0.51
1999	\$ 678	\$ 678	\$ 981	0.69
2000	\$ 701	\$ 701	\$ 1,016	0.69

The date of census (ranging between March and August 1999 depending on the facility) impacts this analysis in that persons had to survive to be censuses and we are therefore eliminating the sickest persons in the months before the census. Likewise, in the months after census took place the population is aging in place with no relatively healthy newcomers being added. The increase in actual costs over time reflects the greater utilization after the census as

well inflation. In 2000 the mean amount spent per member per month on inpatient hospitalization was \$296 or 42% of all costs. In addition to short term hospitalizations, in 2000 22% of costs came from provider claims, 20% from SNF claims, and 8% for outpatient hospitalizations. The remaining balance of the costs went to durable medical equipment and long-stay hospitalizations.

### **Estimating Capitation Payments Based on the HCC Approach**

A second approach to examining Medicare costs used the HCC (Hierarchical Condition Category) model developed by Health Economics Research, Inc. under contract with CMS) approach as a method to calculate capitated payments. The HCC was developed for use with all Medicare beneficiaries, most of whom live in the community. Its applicability to nursing home residents has not been established. The relative risk of expenditures in the following year was calculated using HCC algorithms. The first step in this algorithm is gathering diagnoses. Information on diagnoses was collected from both CMS and Evercare claim files. Diagnoses were collected from inpatient hospital claims, outpatient hospital claims, physician claims (including radiology, anesthesiology, pathology), and clinically trained non-physician claims. Evercare diagnoses from intensive service claims were also included. Diagnoses were assigned to an HCC category.

Next, person-year tables were created for 1998, 1999, and 2000. Persons were identified on a census of residents in our study nursing homes that took place in 1999. Nursing home residents enrolled in managed care programs other than Evercare were eliminated from the analysis. Information used in the weighting scheme included gender, age, Medicaid status in a particular year, and whether an individual was initially enrolled in Medicare as a disabled person. After all HCC categories associated with a person within a given year were calculated, a hierarchical matrix was applied and CMS designated weights were assigned. This resulted in a

relative risk of expenditures for each person for each year. The predicted expenditures in the following year can be calculated by multiplying this number by the national average CMS expenditures in that year. For these analyses persons in the Evercare group were required to have diagnosis information available for all twelve months of the year. Because Evercare claims are for persons in the nursing home by definition, we felt that it was prudent to restrict the control groups to only those persons who were in the nursing home for all 12 months as well.

Costs in each year were calculated based by summing up the amount paid on claims from all sources that contributed diagnoses. Claims were included whether or not the diagnosis affected the HCC weighting. Among others, SNFs and DME costs were not included. Cost for the control groups came from CMS data, whereas costs for the EverCare population came from EverCare records. Evercare NP payments were undercounted due to their being on a salary. The placeholder that Evercare used for NP payments was included in the summing up of payments. Intensive Service Day claims in the EverCare database contributed costs.

Each relative risk score was multiplied by the estimated average yearly cost for part A and part B (see Table 26). This estimate is based on a combined aged and disabled population. It is not restricted to nursing home patients so it may underestimate the costs in this population. At the same time certain Part A and B claims were not included in the actual costs so the estimate would be too high. The average error rate between predicted and actual rates was compared for each group.

**Table 26. CMS Estimates of Estimated Part A and Part B Costs  
for Aged and Disabled Population**

	<b>Monthly</b>	<b>Yearly</b>
<b>1997</b>	\$436.70	\$5,240.40
<b>1998</b>	\$434.80	\$5,217.60
<b>1999</b>	\$437.04	\$5,244.48
<b>2000</b>	\$455.15	\$5,461.80

For each year the actual payments were predicted using a regression with the predicted relative risk and dummy variables indicating study group. Evercare was the omitted comparison group. In order to qualify for the analysis a person had to have 12 months of diagnosis information in the nursing home in the base year and 12 months of payment information in the predicted year. Control persons who enrolled in Evercare after the base year were eliminated for this analysis.

A separate analysis was performed using our matched sample. A control-in person and a control-out person were matched to an Evercare person based on date of admission to the nursing home. A virtual Evercare enrollment date was assigned to the matched controls. This matched sample was used to obtain the relative risk scores based on the year prior to virtual Evercare enrollment. We again required that a full twelve months of diagnosis information was available. In this case all diagnosis information comes from CMS sources. Independent sample t-tests and regression were used to test for statistical significance.

**Results**

Table 27 shows the relative risk score across the three study groups in the years 1998, 1999, and 2000. The persons in the table were required to have 12 months of nursing home based diagnoses. Evercare results are based on diagnoses on Evercare claims. Evercare shows a relative

risk significantly lower than the control-in population in 1999 (1.86 versus 2.01,  $p < .001$ ) and significantly lower than the control out population in 1998 and 1999 (1.77 versus 1.87,  $p < .05$  in 1998 and 1.86 versus 2.00,  $p < .001$  in 1999). This pattern shifts in 2000 and Evercare's score becomes significantly higher than the Control-Out score (2.31 versus 1.94,  $p < .001$ ) and significantly higher than the Control-In populations (2.31 versus 1.91,  $p < .001$ ).

Table 27 also shows an increase in relative risk scores from 1998 to 1999 and 2000 in all three groups. These results represent a sample that was collected in the first part of 1999 and followed forward and backwards from the census date. The 2000 data thus represents the population aging in place and requires that the population would have survived in the nursing homes from mid 1999 to December 2000. Each year has a population with more heavily weighted diagnoses.

**Table 27. Relative Risk of Expenditures Using Three Base Years**

Base Year	Evercare			Control-In				Control-Out			
	N	Mean	SD	N	Mean	SD	Sig from EC	N	Mean	SD	Sig from EC
1998	658	1.77	0.82	1,443	1.77	1.07		2,877	1.87	1.10	$p < .05$
1999	1,266	1.86	0.96	1,632	2.01	1.37	$p < .001$	3,577	2.00	1.29	$p < .001$
2000	1,345	2.31	1.19	1,354	1.91	1.38	$p < .001$	2,979	1.94	1.27	$p < .001$

We took the sample shown in Table 27 and further restricted it to those persons who survived and contributed claims for an additional 12 months. We then took the costs in the predicted year minus the relative risk multiplied by the average expenditures in base year. The results are shown in Table 28. Because of the sample chosen, end of life costs are not included in the analysis.

**Table 28. Actual Minus Predicted Annual Costs Using CMS Average Expenditures**

	1998 Predicting 1999					1999 Predicting 2000				
	N	Mean	SD	Median	From EC	N	Mean	SD	Median	From EC
Evercare	565	-3602.3	7459.0	-4312.6		893	-2806.8	9370.6	-3890.8	
Control-In	1191	-4595.1	8863.1	-5293.9	p<.05	1110	-4935.3	10169.6	-5655.7	p<.001
Control-Out	2360	-5829.0	8113.5	-6082.9	p<.001	2500	-5747.4	8056.9	-5843.3	p<.001

In all cases the average predicted annual cost is higher than the average observed costs. This can be due to a number of factors including the fact that the average rate is not designed for this type of nursing home population and that the actual costs did not include services such as DME, SNF, and lab work that did not contribute diagnoses to the HCCmodel. If Evercare was paid using this method for their expenditures in 1999 they would have less overpayment in the average enrollee than either control group (p<.05 versus control in and p<.001 versus control out.) The same pattern holds true when predicting costs in 2000. Because the cost data come from two different sources, the interpretation of the difference between the Evercare overpayment and that for the control groups is unclear.

The actual mean expenditures in 2000 for the population shown in Table 28 was \$4,773.52 with a median of \$1,769.09. Both controls are significantly different from Evercare at p<.001 (Evercare mean \$6,490.83, median \$3,597.59; Control-In mean \$4,904.29, median \$1,318.84; and Control-Out mean \$4,102.10, median \$1,121.30). For 1999 expenditures the Evercare mean was \$5,569.59, with a median of \$3,312.68; the Control-In mean was \$4,625.58 with median \$1,571.47, (significantly different from Evercare at p<.05) and the Control Out mean was \$3,684.06, with median \$959.03 (significantly different at p<.001)

Table 29 shows the results of two regressions: 1) predicting actual costs in 1999 using the relative risk prediction based on 1998 diagnoses and two dummy variables indicating if the

person was Control-In or Control-Out; and 2) the same analysis predicting 2000 expenditures based on 1999 diagnoses. The interpretation of this table is problematical due to different sources of information between the controls and Evercare. When 1999 expenditures are predicted the beta associated with being a Control Out person is significant and negative. Betas for both Control-Out and control-in were significant and negative when predicting 2000 expenditures. Evercare appears to have higher predicted expenditures

**Table 29. Predicting Actual Costs Based on Study Group and Relative Risk**

	1998 Predicting 1999			1999 Predicting 2000		
	Adjusted R Square	0.08			0.11	
F	110.4			183.2		
Sig.	P< 0.001			P<0.001		
	$\beta$	SD	Sig	$\beta$	SD	Sig
Constant	1830.0	388.4	0.000	2083.6	337.7	0.000
Relative Risk	2127.3	122.3	0.000	2485.9	111.9	0.000
Control-Out	-2024.6	360.2	0.000	-2649.9	319.1	0.000
Control-In	-1307.2	410.4	0.001	-2182.1	374.7	0.000

The next step involves looking at the year before Evercare enrollment in the matched sample. Table 30 shows the relative risk for persons with and without restrictions as to whether those twelve months had to be all in the nursing home. Diagnosis information was available from January 1, 1996, to December 31, 2000, indicating that virtual Evercare enrollment could occur at any point between January 1, 1997, and December 31, 2000. Twenty-one percent of virtual Evercare enrollment dates occurred in calendar year 1997, 37% enrolled in 1998, 36% enrolled in 1999, and 6% in 2000.

**Table 30. Relative Risk in Year Before Enrollment in Matched Sample**

	Evercare			Control-In				Control-Out			
	N	Mean	SD	N	Mean	SD	Sig from EC	N	Mean	SD	Sig from EC
No restrictions	1817	2.04	1.25	1152	2.18	1.39	P<.01	1727	2.08	1.28	ns
All 12 months in NH	1062	1.75	0.98	627	1.81	1.07	ns	1001	1.76	1.04	ns

The matched sample results show much smaller differences between Evercare and the controls than seen in Table 27. The differences with Control-Out are not significant for either approach and those with Control-In are significant for only the unrestricted analysis.

These analyses suggest that if the HCC approach were applied, it too would overpay the costs for nursing home residents. Whether Evercare residents have truly higher costs or whether the differences are attributed to the way their diagnoses are recorded, cannot be determined.

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## **Appendix 1**

### **Evercare Site Visits in 1998**

#### **Summary Tables**

**EVERCARE SITE VISIT COMPARISON - 1998**

	<u>Atlanta</u>	<u>Baltimore</u>	<u>Boston</u>	<u>Denver</u>	<u>Phoenix</u>	<u>Tampa</u>
<b>Nursing Homes</b>						
Number in Service Area	55	130	293	94	77(Phoenix	108
Number NF in Evercare (2/98)	34	36	50	15	35	44
Proportion Approached participating	68%	60%	50%	94%	60%	60%
<b>Physicians</b>						
Number participating (2/98)	38	85	73	44	30	51
Departure Rate	3%	6 left	3-4 left	2%	1%	1
Proportion of MD's approached who join	84%	75%	75%	98%	99%	75%
Proportion of patients in Evercare				11%	40-60%	40-60%
Proportion of MD's with own NP	27%	0	25 (34%)	45%	3%	9 (18%)
Proportion of MD's who are NF Med. Dir.	40%	30 med. dir. In EC NH	40%	66%	50%	50%
<b>Nurse Practitioners (2/98)</b>						
E.C. Nurse Practitioners	21	30	19	7	11.5	9
Contracted	2	0	24	8	1	9
Departure Rate: Employed	47% ( '97)	6 left	5 left in '97	1	13% (2)	3
Departure: Contracted		NA	1 left in '97	unknown		

**EVERCARE SITE DESCRIPTION**

	<b>ATLANTA</b>	<b>BALTIMORE</b>	<b>BOSTON</b>	<b>DENVER</b>	<b>PHOENIX*</b>	<b>TAMPA</b>
Counties Served	Fulton, Cobb, DeKalb; expanded to Clayton, Gwinett 1/98	Montgomery, Howard, Prince George, Carroll, Baltimore, Anne Arundel	Essex, Middlesex, Norfolk, Suffolk, Worcester	Adams, Arapaho, Denver, Douglas, El Paso, Jefferson	Maricopa; Start Pima 3/1/98	Hillsborough Pinellas
Date Started	7/1/95	12/1/95	11/1/95	9/1/98	1/1/95 (MMSP contract)	4/1/96
Enrollment (2/1/98)	1200	1902	1760	482 (6/1/98)	1136 (98-106 Demonstration)	862
Disenrollment Month	3.5% .7% Voluntary	4% .8% Voluntary	3.1% .8% Voluntary	2.5% .9% Voluntary	3.5% .5% Voluntary	3.7% 1.2% Voluntary
Contracted Nursing Homes	34	37	50	15	35	44
Contracted Physicians	38	85	73	44	30	51
Nurse Practitioners	21 Employed (19NP/2PA) 2 Contracted	30 Employed +3 clinical leaders 0 Contracted	19 Employed (18 NP/1PA) 24 Contracted (21NP/3PA)	7 Employed 8 Contracted	11.5 Employed 1 Contracted	9 Employed (8 NP/1LPN) 9 contracted
Nurse Practitioner Caseload	72 Employed	80-100 Employed	80-110 Employed	20 to 100 (varies)	97 Employed	66 Employed
Average Caseload		NA	120 Contracted	18 Contracted		120 Contracted

	<b>ATLANTA</b>	<b>BALTIMORE</b>	<b>BOSTON</b>	<b>DENVER</b>	<b>PHOENIX*</b>	<b>TAMPA</b>
Market Conditions	<p>Low penetration of managed care</p> <p>Limited expansion possibilities outside metro area</p> <p>Limited geriatric expertise</p> <p>Scarcity of NPs</p>	<p>Competition from Elder Health: Model is different use NP as gatekeeper, not collaborative model, marketing has slowed down</p> <p>State policy to reimburse for bed hold days (not full reimbursement)</p> <p>Maryland: waiver allows skilled care to be provided in non “skill” beds, allows for overall more Medicare skill days</p> <p>Maryland is a non DRG state</p> <p>Hospitals paid by daily charges: can save by shortening length of stay, at risk for those patient requiring longer stays; issue with ventilator patients—must go out of state</p> <p>1/3 of IVs put in by infusion companies; response time less than 4 hours</p>	<p>Competition form Urban Health &amp; Secure Horizon</p> <p>Further from Boston metro; fewer geriatricians, less HMO experience</p> <p>Overall, managed care environment</p> <p>HMOs focus on younger Medicare population</p> <p>Some Medicare risk HMOs have exclusion clauses where MDs/group can’t participate in Evercare</p>	<p>Heavy HMO penetrance</p> <p>Several large MD groups that specialize in NH care</p>	<p>90% of AZ. 65+ pop lives in Maricopa/Pima Co. AZ Medicaid under managed care since inception</p> <p>Vast majority of members from contract with MMSP</p> <p>Evercare sub capitated to MMSP</p>	<p>Competition with IHS &amp; Humana</p> <p>Assisted Living market larger than NF market</p> <p>Elder Health/IHS has subcapitations w/Humana</p> <p>Evercare not in any IHS NF</p> <p>Overall little market experience with managed care</p> <p>Inefficient market: many physicians in each NF with few patients</p> <p>Majority of Evercare NF’s for-profit; as are majority of NF’s in service area</p> <p>5 Evercare contracted NF have been purchased by VinCorp which is developing its own program</p>

\*The Phoenix site was dropped from the evaluation because it operated through a subcontract of a larger HMO

**EVERCARE SITE ISSUES/VARIATIONS**

	<b>ATLANTA</b>	<b>BALTIMORE</b>	<b>BOSTON</b>	<b>DENVER</b>	<b>PHOENIX*</b>	<b>TAMPA</b>
Sales Enrollment	98% of patient have responsible party Less than 2% non-contracted MD patients in NF enroll and change to EC MD 50% of contracted MD patients enroll; new admissions enroll higher	50% of contracted MD patients enroll; 70% of new admissions enroll 25% of non-contracted MD patients in NF enroll and change to EC MD High number of people with guardianships through guardian program NF very actively involved in enrollment	Few conversions from patients of non-contracted MDs Few residents own responsible party 60-70% agree to participate on first recruitment	Work with large MD groups. About 50% of NH patients approached join	40-50% of patients approached join	Many out of state responsible parties High % of member have responsible party
Nursing Homes	Approx. 10% of NF not eligible	Master contracts with large chains Some participating NF cannot deliver all necessary services	10% NF not eligible due to quality of care 10 day bed hold policy	Controlled rate of enrollment; have had few refusals from carefully targeted NHs; began in Colorado Springs Work with several large chains (Lifecare, Living Centers, IHS), but not all members enroll, at least up to now	60% approached participating All but 1 NF have contracts with MMSP Private NF resistive to managed care Bed Hold policy: partial compensation	Only contracted chains: New England Mariner & Arbors 3 NF with both Evercare & Elder Health patients Have started at NF with only 14 patients Majority of Evercare NF are for-profit Bed hold policy

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Physicians	Limited geriatric expertise Dubious of managed care 60% MDs follow patient into hospital	<u>Most</u> contracted physicians do not have hospital privileges Low NF penetration by individual MDs Goal to round MDs with NPs every 2 months Hebrew Home has 3 on-site MDs for 270 patients	Geriatrician supply ample in urban area 90% of MDs follow patient into hospital Most MDs in group practice Urban Med. Group at risk, other MDs FFS	Three large MD groups in Denver: • Rocky Mountain Geriatrics (Geri-Med) • Community Geriatrics • Geriatrics Medical Associates 2 independents (Fishman & Geller) In Colorado Springs 7 MDs in 6 NHs; 3 have most of the patients	99% of MDs approached are participating 50% of contracted MDs are NF medical directors Most MDs belong to Med Pro; Med Pro MDs are mostly geriatric trained Evercare pays FFS to Med Pro	High physician/patient in each NF: inefficient market Small number of MDs with geriatric specialty Some MDs resistive to managed Care
Nurse Practitioners	Scarcity of NPs; most recent recruits from out of state High NP turnover (46%) No prescription authority; can order meds/tests	No contracted NPs 8 GNPs; most ANP Take call on facility specific basis	Good market for NPs NPs take weekend call Contracted NPs are paid either capitated rate or hourly rate Can write prescriptions 4 of 19 NPs are clinical leaders Contracted NPs have higher caseload	MD groups have their own GNPs; 25% of enrollees use contract NP; may lower overall effectiveness; some evidence that hospitalization rates higher with contracted GNPs GNP market not great but so far have been able to recruit well; small numbers NPs teamed in NHs	NP market strong Most NPs have strong geriatric background NPs can prescribe	Good GNP market Cannot write prescriptions Contract NPs take night call Vast majority of NPs GNPs 50% NPs contracted Tend to work with several MDs
Hospital Payment	No shared risk agreements; pay DRGs to hospitals	Paid by daily charges (at risk) MSCRC rates	Urban Medical per diem contract; other hospitals DRG	Use United per diem rates		Pay contracted rates (per diem) to most hospitals; pay DRG to a few (i.e., Tampa General)

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Evercare Medical Director	Medical director (50%) Very involved in Evercare	1 Medical director & 3 associate medical directors	Medical director (25-30% effort) & 1 assistant medical director	2 Medical directors: 1 for Denver (also works for Geri- Med); works for EC 3-4 hrs/wk; 1 in CS	Medical director (25-30%) Also head of geriatric div. at Med Pro	