A Comparative Effectiveness Trial Between a Post-Acute Care Hospitalist Model and a Community-Based Physician Model of Nursing Home Care

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Introduction: To evaluate whether a designated Post-Acute Care Hospitalist (PACH) (an individual physician charged with care of most residents in the nursing home and with set hours to be in the facility each week) could improve some measureable outcomes in the long-term care setting compared with a traditional cadre of community physicians, a comparative trial was designed to measure multiple cost and care variables.

Methods: Data were collected in a historical prospective study design for 6 months before the institution of a PACH model in a nursing home in the Baltimore area. Similar data were collected in a similar setting in the same region during the same time frame. During the same 6 months in the following year (ending June 30, 2008) after initiating the PACH program, the same outcome measures, which included demographic information, admissions per census, number of medications per resident, laboratory services and fees per resident day, fallers and falls per resident day, unplanned discharges per resident day, and average pharmacy costs per patient, were collected.

Results: Demographic information was similar in all groups. PACH and non-PACH models per resident day were significantly different for laboratory tests (intrafacility pre-PACH $1.93, post-PACH $2.97; $P < .005$ and interfacility post-PACH $2.97, non-PACH $0.97), fallers (intrafacility pre-PACH 0.006, post-PACH 0.008; $P = .01$ and interfacility post-PACH 0.008, non-PACH 0.006; $P < .005$), and falls (intrafacility pre-PACH 0.007, post-PACH 0.01; $P < .05$ and interfacility post-PACH 0.01, non-PACH 0.008; $P < .05$). Medication errors after PACH was instituted were 1/6 of pre-PACH rate and 1/60 of the non-PACH facility. Post-PACH pharmacy costs were also better than the non-PACH facility pharmacy costs per resident day by $7.74, but differences for medication errors and pharmacy costs were not statistically significant.

Conclusion: Institution of a PACH in a nursing home was associated with a significant increase in laboratory costs and no improvement in fall rates. There was a nonsignificant reduction in medication errors and pharmacy costs. These data support the hypothesis that a PACH model may lead to greater clinician involvement, which may be associated with an increase in clinical testing and a decrease in pharmacy costs and medication errors. If true, the latter would likely far offset any costs associated with additional laboratory testing. These findings warrant further investigation of larger magnitude. **(J Am Med Dir Assoc 2010; ■: ■–■)**

Many nursing homes currently rely on a community base of physicians to provide care to their residents.[1–3] An alternative model is to identify a single physician to follow most of the residents in a facility. The theory behind such a practice is that having a very small number of physicians allows for a greater physician presence in the nursing home and hence greater access to such medical oversight. Additionally, one could argue that long-term care education to clinicians is easier when fewer individuals are involved. Hence, formulary additions/deletions, policy changes, guideline instruction, and so forth are communicated more easily when there are fewer individuals involved.

No prospective comparative trials looking at the benefit of one model over another in the nursing home setting have been published. An argument can be made that having a single physician provide most of the care in a nursing home and having a presence in the facility by that same physician scheduled 3 to 4 times per week would reduce unplanned discharges, hospital readmissions, pharmacy costs, medication errors, and other parameters that might reflect the quality of care. With this hypothesis in mind, a study was designed

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to compare multiple outcome measures between 2 nursing home models. Outcome measures were determined through discussion with clinical and administrative management based on variables that would be most influential from the perspective of cost-effectiveness and quality in motivating a change in paradigm throughout a national chain.

METHODS

A research study was designed to compare various outcome measures between 2 nursing home models. Model 1 was a nursing home with a dedicated post-acute care hospitalist (PACH), a geriatrician in this study who provided attending physician duties for at least 70% of the nursing home residents and was present in the facility at least 3 times each week.

Model 2 was a traditional model with a cadre of community physicians who provided care for the residents in the nursing facility. There was no minimum for the number of times per week that such physicians were required to be in the facility, although visits were required within a 30- to 60-day period depending on the documented status of the resident in the nursing home.

Setting

Two nursing homes were selected with similar geography and demographics in the Baltimore area. Both were in a suburban setting and of similar distances from the Baltimore Beltway, the major highway thoroughfare around Baltimore City. Both facilities were part of the same long-term care corporate nursing home chain. Both facilities had a nurse practitioner hired to oversee all residents as needed for the first 6 months of the evaluation, before instituting the PACH model. Only the PACH facility retained a nurse practitioner for the second phase of evaluation. The nurse practitioner did not have attending responsibilities and was not specifically assigned to any individual resident.

Physician Attending Staff

The PACH nursing home had a single physician hired independently to provide the bulk of care for the residents in the facility. This PACH physician was a fellowship-trained physician who was felt by nursing staff to be the best physician credentialed to see residents in that facility. The PACH physician came to the facility at least 3 days per week and attended on at least 70% of the residents in that nursing home throughout the study period.

The non-PACH nursing home had multiple physicians from the community who attended on residents based on facility assignment or admission of residents who had been followed previously by nursing home attending physicians outside of the facility. Two non-PACH facility physicians credentialed to see residents were fellowship-trained in geriatrics. The remainder of physicians, who served as the primary care providers, had been trained in internal medicine or family medicine. Two of the community physician practices employed a facility-based nurse practitioner independent of the facility.

Study Design

Figure 1 illustrates the study design. Data were collected in a historical prospective fashion for 6 months before the institution of a PACH model (pre-PACH) in a nursing home (bed capacity 110) in the Baltimore area. Similar data were collected in a similar nursing home (bed capacity 179) in the same region during the same time frame (non-PACH). Short-stay patients (skilled and rehabilitation patients) in each facility were excluded from the study. Both facilities were owned by a single company and had similar policies and procedures, similar staffing ratios, and similar quality assurance programs.

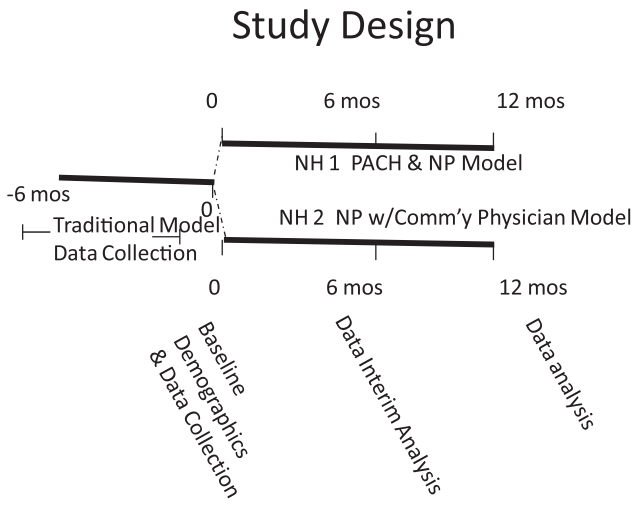

Fig. 1. *Combined historical prospective and prospective study design with interfacility and intrafacility comparisons.*

During the same 6 months in the following year (ending June 30, 2008), after initiating the PACH program, the same outcome measures (see later in this article) were collected in both the non-PACH nursing home and the PACH nursing home. Primary outcome measures included percent occupancy, census (average, admissions/census, admissions/capacity, #dual eligible per census), unplanned discharges, fallers (# per resident day [prd]), falls (# prd), lab tests (cost prd), pharmacy cost (cost prd), and medication errors (# prd).

Data Analyses

Student *t* test for comparison of means with normal distribution was used. Two-tailed equal or unequal variance techniques were used depending on outcome measures. Sample size estimates were based on an alpha error of 5% and a beta error of 80%.

RESULTS

Baseline demographics and measured variables were similar between both settings. The PACH model was composed of 390 chronic care residents and the non-PACH model was composed of 364 residents. The mean age was 75 (± 13 SD) years in the PACH facility and 78 (±13 SD) years in the non-PACH facility. In the both PACH and non-PACH buildings the number of females was similar (68% and 69% respectively). Cognitive status and change in status also were similar between the 2 groups. The race distribution showed a greater number of residents classified as "White" in the non-PACH facility (57%) compared with the PACH facility (33%). In the non-PACH nursing home, 22% of residents were classified as "Black" as compared with 54% of residents in the PACH nursing home. Although not a primary outcome measure, it was noted incidentally that a measured

Table 1. *Results of Selected Intrafacility and Interfacility Average Differences among Models*

Outcome Measure	Pre-PACH	Post-PACH	Non-PACH	*P* (*t* test)*	
				A	B
Fallers (# prd)	0.006	0.008	0.006	.01	<.005
Falls (# prd)	0.007	0.01	0.008	<.05	<.05
Lab tests (cost prd)	$1.93	$2.97	$0.97	<.005	<.001
Pharm cost (cost prd)	$36.64	$34.83	$42.64	.55	.27
Med errors (# prd)	0.006	0.001	0.06	.33	.16

Lab, laboratory; Med, medication; PACH, post-acute care hospitalist; Pharm, pharmacy; prd, per resident day.
* A = pre-PACH versus post-PACH; B = post-PACH versus non-PACH (over same post-PACH 6-month period).

baseline characteristic, activities of daily living, declined more in the non-PACH control facility (42%) as compared with the PACH facility (21%).

Primary outcome measures are depicted in Table 1. There were significant differences between PACH and non-PACH facilities in number of fallers and number of falls, wherein the number of fallers increased in post-PACH intervention going up to 8 per 1000 resident days compared with 6 fallers per 1000 resident days at baseline as well as after 6 months in the control facility ($P = .01$ and $< .005$ respectively). The number of falls reflected similar increases in the post-PACH setting ($P < .05$ in both comparisons).

Laboratory costs also increased in the post-PACH intervention nursing home increasing by more than $1 prd. This was again significant in both comparisons ($P < .005$ and <.001 respectively) as well. Pharmacy cost and number of medication errors declined in the post-PACH environment, but these were not significant changes.

An increase in census was seen, as well as the proportion of residents who were dually eligible (Medicare/Medicaid) in the post-PACH setting. Unplanned discharge rates did not improve with the PACH model. Interestingly, a significant reduction in unplanned discharges with return beyond 24 hours (mostly hospital admissions) occurred during the trial in the control group ($P = .05$) over time. This was not significantly different from the non-PACH model, however. The number of unplanned discharges with return to the facility in less than 24 hours (without admission to the hospital), was not significantly different regardless of model.

DISCUSSION

Institution of a PACH in a nursing home was associated with a significant increase in laboratory costs and offered no reduction in falls. The reduction in medication errors and pharmacy costs was not significant, but of interest nonetheless. Larger standard deviations than anticipated support the contention that a larger sample size may be needed to demonstrate significant differences for these outcome measures. Taking that into account, these data support the concept that a PACH model may lead to greater clinician involvement, which may be associated with an increase in clinical testing and a decrease in pharmacy costs and medication errors. If true, the latter would likely far offset any costs associated with additional laboratory testing.

Whether the use of a PACH model improves care cannot be resolved with a single study. However, it is clear from this study that the PACH model may not always be superior to the model of multiple community-based physicians serving as attending physicians in a nursing home population.

This study design was limited in multiple areas. First, only 2 nursing facilities were evaluated. It is possible that a trial of a large number of facilities might provide a more representative sample of nursing homes in other settings nationwide. Nonetheless, it is worth noting that a larger sample size provides the additional challenge of controlling for additional geographic and demographic differences among facilities.

Second, the cadre of community physicians was atypical of nursing home physicians nationwide. In addition to having practices in a metropolis with some of the best medical schools in the country, a third of the community physicians serving as attending physicians in the control facility had fellowship training in geriatrics.

Third, only one geriatrician represented the PACH model. This geriatrician was considered to be the best physician in the nursing facility for the trial (per staff, director of nursing, and the medical director) and consistently received accolades from colleagues, as well as from patients, families, and staff. Regardless, a larger sample size would provide a variety of PACH physicians to contribute to the analyses.

The study did provide the advantage of both real time and historical comparators, ie, to a similar control facility as well as to the same facility 1 year later, respectively. Such a design helps to minimize secular and temporal confounders.

In conclusion, the results of this study challenge conventional wisdom that a PACH model provides better care. More studies are warranted in this area before implementing large-scale efforts to modify the physician model of care in the long-term care setting.

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