The Relationship Between Physical Restraint Removal and Falls and Injuries Among Nursing Home Residents

Elizabeth Capezuti,† Neville E. Strumpf,† Lois K. Evans,† Jeane Ann Grisso,‡ and Greg Maislin‡

†School of Nursing, University of Pennsylvania.
‡School of Medicine, University of Pennsylvania.

Background. A major reason cited for continued restraint use in American nursing homes is the widely held belief that restraint reduction will lead to fall-related incidents and injuries.

Methods. This study represents an analysis of data collected in a clinical trial of interventions aimed at reducing the use of restraints in nursing homes. Two different designs were employed to test the relationship between restraint reduction and falls/injuries. First, multiple logistic regression was used to compare fall/injury rates in subjects who had restraints removed (n = 38) to those who continued to be restrained (n = 88); second, survival analysis was employed to test the relationship between physical restraint removal and falls/injuries at the institutional level by comparing fall/injury rates among three nursing homes (n = 633) with varying rates of restraint reduction.

Results. Based on the multiple logistic regression analysis, there was no indication of increased risk of falls or injuries with restraint removal. Moreover, restraint removal significantly decreased the chance of minor injuries due to falls (adjusted odds ratio: 0.3, 95% CI: 0.1, 0.9; p < .05). The survival analysis demonstrated that the nursing home that had the least restraint reduction (11%) had a 50% higher rate of falls (p < .01) and more than twice the rate of fall-related minor injuries (p < .001) when compared to the homes with 23% and 56% restraint reduction, respectively.

Conclusions. Physical restraint removal does not lead to increases in falls or subsequent fall-related injury in older nursing home residents.

A MAJOR reason cited for continued restraint use in American nursing homes is the widely held belief that restraint reduction will lead to fall-related incidents and injuries (1,2). Belief in effectiveness is reinforced by the perception that failure to restrain puts health care providers and facilities at risk for legal liability (2–5). In cases of fall risk, physical restraint has been used for decades on the assumption that it protected patients (6).

Recently, two studies have provided evidence for the ineffectiveness of restraints in preventing falls. Tinetti et al. (7) prospectively observed fall-related incidents and injuries following initiation of physical restraints among previously unrestrained ambulatory nursing home residents. Using multivariable analysis and adjusting for factors that confound the relationship between restraint use and injury, they found that application of physical restraint was associated with continued falls, and, more importantly, fall-related serious injury (7). Consistent with these findings, another study examined restraint use in confused ambulatory nursing home residents and found an increased likelihood of falling among those restrained when compared to the unrestrained (8).

Evidence that restraint removal does not significantly increase falls and injuries is crucial if beliefs and practice with regard to restraint use are to be changed. Unfortunately, the only restraint reduction programs with documented outcomes, including falls and fall-related injury rates, are limited to descriptive studies. The findings from these programs have been inconsistent, variously reporting an increase in fall rates after restraint reduction without any change in the number of injurious falls (9–11), a decrease in fall rates (12,13), a decrease in both falls and fall-related injuries (14,15), or no change in the number of falls (16,17) or injuries (18). Conclusions and generalizability are limited because the studies did not include preintervention comparison data, did not employ comparison groups or matched cases, failed to control for confounding risk factors for falls and fall-related injuries, and/or reported only pre- and postintervention group means instead of following individuals over time.

Using data from a longitudinal, prospective clinical trial (19), this secondary analysis is, to our knowledge, the first study to follow a cohort of subjects over time to test the effect of restraint removal on fall and injury rates while controlling for fall risk factors. We used two statistical designs to analyze data from the original trial. First, we examined the relationship between physical restraint removal and falls and fall-related injuries among a sample of individual nursing home residents. A second important question is whether restraint reduction results in an overall impact on fall and injury rates in a nursing home and whether the magnitude of the effect is associated with the level of reduction of restraint use. We tested the relationship between physical restraint removal and falls and fall-related injuries at the institutional level by comparing fall/injury rates among three nursing homes with varying rates of restraint reduction.
METHODS

Subjects. — In the original trial, data were collected to test the effects of two interventions to reduce physical restraint use in nursing homes: restraint education (RE) and restraint education with consultation (REC). Because within-home randomization was not feasible, the clinical trial employed a quasi-experimental design to compare the nursing homes randomly assigned to either of the two interventions or to Control. Intervention I, Restraint Education, consisted of 10 classes implemented over a 6-month period designed to educate the nursing home staff regarding intervention techniques for understanding and responding to specific resident behaviors that often result in physical restraint application. Intervention II, Restraint Education with Consultation, consisted of the same 6-month Restraint Education program, supplemented by 12 h per week of direct resident-centered consultation to staff. The same masters’ prepared gerontologic clinical nurse specialist (GNS) was responsible for Interventions I and II. The aim of consultation by the GNS was to assist staff in direct application of content from the classes. Consultation included assistance with resident assessment, evaluation of behaviors, and individualized care planning. The interventions, methodology, and results of the original trial are described elsewhere (19).

The first secondary analysis included data from four data collection points: immediate preintervention (baseline) and three postintervention (6, 9, and 12 months after baseline). A total population of 463 residents survived the 1-year data collection period. To test the effect of removing restraints in individuals, regardless of nursing home site, we identified all residents (n = 126) who fulfilled the following criteria: (a) restrained at preintervention but not restrained at any of the three postintervention data collection points (n = 38), or (b) restrained at preintervention and continued to be restrained at all three data collection points following the intervention period (comparison group, n = 88). Those that were never restrained prior to the intervention (n = 302) and those whose restraint status varied (n = 35) were excluded from this analysis.

To answer the research question at the institutional level, fall and injury rates were compared across the three sites, each representing a different prevalence of physical restraint use. All subjects, regardless of restraint status, who were present in the three nursing homes following the intervention, were included in the analysis (n = 633).

Instruments. — Restraint status was the chief independent variable in the study. Physical restraints included vest, wrist/ankle, belt, pelvic and geriatric/recliner chairs, or wheelchairs with fixed tray tables. Bilateral siderail use was excluded. At each time point, restraint status of each resident was determined by two concurrent nurse-interviewers during observations made twice per shift over a consecutive 72-h period (18 total observations). Subjects were classified as restrained if observed to be restrained at least once during the 18 observations in the 72-h period.

Falls, fall-related minor injury, and fall-related serious injury were the outcome variables for this study. Fall data was ascertained from a review of nursing home incident reports during the 6-month postintervention period. Fall outcomes were classified according to following: presence or absence of any fall, any fall with minor injury, or any fall with serious injury. Subjects were categorized by their most severe outcome, regardless of number of falls. Fall-related serious injury was defined as “all fractures and other injuries resulting in medical attention and bed rest for at least 2 days” (7, p. 370). Minor injuries were those injuries that did not meet the criteria for “serious” injury, e.g., bruises, abrasions, certain sprains, and other soft tissue injuries (20).

Although various physical, cognitive, and environmental factors can affect fall and fall-related injury rates among nursing home residents, three significant covariates have been identified from prior studies due to their high correlation with both restraint use and falls: impaired cognition, ambulatory status, and use of psychoactive/antidepressant drugs (7,8,18).

Thus, these potentially confounding factors were included in this study. Cognitive status was measured with the Folstein Mini-Mental State Exam (MMSE; ref. 21). Subjects were asked to respond to the MMSE by a nurse-interviewer. Severe cognitive impairment was defined as a score of 17 or less on the MMSE. Mobility status was determined by a single item on the Psychogeriatric Dependency Rating Scale (PGDRS; ref. 22) that was completed by nursing home staff; subjects were dichotomized as ambulatory versus nonambulatory. Behavioral symptoms were measured by the behavior subscale of the PGDRS. Psychotropic drug use was determined by examination of medication records for a 90-day period and included any use of antipsychotics, antianxiety agents, hypnotics, and sedatives. Antidepressant drug use was calculated separately. Drug use was dichotomized by use: none versus any, including the extreme bimodality in which almost all patients had either none or 90 days of use.

Statistical analysis. — This study employed two different statistical methods to test the relationship between restraint removal and falls/injuries. For analysis of the effect of restraint removal on individuals, multiple logistic regression was used to compare a subsample of subjects who had restraints removed (n = 38) to those who continued to be restrained (n = 88), while adjusting for covariates (mental status, mobility, and psychoactive drug use).

To examine the effect of restraint reduction at the institutional level, survival analysis was employed to assess the effect of several independent variables on fall/injury rates in subjects (n = 633) of each of the three nursing homes. The nursing home was the main independent variable in this analysis, each representing a different rate of reduction in restraint use. Crude incidence density ratios were calculated using the Control home as the reference. Adjusted incidence density ratios were estimated from multivariable proportional hazards models that controlled for mental status, mobility, psychoactive and antidepressant drug use. Statistical significance was defined as p ≤ .05.

RESULTS

Table 1 presents the demographic and clinical characteristics of the sample used for the institutional analysis (n =
633) and the two subsample groups (n = 38 and 88). The typical residents were widowed, white women who relied on Medicaid as their primary source of nursing home pay-
ment and displayed high levels of mental and functional impairment. Mean scores for cognitive function of residents who had restraints removed (M = 15.7, SD = 10.6) were significantly higher than those who did not have restraints removed (M = 3.7, SD = 6.4) (t = -6.79, df = 47.8, p < .0001). The differences were not significant, however, for the subscale of behaviors (t = 1.47, df = 122, p = .14). Residents who remained in restraints were significantly more functionally impaired than those who had restraints removed (t = 6.88, df = 38.5, p < .0001). With regard to mobility (another marker for functional status), those who remained restrained were twice as likely to be chairfast (85.3%) than those who had restraints removed (42%; χ² = 24.59, df = 1, p < .0001). No differences were found between the two groups for frequency of medical diagnoses associated with increased fall risk or for proportion receiving antidepressant or other psychoactive drugs.

**Effect of restraint removal on individuals (subsample analysis).** — In the crude bivariate analysis (Table 2), impaired cognition was associated with a significantly increased risk of falling (p < .05) whereas use of psychoactive drugs and ambulatory status were not associated with increased fall risk. Restraint removal was associated with a significantly lower fall rate. After adjusting for cognitive status and the other covariates, however, the relative risk of falls remained below 1 but was not statistically significant (Table 2). In addition, testing for an interaction effect of cognitive status and restraint use demonstrated that the level of cognitive impairment did not modify the effect of restraint removal on fall risk (χ² = 3.13, p = .076). Similar analyses were performed for the outcome of fall-related minor injury (Table 3). Restraint removal was significantly associated with a reduced risk of fall-related minor injury both before and after adjustment for other variables in the model.

Only eight serious injuries occurred in this sample; therefore, a crude bivariate analysis with a Fisher’s exact test (two-tailed) was conducted. None of the covariates from the main effects model significantly affected the risk of fall-related serious injury. Although not statistically significant, it is interesting to note that seven of the eight serious injuries were sustained by residents who remained restrained.

Effect of restraint use at the institutional level (institutional analysis). — The Control home averaged an 11% (range, 8–14%) restraint reduction over the postintervention period, whereas the Restraint Education (RE) intervention nursing home had an average 23% reduction (range, 17–30%), and the Restraint Education/Consultation (REC) intervention nursing home had an average 56% reduction (range, 50–63%). Only in the REC site was there a statistically significant reduction in the use of restraints over time (19).

During the 6-month data collection period following the intervention, there were 602 falls among 633 nursing home residents. Approximately a third of all residents fell at least once and about half of those (12.4% of the total sample) fell two or more times. An average of 24.8% of falls re-
falls. The intervention (RE, REC) homes had a significantly lower occurrence of fall-related minor injuries when compared to the Control home (p = .001). The Control nursing home’s rate of minor injury was twice that of the intervention homes. In the multivariable model, ambulatory status resulted in minor injury and 2.8% resulted in serious injury. Table 4 provides the fall rates (per 1000 patients), the total number of falls or incident events, total time (in days) until the first fall or end of follow-up, and the incidence density ratios (and 95% confidence intervals) for each of the three nursing homes. The fall rates in the two intervention nursing homes were 50% less than that of the Control nursing home sites. The fall rates compared to the other two nursing homes, an additional survival analysis of preintervention fall data was performed. When compared to the other two nursing homes, the Control nursing home actually had fewer falls prior to the intervention.

Results from analysis of the effect of several independent variables on fall rates using the main predictor values (cognitive status, mobility, psychoactive and antidepressant drug use) are also presented in Table 4. Consistent with the analysis of the individual residents, ambulatory status and use of antidepressants were not associated with increased fall risk, whereas impaired cognition significantly increased risk of falling. In contrast to the results of the analysis of individual residents, psychoactive drug use was significantly associated with increased fall risk. To ascertain whether the Control home had a predisposition to higher fall rates compared to the other two nursing homes, an additional survival analysis of preintervention fall data was performed. When compared to the other two nursing homes, the Control nursing home actually had fewer falls prior to the intervention.

Results of the survival analysis for the outcome of fall-related minor injury is presented in Table 5. These results mirror those of the survival analysis for the outcome of falls. The intervention (RE, REC) homes had a significantly lower occurrence of fall-related minor injuries when compared to the Control home (p = .001). The Control nursing home’s rate of minor injury was twice that of the intervention homes. In the multivariable model, ambulatory status

Table 3. Effect of Restraint Reduction, Cognitive Status, Psychoactive Drug Use, and Mobility on Fall-Related Minor Injury

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>% Minor Injuries</th>
<th>Unadjusted Odds Ratio (95% CI)</th>
<th>Adjusted Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restraint status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restraint removed</td>
<td>18/38 (47%)</td>
<td>0.3 (0.1, 0.6)*</td>
<td>0.3 (0.1, 0.9)*</td>
</tr>
<tr>
<td>Restrained</td>
<td>67/88 (76%)†</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impaired</td>
<td>71/98 (72%)</td>
<td>3.3 (1.4, 8.3)*</td>
<td>1.9 (0.6, 5.4)</td>
</tr>
<tr>
<td>Not impaired</td>
<td>11/25 (44%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychoactive drug use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any</td>
<td>37/57 (65%)</td>
<td>0.8 (0.4, 1.7)</td>
<td>0.7 (0.4, 1.6)</td>
</tr>
<tr>
<td>None</td>
<td>48/69 (70%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobility status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambulatory</td>
<td>21/35 (60%)</td>
<td>0.6 (0.3, 1.4)</td>
<td>1.0 (0.4, 2.8)</td>
</tr>
<tr>
<td>Chairfast</td>
<td>64/91 (70%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: Data for n = 126. Each variable was added one at a time to the reduced model of restraint use on fall risk.

* p < .05.

†The odds ratio and 95% confidence interval (CI) for restrained residents is the reciprocal of those who had restraints removed, unadjusted odds ratio/95% CI: 3.5 (1.6, 7.9); adjusted odds ratio/95% CI: 3.0 (1.1, 8.7).

Table 4. Survival Analysis: Crude Incidence Density Ratios and 95% Confidence Intervals for Effect of Restraint Reduction on Fall Risk in Three Nursing Homes

<table>
<thead>
<tr>
<th>Group*</th>
<th>Fall Rate†</th>
<th>Incidents</th>
<th>Number of Total Days</th>
<th>IDR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>8.2</td>
<td>164</td>
<td>19,846</td>
<td>1.0 (reference)</td>
</tr>
<tr>
<td>RE</td>
<td>5.3</td>
<td>124</td>
<td>23,745</td>
<td>0.66 (0.52, 0.83)†</td>
</tr>
<tr>
<td>REC</td>
<td>5.4</td>
<td>91</td>
<td>16,995</td>
<td>0.67 (0.52, 0.86)§</td>
</tr>
</tbody>
</table>

Multivariable Fall Risk Model for IDR

<table>
<thead>
<tr>
<th>Adjusted IDR*</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RE</td>
<td>0.7</td>
<td>0.5, 0.9</td>
</tr>
<tr>
<td>REC</td>
<td>0.6</td>
<td>0.4, 0.8</td>
</tr>
<tr>
<td>Ambulatory</td>
<td>1.1</td>
<td>0.8, 1.4</td>
</tr>
<tr>
<td>Impaired cognition</td>
<td>1.2</td>
<td>1.0, 1.6</td>
</tr>
<tr>
<td>Psychoactive drug use</td>
<td>1.3</td>
<td>1.0, 1.7</td>
</tr>
<tr>
<td>Antidepressant drug use</td>
<td>1.2</td>
<td>0.9, 1.6</td>
</tr>
</tbody>
</table>

Notes: Data for n = 633. IDR, incidence density ratio; CI, confidence interval; ns, not significant.
* Group: C, Control; RE, Restraint Education; REC, Restraint Education-with-Consultation.
† Per 1000 patient days computed as total no. of events/total no. of days
§Comparing RE to control.

Table 5. Survival Analysis: Crude Incidence Density Ratios and 95% Confidence Intervals for Effect of Restraint Reduction on Fall-Related Minor Injury in Three Nursing Homes

<table>
<thead>
<tr>
<th>Group*</th>
<th>Minor Injury Rate†</th>
<th>Incidents</th>
<th>Number of Total Days</th>
<th>IDR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>5.6</td>
<td>131</td>
<td>23,242</td>
<td>1.0 (reference)</td>
</tr>
<tr>
<td>RE</td>
<td>2.3</td>
<td>67</td>
<td>29,106</td>
<td>0.44 (0.33, 0.59)‡</td>
</tr>
<tr>
<td>REC</td>
<td>2.3</td>
<td>47</td>
<td>20,511</td>
<td>0.42 (0.30, 0.59)§</td>
</tr>
</tbody>
</table>

Multivariable Fall-Related Minor Injury Model for IDR

<table>
<thead>
<tr>
<th>Adjusted IDR*</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing Home</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RE</td>
<td>0.5</td>
<td>0.4, 0.7</td>
</tr>
<tr>
<td>REC</td>
<td>0.4</td>
<td>0.3, 0.6</td>
</tr>
<tr>
<td>Ambulatory</td>
<td>0.8</td>
<td>0.6, 1.0</td>
</tr>
<tr>
<td>Impaired cognition</td>
<td>1.6</td>
<td>1.2, 2.2</td>
</tr>
<tr>
<td>Psychoactive drug use</td>
<td>1.3</td>
<td>1.0, 1.8</td>
</tr>
<tr>
<td>Antidepressant drug use</td>
<td>1.1</td>
<td>0.8, 1.6</td>
</tr>
</tbody>
</table>

Notes: Data are for n = 633. IDR, incidence density ratio; CI, confidence interval; ns, not significant.
* Group: C, Control; RE, Restraint Education; REC, Restraint Education-with-Consultation.
† Per 1000 patient days computed as total no. of events/total no. of days
‡Comparing RE to control.
§Comparing REC to control.
and antidepressant drug use were not associated with an increased risk for fall-related minor injury. Both impaired cognition and use of psychoactive medications were associated with a statistically significant increased risk of fall-related minor injuries.

The sample size \( n = 17 \) was too small for a multivariable survival analysis for the outcome of serious injuries in the institutional sample; thus, only the crude incidence density ratios were calculated. The serious injury rate (per 1000 patient days) was highest in the RE nursing home (25) followed by the Control home (16). The REC nursing home that underwent the most restraint reduction (mean = 56%) experienced the lowest rate of fall-related serious injuries (0.08).

**DISCUSSION**

Despite growing empirical evidence that use of physical restraints produces more problems than it solves and federal guidelines that discourage use of restraints, American nurses and physicians continue to act on the belief that physical restraints are an effective strategy for preventing falls and injuries. This study tested that assumption by using two statistical designs to examine the relationship between restraint removal and falls and injuries. In neither analysis was there a statistically significant association between restraint removal and increases in falls or fall-related injuries.

Approximately one quarter of all falls in the total sample resulted in minor injury. In the multivariable analysis of the subsample, continued restraint use (versus restraint removal) was the only characteristic to increase significantly the risk of fall-related minor injury. In comparing incidence of fall-related minor injury among the three nursing homes, the Control home, which underwent the least amount of restraint reduction, demonstrated a significantly higher minor injury rate. Its rate of fall-related minor injury was twice as high as that in the intervention homes. Fall-related minor injury in older persons has significant implications for morbidity and mortality, as demonstrated in older, community-residing African-Americans who had pain or functional impairments a median of 8 weeks after a fall (23). Unfortunately, other studies examining outcomes of restraint reduction (9,17) have not addressed fall-related minor injury.

Impaired cognition was a significant independent predictor of falling as well as a significant confounding factor in the evaluation of restraint use and the risk of falls. While physical restraint may discourage the resident from walking, it may not affect the resident’s desire to walk or to remove the restraint. The significant contribution of cognitive status to fall risk in this study suggests that although physical impairment contributes to increased fall risk, the resident’s impaired cognitive status with concomitant impairment in judgment also plays an important role. Approximately one third of falls occurred while the resident was standing or walking. Elsewhere, a subgroup of confused ambulatory residents were found to be at highest risk of falls and injuries compared to nonconfused and chairfast residents (8). Tinetti et al.’s study (7) of restraint use and serious injuries among ambulatory nursing home residents also showed that disorientation was a highly significant predictor of fall-related serious injury. Their study differentiated between intermittent and continuous restraint use. It was conjectured that intermittent use in ambulatory residents led to increased fall-related serious injuries due to deconditioning effects of physical restraints. When the resident was not restrained, attempts to ambulate in conjunction with reduced motor functioning from restraint use would contribute to increased likelihood of serious injury following a fall (7).

In this study, most falls occurred while a resident was transferring from a bed, chair, or toilet. A chairfast, yet cognitively intact, resident generally requests and waits for assistance. A confused resident, on the other hand, lacks the insight and judgment to consider physical disabilities and may attempt to walk without assistance. Also, a cognitively impaired resident may attempt to remove a physical restraint which is perceived as uncomfortable, and in the process sustain a fall or injury (24). This is consistent with results from other research which found that confused chairfast residents were more likely to fall than nonconfused chairfast residents (8).

The demographic and health-related characteristics of the sample resembled typical American nursing home residents (25,26), and the fall and injury data approximated national averages (27,28). The nursing homes in this study, however, were representative of only religious-affiliated, voluntary nursing homes. The generalizability of the subsample analysis is limited to those who survived 1 year in a nursing home. Also, of the 161 residents who were restrained prior to the intervention, 35 were excluded from the subsample analysis because their restraint status varied during the three postintervention data collection points. Although this was necessary for testing the relationship between restraint removal and falls/injuries, intermittent restraint use has been associated with increased likelihood of injury (28).

Another limitation of the study is the number of fall-related serious injuries in the sample which was too small to test for statistical significance. Twice the sample size would be necessary with this design to address the relationship between restraint reduction and fall-related serious injury.

Incident reports rarely contained documentation of residents’ restraint status immediately before or during reported falls. Given this absence in documentation, it was impossible to conclude any direct cause-effect relationship between restraint use and falls and injuries. Several variables, including functional and mobility status, were based on nursing staff perception of the resident’s abilities rather than objective evidence from a performance-based measure. Optimally, specific results of increased mobility after physical restraint removal, such as increased muscle strength or ability to stand independently, should be directly measured.

Nursing home reform and persistent questioning by nursing home advocates and researchers concerning effects of routine, prolonged physical restraint has greatly decreased physical restraint use in nursing homes in the United States. Despite these efforts, some 300,000 residents of nursing homes remain restrained (29). The belief that restraints prevent falls, however, is clearly challenged by the present study. Similar to use of physical restraints, use of siderails...
is based on the belief that they prevent falls and subsequent injury, although their efficacy has never been demonstrated (30). Research is thus needed to test the relationship between siderail use and falls and injury. Prevention of falls and fall-related injury is best achieved by individualized plans of care that address risk factors specific to each nursing home resident. We believe that findings from this study support that philosophy by demonstrating that restraint removal is not associated with more falls or fall-related injuries in older nursing home residents.

ACKNOWLEDGMENTS

This study was funded by grants from the National Institute on Aging (R01-AG06324), the Frank Morgan Jones Fund and a Research Scholarship from the Delta Zeta Chapter of Sigma Theta Tau.

Initial findings were presented at the 48th Annual Scientific Meeting of The Gerontological Society of America, Los Angeles, CA, November, 1995.

Address correspondence to Dr. Elizabeth Capezuti, School of Nursing, University of Pennsylvania, 3615 Chestnut Street, Philadelphia, PA 19104-2676.

REFERENCES


Received September 20, 1996
Accepted May 12, 1997