PHYSICIAN PERSPECTIVES ON FALL PREVENTION IN ASSISTED LIVING

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Abstract

KIRSTEN A. NYROP: Physician Perspectives on Fall Prevention in Assisted Living
(Under the direction of Sheryl Zimmerman)

Residential care/assisted living (RC/AL) communities are a relatively new focus of aging research. Little data exist on care practices and outcomes in these settings, because they are not regulated in the same manner as nursing homes. Falls are of particular concern among the one million older adult residents of RC/AL communities. This dissertation study provides first data on physician perspectives on fall prevention and monitoring among RC/AL residents with regard to: (a) fall risk assessment, (b) medications review for potential side effects related to falls, and (c) communication and collaboration between primary physicians and RC/AL staff regarding patients at high risk for falls. Data were collected through a questionnaire informed by the Theory of Planned Behavior (TPB), mailed to primary physicians for residents of four RC/AL communities in North Carolina. Physicians expressed strong support for fall risk assessment, medications review, and talking/working with RC/AL staff to reduce fall risk, and they believed these activities could reduce fall risks among RC/AL patients. Physicians assumed full responsibility for medications review but had conflicting beliefs about fall risk assessment – they thought RC/AL staff had more time and responsibility for this task and that it was easier for them to do, but expressed some reservations about RC/AL staff expertise. Communication and collaboration challenges between physicians and RC/AL staff were also identified by the survey. Further, theory-based models were developed and tested to identify physician beliefs predictive of their self-reported (past) behavior and (future) intention with regard to fall risk assessment, medication review, and talking/working with RC/AL staff. The models were robust, explaining 22-52% of the variance in behavior and 21-46% of the variance in intention. Models also identified specific beliefs that were especially salient for various fall prevention and

monitoring activities. This research provides (a) baseline data for on-going discussions of the role of primary physicians in the care of RC/AL residents, (b) contributes to theory-based implementation and dissemination research focused on interventions to influence physician beliefs and behavior, and (c) informs social work practice by drawing attention to coordination and collaboration challenges in the care of the frail older adults in RC/AL communities.

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List of Abbreviations

ADLs	Activities of daily living
AGS	American Geriatrics Society
AHRQ	Agency for Healthcare Research and Quality
AMDA	American Medical Directors Association
ANOVA	Analysis of variance
IADL	Instrumental activities of daily living
LTC	Long-term care
NH	Nursing home
QI	Quality improvement
RC/AL	Residential care/assisted living
RCT	Randomized controlled trial
RTI	Research Triangle Institute
SD	Standard deviation
TPB	Theory of Planned Behavior
UNC	University of North Carolina at Chapel Hill

Chapter I
Introduction

Falls in Long-Term Care Settings

Falls and related injuries are common problems among older adults that increase in frequency and seriousness with advancing age. Fall rates per 100,000 rise dramatically from 9.5 for persons age 65-69 to 151.9 for persons age 85 and older (National Center for Injury Prevention and Control, 2009), contributing to mortality and morbidity, reduced functioning and independence, and admissions to long-term care (LTC) (Fuller, 2000; Tinetti & Williams, 1997). Three risk factors for falls – hip weakness, unstable balance, and taking four or more medications – alone can increase the one-year risk of falling from 12 % for older adults with none of these risk factors to as high as 100% for those with all three risk factors (Robbins et al., 1989). In light of the serious consequences of falls-related hip fractures, *Healthy People 2010* (Department of Health and Human Services, 2008) includes a specific objective of reducing hip fractures among older adults. Falls reduction is also highlighted in *The State of Aging and Health in America 2007* as one of three key outcomes that could significantly improve the quality of life of older adults (Centers for Disease Control and Prevention and The Merck Company Foundation, 2007). And, the U.S. Congress recently enacted the Safety of Seniors Act of 2007 (Public Law 110-202), calling attention to falls as a leading cause of injury death for adults age 65 and older (110th Congress, 2008).

Falls are of particular concern in LTC settings, where frail elderly residents have most of the risk factors for falls: a history of falls within the past year, problems with gait and balance, ambulating with an assistive device, and taking four or more medications each day (French et al., 2007; Kannus, Sievanen, Palvanen, Jarvinen, & Parkkari, 2005). Among the 1.5 million elderly residents of U.S. nursing homes (NH) (National Center for Health Statistics, 2009), as many as half

will fall each year (Rask et al., 2007) and 10-20% of these falls will result in a fracture or hospital admission (Rubenstein, 2006). The risk of falling among NH residents is 2-3 times higher than for older adults living independently in the community, and deaths precipitated by falls are four times higher among NH residents as compared to the general population of adults 65 years and older (Rubenstein et al., 1988).

Data on falls among the estimated one million residents of residential care/assisted living (RC/AL) communities in the U.S. (Polzer, 2009) are scarce, because these settings are not subject to the federal reporting requirements of nursing homes. RC/AL communities are community-based residences licensed by states at a non-NH level of care that provide 24-hour oversight, assistance with activities of daily living (ADLs), and an ability to respond to unscheduled needs for support (Kane & Wilson, 1993; Zimmerman, Sloane, & Eckert, 2001). There is evidence that RC/AL communities are increasingly admitting older adults with physical and cognitive impairments that resemble those of NH patients (Zimmerman et al., 2005a; Zimmerman & Sloane, 2007). A recent study of RC/AL residents found they had a mean age of 85 years, an average of 4.6 chronic health conditions, 55% had a diagnosis of dementia or Alzheimer's Disease, and 67% took 10 or more mediations a day (Zimmerman & et al., 2010). Therefore, attention to fall prevention and management among RC/AL residents is timely (Boustani & Sloane, 2003; Chen, Raymond, & Bhalla, 2008; Mitty & Flores, 2007; Song & Chila, 2007).

Fall Prevention Interventions in Long-Term Care Settings

From studies conducted over the past three decades, there is convincing evidence for fall prevention interventions among older adults that address multiple risk factors for falls and focus on modifying the living environment, prescribing alternatives to medications with potential side effects related to falls, correcting visual acuity problems, encouraging balance and gait training, and addressing orthostatic hypotension and other cardiovascular issues (McClure et al., 2005). Studies of older adults suggest that fall risks can be reduced by 14-27% through balance/gait training and strengthening exercises, 39% through discontinuation of psychotropic medication, and 25-39%

through multi-factorial fall risk assessment coupled with targeted falls management (Tinetti, 2003). Based on the evidence, guidelines for fall prevention among adults have been issued by the American Geriatrics Society (AGS), with a fundamental tenet that awareness of a patient's history of falls and performing a fall risk assessment can reduce the future probability of falls when coupled with appropriate interventions (American Geriatrics Society, 2001). Building on the AGS guidelines, the American Medical Directors Association (AMDA) issued clinical practice guidelines for falls and fall risks in LTC settings (American Medical Directors Association, 2003).

The evidence for these guidelines has come from randomized controlled trials (RCTs) conducted primarily with older adults living independently in the community. To investigate the extent to which results from community-based studies can be extrapolated to the generally older and frailer population in LTC communities, a limited number of multifaceted fall prevention trials have been conducted in nursing homes and, to a lesser extent, in RC/AL communities. The results from these trials are promising (Cusimano, Kwok, & Spadafora, 2008; Vu, Weintraub, & Rubenstein, 2006), but they also point to the need for further research. One area for further research pertains to the complexities of implementing quality improvement (QI) initiatives in LTC communities. The difficulty of effecting change in LTC organizations is illustrated by the fact that fall reduction remains a significant challenge for nursing homes (Capezuti, Taylor, Brown, Strothers, & Ouslander, 2007; Colon-Emeric et al., 2006; Rask et al., 2007; Taylor et al., 2007), despite federal regulations in effect since 1991 that require Medicare and Medicaid certified nursing homes to conduct comprehensive geriatric assessments of all residents within 14 days of admission, including an assessment of falls risk (U.S.Congress, 1987). Further, there are likely to be different QI implementation challenges and considerations between nursing homes – which are required by federal law to have a medical director, nurses and certain care practices – and other LTC settings that are not subject to similar regulations and have different care practices. For example, unlike in nursing homes, the primary physicians for RC/AL residents are generally clinicians practicing in the community who typically do not have any contractual or other relationship with the RC/AL community (Schumacher, 2006).

The Role of Primary Physicians

To date, physicians have received minimal attention as essential players in multifaceted fall prevention interventions in LTC settings, despite their critical role in ensuring quality care for LTC residents (Balogun & Evans, 2005). Various components of fall risk assessment, management and monitoring can be conducted by in-house or contracted personnel, such as nurses, social workers and occupational therapists. However, ultimate responsibility for determining fall risks and causes, prescribing treatments, and monitoring the results of clinical interventions rests with physicians (Abt Associates, 2004; Boustani et al., 2003; Feinsod, Capezuti, & Felix, 2005; Ouslander & Osterweil, 1994).

The role of physicians in LTC fall prevention interventions is a further area of needed research, because the effective involvement of physicians in QI initiatives cannot be assumed or taken for granted. Research suggests that the adoption of best practices in fall prevention and management into clinical practice, in general, is complex (Chou, Tinetti, King, Irwin, & Fortinsky, 2005; Tinetti, Gordon, Sogolow, Lapin, & Bradley, 2006) and may be further complicated by communication and coordination challenges between primary physicians and LTC staff (Kane & Mach, 2007b). These challenges may be compounded in the RC/AL sector, where the absence of regulations specifying RC/AL staff responsibilities in fall risk assessment or the frequency and focus of communications between physicians and RC/AL staff may foster confusion or mistaken assumptions among physicians regarding the involvement of individual RC/AL communities in fall prevention. In turn, RC/AL communities may have unrealistic expectations or assumptions about the extent to which individual primary physicians are actively engaged in assessing, managing and monitoring the fall risks of their RC/AL patients.

The effective involvement of physicians in fall prevention interventions in RC/AL communities requires baseline information on current physician behavior and the determinants of that behavior. How do primary physicians see their responsibilities in fall prevention and monitoring among patients in RC/AL communities? What do physicians know about RC/AL policies and

practices and RC/AL staff capabilities regarding the assessment and management of falls among RC/AL residents? How do physicians communicate and work with RC/AL staff to reduce falls and fall risks for individual patients?

Dissertation Study

The objective of the research presented in this dissertation was to investigate primary physician involvement with and perspectives on fall prevention and monitoring among residents of RC/AL communities. Specific aims of the dissertation research were:

1. To identify the role of primary physicians in randomized controlled trials of multifaceted fall prevention interventions in LTC settings, through a systematic review of the literature.
2. To characterize physician perspectives on their role and the role of RC/AL staff in fall prevention and monitoring of RC/AL residents, specifically with regard to (a) conducting fall risk assessments, (b) reviewing medications for potential side effects related to falls, and (c) communicating about RC/AL residents at high risk for falls.
3. To develop theory-based models for understanding the self-reported behavior and intentions of physicians with regard to (a) fall risk assessment, (b) medications review, and (c) talking/working with RC/AL staff to prevent and manage falls risk for individual patients.

The dissertation research was conducted as an unfunded adjunct to a QI project funded through an Agency for Healthcare Research and Quality (AHRQ) contract with a project team from the Research Triangle Institute (RTI) and the University of North Carolina at Chapel Hill (Sheryl Zimmerman, PhD, UNC-Principal Investigator). The AHRQ-funded study (hereafter "parent study") was a multifaceted intervention to promote fall prevention and monitoring in RC/AL communities in North Carolina, and was focused on the larger organizational context for implementing changes in falls-related practices and procedures. The dissertation study pertains strictly to the role of primary physicians (within the larger QI initiative), which was not a focus of investigation in the parent study.

Through an amendment to the parent study, approval for the dissertation study was received from the Institutional Review Board of the University of North Carolina at Chapel Hill in 2007.

The dissertation study design is a cross-sectional survey using a questionnaire informed by the Theory of Planned Behavior (TPB) (Ajzen, 1991) (see Appendix B for a structural diagram of TPB and Appendix C for a copy of the Physician Questionnaire). The questionnaire was developed specifically for this study (by K. Nyrop with the guidance of S. Zimmerman and P. Sloane) and pilot tested (with UNC Family Medicine physicians specializing in Geriatric Medicine) in the summer of 2007. The instrument consists primarily of questions using TPB constructs, based on instructions for the proper construction of TPB-based questions provided by the author of TPB (Aizen, 2006) and a manual for health services researchers on constructing TPB-based questionnaires (Francis et al., 2004). The survey instrument also includes questions about physician and physician practice characteristics, physician views on RC/AL communications regarding fall incidents and residents identified as high-risk for falls, and physician interest in receiving additional education or training pertaining to fall prevention. The questionnaire takes about 15 minutes to complete.

The parent study was conducted with a sample of four RC/AL communities associated with two well-established providers in North Carolina (two communities per provider). The target population for the dissertation study was all physicians who are the primary providers for the residents in all four sites. Physician names and contact information were provided by the RC/AL communities, and 100 percent of the physician population was invited to participate in the study. All physicians received a package with a cover letter (co-signed by S. Zimmerman and P. Sloane) that invited them to complete an enclosed questionnaire and return the completed survey in a self-addressed envelope to K. Nyrop. To achieve the highest possible response rate, follow-up faxes to the physicians, telephone conversations with practice managers, repeated mailings of both cover letters and questionnaires, and a $10 gift card from Border's Books were among the strategies utilized.

In the chapters that follow, further details pertaining to the study methodology as well as findings and conclusions from the dissertation research are presented in the format of three

manuscripts developed for submission to peer-reviewed journals. Chapter II is a review article analyzing primary physician involvement in multifaceted fall prevention trials conducted in LTC settings (Aim One). This article will be submitted to the *Annals of Long-Term Care*. Chapter III is a descriptive article that presents findings from a survey of primary physician perspectives on their own role and the role of RC/AL staff in fall prevention and monitoring among RC/AL patients, as well as physician views on the helpfulness of communications from RC/AL staff about residents who had fallen or were identified as high risk for falls and physician interest in additional information or training about fall risks (Aim Two). This article will be submitted to the *Journal of the American Medical Directors Association*. Chapter IV presents findings from theory-based models for understanding physician beliefs about their self-reported behavior and their intentions with regard to three fall prevention and monitoring activities: fall risk assessment, medications review, and talking or working with RC/AL staff to reduce the fall risks of individual patients (Aim Three). This article will be submitted to the *Journal of the American Geriatrics Society*. The final chapter summarizes key findings from the manuscripts, describes strengths and limitations of the dissertation research, and suggests areas for future research.

Significance for Social Work Practice

In the United States, the population of persons age 65 and over is projected to more than double between 2010 and 2050 -- from 40 million to 88.5 million (Population Division, 2008b) – and increase from 13% to 20% of the total population (Population Division, 2008a). A majority of older adults (83%) will live independently in the community and most of them (78%) will rely on family and friends to help them with their needs (Friedland, 2004). However, an estimated 14% of older adults will need some form of paid LTC -- assistance with one or more activities of daily living (ADLs) and/or instrumental activities of daily living (IADLs) -- rising to 50% among people age 85 and older (Rogers & Komisar, 2003). Home health care agencies and community-based programs can provide supports for the frail elderly living independently in the community, and nursing homes provide care for those who require 24-hour nursing services. As a third option in long-term care, the

RC/AL sector continues to evolve in response to market demands for competent and diverse alternatives to nursing homes. As the demand for long-term care grows, so will the need for professional social workers willing and trained to work with the frail elderly. The U.S. Bureau of Labor Statistics estimates that employment of social workers will increase by 22% between 2006 and 2016, and attributes much of this growth to the expanding elderly population and their projected need for health and social services (U.S.Bureau of Labor Statistics, 2009).

As of now, social workers are not a significant presence among staff employed by RC/AL communities. To the extent there is evidence that some RC/AL communities – especially the larger ones with more than 16 beds – offer on-site case management/social work services (Morgan, Eckert, Gruber-Baldini, & Zimmerman, 2004), these services are currently not being provided by individuals with a social work degree (Zimmerman, Munn, & Koening, 2006). Further, there are few references to RC/AL communities in the literature on social work practice (Spitzer, Newman, & Holden, 2004), although this sector has been presented as a new career opportunity for social workers interested in serving LTC populations (Butler, 2002; Feinberg, 2002; Harrington, 1999). It has also been noted that key philosophical tenets of the RC/AL "social model of care" -- which emphasize the dignity, autonomy, privacy, and independence of residents (Hawes, 2001) -- are especially congruent with the values, ethics, biopsychosocial perspective, and clinical training of professional social workers (Spitzer et al., 2004; Zimmerman et al., 2006).

The roles of social workers in hospitals and nursing homes are suggestive of ways in which this profession could benefit residents of RC/AL communities (Zimmerman et al., 2006). For example, social workers may be members of interdisciplinary teams responsible for evaluating older adults for referral to long-term care (Mellor & Lindeman, 1998), including RC/AL communities. When LTC placement is indicated, social workers can help patients and families understand their options within the RC/AL sector and aid in the transition. This will include communications with the patient's primary physician regarding care policies and practices at the selected RC/AL community. Further, to the extent RC/AL communities increasingly adopt a medical model that invites frail and

medically complex residents to age in place until their death (Mitty, 2008), these communities are likely to see social workers as a new source of skilled professionals essential to meeting the needs of their residents. To the extent these speculations materialize, social workers can play an essential role in fostering effective communication and collaboration between RC/AL staff and primary physicians in a variety of QI initiatives, including fall prevention, monitoring and management. This dissertation contributes insights for effective communication and collaboration in this important area of quality improvement.

Chapter II
Fall Prevention Interventions in Long-Term Care Settings:
Involving Primary Physicians in Research and Implementation

Nyrop KA, Zimmerman S, and Sloane PD

Introduction

Falls and related injuries are of particular concern in long-term care (LTC) settings, where frail elderly residents exhibit most of the risk factors for falls: a history of falls within the past year, problems with gait and balance, ambulating with an assistive device, and taking four or more medications each day (French et al., 2007; Kannus et al., 2005). Among the 1.5 million residents of U.S. nursing homes (NHs), falls are the most frequently reported adverse event (Wagner, Capezuti, Clark, Parmelee, & Ouslander, 2008) and 10-25% of falls result in serious injury (Rubenstein, 2006). To the extent residents of other LTC settings – such as residential care/assisted living (RC/AL) communities – increasingly resemble those of NHs (Zimmerman et al., 2001), falls and related injuries have emerged as concerns within these communities, as well (Bonner, 2006). RC/AL communities in the U.S. provide housing and supportive services to an estimated one million older adults (Polzer, 2009) who need assistance with activities of daily living but do not require the intensity of care available in skilled nursing facilities (Kane et al., 1993).

As of 1991, federal regulations have required residents of Medicare and Medicaid certified NHs to receive a comprehensive geriatric assessment within 14 days of admission, which includes an evaluation of falls risk. Guidelines pertaining to falls and fall risks in LTC settings issued by the American Medical Directors Association (AMDA) focus on recognizing each resident's risk for falls, assessing the causes and consequences of falls, developing and implementing a treatment plan appropriate to the individual, and continuous monitoring of both fall risks and the effectiveness of fall interventions (American Medical Directors Association, 2003). Yet, despite increased attention to

falls among the frail elderly and strong evidence that multifaceted interventions focused on multiple risk factors can be effective in reducing falls among at-risk seniors (Tinetti, 2008), falls remain a significant challenge in LTC settings (Capezuti et al., 2007; Colon-Emeric et al., 2006; Rask et al., 2007; Taylor et al., 2007).

This article reviews multifaceted fall prevention trials conducted in LTC settings, with a specific focus on identifying the nature and extent of involvement of primary physicians for LTC residents. Our focus on primary physicians is based on the assumption that they play a critical role in quality care of LTC residents (Balogun et al., 2005), including fall prevention, management and monitoring. While nursing staff can conduct various components of comprehensive fall risk assessments, for most LTC patients, ultimate responsibility for management of medications and other medical components of fall risk reduction rests with physicians (Abt Associates, 2004; Boustani et al., 2003; Feinsod et al., 2005; Ouslander et al., 1994). It is important to include primary physicians in LTC intervention trials, because their effective and sustained involvement in quality improvement (QI) initiatives cannot be assumed or taken for granted. Prior studies have shown that the adoption of best practice in fall prevention and management into clinical practice is challenging and faces numerous barriers (Chou et al., 2005; Tinetti et al., 2006). This challenge can be exacerbated by time demands and other barriers to optimal care for physicians serving as the medical director for one or more NHs (Caprio, Karuza, & Katz, 2009). Further, for physicians with patients in RC/AL communities, the wide variety of approaches to patient care in these settings (Golant, 2004; Hawes, Phillips, Rose, Holan, & Sherman, 2003; Zimmerman et al., 2007) can pose added communication and coordination challenges for patient care (Kane et al., 2007b; Nyrop, Zimmerman, & Sloane, 2010).

Randomized Controlled Trials

Guidelines for the prevention of falls among older adults issued by the American Geriatrics Society recommend multifaceted interventions in LTC settings that are targeted at multiple risk factors for falls (American Geriatrics Society, 2001). Our review is focused on randomized controlled

trials (RCTs) of multifaceted fall "prevention" interventions, in which the primary outcome measure of interest is falls or fallers (rate, number, recurrent fallers, time to first fall). This excludes fall "management" studies focused on intermediate outcomes (such as increased functioning or reduced fear of falling) or on the severity and consequences of falls (including related injuries, fractures or hospitalization).

Our search identified eight trials conducted in LTC settings with populations ranging from lower dependency (equivalent to residents of U.S. RC/AL communities) to high-dependency communities (equivalent to patients in U.S. nursing homes). Table 2.1 provides an overview of study sites, sample sizes, intervention periods, and follow-up; Table 2.2 provides an overview of intervention components; and Table 2.3 presents results pertaining to falls, fallers and recurrent fallers. Of the eight trials, four reported statistically significant positive intervention effects (Becker et al., 2003; Jensen, Lundin-Olsson, Nyberg, & Gustafson, 2002; Neyens et al., 2009a; Ray et al., 1997). Two trials (Dyer et al., 2004; Rubenstein et al., 1990) reported trends toward positive outcomes, although not at a level of statistical significance. One study reported no significant differences between intervention and control groups (McMurdo, Millar, & Daly, 2000), and one study reported a statistically significant negative impact on fall rates and numbers (Kerse, Butler, Robinson, & Todd, 2004).

The authors of trials reporting non-significant positive trends (Dyer et al., 2004; Rubenstein, Josephson, & Robbins, 1994) or no significant difference between intervention and control groups (McMurdo et al., 2000) concluded their studies were not adequately powered. The trial reporting a significant negative impact on falls (Kerse et al., 2004) was designed to test the efficacy a low-intensity intervention, akin to QI initiatives in LTC communities – staff training but no assistance from outside experts or additional resources. The authors of this trial concluded it was not clear why their intervention failed, but they noted the mixed results from higher-intensity interventions (McMurdo et al., 2000; Rubenstein et al., 1994) as evidence of the difficulties in reducing falls in LTC communities.

Overall, results from the eight trials are encouraging. This finding concurs with recent reviews of fall prevention studies in LTC settings which concluded that multifaceted interventions can significantly reduce the number of recurrent fallers (Cusimano et al., 2008) and may reduce falls by 20 to 45 percent (Vu et al., 2006).

Involvement of Physicians

Building on the Kerse and colleagues distinction between "low-intensity" and "higher-intensity" interventions (Kerse et al., 2004), this section identifies the nature and extent of involvement from primary physicians within various study designs -- consultant intensive, staff centered or hybrid. The involvement of primary physicians is most evident in intervention components pertaining to fall risk assessment/follow-up and education/training of existing LTC clinical personnel.

Consultant intensive. In the consultant intensive trials, baseline assessments and the identification of fall risk factors were done by a clinician associated with the research team (McMurdo et al., 2000) or a team of outside experts (Dyer et al., 2004). Staff education or training was minimal in these trials. Recommendations resulting from baseline assessments and medication reviews were forwarded to the resident's general practitioner. The McMurdo study reported no significant differences between intervention and control groups with regard to falls and fallers; reductions in drug doses were observed but no significant change in total number of medications prescribed (McMurdo et al., 2000). The Dyer study reported a small and non-significant reduction in falls per resident, but also a modest and significant reduction in overall medication use within the intervention group at 3-month reassessment and significantly more intervention group residents having been seen by an optician or podiatrist at 1-year follow-up (Dyer et al., 2004).

Hybrid design. In the hybrid trials, involvement of the research team or outside consultants was extensive, as well, but the interventions also included an effort to educate and train LTC staff. In two trials, nursing staff employed by the LTC study sites were trained to conduct the fall risk assessments, with support and supervision from research team experts (Becker et al., 2003;

Rubenstein et al., 1994); in the other trials, resident assessment was conducted solely by outside experts (Jensen et al., 2002; Ray et al., 1997). In one study, staff training was limited to a nurse practitioner who was thoroughly trained in the fall risk assessment and management protocol by physician investigators (Rubenstein et al., 1994). In the other three studies, education was extended to all staff and ranged from one to four hours (Becker et al., 2003; Jensen et al., 2002; Ray et al., 1997).

The Becker study was expressly non-pharmaceutical and noted only that physicians were informed of patient consent to participate in the study (Becker et al., 2003). In the Jensen study, each resident's physician completed a questionnaire pertaining to the clinical characteristics and medications regimen of their patients. Physicians were also included in weekly team meetings with a nurse, physiotherapist and other staff members to discuss fall reports and high-risk residents (Jensen et al., 2002). The Ray trial included initial meetings between intervention team physicians and each study site's medical director and physicians with patients in the NH, to secure their support for the fall prevention intervention and facilitate their acceptance of written recommendations from outside experts pertaining to changes in drug regimens (Ray et al., 1997). In the Rubenstein study, primary physicians for the LTC residents were made aware of the ongoing fall prevention study, but they did not receive study details and were not otherwise encouraged to play a direct role in the study other than responding to research team recommendations presented to them in written reports (Rubenstein et al., 1994).

The Becker trial reported significant positive intervention effects on falls and fallers; however, no data were presented on clinical outcomes in light of the intervention's primary focus on use of hip protectors, exercise and progressive resistance training, and environmental adaptations (Becker et al., 2003). The Jensen trial reported significant improvement in fall rates and proportion of fallers within the intervention group, and noted active participation from all permanent staff at the LTC sites although no specifics were provided (Jensen et al., 2002). The Ray trial reported a significantly lower proportion of recurrent fallers in intervention as compared to control groups, as well as 45% compliance with psychotropic drug recommendations (Ray et al., 1997).

The Rubenstein trial reported fewer falls in the intervention group at two-year follow-up, but not at a level of statistical significance (Rubenstein et al., 1994). The study design included an emphasis on analyzing how primary physicians responded to post-fall recommendations from the research team. Relatively high physician compliance with study team recommendations was reported (62% overall), especially for recommendations pertaining to rehabilitation therapy (67%), medication change (67%), and further diagnostic work-up (61%). The authors attributed this success to focusing on problems that could be easily addressed by physicians. Attempts to analyze the relationship between falls and physician compliance with recommendations were constrained by the study's small sample.

Staff centered. In the staff centered trials, the emphasis was on training existing LTC staff to implement all or most components of the fall prevention intervention, with minimal involvement from outside experts or additional resources. In one study, staff training was focused on a falls coordinator who was responsible for implementing all components of the intervention at the LTC home (Kerse et al., 2004). In this trial, training of primary physicians for the LTC residents was limited to an evening educational session. In the other study, multidisciplinary fall prevention teams were established at each site that included the NH physician as well as routine NH staff (Neyens et al., 2009a). These teams had responsibility for coordinating and ensuring full implementation of all aspects of the intervention program, from medical assessments upon admission or when a resident's medical condition changed through the development and implementation of individualized fall prevention plans.

The Kerse trial reported an adverse intervention effect, with a finding of significantly higher fall rates in intervention homes as compared to control homes at 12-month follow-up (Kerse et al., 2004). Yet, the authors also reported that 83% of LTC residents identified as needing physician review were in fact reviewed and had their medications changed. The Neyens trial, by contrast, reported a significantly positive intervention effect; however, no data were reported on fall prevention team recommendations or compliance with those recommendations (Neyens et al., 2009a).

Discussion

Our review suggests that primary physician involvement has been a very limited focus of multifaceted fall prevention RCTs in LTC settings to date. At the most active level of involvement, only one study lists physicians as members of active fall prevention teams established at each study site (Neyens et al., 2009a); however, no further information is provided on the specific roles or actions of these physicians that could be informative for future fall prevention interventions.

For the most part, physicians are mentioned in the RCTs as having been invited to briefings or educational sessions or as recipients of recommendations from research team/consultant experts, with the assumption or expectation that the physicians follow through on the recommendations. Yet, prior research suggests that passive referral of recommendations to physicians has its limitations. Compliance has been found to be low, because general practitioners often do not know what to do with the fall risk information or recommendations to modify risks (Tinetti, 2008). This suggests that referral needs to be coupled with focused efforts to inform and educate primary physicians about the importance of being involved with fall prevention in LTC settings and how they can contribute to reducing fall risks among their patients (Tinetti, 2008).

In this regard, trials testing interventions to influence physician prescribing behavior pertaining to their NH patients have shown promising results. For example, in a study to reduce antipsychotic drug use in NHs (Ray et al., 1993), the physician education intervention was successful in reducing days of antipsychotic drug use, although no statistically significant changes were found for other psychotic drugs. Similarly, an RCT testing an educational program in geriatric pharmacology for NH physicians, nurses and aides (Avorn et al., 1992) reported significantly greater decline in psycho-active drug use in intervention as compared to control homes. And, an RCT testing an educational program for NH physicians and staff (Stein et al., 2001) showed positive results in decreasing NSAID use and increasing acetaminophen use among NH residents. These studies suggest the value of including physicians as change agents in QI interventions in LTC settings.

A second suggestion is that trials which include physician referral among their strategies should present data on the up-take of recommendations by physicians. Among the eight trials reviewed in this paper, only one study attempted to analyze the relationship between fall outcomes and physician compliance, although it was underpowered to identify statistically significant results (Rubenstein et al., 1994). It would be helpful if future intervention studies reported data – not just anecdotal summaries -- on physician responses to recommendation from outside experts/consultants and investigated associations between physician compliance and fall-related outcomes.

Non-RCT intervention studies of multifaceted fall prevention programs in LTC settings are recognizing the importance of including primary physicians in QI initiatives. For example, a LTC fall prevention program developed by a team of researchers at Vanderbilt University (Ray et al., 1997; Taylor, 2002) initially did not include a focus on the roles of medical directors or attending physicians in the QI process (Judge, 2002). However, lessons learned have resulted in an increased focus on NH medical directors and the primary care providers (PCPs) (physicians, nurses, and physician assistants) for NH residents as the falls management program (FMP) has evolved (Taylor, Parmelee, Brown, & Ouslander, 2005). The program now includes a 30-minute conference with medical directors and PCPs (Capezuti et al., 2007) as well as fax-based communications between NH nursing staff and PCPs regarding patients who have experienced a fall, the results of fall risk assessments conducted by NH staff, and PCP orders for referrals, medication changes, additional tests, or other treatments (Rask et al., 2007; Taylor et al., 2007). The program also enlists the support of medical directors in the distribution of educational materials to PCPs about the FMP and the encouragement of PCPs to respond in a timely manner to notifications from NH staff (Taylor et al., 2007). Yet, despite these efforts directed at medical directors and PCPs, one of the findings from implementation of the FMP is the difficulty of securing high levels of physician involvement (Taylor et al., 2007). Lack of interest and even resistance to the FPM among medical directors and primary physicians have been observed (Rask et al., 2007). These findings illustrate how challenging it can be to secure and sustain physician interest and involvement in LTC interventions. Nevertheless, authors of the FPM emphasize that full

implementation of the program cannot occur without effective physician involvement (Taylor et al., 2007).

Further RCTs are needed to test the effectiveness of multifaceted fall prevention strategies for LTC populations at varying dependency levels that are large enough to detect significant differences between intervention and control groups. Studies are also needed to test implementation strategies in a variety of LTC settings – RC/AL communities as well as nursing homes. Physicians who are the primary providers for LTC residents need to be included in these studies, as deliberate targets of the intervention. Education, training and outreach to physicians expected to respond to fall risk information and recommendations from others should be explicitly included as a component of the intervention, and study outcomes should include physician compliance with recommendations. For sustained commitment beyond the timeframe of the study, interventions should address barriers and emphasize facilitators to physician involvement in fall risk assessment, management and monitoring in LTC settings.

Chapter III
Physician Perspectives on Fall Prevention and Monitoring in Assisted Living

Nyrop KA, Zimmerman S, Sloane PD

Introduction

Falls and related injuries are common problems among older adults and are especially troublesome for the frail elderly in residential long-term care (LTC) settings. Among the 1.5 million residents of U.S. nursing homes (NHs) (National Center for Health Statistics, 2009), an average of 43% (range 16 to 75%) will fall at least once during the year, with the mean incidence for falls being 1.6 per bed per year (range 0.2 to 3.6) (Rubenstein & Josephson, 2002). An estimated 10 to 25% of falls in LTC settings result in serious injury, such as fractures and lacerations (Rubenstein, 2006), and NH residents account for 20% of deaths from falls among adults age 65 and older (Rubenstein, 1997).

As residential care/assisted living (RC/AL) communities in the U.S. have shown a growing willingness to admit seniors with increasing physical and cognitive impairment (Zimmerman et al., 2005a; Zimmerman et al., 2007) fall prevention and monitoring have emerged as concerns within these settings, as well. RC/AL communities are licensed residential settings that provide housing and supportive services to an estimated one million Americans (Polzer, 2009) who can no longer live independently in the community but do not require the intensity of care available at skilled nursing facilities (Zimmerman et al., 2001). Data on the incidence and prevalence of falls in RC/AL communities are scarce, in part because these settings are not subject to the federal reporting requirements of nursing homes. We were not able to identify any published studies with data on fall rates in RC/AL communities in the U.S. Nonetheless, several articles provide advice on fall risk assessment, prevention, monitoring and management in these LTC settings (Boustani et al., 2003; Chen et al., 2008; Mitty et al., 2007; Song et al., 2007).

Studies over the past several decades have established the causes and consequences of falls among older adults, and clinical practice guidelines for the prevention of falls among older persons have been issued by the American Geriatrics Society (American Geriatrics Society, 2001). A fundamental tenet of these guidelines is that awareness of a patient's history of falls and performing a falls risk assessment can reduce the future probability of falls when coupled with appropriate interventions. Building on the American Geriatrics Society guidelines, the American Medical Directors Association (AMDA) issued clinical practice guidelines pertaining to falls and fall risks in LTC settings (American Medical Directors Association, 2003). The AMDA guidelines focus on recognizing each patient's risk for falls, assessing the causes and consequences of their falls, identifying and providing interventions appropriate to the individual, and continuous monitoring of both fall risks and the effectiveness of fall interventions.

The AMDA guidelines are written for a generic LTC setting and do not distinguish between NHs – which are required by federal law to have a medical director, nurses and certain care practices -- and other LTC settings that are not subject to similar regulations and have different practices. For example, unlike in NHs, the primary physicians for RC/AL residents are generally clinicians practicing in the community who typically do not have a contractual or informal relationship with the RC/AL community (Schumacher, 2006). In the absence of regulations specifying RC/AL staff responsibilities in fall risk assessment or the frequency and focus of communications between physicians and RC/AL staff, there can be considerable confusion or mistaken assumptions among primary physicians regarding the capabilities of staff in individual RC/AL communities to reduce falls and fall risks. In turn, RC/AL communities may have unrealistic expectations or assumptions about the extent to which individual primary physicians are actively engaged in assessing, managing and monitoring the fall risks of their RC/AL patients.

This article presents findings from an exploratory investigation of primary physician perspectives on their own role and the role of RC/AL staff in reducing falls and fall risks among RC/AL residents/patients. The objective of the study is to gain insights into physician attitudes,

perceptions of social pressures, and perceived barriers to fall prevention and monitoring of RC/AL residents. Findings from this study contribute to a baseline of data for consideration as to what physician practices could or should be in this important area of quality improvement for the frail elderly in RC/AL communities.

Methods

The primary physicians (N=131) for residents of four RC/AL communities in North Carolina were sent a mailed questionnaire to ascertain their perspectives on their own role and the role of RC/AL staff in fall prevention and monitoring among RC/AL residents/patients. The four study settings were licensed to provide supportive care, 24-hour oversight, and at least two meals a day, at a non-nursing home level of care (Zimmerman et al., 2001). The questionnaire was focused on four specific fall prevention and monitoring activities: (a) assessing RC/AL patients for falls risk, (b) reviewing RC/AL patient medications for potential side effects related to falls, (c) primary physicians talking and otherwise working with RC/AL staff to reduce the fall risks of individual RC/AL patients, and (d) communications from RC/AL staff to primary physicians regarding residents at high risk for falls and fall incidents requiring medical attention from someone other than the primary physician.

Items in the questionnaire were organized around constructs from the Theory of Planned Behavior (TPB) (Ajzen, 1991) and designed to elicit: (a) *attitudes* about specific fall prevention and monitoring activities, (b) *perceived constraints* on doing these activities, and (c) *perceived social pressures* or expectations from important referent groups to do these activities. Table 3.1 (column 1) illustrates how the TPB constructs were operationalized for each of the fall prevention and monitoring activities. Response options were on a Likert-type scale from 1 to 6, with higher scores favoring involvement in fall prevention and monitoring. The following are examples of questionnaire items pertaining to fall risk assessment:

- *Attitude*: It is the primary physician's responsibility to assess the falls risk of their patients in assisted living (strongly disagree = 1 through strongly agree = 6).
- *Perceived Constraints*: How easy is it for you to do fall risk assessments of assisted living patients (very difficult = 1 though very easy = 6).

- *Social Pressures*: Your assisted living patients or their families think you, the primary physician, should assess the falls risk of your assisted living patients (strongly disagree = 1 through strongly agree = 6).

The questionnaire also asked physicians to estimate, as a percent of patients over the past six months, the extent to which they conducted fall risk assessments and medication reviews of their RC/AL patients and talked/worked with RC/AL staff to reduce the falls risk of individual patients. And, physicians were queried about their familiarity with RC/AL communities as well as their interest in obtaining additional information or training related to fall prevention among RC/AL patients. The term "assisted living" was used throughout the survey to reinforce the study's focus on RC/AL communities and not on nursing homes. To characterize the sample, items in the questionnaire inquired about the respondent's age, gender, race/ethnicity, medical school graduation year, attendance at a US medical school (yes, no), type of medical degree (MD, DO, other), and specialty (Family Medicine, Internal Medicine, other).

Univariate descriptive statistics were used to describe the sample and summarize physician perspectives on their role and the role of RC/AL staff in fall prevention and monitoring. Findings reported as means are the average on a scale from 1 to 6. All data were entered, managed and analyzed using SPSS for Windows, Version 17.0 (SPSS, 2009). The study was approved by the Institutional Review Board of the University of North Carolina at Chapel Hill.

Results

Thirty-six physicians (27% response rate) completed the questionnaire, the majority of who were male (58%) and white (89%), with a median age of 52 years (range 33 to 77 years). Most respondents (97%) had attended a US medical school, with a median graduation year of 1985. Close to half of the respondents specialized in Internal Medicine (47%), while the remainder specialized in Family Medicine (25%) or another area (28%).

Physicians estimated that, in the past six months, they (a) conducted fall risk assessments of 47% of their RC/AL patients, (b) reviewed medications for potential side effects related to falls for

73% of their RC/AL patients, and (c) talked/worked with RC/AL staff to reduce the fall risks for 36% of their RC/AL patients at high risk for falls. Table 3.1 summarizes physician perspectives on their own role and the role of RC/AL staff in fall prevention and monitoring. The text here highlights some of the key findings. On a scale from 1 to 6, mean scores above 4.0 suggest moderate agreement/ likelihood/interest and those above 5.0 suggest high agreement/likelihood/interest in specific fall prevention and monitoring activities.

Fall risk assessment. Physicians expressed strong support for fall risk assessment of all patients in RC/AL communities (mean 5.7), but were less certain that RC/AL leadership was committed to this task (mean 4.5). Physicians believed fall risk assessments would uncover risks that might be preventable (mean 4.8), and that knowing a patient's risk for falls would result in specific actions by the primary physician (mean 5.1) and somewhat less by the RC/AL staff (mean 4.6) to reduce that risk. Physicians thought RC/AL staff had a greater responsibility than primary physicians for doing fall risk assessments (mean 5.6 vs. 4.3). They also felt it was easier for RC/AL staff than for primary physicians to perform risk assessments (mean 4.6 vs. 3.7), and that RC/AL staff had more time (mean 4.4 vs. 3.3) to do so. However, physicians thought RC/AL staff expertise in doing these assessments was lower than that of primary physicians (mean 3.9 vs. 4.4). Physicians also perceived expectations from their RC/AL patients and families (mean 4.9) and RC/AL communities (mean 4.6) to conduct assessments, but less pressure from their professional peers (mean 4.1). The only items scored below a mean of 3.0 pertained to the adequacy of reimbursement, for both physicians and RC/AL staff, for doing fall risk assessments.

Medication review. Physicians believed a review of RC/AL patient medications was likely to uncover medications with side effects related to falls (mean 5.1). They expressed a stronger belief in the primary physician's responsibility to review medications than in the RC/AL staff's responsibility (mean 5.4 vs. 4.6). Physicians also thought that reviewing medications was easier for them to perform than for RC/AL staff (mean 4.9 vs. 3.9), and that primary physicians had more time (mean 4.6 vs. 3.7) and expertise (mean 5.2 vs. 3.3) to do so. Physicians perceived strong expectations

to review medications from RC/AL patients/families (mean 5.4) and RC/AL communities (mean 5.3) but, as with fall risk assessment, less pressure from their professional peers (mean 4.7). Again, the only items scored below a 3.0 pertained to the adequacy of reimbursement.

Talking/working with RC/AL staff. Most physicians agreed they should talk and work with RC/AL staff to prevent and monitor the fall risks of individual patients (mean 5.4), and that doing so could reduce the number of falls (mean 4.8). Physicians believed they had the expertise to talk and work with RC/AL staff (mean 4.8), but they scored the ease (mean 3.8) and time (mean 3.7) of doing this activity somewhat lower. Physicians believed RC/AL patients and their families (mean 5.1) and RC/AL communities (mean 4.7) expected them to work with RC/AL staff on fall prevention and monitoring, but again perceived pressure from peers was less (mean 4.2). Reimbursement for this activity was scored below a 3.0.

Notifications from RC/AL staff. Consistent with their belief that RC/AL staff were responsible for conducting fall risk assessments, physicians expressed strong support for being notified by RC/AL staff when a resident was identified by the RC/AL staff as high risk for falls (mean 5.6) or experienced a fall requiring medical attention from someone other than the primary physician (mean 5.7). Physicians thought RC/AL staff had the time (mean 4.7) and expertise (mean 4.8) to notify primary physicians about residents at high risk for falls, and that this notification was easy for RC/AL staff to do (mean 5.1). Similarly, physicians thought RC/AL staff had the time and expertise (both mean 5.3) to notify primary physicians when a patient's fall had required medical attention from someone other than the primary physician, and that this notification was easy for RC/AL staff to do (mean 5.4). Physicians agreed that RC/AL staff communications (faxes, emails, phone calls) about patient falls requiring medical attention from someone other than the primary physician were helpful (mean 5.4) and the right amount (mean 5.9). They expressed less agreement with the helpfulness (mean 3.6) and amount (mean 3.4) of RC/AL staff communications about residents identified as high risk for falls. Physicians did not believe RC/AL communities were adequately reimbursed for these activities (means below 3.0).

Additional training/education. Physicians rated both their familiarity with RC/AL community policies, practices and programs (mean 3.3) and their interest in knowing more about RC/AL community involvement in fall prevention and monitoring (mean 3.6) as moderate. As shown in Table 3.2, physician interest in additional training and information in all categories was moderate, averaging around the midpoint (mean 3.5). Highest interest was expressed in education or training pertaining to the role of physical therapy in reducing fall risks (mean 4.0), coding and billing for office visits of RC/AL patients (mean 3.8), and specific medications that might increase the risk for falls (mean 3.7).

Discussion

This survey of physicians who treat RC/AL patients found strong support for fall risk assessment of all RC/AL residents. Respondents believed these assessments would uncover risks that might be preventable, and that knowing a patient's risk for falls would result in specific actions by the primary physician and RC/AL staff to reduce the risk. Physicians perceived expectations from RC/AL patients and families and RC/AL communities to conduct assessments, and believed that they had greater expertise than RC/AL staff to conduct assessments. Nevertheless, physicians believed that greater responsibility for fall risk assessments rested with RC/AL staff rather than themselves. By their own assessment, physicians were only moderately familiar with the policies and practices of RC/AL communities, and so the likelihood for fall prevention and monitoring to receive insufficient attention seems great. By contrast, there was far less ambiguity about medication reviews for side effects related to falls, with physicians assuming responsibility for this activity and believing they are the most qualified and have the time to do this activity. The implications of these findings are clear: it is important for RC/AL staff and primary physicians to establish realistic cooperative practices in efforts to reduce falls and fall risks for RC/AL patients.

For example, the communications between physicians and RC/AL staff must be appropriate to each setting, because there is tremendous variety among the estimated 38,000 RC/AL communities (Mollica, Sims-Kastlelein, & O'Keefe, 2007; Zimmerman et al., 2007) included under this umbrella

term. This great variety is due to considerable differences among states in how RC/AL communities are defined and licensed (Mollica, 2006) and in how individual RC/AL communities respond to internal and external forces in shaping their own policies and practices (Carder, Zimmerman, & Schumacher, 2009). Further, although some physicians may have several patients in a particular RC/AL community, most physicians are likely to have only one or two patients per site. These circumstances place a great burden on physicians attempting to understand whether and to what extent individual RC/AL communities are engaged in fall risk assessment and monitoring, and so it seems more realistic that the RC/AL setting be responsible for assuring their practices are known to the physicians.

Our study found relatively low scores on the helpfulness and quantity of RC/AL staff communications with primary physicians about residents identified by the RC/AL staff as high risk for falls, and for physician time and ease in talking and otherwise working with RC/AL staff on fall prevention and monitoring of RC/AL patients at high risk for falls. Thus, to the extent that individual RC/AL communities adopt policies and practices to reduce falls and fall risks among their residents, their strategies should include an emphasis on effective communications with primary physicians. Good communication should include learning what and how physicians want to and can be involved in falls risk reduction, and what they need from the RC/AL staff in a cooperative effort to reduce falls among their RC/AL patients. Ultimately, this communication should facilitate an efficient division of labor that makes good use of the RC/AL staff's intimate knowledge of and daily contact with RC/AL residents and the physician's clinical expertise in clarifying fall risks and prescribing appropriate interventions.

AMDA recently released a white paper on the physician's role in assisted living (American Medical Directors Association, 2009). It builds on an earlier position paper issued by the American Geriatrics Society Health Care Systems Committee (AGS Health Care Systems Committee, 2005) which lists several principles considered essential to ensuring that RC/AL communities offer an environment that enhances the health status of their residents. One of these principles is the conduct

of a culturally sensitive evaluation of each new RC/AL resident within 30 days of admission by a qualified, licensed practitioner experienced in the care of older adults (AGS Health Care Systems Committee, 2005). This principle sets the stage for the continuing and essential involvement of primary physicians in the care of patients who are transitioning from living independently in the community into new residential arrangements that can be as unfamiliar for physicians as they are for RC/AL patients and their families. Unless and until it is clear that RC/AL communities -- as a cohesive sector of residential LTC -- are committed and capable of assessing their residents for falls risk, it is important for primary physicians to acknowledge that their own responsibility for assessing, managing and monitoring fall risks of their RC/AL patients is likely to be the same as for their patients living independently in the community.

Reimbursement was a concern for all fall prevention and monitoring activities, with physicians believing that neither they nor RC/AL staff was adequately reimbursed for these activities. With regard to fall risk assessments conducted by physicians, this finding could reflect a lack of awareness of Medicare's Physician Quality Reporting Initiative (PQRI) or a belief that the PQRI bonus (up to 1.5% of a health care provider's total Medicare charges) for routine screening and reporting of a patient risk of falling (Centers for Medicare and Medicaid Services, 2009) is inadequate. Perhaps better understanding or sufficiency of this reimbursement, coupled with cooperative and mutual responsibility with RC/AL staff for fall risk assessment, will facilitate a change in prevailing beliefs and actions among physicians with regard to fall prevention and monitoring among RC/AL patients.

While this is the first paper to explore physician perspectives on fall prevention and monitoring among RC/AL patients, certain limitations must be noted. Specifically, the limited response rate and modest overall sample raise the potential for self-selection bias and lack of generalizability. In an analysis of responders and non-responders to our survey, no significant differences were identified with regard to gender, age, U.S. medical school attendance, or medical school graduation year. However, there was a significant difference in area of specialization (Chi-

square=8.358, p=.015), with a higher proportion of non-responders (63%) identifying themselves as practicing in Internal Medicine as compared to responders (47%). Overall, it should be considered that the data reported in this paper are a beginning in the discussion of physician perspectives on fall prevention in assisted living.

Conclusion

RC/AL communities are a relatively new focus of aging research (Kane & Wilson, 2007; Kane, Chan, & Kane, 2007a) and within this new area of scholarly investigation physicians are among the least studied (Schumacher, 2006). This paper provides insights into how primary physicians currently view their own responsibilities and capabilities and those of RC/AL staff in an important area of quality improvement -- fall prevention and monitoring -- and can serve as a baseline for assessing where we are today and where we need to go in future development and implementation of best practices within this sector of residential long-term care.

Chapter IV
Fall Prevention and Monitoring Among Assisted Living Patients: An Exploratory Study of Physician Perspectives

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Introduction

For the frail elderly, falls and related injuries are common problems that increase in frequency and seriousness with advancing age. The incidence of falls rises dramatically from 9.5 per 100,000 for persons age 65-69 to 151.9 per 100,000 for persons age 85 and older (National Center for Injury Prevention and Control, 2009). Three risk factors for falls – hip weakness, unstable balance, and taking four or more medications – alone can increase the one-year risk of falling from 12% for older adults with none of these risk factors to as high as 100% for those with all three risk factors (Robbins et al., 1989).

Falls are of particular concern in residential long-term care (LTC) settings. Of the 1.5 million Americans in nursing homes (NHs), 45% are age 85 and older and 48% take nine or more medications a day (National Center for Health Statistics, 2009). An average of 43% of all NH residents fall at least once during the year, and 10-25% of these falls result in serious injury (Rubenstein, 2006).

Data on falls among the estimated one million residents of residential care/assisted living (RC/AL) communities in the U.S. (Polzer, 2009) are scarce, because these settings are not subject to the federal reporting requirements of nursing homes. However, there is evidence that RC/AL communities are increasingly admitting older adults with physical and cognitive impairments that mirror those of NH residents (Zimmerman et al., 2005a; Zimmerman et al., 2007). For example, a recent study of RC/AL residents found they had a mean age of 85 years, an average of 4.6 chronic health conditions, 55% had a diagnosis of dementia or Alzheimer's Disease, and 67% took more than

10 medications a day (Zimmerman et al., 2010). RC/AL communities are state-licensed residential care settings that provide housing and supportive services for persons who need assistance with activities of daily living but do not require the intensity of care available in skilled nursing facilities (Kane et al., 1993; Zimmerman et al., 2001). Thus, attention to fall prevention and monitoring in RC/AL communities is timely.

The Nursing Home Reform Act (U.S.Congress, 1987) requires all Medicare and Medicaid certified nursing homes to conduct a comprehensive geriatric assessment of every resident's functional, medical, psychosocial, and cognitive status, including their risk for falls. Federal regulations also require nursing homes to have a medical director, nurses and certain care practices. Other types of LTC settings -- such as RC/AL communities – are not subject to these federal regulations and vary widely in staffing and care practices according to state licensing requirements (Mollica et al., 2007) and local market conditions (Carder et al., 2009). As a consequence, the estimated 38,000 RC/AL communities in the U.S. included under this umbrella term range widely in facility size, nursing care, resident-case mix, and other characteristics (Mollica et al., 2007; Zimmerman et al., 2005a). This variability can be confusing for primary physicians needing to determine where their own responsibilities and those of individual RC/AL communities begin, end and interface in fall prevention and monitoring of RC/AL patients.

The purpose of this study was to use theory-based models to explore physician perspectives regarding their involvement in fall prevention and monitoring among RC/AL patients. Specifically, we studied three activities: (a) conducting fall risk assessments, (b) reviewing medications for potential side effects related to falls, and (c) talking and working with RC/AL staff to reduce the falls risk of individual RC/AL patients. Underlying assumptions of our study were that (a) the success of efforts to reduce falls and fall risks among RC/AL residents requires the effective involvement of primary physicians (Abt Associates, 2004; Boustani et al., 2003; Feinsod et al., 2005; Ouslander et al., 1994), and (b) the effective and sustained involvement of primary physicians in reducing fall risks

among RC/AL patients depends on the extent to which facilitators and barriers to their participation in fall prevention and monitoring are understood and addressed (Grol & Wensing, 2004).

Methods

The study was a cross-sectional survey of physicians identified by four RC/AL communities in North Carolina as the primary physicians for their residents. Data were collected through a mailed questionnaire. Items in the questionnaire were organized around constructs from the Theory of Planned Behavior/TPB (Ajzen, 1991), which posits that human *behavior* is most directly influenced by the individual's intention to engage in the behavior. *Intention*, in turn, is influenced by the individual's *beliefs* or perceptions about (a) positive or negative aspects of the behavior (*Attitudes*), (b) social pressures or expectations to engage in the behavior (*Subjective Norms*), and (c) inhibitors or facilitators of the behavior (*Perceived Behavioral Controls*). TPB and its precursor, the Theory of Reasoned Action/TRA (Fishbein & Ajzen, 1975), are among of the most widely tested theories of human behavior (Armitage & Conner, 2001) and are used increasingly in health services research to identify factors that influence the attitudes and behavior of both patients and healthcare providers.

Measures. Outcome measures were the physician's self-reported behavior (past) and intention (future) to engage in three fall prevention and monitoring activities. Self-reported *Behavior* was measured by asking physicians to estimate the percent of RC/AL patients, over the past six months, for whom they (a) conducted fall risk assessments, (b) reviewed medications for potential side effects related to falls, and (c) talked/worked with RC/AL staff to reduce fall risks of individual patients. *Intention* was measured by asking physicians to estimate the percent of new RC/AL patients, in the coming six months, for whom they intended to engage in these three fall prevention and monitoring activities.

For the "predictor" variables, we asked physicians about their beliefs -- *Attitudes, Subjective Norms*, and *Perceived Behavioral Controls* – regarding each of the three fall prevention and monitoring activities. *Attitude* questions (one item per activity) inquired about physician views regarding their responsibility for fall risk assessment, medications review, and talking/working with

RC/AL staff to reduce fall risks. *Subjective Norm* questions (four items per activity) inquired about perceived pressures or expectations to engage in fall prevention and monitoring of RC/AL patients, in general and with regard to three important referent groups – RC/AL patients and their families, RC/AL communities, and professional peers in the medical community. *Perceived Behavioral Control* questions (four items per activity) inquired about the ease or difficulty, time demand, reimbursement adequacy, and expertise associated with each fall prevention and monitoring activity.

Table 4.1 illustrates how the three belief constructs *(Attitudes, Subjective Norms*, and *Perceived Behavioral Controls)* were operationalized in the questionnaire, using the full set of items pertaining to "fall risk assessment" as an example. Similar questions were constructed for the other two fall prevention and monitoring activities -- "medications review" and "talking/working with RC/AL staff". The belief constructs were scored on a Likert-type scale, with response options ranging from 1 to 6. Responses on the higher end of the scale suggest beliefs favoring physician involvement in fall prevention and monitoring.

The term "assisted living" was used throughout the survey to reinforce the study's focus on RC/AL communities and not on nursing homes. To characterize the sample, items in the questionnaire inquired about the respondent's age, gender, race/ethnicity, medical school graduation year, attendance at a US medical school (yes, no), type of medical degree (MD, DO, Other), and specialty (Family Medicine, Internal Medicine, and Other).

Analyses. Univariate descriptive statistics were used to characterize the sample and summarize physician perspectives on their role in fall prevention and monitoring. Cronbach's alphas were calculated for TPB belief constructs measured through more than one item (*Subjective Norms* and *Perceived Behavioral Control*). Cross-tabs and ANOVA were used to analyze differences between responders and non-responders. Correlation coefficients were used for a preliminary exploration of relationships among variables.

Multiple regression analysis was used to test models of associations between the outcome variables (self-reported past *Behavior* and future *Intention*) and the belief variables (*Attitudes*,

Subjective Norms, and *Perceived Behavioral Control*), separately for each of the three fall prevention and monitoring activities (fall risk assessment, medications review, and talk/work with RC/AL staff). Self-reported past *Behavior* was explored both in terms of its association with future *Intentions* (as a predictor variable) and how it is influenced by belief variables (as an outcome variable). In Model One, self-reported *Behavior* was regressed on the belief variables. In Model Two, *Intention* was regressed on the belief variables. In Model Three, *Intention* was regressed first on the belief variables (Step One) and then on self-reported *Behavior* (Step Two).

All data were entered, managed and analyzed using SPSS for Windows, Version 17.0 (SPSS, 2009). The study was approved by the Institutional Review Board of the University of North Carolina at Chapel Hill.

Results

Sample. Of the 131 physicians invited to participate in the survey, 36 returned completed questionnaires (27% response rate). The majority of respondents were male (58%) and white (89%), with a median age of 52 years (range 33 to 77 years). Respondents specialized in Internal Medicine (47%), Family Medicine (25%) or another area (28%), and most (97%) attended a US medical school. An analysis of responders and non-responders found no significant differences with regard to gender, age, U.S. medical school attendance, or medical school graduation year – variables for which we had data on non-responders. However, we did find a significant difference with regard to area of specialization (Chi-square=8.358, p=.015), with a higher proportion of non-responders in Internal Medicine as compared to responders (63% vs. 47%). Looking at responders only, further analyses uncovered no significant differences by area of specialization in the outcome variables for each of the fall prevention and monitoring activities.

Cronbach's alpha. Cronbach's alphas for the multiple measures (4 items) of *Subjective Norms* and *Perceived Behavioral Control,* respectively, were calculated and found to be above the reliability threshold set at .70 (see Table 4.2). This enabled an aggregate *Subjective Norms* variable

and an aggregate *Perceived Behavioral Control* variable to be created by summing the multiple items for each construct.

Outcome variables. Table 4.2 presents descriptive statistics for the outcome and belief variables. Physicians reported that, over the past six months, they (a) assessed 47% of their RC/AL patients for falls risk, (b) reviewed medications for side effects related to falls for 73% of these patients, and (c) talked/worked with RC/AL staff to reduce the fall risks of 36% of their patients (self-reported *Behavior*). Physician *Intentions* in the coming six months were higher than self-reported *Behavior*, with respondents proposing to (a) conduct fall risk assessments for 75% of their new RC/AL patients, (b) review medications for 92% of these patients, and (c) talk/work with RC/AL staff on fall prevention for 62% of their new RC/AL patients (*Intention*). A review of psychometric properties found all outcome variables to be normally distributed, with the exception of physician *Intention* to review the medications of new RC/AL patients for potential side effects related to falls (Skewness = -3.088, Kurtosis = 9.952).

Belief variables. On a scale from 1 to 6, mean scores above 4.0 suggest moderately strong agreement and those above 5.0 suggest high agreement with various statements about primary physician involvement with fall prevention and monitoring of RC/AL patients. For findings reported in this section, means were calculated for the multiple measures of *Subjective Norms* and *Perceived Behavioral Controls*, respectively, to enable comparisons on a 6-point scale (see Table 4.2).

Physicians expressed strong support for their own role (*Attitude*) in medication review and talking/working with RC/AL staff (both mean 5.4) and moderate support for fall risk assessment (mean 4.3). Perceived expectations (*Subjective Norms*) were highest for medications review (mean 5.1) and more moderate for talking/working with RC/AL staff (mean 4.5) and fall risk assessment (mean 4.4). Physicians believed they had a moderate amount of control (*Perceived Behavioral Control*) over medication review (mean 4.3) but less control over talking/working with RC/AL staff (mean 3.5) and conducting fall risk assessments (mean 3.3). Further details on items in the questionnaire are reported elsewhere (Nyrop et al., 2010).

Associations among variables. Correlation coefficients (Kendall's tau-b as well as Pearson Product-Moment, in light of our finding of non-normal distribution of the data for *Intention* to conduct medication reviews) were computed for a preliminary investigation of bivariate associations among all variables, separately for each of the three fall prevention and monitoring activities. Results presented in Table 4.3 show that all correlations between belief and outcome variables were positive. For fall risk assessment, correlations were especially strong among TPB belief variables as well as between TPB belief and outcome variables, with Kendall's tau-b correlations ranging from .40 to .59 ($p<0.01$). For all three fall prevention and monitoring activities, each outcome measure was significantly correlated with at least two belief variables at the $p<.05$ level.

Models of self-reported behavior and intention. Multiple regression analysis was conducted to assess how belief variables (*Attitudes, Subjective Norms*, and *Perceived Behavioral Control*) were associated with self-reported *Behavior* and *Intention*, with analyses conducted separately for each fall prevention and monitoring activity. Results are presented in Table 4.4.

Model one: Physician beliefs associated with self-reported behavior. In Model One, *Behavior* was regressed on the three belief variables. The model accounted for 57% of the variance in *Behavior* related to fall risk assessment 30% of the variance in *Behavior* related to medications review and 31% related to talking/working with RC/AL staff. All models were statistically significant ($p<.05$). *Perceived Behavioral Control* was independently significant for fall risk assessment (Beta=.54, $p<.05$) and talking/working with RC/AL staff (Beta=.44, $p<.05$), while *Attitude* was independently significant for medication review (Beta=.40, $p<.05$).

Model two: Physician beliefs associated with intention. In Model Two, *Intention* was regressed on the three belief variables. This model explained 52% of the variance in *Intention* related to fall risk assessment,28% of *Intention* related to medication review and 29% related to talking/working with RC/AL staff. All models were statistically significant ($p<.05$). *Attitude* was independently significant for medication review (Beta=.37, $p<.05$).

Model three: Physician beliefs and self-reported behavior associated with intention. In the final model (Model Three), *Intention* was regressed hierarchically first on the belief variables (Step One) and then on self-reported *Behavior* (Step Two). The addition of *Behavior* to the model increased the amount of variance in *Intention* explained by the model by 8% for fall risk assessment (R^2 =.60), 7% for medications review (R^2 =.35), and 23% for talking/working with RC/AL staff (R^2 =.52). F Change from Step One to Step Two was significant for fall risk assessment (F Change=4.79, p<.05) and talking/working with RC/AL staff (F Change=9.70, p<.01), but not for medications review. All models were statistically significant (p<.05). *Attitude* (Beta=.41, p<.01) and past *Behavior* (Beta=.43, p<.01) were independently significant for *Intention* related to fall risk assessment, and past *Behavior* (Beta=.53, p<.01) was independently significant for *Intention* related to talking/working with RC/AL staff.

Discussion

RC/AL communities are a relatively new area of study within aging research (Kane et al., 2007a) and little is known about whether or how primary physicians are adjusting their own care practices to this still-evolving sector of residential long-term care (Schumacher, Eckert, Zimmerman, & Carder, 2005; Schumacher, 2006). The purpose of our study was gain insight into primary physician perspectives on an essential area of quality care for older adults in RC/AL communities – fall prevention and monitoring. Our specific focus was the identification of physician beliefs associated with their own intentions and self-reported behavior in three essential activities of fall prevention and monitoring: fall risk assessment, medication review, and talking/working with RC/AL staff to reduce fall risks.

Using a theory-based methodology, our models for each of the three activities were robust; underlying beliefs about each of the prevention and monitoring activities explained 30%-57% of the variance in physician self-reported *Behavior* and 28%-60% of the variance in *Intention*. These findings are in line with a meta-analysis which found that Theory of Planned Behavior variables, on

average, accounted for 31% of the variance in self-reported *Behavior* and 32% of the variance in *Intention* in a variety of settings and contexts (Armitage et al., 2001).

Our models also identified specific beliefs that were especially salient for each fall prevention and monitoring activity. Specifically, perceived control over facilitators or barriers to physician involvement (ease, time, reimbursement, and expertise) were independently significant and alone accounted for 43%-46% of the variance in self-reported *Behavior* with regard to fall risk assessment and talking/working with RC/AL staff – the two less frequently reported activities in our sample. By contrast, belief in the physician's responsibility (*Attitude*) was independently significant for medications review – the more frequently reported activity – and alone accounted for 40% of the variance in self-reported *Behavior* and 37% of the variance in *Intention*.

The practical implication of our study is that the findings from our TPB-based analysis of physician perspectives can be used to inform future interventions seeking to encourage fall prevention and monitoring among RC/AL patients. Within our sample of physicians, for example, an intervention seeking to increase the proportion of RC/AL residents who are assessed for falls risk would be well-advised to include a focus on addressing physician concerns about perceived barriers to engaging in this activity – specifically, their concerns about time and ease in doing assessments and the expertise of RC/AL staff. To address these concerns, an intervention could identify individual components of fall risk assessments that physicians agreed would be more effectively conducted by appropriately trained RC/AL staff, such as standardized assessments of resident function. The intervention would focus on securing sustained agreement from RC/AL community administrators to assume responsibility for these components and ensure that RC/AL staff are trained and monitored in the implementation of the agreed-to components. The intervention would also include the establishment of effective procedures for transmitting assessment results to the primary physician. Up-to-date information of physician reimbursement for fall risk assessments could also be included in the intervention, to address physician concerns about the adequacy of compensation for this activity.

Although our cross-sectional design was not able or intended to determine causal relationships, the relationships between belief ("predictor") and outcome variables in our sample were in line with expectations of the Theory of Planned Behavior. First, for each activity, all three belief variables were positively correlated with the two outcome variables – positive attitudes, perceived expectations, and perceived control over fall prevention and monitoring activities were associated with positive self-reported behavior and intentions to engage in fall prevention and monitoring activities. Second, our finding of significant correlations between *Intention* and self-reported *Behavior* for all three activities, ranging between $r=.35$ ($p<.05$) and $r=.60$ ($p<.01$), is in line with prior research showing a reliable association ($r=.47$) between these two variables (Armitage et al., 2001). The value of focusing on behavioral intentions derives from strong evidence that intentions are a reliable predictor of future behavior (Ajzen, 1991; Fishbein et al., 1975) and a recent meta-analysis which found that medium-to-large change in intention ($d=0.66$) leads to small-to-medium change in behavior ($d=0.36$) (Webb & Sheeran, 2006). While a longitudinal study design can more directly evaluate causality, most TPB/TRA-based studies to date pertaining to clinician behavior utilize a cross-sectional design, have intention or self-reported behavior as the outcome variable instead of actual behavior, and are focused on trying to understand rather than predict behavior (Perkins et al., 2007).

The limited response rate and final sample size of our study raise the potential for self-selection bias and problems of generalizability. To investigate the possibility of self-selection bias, we analyzed responders and non-responders and found a significant difference in regard to area of specialization. Further analysis of responders only uncovered no significant differences by area of specialization in the outcome variables for each of the fall prevention and monitoring activities. The analysis of potential self-selection bias was constrained by the limited number of variables for which we had data on non-responders. Further, we suggest caution in the interpretation of results pertaining to physician *Intention* to conduct medication reviews for new RC/AL patients, due to non-normal distribution of the data for that variable.

This study contributes to the literature pertaining to the usefulness of theory-based models in understanding, predicting and designing interventions to influence clinician behavior. Future research should aim to recruit a larger sample of physicians and include measures of (a) actual physician control over various fall prevention and monitoring activities (Ajzen, 1991), (b) physician knowledge of best practices in reducing falls and fall risks among older adults, and (c) actual physician behavior in fall prevention and monitoring among RC/AL patients.

Chapter V
Conclusion

The aims of the research presented in this dissertation were: (a) to identify the role of physicians in RCTs of multifaceted fall prevention interventions in LTC settings, (b) to characterize physician perspectives on their role and the role of RC/AL staff in fall prevention and monitoring of RC/AL patients, and (c) to develop theory-based models for understanding the self-reported behavior and intentions of physicians in fall prevention and monitoring of RC/AL patients. To pursue these aims, a systematic review of the literature was conducted to identify how and to what extent primary physicians have been included in trials testing multifaceted fall prevention interventions in LTC settings, and a survey was conducted to ascertain physician perspectives on (a) fall risk assessment, (b) medications review for potential side effects related to falls, (c) talking and otherwise working with RC/AL staff to reduce fall risks of individual RC/AL patients, and (d) communications from RC/AL staff with regard to patients who have experienced a fall or been identified as high risk for falls. This chapter presents a summary of key findings from the dissertation study, implications for research and practice, limitations of the study, and suggestions for future research.

Key Findings

Literature review. A review of RCTs of multifaceted fall prevention interventions in LTC communities identified eight studies. The earliest was conducted in 1990 (Rubenstein, Robbins, Josephson, Schulman, & Osterweil, 1990) and the remainder since 1997. Most of the studies were conducted with NH populations (N=3) or a mixture of NH and RC/AL populations (N=3); only two studies were conducted solely with populations equivalent to those of U.S. RC/AL communities. The results of the trials were promising but mixed, with four studies finding statistically significant positive intervention effects (Becker et al., 2003; Jensen et al., 2002; Neyens et al., 2009b; Ray et al.,

1997) and two trials reporting trends toward positive outcomes, although not at a level of statistical significance (Dyer et al., 2004; Rubenstein et al., 1990). Of the remaining trials, one study reported no significant difference between intervention and control groups (McMurdo et al., 2000) and the other study reported a statistically significant negative impact on falls (Kerse et al., 2004).

The eight trials can be characterized as consultant-intensive (fall risk assessment and associated recommendations were conducted by the research team or outside experts), staff-centered (focused on training and enabling existing LTC staff to conduct the assessments and make recommendations), or a hybrid of the two approaches. In all studies, information pertaining to physician involvement or physician-related outcomes was very limited. At best, primary physicians were recipients of recommendations from other experts, with some data presented on the uptake of recommendations. However, no analyses were conducted to identify an association between physician uptake of recommendations and results pertaining to falls and fallers. The overall impression is that primary physicians have not been a focus of fall prevention interventions in LTC settings to date.

Descriptive analysis. In the survey conducted for this dissertation, physicians expressed strong support for fall risk assessment of all RC/AL patients and a belief that assessments would uncover fall risks that might be preventable. Physicians reported conducting assessments of close to half of their RC/AL patients, perceived expectations from significant referent groups that they conduct assessments, and rated their own expertise in doing assessments higher than that of RC/AL staff. Nevertheless, they felt that RC/AL staff had greater responsibility and relatively more time and less difficulty in doing this activity. Physician beliefs regarding medications review, by contrast, were more consistent; physicians believed they themselves had the greater responsibility, time, ease and expertise as compared to RC/AL staff and that they were expected to do this activity. Physicians also believed they had a responsibility to talk and otherwise work with RC/AL staff to reduce the fall risks of individual patients, and that doing so could be effective in reducing falls. They perceived expectations to talk/work with RC/AL staff and believed they had the necessary expertise, although they expressed some concerns about the difficulty and time to do so.

Physicians expressed a strong belief in RC/AL staff responsibility for notifying primary physicians about RC/AL patients identified as high risk for falls or when a patient fall had required medical attention from someone other than the primary physician. They believed RC/AL staff had the time and expertise to make these notifications and that it was not difficult for them to do so. Physicians rated communications from RC/AL staff pertaining to fall incidents more helpful than communications about patients identified as high risk for falls. For all of these activities, physicians believed that neither they nor RC/AL communities were adequately reimbursed for their efforts. Physicians rated their familiarity with the policies, practices and programs of RC/AL communities as moderate, and expressed moderate interest in additional information and training pertaining to fall risks and reimbursement for seeing RC/AL patients.

Theory-based models. Models using constructs from the Theory of Planned Behavior (TPB) (Ajzen, 1991) explained 30-57% of the variance in physician self-reported (past) behavior and 28-60% of their (future) intentions with regard to three activities of fall prevention and monitoring among RC/AL patients: conducting fall risk assessments, reviewing medications for potential side effects related to falls, and talking/working with RC/AL staff to reduce fall risks for individual patients. The models also identified specific beliefs that were independently predictive of self-reported behavior. For example, perceived control over the activity – ease, time, expertise and reimbursement – was especially salient for the two less frequently reported activities (fall risk assessment and talking/working with RC/AL staff), while beliefs about physician responsibility were especially salient for the more frequently reported behavior (medication review). Perceived expectations from important referent groups – RC/AL patients and family, RC/AL communities, and professional peers – were not independently significant in any of the models. The addition of self-reported past behavior as a predictor of future intentions was statistically significant for fall risk assessment and talking/working with RC/AL staff, but not for medication review.

Contributions

The exploratory study presented in this dissertation contributes to the literature and to practice at several levels. First, the study contributes to the study of residential care/assisted living in the United States. RC/AL communities are still a relatively new focus of aging research (Kane et al., 2007a) and baseline data on care practices and quality improvement in these LTC settings are still relatively limited (Kane et al., 2007a; Zimmerman et al., 2003). Further, within this emerging area of research, the role of physicians who care for RC/AL residents is among the least investigated and only beginning to be recognized as a topic of scholarly research (Schumacher et al., 2005; Schumacher, 2006). It is an indication of the importance of this topic that the American Medical Directors Association (AMDA) recently released a white paper on the physician's role in assisted living (American Medical Directors Association, 2009). As a contribution to RC/AL research and practice, the dissertation study provides first data on physician behavior, intentions and beliefs regarding three essential activities in fall prevention and monitoring of RC/AL residents: fall risk assessment, medications review for potential side effects related to falls, and talking/working with RC/AL staff to reduce the fall risks of individual residents. These data can serve as a baseline for discussions about what the role of primary physicians could or should be in this important area of quality improvement.

The dissertation study also provides first data on physician beliefs about RC/AL staff involvement in fall prevention and monitoring. Particularly noteworthy is their conflicting belief about fall risk assessment; physicians believed RC/AL staff had greater responsibility as well as time and ease but also less expertise to do this activity. These conflicting opinions underscore the need for physicians to become more familiar with the activities and capabilities of RC/AL staff in important areas of quality improvement. Findings from the dissertation study, in general, point to the need for improved communication and cooperation between primary physicians and RC/AL staff in efforts to reduce falls and fall risks. These findings can inform both RC/AL communities interested in collaborating with primary physicians on quality improvement and AMDA's ongoing efforts to

identify, clarify and potentially recommend appropriate roles for physicians with patients in assisted living.

Second, the dissertation study contributes to implementation and dissemination research focused on interventions to influence physician behavior. The Theory of Planned Behavior is one of most tested of the psychosocial theories of human behavioral change, and its application to the topic at hand – three activities of physician involvement in fall prevention and monitoring among RC/AL patients – was especially robust. The dissertation study joins other studies illustrating the value of a TPB framework for understanding physician beliefs and behavior in clinical practice. The absence of theory in most interventions to influence clinician behavior has been identified as a major problem with current implementation research and a reason for continued frustration with the adoption of best practices in clinical care (Grimshaw, Eccles, & Walker, 2002; Grol, 2005). Theories that help identify barriers and facilitators to human behavior change provide an essential foundation for the design of evidence-based interventions to influence human behavior (Rimer & Glanz, 2005).

More specifically, the dissertation study contributes to implementation research and practice in fall prevention and monitoring within LTC settings. Prior studies have identified physician, patient and logistical factors that influence physician involvement in fall prevention and monitoring among older adults living in the community (Chou et al., 2005; Fortinsky et al., 2004; Tinetti et al., 2006) and barriers to quality improvement in nursing homes (Colon-Emeric et al., 2006; Colon-Emeric et al., 2007). With a focus on TPB constructs (variables that are amenable to change) and the performance of data as theorized, findings from the dissertation can be used to inform the design of future interventions aiming to encourage best practice in fall prevention and monitoring among RC/AL patients. Furthermore, the theory-based approach utilized in this dissertation is applicable to implementation and dissemination in other settings (not just RC/AL communities) and other targeted behaviors (not just fall prevention and monitoring) where physician practice with older adult patients is of interest.

Third, findings from the dissertation study can inform social work practice in RC/AL communities. The research points to the importance of understanding the capabilities and commitments of RC/AL communities in an important area of quality improvement for their residents – fall prevention and monitoring. An estimated 38,000 RC/AL communities (National Center for Assisted Living, 2008) provide homes and services for an estimated one million frail older adults (Polzer, 2009). RC/AL communities are not subject to the same federal regulations as those governing nursing homes; instead, they are licensed at the state level and have great latitude in determining their staffing and attention to quality of care (Mollica et al., 2007). The resulting wide variety in care policies and practices among RC/AL communities can be very confusing for RC/AL residents, families and physicians, which provides an opportunity for guidance from professional social workers. Findings from the dissertation research suggest, in particular, that fall risk assessment could benefit from social worker advocacy, to ensure the assessment takes place and an appropriate plan of action is put in place. For RC/AL communities, the engagement of professional social workers in the conduct of key components of the assessment may build physician confidence in the ability of RC/AL communities to identify residents at high risk for falls and to communicate these findings effectively to primary physicians.

Limitations

The research presented in this dissertation is exploratory; it was not an objective of the study to generate findings that are generalizable beyond the sample of physicians identified by four North Carolina RC/AL communities as the primary providers for their residents. Nevertheless, limitations associated with the response rate and final sample size must be noted. The response rate of 27.5% was below a conservative estimate of 30% for a physician survey (Foy et al., 2007), and the final sample size of 36 raises concerns about the overall power of the study. Adequate power proved not to be an issue for the analyses that were conducted; in light of robust findings from the regression analyses, power exceeded .80 for all six regression models (alpha=.05, three predictors, N=36). The study's limited response rate despite multiple strategies and repeated efforts to encourage participation in the

survey remains a concern and illustrates the substantial challenges in securing physician participation in health services research.

The limited response rate also raised the potential for self-selection bias. To investigate this concern, an analysis of responders and non-responders was conducted. No significant differences were identified with regard to gender, age, U.S. medical school attendance, or medical school graduation year – the only variables for which data were available on non-responders. It is possible that analysis of a larger set of descriptive variables might have identified additional significant differences. A significant difference between responders and non-responders was identified with regard to area of specialization (Chi-square=8.358, p=.015), with a higher proportion of non-responders (6%) identifying themselves as practicing in Internal Medicine as compared to responders (47%). Further analysis of the responder group only found no significant differences by area of specialization in the outcome variables for all three fall prevention and monitoring activities. A further limitation was the non-normal distribution of data pertaining to physician intention to conduct medication reviews for RC/AL patients in the coming six months.

Directions for Further Research

A recent initiative to set priorities for gerontological social work research (Burnette, Morrow-Howell, & Chen, 2003) identified "LTC policy" among its highest priority, including topics pertaining to housing/living arrangements and care settings:

> Ensuring safe, appropriate, affordable housing is an essential social work function, the urgency and complexity of which may grow as housing options and preferences expand with population aging. The identification of transitions across care settings as a unique topic is of particular note because older adults often move within and among care settings as the capacities and resources fluctuate. These transitions may also become more common and more complex as new levels and types of care evolve with changing needs, care philosophies, and policies. Current examples are the rapid growth of palliative care and assisted living settings. Social workers are well situated to examine the risks and challenges associated with these transitions. (Burnette et al., 2003) (p.834)

Reflecting this interest in emerging options in LTC communities and building on findings from the dissertation study, future research is proposed in three broad directions. One direction is primary physician-RC/AL staff communication and collaboration in quality improvement. The need for

improved communication between physicians and RC/AL staff has already been noted as both a need and a challenge (Kane et al., 2007b). Future research should focus not only on fall prevention and monitoring, but also on communication and collaboration in a variety of areas affecting resident quality of care and quality of life, such as dementia care (Zimmerman et al., 2005b), medication management (Carder et al., 2009; Sloane, Zimmerman, Brown, Ives, & Walsh, 2002), changes in physical and mental health status (Gruber-Baldini, Boustani, Sloane, & Zimmerman, 2004), and end of life decisions (Biola et al., 2007). Future research should focus on identifying methods of communication and collaboration that primary physicians consider especially helpful (timely, succinct, relevant and credible might be criteria for helpfulness). Research should also focus on identifying methods of communication and collaboration that are feasible and relevant for RC/AL staff, in light of competing demands for their time and potential limits on their access to communication modes (such as email, fax, voice mail, or texting).

A second direction for further research is the identification of current RC/AL policies and practices in fall prevention and monitoring. In particular, the larger facilities (greater than 16 bed capacity) built after 1987 – so-called "new model" RC/AL communities (Zimmerman et al., 2001) – owned and operated by corporations are likely to have policies focused on safety and medical care, including the prevention of falls. Very little data currently exist on the extent to which fall prevention policies are in place, what they emphasize, how they are communicated to the managers of individual RC/AL facilities, whether corporate policies include recommended practices, and how implementation is monitored and evaluated. The methodology used to collect these data could be applied to other areas of RC/AL-initiated quality improvement, as well. The objective of the research is to identify policies and practices that might serve as models for RC/AL-led quality improvement initiatives. The research could also inform public policy discussions regarding care practices and capabilities in RC/AL communities.

A third direction is comparative effectiveness analysis (CEA) of staff-centered approaches to fall risk assessment, monitoring and management in RC/AL communities. Staff-centered approaches

focus on educating and training existing LTC leaders and staff. Comparisons could be made between various components of fall prevention, monitoring and management, such as (a) fall risk assessment alone, (b) fall risk assessment plus environmental scan, (c) fall risk assessment plus exercise/movement programs. Multifaceted interventions are recommended for fall prevention and monitoring among older adults (American Geriatrics Society, 2001; American Medical Directors Association, 2003); however, sustained implementation of QI initiatives with multiple components may be overwhelming for RC/AL administrators and staff. The objective of the CEA study would be the identification of components or combinations of components that are the most effective in reducing falls and fallers. Data on costs of implementation should also be collected for cost-effectiveness analysis. Another approach to CEA could compare different teams responsible for fall risk assessment and monitoring, such as (a) RC/AL nurse coordinator and personal care attendants, (b) RC/AL nurse coordinator and personal care attendants plus social worker, (c) primary care providers, and (d) primary care providers with RC/AL staff.

In sum, there is strong evidence that multifaceted interventions targeted at multiple risk factors for falls can be effective in reducing falls, even among the frail elderly in LTC communities. The challenge now is effective and sustained implementation. The research presented in this dissertation points to the importance of including primary physicians in fall prevention initiatives and the need to include communication and collaboration between physicians and RC/AL staff as a key component of multifaceted interventions.

Appendix A
Tables

Table 2.1

Randomized Controlled Trials: Study Sites, Samples, Intervention Months, and Follow-Up

First Author (Year)	Country	No. of Sites/ Type of LTC	Residents Randomized	Intervention Months	Follow-Up Months
Becker (2003)	Germany	6 – High[1a]	981	12	12
Dyer (2004)	U.K.	20 – Lower[2a]	196	3-3.5	3, 12
Jensen (2002)	Sweden	9 – Mixed[3a]	439	2.75	8.5
Kerse (2004)	N. Zealand	14 – Mixed[3b]	628	6	12
McMurdo (2000)	U.K.	9 – Lower[2b]	133	6	7-12
Neyens (2009)	Netherlands	12 – High[1a]	518	12	12
Ray (1997)	U.S.	14 – High[1]	482	12	12
Rubenstein (1990)	U.S.	1—Mixed[3c]	160	unclear	3, 12, 24

[1]High: High-dependency population -- U.S. nursing homes or [1a]equivalent to U.S. nursing homes

[2]Lower: Lower-dependency population -- equivalent to US residential care/assisted living ([2a]U.K. residential homes for older people which do not specialize in the elderly mentally ill or provide nursing services. [2b]Scottish residential homes.)

[3]Mixed: Mixture of lower and high-dependency populations ([3a]Swedish residential care facility residents who are disabled by cognitive or physical impairment and therefore require supervision, functional support, or nursing care. [3b]New Zealand residential care homes that included low-dependency rest homes or hostels, high-level private hospitals or nursing homes, and complexes with both low- and high-dependency populations. [3c]U.S. long-term care facility providing multiple levels of care).

Table 2.2

Randomized Controlled Trials: Intervention Components

Author	Staff Education	Fall Risk Assessment	Medication Review	Exercise/ Activity	Environmental Scan	Other	Total
Becker	◊	◊		◊	◊	hip protector	5
Dyer	◊	◊	◊	◊	◊	vision; podiatry	6
Jensen	◊	◊	◊	◊	◊	aids; hip protect.	6
Kerse	◊	◊	◊		◊	logo	6
McMurdo		◊	◊	◊	◊	vision	5
Neyens	◊	◊	◊	◊	◊	aids	6
Ray	◊	◊	◊		◊	aids	5
Rubenstein	◊	◊	◊		◊		4

Table 2.3

Randomized Controlled Trials: Results Pertaining to Falls and Fallers (adapted from Cusimano et al. 2008)

Trial	Falls	Fallers	Recurrent Fallers
Becker	Total - IG:547, CG:1399	IG:188 (37%), CG:247 (52%)	> 2 falls/year
IG (N) = 509	Incidence density rate/1000 RY	RR=0.75 (CI=0.57-0.98) (p=.038)	IG:66 (13%), CG:115 (24%)
CG (N) = 472	IG:1399, CG:2558	Incidence per 1000 RY	RR=0.56 (0.35-0.89) (p=.015)
	RR=0.55 (CI=0.41-0.73) (p<.001)	IG:481, CG:645	Incidence per 1000 RY - IG:169,
CG:300			
Dyer	IG:194 total; per person/year=2.17	IG:56 (55%), CG:51 (54%)	≥3 falls/year
IG (N) = 102	(CI=1.32-3.01)	ICC=0.071	IG:26 (25%), CG:25 (27%)
CG (N) = 94	CG:266 total; per person/year=4.02	OR=1.03 (CI=0.59-1.80) (p=0.942)	ICC=0.029
	ICC=0.10 (p=0.272)		OR=0.94 (CI=0.50-0.79) (p=0.279)
Jensen	OR for falling=0.62 (CI=0.42-0.91)	IG:82 (44%), CG:109 (56%)	Falls per resident - range
IG (N) = 188	AdjOR=0.49 (CI=0.37-0.65)	RR=0.78 (CI=0.64-0.96)	IG:0-16, CG:0-26
CG (N) = 196	Total falls – IG:273, CG:346		>1 fall - IG:48 (26%), CG:64 (33%)
	Incidence per 1000 person/days		OR=0.71 (CI=0.37-1.34)

Trial	Falls	Fallers	Recurrent Fallers
	IG:6.7, CG:8.3		AdjOR=0.58 (CI=0.38-0.39)
	IRR=0.7 (CI=0.51-1.10)		
	AdjIRR=0.60 (CI=0.50-0.73)		
	Time to 1st fall HR=0.71 (CI=0.54-0.94)		
	AdjHR=0.66 (CI=0.54-0.79)		
Kerse	Falls/RY Baseline (5 months)	IG:173 (56%); CG:103 (43%)	
IG (N) = 309	IG:2.9 (SD=7.1), CG:2.3 (SD=7.8)	(p=.018)	1-2 falls - IG:96 (31%), CG:59 (25%)
CG (N) = 238	Intervention Period		3-15 falls – IG:68 (22%), CG:40 (17%)
	IG:4.1 (SD=13.2), CG:2.3 (SD=7.1)		>15 falls – IG:9 (3%), CG:4 (2%)
	IRR=1.34 (CI=1.06-1.72)		
McMurdo	Median # of falls (range)	IG:20 (38%), CG:22 (58%) (p=0.09)	Residents w/ ≥3 falls
IG (N) = 77	IG:0 (0-13), CG:1 (0-11)	OR=0.45 (CI=0.19-1.14)	IG:13 (25%), CG:9 (24%)
CG (N) = 56	Cumulative # of falls		OR=1.07 (CI=0.40-2.97)
	IG:68, CG:67		

Trial	Falls	Fallers	Recurrent Fallers
	Falls/person – IG:1.31, CG:1.76 (p=0.097) Falls/person/week) – IG:0.058, CG:0.074 (p=0.165)		
Neyens IG (N) = 249 CG (N) = 269	Falls/patient – IG:2.09, CG:2.54 RR=0.79 (CI=0.43-1.47) (p=0.459) Adj. RR=0.64 (CI=0.43-0.96) (p=0.029) IG falls/patient/year by length of intervention >0.0 yrs - 2.05, RR=0.54 (CI=0.38-0.78) (p=0.001) >0.3 yrs - 1.91, RR=0.53 (CI=0.34-0.81) (p=0.004) >0.5 yrs - 1.69, RR=0.47 (CI=0.26-0.86) (p=0.015) >0.7 yrs - 1.52, RR=0.43 (CI=0.19-0.94) (p=0.033)		

Trial	Falls	Fallers	Recurrent Fallers
Ray IG (N) = 221 CG (N) = 261	Injurious falls rate IG:14%, CG:20% 31% lower (CI=24.6%-86.4%) (p=0.22)		Proportion of recurrent fallers IG:44%, CG:54% 19% lower (CI=2.4%-35.8%) (p=0.03) RR=0.81 (calculated by Cumming et al., 2002)
Rubenstein IG (N) = 79 CG (N) = 81	RR=0.95 (calculated by Cumming et al. 2002) Mean # of falls – One-year IG:2.49 (SD=.36), CG:2.63 (SD=.40) Two-year – IG:4.09 (SD=.53), CG:4.51 (SD=.53)	0ne-year # of fallers– IG:56 (71%), CG:61 (75%) (CI=-9.3-18.1)	Two-year # of fallers – IG:64 (81%), CG:68 (84%) (CI=-8.9-14.7)

Note. IG = intervention group; CG = control group. SD=standard deviation. RY=resident years. RR=relative risk or rate ratio. ICC = intra-cluster correlation. OR=odds ratio; AdjOR=adjusted odds ratio. IRR=incidence rate ratio; AdjIRR=adjusted incidence rate ratio. HR=hazard ratio; AdjHR=adjusted hazard ratio. IRR=incident rate ratio.

Table 3.1

Physician Perspectives on the Role of Primary Physicians and RC/AL Staff in Fall Prevention and Monitoring of RC/AL Patients (N=36)

Item	Mean (SD)
Fall Risk Assessment (FRA) of RC/AL patients	
All RC/AL patients should be assessed for falls risk[1]	5.7 (0.9)
The leadership at most RC/AL communities is committed to reducing fall risks among their residents[1]	4.5 (1.0)
Attitude	
Primary physicians are responsible for conducting FRAs[1]	4.3 (1.7)
RC/AL staff are responsible for conducting FRAs[1]	5.6 (0.9)
Knowing an RC/AL patient's falls risk will result in specific actions by the primary physician[2]	5.1 (1.0)
Knowing an RC/AL patient's falls risk will result in specific actions by the RC/AL staff[2]	4.6 (0.9)
FRAs will uncover risks that might be preventable[1]	4.8 (0.9)
Perceived Constraints	
It is easy for primary physicians to do FRAs[3]	3.7 (1.7)
It is easy for RC/AL staff to do FRAs[3]	4.6 (1.1)
Primary physicians have the time to do FRAs[1]	3.3 (1.7)
RC/AL staff have the time to do FRAs[1]	4.4 (1.0)
Primary physicians are reimbursed for doing FRAs[1]	1.9 (1.4)
RC/AL staff are reimbursed for doing FRAs[1]	2.4 (1.4)
Primary physicians have the expertise to do FRAs of RC/AL patients[1]	4.4 (1.5)
RC/AL staff have the expertise to do FRAs of RC/AL patients[1]	3.9 (1.3)
Social Pressures	
RC/AL patients/families expect primary physicians to do FRAs[1]	4.8 (1.2)
RC/AL communities expect primary physicians to do FRAs[1]	4.6 (1.3)
It is the prevailing standard among professional peers that primary physicians do FRAs[1]	4.1 (1.5)

Item	Mean (SD)
Medication Review (MR) for potential side effects related to falls	
Attitude	
Primary physicians are responsible for doing medication reviews for side effects related to falls[1]	5.4 (1.0)
RC/AL staff are responsible for doing medication reviews for side effects related to falls[1]	4.6 (1.2)
Medication reviews will uncover medications with potential side effects related to falls[1]	5.1 (1.0)
Perceived Constraints	
It is easy for primary physicians to do medication reviews for side effects related to falls[3]	4.9 (1.0)
It is easy for RC/AL staff to do medication reviews for side effects related to falls[3]	3.9 (1.2)
Primary physicians have the time to do medication reviews for side effects related to falls[1]	4.6 (1.3)
RC/AL staff have the time to do medication reviews for side effects related to falls[1]	3.7 (1.2)
Primary physicians are reimbursed for doing medication reviews for side effects related to falls[1]	2.5 (1.8)
RC/AL staff are reimbursed for doing medication reviews for side effects related to falls[1]	2.3 (1.3)
Primary physicians have the expertise to do medication reviews for side effects related to falls[1]	5.2 (1.1)
RC/AL staff have the expertise to do medication reviews for side effects related to falls[1]	3.3 (1.5)
Social Pressures	
RC/AL patients/families expect primary physicians to do medication reviews for side effects related to falls[1]	5.4 (0.8)
RC/AL communities expect primary physicians to do medication reviews for side effects related to falls[1]	5.3 (1.0)
It is the prevailing standard among professional peers that primary physicians do medication reviews for side effects related to falls[1]	4.7 (1.4)
Physicians Talking and Working with RC/AL Staff about fall prevention and monitoring among high-risk RC/AL patients	
Attitude	
Primary physicians should talk/work with RC/AL staff [1]	5.4 (1.2)
Talking/working with RC/AL staff will reduce the number of falls[1]	4.8 (0.9)

Item	Mean (SD)
Perceived Constraints	
It is easy for primary physicians to talk/work with RC/AL staff[3]	3.8 (1.5)
Primary physicians have the time to talk/work with RC/AL staff[1]	3.7 (1.6)
Primary physicians are reimbursed for talking/working with RC/AL staff[1]	1.8 (1.4)
Primary physicians have the expertise to talk/work with RC/AL staff[1]	4.8 (1.4)
Social Pressures	
RC/AL patients/families expect primary physicians to talk/work with RC/AL staff[1]	5.1 (1.0)
RC/AL communities expect primary care physicians to talk/work with RC/AL staff[1]	4.7 (1.1)
It is the prevailing standard among professional peers that primary physicians to talk/work with RC/AL staff[1]	4.2 (1.5)
RC/AL Staff Responsibilities for Notifying Primary Physicians about their RC/AL patients	
Attitude	
RC/AL staff are responsible for notifying primary physicians about patients at high-risk for falls[1]	5.6 (1.0)
RC/AL staff are responsible for notifying primary physicians about incidents requiring medical attention from someone other than the primary physicians[1]	5.7 (0.9)
Perceived Constraints	
With regard to notifying primary physicians about their RC/AL patients at high-risk for falls	
It is easy for RC/AL staff to notify primary physicians[3]	5.1 (1.0)
RC/AL staff have the time to notify primary physicians[1]	4.7 (1.1)
RC/AL staff are reimbursed for notifying primary physicians[1]	2.5 (1.5)
RC/AL staff have the expertise to notify primary physicians[1]	4.8 (1.1)
With regard to notifying primary physicians about incidents requiring medical attention from someone other than the primary physician	
It is easy for RC/AL staff to notify primary physicians[3]	5.4 (0.9)
RC/AL staff have the time to notify primary physicians[1]	5.3 (1.0)
RC/AL staff are reimbursed notifying primary physicians[1]	2.8 (1.8)

Item	Mean (SD)
RC/AL staff have the expertise to notify primary care physicians[1]	5.3 (1.1)
Communications from RC/AL Staff to Primary Physicians	
When a resident has been identified as high-risk for falls	
Helpful[1]	3.6 (1.6)
Right amount[1]	3.4 (1.5)
When a resident has required medical attention from someone other than the primary physician	
Helpful[1]	5.4 (0.8)
Right amount[1]	5.9 (1.2)

[1]Response option, scale 1-6 -- strongly disagree to strongly agree.
[2]Response option, scale 1-6 -- very unlikely to very likely.
[3]Response option, scale 1-6 -- very difficult to very easy.

Table 3.2

Physician Perspectives on Additional Information and Training (N=36)

Item	Mean (SD)
You (primary physician) are familiar with the policies, practices and programs of RC/AL communities[1]	3.3 (1.7)
Interest in Additional Information and Training[2]	
Coding and billing for visits to see patients at an RC/AL setting	3.2 (1.9)
Coding and billing for office visits of RC/AL patients	3.8 (2.0)
Potential for multiple medications to increase the risk for falls	3.5 (1.8)
Specific medications that may increase the risk for falls	3.7 (1.9)
Specific medical conditions that may increase the risk for falls	3.6 (1.8)
Role of physical therapy in reducing falls risk	4.0 (1.7)
Coding for Medicare reimbursement for physical therapy services for RC/AL patients	3.0 (1.9)
Policies, programs and practices of RC/AL setting related to fall prevention and monitoring	3.6 (1.7)

[1]Response option, scale 1-6 – strongly disagree to strongly agree.
[2]Response option, scale 1-6 – not at all interested to very interested.

Table 4.1

Theory of Planned Behavior (TPB) Constructs Operationalized: Fall Risk Assessment (Example)

Constructs
Behavior/Self-Reported Behavior (one item)
Over the past six months, for approximately what percent of your patients in assisted living did you do an assessment of their falls risk? (percent)
Intention (one item)
Over the next six months, for approximately what percent of your new patients in assisted living do you intend to assess their falls risk? (percent)
Attitude (one item)
It is the primary physician's responsibility to assess the falls risk of their patients in assisted living. (strongly disagree = 0 to strongly agree = 6)
Subjective Norms (four items)
In general, it is expected that you, the primary physician, do fall risk assessments of your assisted living patients. (strongly disagree = 0 to strongly agree = 6)
In general, your assisted living patients and their families think you, as the primary physician, should assess the falls risk of your assisted living patients. (strongly disagree = 0 to strongly agree = 6)
In general, assisted living facilities think you, as the primary physician, should assess the falls risk of your assisted living patients. (strongly disagree = 0 to strongly agree = 6)
It is the prevailing community standard among your professional peers that you, as the primary physician, should assess the falls risk of your assisted living patients. (strongly disagree = 0 to strongly agree = 6)

Constructs

Perceived Behavioral Control (four items)

How difficult or easy is it for you to do fall risk assessments of your assisted living patients. (very difficult = 0 to very easy = 6)

You have the time to do fall risk assessments of your assisted living patients. (strongly disagree = 0 to strongly agree = 6)

You are adequately reimbursed for doing fall risk assessments of your assisted living patients. (strongly disagree = 0 to strongly agree = 6)

You have the expertise to do fall risk assessments of your assisted living patients. (strongly disagree = 0 to strongly agree = 6)

Table 4.2

Primary Physician Perspectives on Their Role in Three Activities of Fall Prevention and Monitoring Among RC/AL Patients (N=36)

Item	N	Mean	SD	Cronbach's Alpha
Outcomes				
Behavior (% of RC/AL patients over the past 6 months)				
Fall Risk Assessment	32	46.8	40.7	
Medications Review	32	72.7	32.1	
Talk/Work with RC/AL Staff	32	36.2	39.8	
Intention (% of RC/AL patients in the coming 6 months)				
Fall Risk Assessment	33	73.3	35.6	
Medications Review	33	92.1	19.8	
Talk/Work with RC/AL Staff	33	62.5	38.5	
Beliefs				
Fall Risk Assessment				
Attitude (Scale: 1 to 6)	36	4.3	1.7	
Subjective Norms–aggregated variable (Scale: 1 to 24)	35	17.6	4.4	.8
Mean of four items (Scale: 1 to 6)		4.4		
Perceived Behavioral Control--aggregated variable (Scale: 1 to 24)	36	13.3	4.8	.8
Divided by 4 (Scale: 1 to 6)		3.3		
Medications Review				
Attitude (Scale: 1 to 6)	36	5.4	1.0	
Subjective Norms--aggregated variable (Scale: 1 to 24)	35	20.5	3.1	.7
Mean of four items (Scale: 1 to 6)		5.1		
Perceived Behavioral Control-- aggregated variable (Scale: 1 to 24)	36	17.2	3.8	.7
Divided by 4 (Scale: 1 to 6)		4.3		

Item	N	Mean	SD	Cronbach's Alpha
Talk/Work with RC/AL Staff				
Attitude (Scale: 1 to 6)	36	5.4	1.2	
Subjective Norms--aggregated variable (Scale: 1 to 24)	34	18.1	3.7	.7
Mean of four items (Scale: 1 to 6)		4.5		
Perceived Behavioral Control--aggregated variable (Scale: 1 to 24)	36	14.1	4.3	.7
Mean of four items (Scale: 1 to 6)		3.5		

Table 4.3

Correlations (Pearson Product-Moment and Kendall's Tau-b) Between Belief Variables and Outcome Variables (N=36)

	Intention	Self-Reported Behavior	Attitude	Subjective Norms
	Pearson Product-Moment Correlation Coefficients			
Fall Risk Assessment				
Intention	1.00			
Self-Reported Behavior	.67**	1.00		
Attitude	.67**	.61**	1.00	
Subjective Norms	.64**	.62**	.52**	1.00
Perceived Behavioral Control	.60**	.75**	.67**	.68**
Medication Review				
Intention	1.00			
Self-Reported Behavior	.50**	1.00		
Attitude	.49**	.51**	1.00	
Subjective Norms	.18	.14	.13	1.00
Perceived Behavioral Control	.42*	.42*	.40*	.35*

	Intention	Self-Reported Behavior	Attitude	Subjective Norms
Talk/Work with RC/AL Staff				
Intention	1.00			
Self-Reported Behavior	.64**	1.00		
Attitude	.47**	.29	1.00	
Subjective Norms	.30	.36*	.12	1.00
Perceived Behavioral Control	.43*	.53**	.28	.31

Kendall's Tau-b Correlation Coefficients

Fall Risk Assessment				
Intention	1.00			
Self-Reported Behavior	.59**	1.00		
Attitude	.47**	.48**	1.00	
Subjective Norms	.46**	.51**	.40**	1.00
Perceived Behavioral Control	.44**	.58**	.54**	.52**

	Intention	Self-Reported Behavior	Attitude	Subjective Norms
Medication Review				
Intention	1.00			
Self-Reported Behavior	.35*	1.00		
Attitude	.41*	.35*	1.00	
Subjective Norms	.28	.12	.18	1.00
Perceived Behavioral Control	.29*	.30*	.34*	.27*
Talk/Work with RC/AL Staff				
Intention	1.00			
Self-Reported Behavior	.60**	1.00		
Attitude	.34*	.30	1.00	
Subjective Norms	.18	.36*	.26	1.00
Perceived Behavioral Control	.34*	.41**	.38*	.23

*p< 0.05 level
**p< 0.01 level

Table 4.4

Models of Primary Physician Perspectives on Fall Prevention and Monitoring: Self-Reported Behavior and Intention (N=36)

	Model One: Behavior Regressed on TPB Variables				Model Two: Intention Regressed on TPB Variables				Model Three: Intention Regressed on TPB Variables (Step One) and Behavior (Step Two)			
Variables	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.
<u>Fall Risk Assessment</u>												
Attitude	2.49	4.40	0.10	0.11	8.69	4.35	0.40	0.35	8.89*	4.12	0.41	0.40*
Subjective Norm	1.72	1.72	0.18	0.19	2.70	1.58	0.33	0.31	2.46	1.56	0.29	0.30
Per'd Behavioral Control	4.34*	1.59	0.54	0.46*	0.49	1.55	0.07	0.06	-1.81	1.72	-0.25	-0.21
Self-Reported Behavior									0.39*	0.18	0.43	0.40*
	F=12.04**				F=9.93**				F=9.523**			
	R^2=.57				R^2=.52				R^2=.60			
	Adjusted R^2=.52				Adjusted R^2=.46				Adjusted R^2=.54			
									F Change=4.79*			

	Model One: Behavior Regressed on TPB Variables				Model Two: Intention Regressed on TPB Variables				Model Three: Intention Regressed on TPB Variables (Step One) and Behavior (Step Two)			
Variables	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.
<u>Medications Review</u>												
Attitude	21.05*	9.40	0.40	0.40*	12.11*	5.82	0.37	0.37*	9.39	6.59	0.28	0.27
Subjective Norm	-0.14	2.01	-0.01	-0.01	0.10	1.20	0.01	0.02	0.30	1.27	0.04	0.05
Per'd Behavioral Control	1.98	1.56	0.24	0.24	1.29	0.96	0.25	0.24	0.73	1.04	0.14	0.14
Self-Reported Behavior									0.18	0.12	0.28	0.28
	F=3.89*				F=3.69*				F=3.32*			
	R^2=.30				R^2=.28				R^2=.35			
	Adjusted R^2=.22				Adjusted R^2=.21				Adjusted R^2=.24			
									F Change=2.17			

	Model One: Behavior Regressed on TPB Variables				Model Two: Intention Regressed on TPB Variables				Model Three: Intention Regressed on TPB Variables (Step One) and Behavior (Step Two)			
Variables	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.	Unstd. Beta	Std. Error	Std. Beta	Partial Corr.
Talk/Work with RC/AL Staff												
Attitude	2.57	7.79	0.06	0.06	14.46	7.96	0.34	0.33	12.17	6.76	0.30	0.34
Subjective Norm	1.99	2.06	0.18	0.19	0.62	1.99	0.06	0.06	0.82	1.82	0.07	0.09
Per'd Behavioral Control	3.76*	1.54	0.44	0.43*	2.39	1.56	0.27	0.28	-0.05	1.49	-0.01	-0.01
Self-Reported Behavior									0.53**	0.17	0.53	0.54**
	F=3.94*				F=3.66*				F=6.40**			
	R^2=.31				R^2=.29				R^2=.52			
	Adjusted R^2=.23				Adjusted R^2=.21				Adjusted R^2=.44			
									F Change=9.70**			

*p< 0.05 level
**p< 0.01 level

Appendix B
Figure

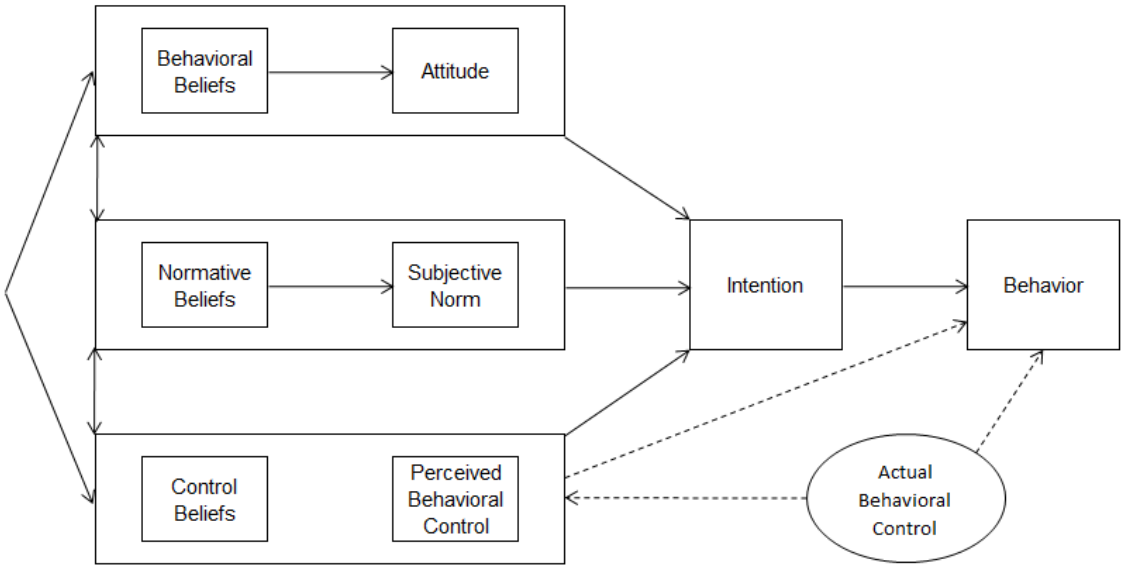

Figure 1. Theory of Planned Behavior. Source: http://www.people.umass.edu/aizen/tpb.html (Aizen 2006).

Appendix C
Physician Questionnaire – Assisted Living

This survey is part of a project we are conducting in several assisted living residences. The goal is to learn about the assessment, prevention and management of falls among older adults (age 65 and older) who live in these facilities. You have been asked to participate because you have one or more patients in these facilities, so that we can learn from you how physicians fit into the overall picture of falls prevention and management and what physicians think about this topic in general. The questionnaire will take no more than 15 minutes of your time.

All questions relate to the care of your patients ages 65 and older in assisted living facilities. "You" refers to "you or your staff". Response options for most questions will range from 1 through 6.

In this first section, please indicate whether you disagree or agree with the following statements, on a scale from 1 = strongly disagree to 6 = strongly agree. We are interested in your opinion on these statements.

1. All patients in assisted living facilities should be assessed for falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree
2. It is the primary care physicians' responsibility to …	
a. assess the risk for falls of their patients in assisted living.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. review the medications of assisted living patients specifically for potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. consider and prescribe available alternatives to medications with potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. consider and prescribe physical therapy, when appropriate, for patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
3. It is the assisted living facility's responsibility to …	
a. assess their residents for falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. identify medications with potential side effects related to falls and notify the primary care physician.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. notify the primary care physician when they have identified a resident at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. notify the primary care physician when a resident has experienced a fall requiring medical attention from someone other than the primary care physician.	1 2 3 4 5 6 Strongly disagree Srongly agree
4. Primary care physicians should talk and work with assisted living staff to prevent and manage falls risk for their individual patients.	1 2 3 4 5 6 Strongly disagree Strongly agree

For the next set of questions, the response options range from 1 = very unlikely to 6 = very likely.

5. How unlikely or likely is it that …	
a. a falls risk assessment will uncover risks that might be preventable?	1 2 3 4 5 6 Very unlikely Very likely
b. knowing a patient's risk level for falls will result in specific actions by you to reduce that risk?	1 2 3 4 5 6 Very unlikely Very likely
c. knowing a patient's risk level for falls will result in specific actions by the assisted living facility to reduce that risk?	1 2 3 4 5 6 Very unlikely Very likely
d. a review of medications will uncover medications with potential side effects related to falls?	1 2 3 4 5 6 Very unlikely Very likely
e. appropriate and available alternatives to medications with potential side effects related to falls will be identified and prescribed?	1 2 3 4 5 6 Very unlikely Very likely
f. physical therapy, when appropriate, will reduce the risk for falls among patients identified as high risk?	1 2 3 4 5 6 Very unlikely Very likely
g. talking and working with assisted living staff to prevent and manage falls will be effective in reducing the number of falls?	1 2 3 4 5 6 Very unlikely Very likely

For the next set of questions, the response options range from 1 = very difficult to 6 = very easy.

6. How difficult or easy is it for you to …	
a. do fall risk assessments of assisted living patients?	1 2 3 4 5 6 Very difficult Very easy
b. identify medications with potential side effects related to falls?	1 2 3 4 5 6 Very difficult Very easy
c. identify and prescribe available alternatives to medications with potential side effects related to falls?	1 2 3 4 5 6 Very difficult Very easy
d. consider and prescribe physical therapy, when appropriate, for patients at high risk for falls?	1 2 3 4 5 6 Very difficult Very easy
e. talk and work with assisted living staff to prevent and manage falls risk?	1 2 3 4 5 6 Very difficult Very easy

For the following questions, the response continue to be from 1 = very difficult to 6 = very easy.

7. In general, how difficult or easy is it for assisted living facilities to …	
a. assess their residents for falls risk?	1 2 3 4 5 6 Very difficult Very easy
b. identify medications with potential side effects related to falls and notify the primary care physician?	1 2 3 4 5 6 Very difficult Very easy
c. notify the primary care physician when they have identified a resident at high risk for falls?	1 2 3 4 5 6 Very difficult Very easy
d. notify the primary care physician when a resident has experienced a fall requiring medical attention from someone other than the primary care physician?	1 2 3 4 5 6 Very difficult Very easy

Please indicate whether you disagree or agree with the following statements, on a scale from 1 = strongly disagree to 6 = strongly agree.

8. You have the time to …	
a. do fall risk assessments of your assisted living patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. review medications for potential side effects related to falls and prescribe available alternatives to these medications.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. consider and prescribe physical therapy for assisted living patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. talk and work with assisted living staff to prevent and manage falls risk among resident patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
9. You are adequately reimbursed for …	
a. doing fall risk assessments of your assisted living patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. reviewing medications for potential side effects related to falls and prescribing available alternatives to these medications.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. considering and prescribing physical therapy for assisted living patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. talking and working with assisted living staff to prevent and manage falls risk among resident patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
10. You have the expertise to …	
a. do fall risk assessments of your assisted living patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. review medications for potential side effects related to falls and prescribe available alternatives to these medications.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. consider and prescribe physical therapy for assisted living patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. talk and work with assisted living staff to prevent and manage falls risk among resident patients.	1 2 3 4 5 6 Strongly disagree Strongly agree

For the following questions, the response options continue to be 1 = strongly disagree to 6 = strongly agree.

11. Assisted living facilities have the time to …	
a. assess their residents for falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. identify medications with potential side effects related to falls and notify the primary care physician.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. notify the primary care physician when they have identified a resident at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. notify the primary care physician when a resident has experienced a fall requiring medical attention from someone other than the primary care physician.	1 2 3 4 5 6 Strongly disagree Strongly agree
12. Assisted living facilities are reimbursed for …	
a. assessing their residents for falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree

b. identifying medications with potential side effects related to falls and notifying the primary care physician.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. notifying the primary care physician when they have identified a resident at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. notifying the primary care physician when a resident has experienced a fall requiring medical attention from someone other than the primary care physician.	1 2 3 4 5 6 Strongly disagree Strongly agree
13. Assisted living facilities have the expertise to …	
a. assess their residents for falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. identify medications with potential side effects related to falls and notify the primary care physician.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. notify the primary care physician when they have identified a resident at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. notify the primary care physician when a resident has experienced a fall requiring medical attention from someone other than the primary care physician.	1 2 3 4 5 6 Strongly disagree Strongly agree

In this section, we are asking you about the proportion of your assisted living patients.

14. Over the past six months, for approximately what percent of your assisted living patients did you …	
a. do an assessment of their risk for falls?	percent
b. review their medications for potential side effects related to falls?	percent
c. prescribe available alternatives for medications with potential side effects related to falls?	percent
d. prescribe physical therapy, when appropriate, for assisted living patients at high risk for falls?	percent
e. talk and work with the assisted living staff to reduce the risk for falls among patients at high risk for falls?	percent

For the following statements, please indicate whether you disagree or agree, from 1 = strongly disagree to 6 = strongly agree.

15. In general, it is expected that you, as the primary care physician …	
a. do fall risk assessments of your assisted living patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. review the medications of assisted living patients for potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. prescribe available alternatives to medications that have potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. consider and prescribe physical therapy, when appropriate, for assisted living patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
e. talk and work with assisted living staff to prevent and manage falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree

16. In general, your assisted living patients or their families think you, as the primary care physician, should …	
a. assess the risk for falls of your assisted living patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. review the medications of assisted living patients for potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. prescribe available alternatives to medications that have potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. prescribe physical therapy, when appropriate, for assisted living patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
e. talk and work with assisted living staff to prevent and manage falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree
17. In general, assisted living facilities think you, as primary care physician, should …	
a. assess the risk for falls of your assisted living patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. review the medications of assisted living patients for potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. prescribe available alternatives to medications that have potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. prescribe physical therapy, when appropriate, for assisted living patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
e. talk and work with them to prevent and manage falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree
18. It is the prevailing community standard among your professional peers that you, as primary care physician, should …	
a. assess the risk for falls of your assisted living patients.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. review the medications of assisted living patients for potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
c. prescribe available alternatives to medications that have potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. prescribe physical therapy, when appropriate, for assisted living patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
e. talk and work with assisted living staff to prevent and manage falls risk.	1 2 3 4 5 6 Strongly disagree Strongly agree

Please indicate whether you disagree or agree with the following statements, ranging from 1 = strongly disagree to 6 = strongly agree. Again, we are interested in your opinion on these statements.

19. The leadership at most assisted living facilities is committed to reducing the risk for falls among their elderly residents.	1 2 3 4 5 6 Strongly disagree Strongly agree
20. In general, communications (faxes, emails, phone calls) from assisted living facilities to your office are helpful with regard to …	
a. identifying patients at high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
b. identifying medications that may have potential side effects related to falls.	1 2 3 4 5 6 Strongly disagree Strongly agree

c. recommending physical therapy for patients identified as high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. letting you know when a patient has experienced a fall that required medical attention from someone other than you or your staff.	1 2 3 4 5 6 Strongly disagree Strongly agree
21. In general, communications (faxes, emails, phone calls) from assisted living facilities to your office are the right amount (not too many or too few) with regard to …	
a. identifying patients at high risk for falls?	1 2 3 4 5 6 Strongly disagree Strongly agree
b. identifying medications that may have potential side effects related to falls?	1 2 3 4 5 6 Strongly disagree Strongly agree
c. recommending physical therapy for patients identified as high risk for falls.	1 2 3 4 5 6 Strongly disagree Strongly agree
d. letting you know when a patient has experienced a fall that required medical attention from someone other than you or your staff.	1 2 3 4 5 6 Strongly disagree Strongly agree
22. You (primary care physician being interviewed) are very familiar with the policies, practices and programs of assisted living facilities.	1 2 3 4 5 6 Strongly disagree Strongly agree

In this section, we are asking you about the proportion of your assisted living patients.

23. Over the next six months, for approximately what percent of your new patients in assisted living do you intend to …	
a. assess their risk for falls?	percent
b. review their medications specifically for potential side effects related to falls?	percent
24. Over the next six months, for approximately what percent of your patients in assisted living do you intend to …	
a. prescribe available alternatives for medications with potential side effects related to falls?	percent
b. prescribe physical therapy, when appropriate, for patients at high risk for falls?	percent
c. talk and work with the assisted living staff to prevent and manage falls risk among resident patients at high risk for falls?	percent

In this next set of questions, we are asking if you or your staff would be interested in receiving additional information or training in certain topics. The response options range from 1 = not at all interested to 6 = very interested.

25. In terms of receiving additional information or training for you or your staff, how uninterested or interested would you be in the following:	
a. Coding and billing for visits to see your patients at an assisted living facility.	1 2 3 4 5 6 Not at all interested Very interested
b. Coding and billing for office visits of assisted living patients.	1 2 3 4 5 6 Not at all interested Very interested
c. The potential for multiple medications to increase the risk for falls among assisted living residents.	1 2 3 4 5 6 Not at all interested Very interested

d. Specific medications that may increase the risk for falls among assisted living residents.	1 2 3 4 5 6 Not at all interested Very interested
e. Specific medical conditions that may increase the risk for falls among assisted living residents.	1 2 3 4 5 6 Not at all interested Very interested
f. The role of physical therapy in reducing the risk for falls among assisted living residents.	1 2 3 4 5 6 Not at all interested Very interested
g. Coding for Medicare reimbursement for physical therapy services provided to assisted living patients.	1 2 3 4 5 6 Not at all interested Very interested
h. Policies, programs and practices of assisted living facilities related to falls prevention and management.	1 2 3 4 5 6 Not at all interested Very interested

To conclude this survey, we would appreciate a bit of information about you and your practice, so we can describe the participants in this survey.

26. What type of medical degree do you have? 1 = MD 2 = DO 3 = Other _____

27. What is your specialty?
1 = Family Practice 2 = Internal Medicine (list subspecialty: _____)
6 = Other _____

28. Do you have a Certificate of Special Competency in Geriatric Medicine from the American Board of Internal Medicine or the American Board of Family Medicine?
1 = no 2 = yes

29. Have you been certified by the American Medical Directors Association (AMDA)?
1 = no 2 = yes

30. Did you attend a US medical school? 1 = no 2 = yes

31. In what year did you graduate? 19 ___ ___

32. Gender: 1 = Male 2 = Female

33. In what year were you born? 19 ___ ___

34. Are you Hispanic or Latino/Latina? 1 = Hispanic or Latino 2 = Not Hispanic or Latino

35. What is your race? Please select one or more.
1 = American Indian or Alaska Native 2 = Asian
3 = White 4 = Black or African American
5 = Native Hawaiian or other Pacific Islander 6 = Other _____

36. Approximately what percent of your office visits are patients over age 65? _____

37. Approximately how many of your patients reside in a nursing home? _____

38. Approximately how many of your patients reside in an assisted living facility? _____

39. Approximately what percent of your assisted living patients do you most often see at the facility instead of your office? _____

40. Approximately how many patients are in your practice? _____

Would you like you share a specific incident or two that you think is particularly relevant in describing falls risk prevention or management for your patients who live in assisted living? Is there anything we may have missed that you would like to share with us?

Thank you very much for taking the time to participate in this survey. Please use the self-addressed envelope to return your completed questionnaire to:

Kirsten Nyrop
c/o Digestive Diseases
CB 7080
Chapel Hill, NC 27599-7080

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