A Quality Improvement Project Using

Fall Management Algorithms in Long-Term Care

by

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Abstract

Background: Falls have been an ongoing and reportable problem in long-term care facilities. Moreover, falls can lead to serious physical, psychological and financial consequences for residents, their families and the staff. Each resident has individual risk factors that may lead to falling. Multifactorial interventions, or strategies that target multiple risk factors for falls, have been shown to reduce the number of falls and are recommended for fall prevention and management. The initial step in fall prevention and management includes identifying each resident's risk factors upon admission into the facility, and after each fall.
Local Problem: The medical administrators from a Mid-Atlantic facility expressed a need for a fall prevention and management intervention because of the increased number of falls, despite frequent changes to the facility's fall management protocol. The latest protocol included fall risk assessment upon admission and fall incident documentation by nurses after each fall. The purpose of this project was to improve fall management in a long-term care unit through implementing the Post Fall Algorithm and reinforcing the Fall Assessment Algorithm with the goals of improving identification of fall risk factors, compliance on post-fall algorithms and overall reducing the number of falls.
Interventions: The quality improvement project occurred over a 10-week period in a 33-bed long-term care unit located in a Mid-Atlantic facility. Participants included the certified nursing assistants, certified medicine assistants, registered nurses, nursing administration and providers. The first two weeks included collecting baseline data, recruiting of champions, and training of participants on the algorithms and the fall forms. The Fall Assessment Algorithm provided the staff with a list of intrinsic and extrinsic fall risk factors. The Post Fall Algorithm listed the process to complete forms and assessments within 72 hours after a resident fall. The algorithms were implemented during weeks three through ten, and the impact was monitored by tracking fall rates and compliance with the process of the post-fall algorithm. Descriptive statistics were used to analyze the completion of the Post Fall Algorithm, and determination of trends on fall incidences through the data on the forms. The generated report on fall incidence was analyzed to determine the relationship between the implementation of the algorithm and the fall incidence in the long-term care unit.
Results: There was an overall decrease in the average number of falls in the unit from before ($\bar{x}$=3.33) to after ($\bar{x}$=2.63) implementation of the Post Fall Algorithm, accompanied by more than 75% staff compliance on documentation of the post fall forms. An inverse relationship was noted between staff compliance and the number of falls. Incidental finding included that the majority of the falls happened in the resident's room (90%) and during a change in position (86%).
Conclusion: Identifying each individual's risk factors for falls and performing comprehensive evaluation by a proactive multidisciplinary team after a fall are important in developing individualized plans of care and may potentially reduce the number of falls.

Keywords: *falls, long-term care, nursing home*

Introduction

Falls have been an ongoing and reportable problem in long-term care (LTC) facilities (Centers for Medicare and Medicaid Services [CMS], 2015). Moreover, falls can lead to serious physical, psychological and financial consequences for the residents, their families and the staff (Agency for Healthcare Research & Quality [AHRQ], 2014). Assessing and addressing each resident's risk factors for falls is recommended to reduce fall risk, as well as minimize injuries related to falls (American Medical Directors Association [AMDA], 2011).

Background and Significance

Globally each year, approximately 646,000 individuals die from falls, the second leading cause of unintentional injury deaths next to road traffic accidents (World Health Organization [WHO], 2018). In the United States, one out of four elderly people suffer from falls each year (Centers for Disease Control and Prevention [CDC], 2017). With the growing elderly population, there is not only an increase in the number of falls, but also an increased economic burden on medical costs related to falls. The average cost of hospitalization from a fall is $30,000, and Medicare spent $50 billion in total medical costs for falls during 2015 (Florence et al., 2018). Falls among the elderly have also been linked to increased morbidity and mortality. One out of five falls among the elderly population results in a serious injury, such as a traumatic brain injury or hip fracture (CDC, 2017).

A fall is defined as "an event which results in a person coming to rest inadvertently on the ground or floor or other lower level" (WHO, 2018, p.1). Falls are a major safety concern in LTC facilities. In 2014, there were approximately 1.4 million residents in LTC with the majority of the population aged 65 years and older, and approximately 50% of those having cognitive impairment (CDC, 2016). The CMS (2013) reported that about 15% of LTC residents in the United States had documented falls and 5% of those experienced serious injuries. According to

the AHRQ (2014), there are several risk factors related to falls in nursing home residents. These include the characteristics of many LTC residents, such as having the diagnosis of dementia or gait, balance and vision impairments. The more risk factors involved, the more likely a resident will fall (AHRQ, 2014). Therefore, it is important that the staff in the LTC unit are aware of the risk factors for falls to be able to address these factors and prevent falls.

Despite frequent changes to the fall prevention and management protocol in a Mid-Atlantic facility, there had not been a decrease in the number of falls. Current practice in the Mid-Atlantic facility included a fall risk assessment on each resident upon admission, and after each fall, nurses conducted fall incident reports and weekly medical evaluations. Multifactorial interventions, or strategies that target multiple risk factors for falls, have been shown to reduce the number of falls and are recommended for fall prevention and management (Burland, Martens, Brownell, Doupe, & Fuchs, 2013; Jung, Shin, & Kim, 2014; Liang et al., 2017; Neyens et al., 2009; Vlaeyen et al., 2015). However, in order to develop multifactorial interventions, the initial step in fall prevention and management includes timely identification of each resident's fall risk factors upon admission and after every fall.

Project Purpose and Goals

The purpose of this Doctor of Nursing Practice (DNP) project was to develop, implement and evaluate the use of fall management algorithms (see Appendix B and C). Since the Mid-Atlantic facility had already established their fall risk assessment upon admission, the focus of the algorithms was on the roles of the providers, administrators and nurses in the timely assessment of risk factors after a resident fall. Expected outcomes included at least 75% compliance in documentation of the steps in the Post Fall Algorithm and a decrease in the number of falls.

Conceptual Framework – Knowledge to Action (KTA) Framework

The Knowledge to Action Framework (KTA) (Graham et al., 2006) is a conceptual framework that was developed to facilitate the application of evidence-based practices. There are two main concepts in this framework: knowledge creation and action. The concept of knowledge creation is in a form of an inverted triangle that represents a funnel for processing knowledge into three different phases: inquiry, synthesis and tools. Knowledge inquiry is primary or raw information, which is then synthesized and appraised into products or tools, such as practice guidelines, that are tailored to meet the needs of the stakeholders. The concept of action reflects the different activities for implementing the knowledge. It has seven phases in a cycle: identify a problem and select the knowledge relevant to the problem; adapt the knowledge to the local context; assess barriers; select, tailor and implement intervention; monitor knowledge use; evaluate the outcomes; and sustain knowledge use (Graham et al., 2006). These phases are connected by giving room for feedback between the phases. The concepts of knowledge creation and action are also connected in such a way that local and external knowledge can affect and contribute to the modifications of each phase of the action cycle (Graham et al., 2006).

Utilization of the KTA Framework

The KTA framework was used in this DNP project to provide an organizing structure for the implementation plan. The seven phases of the action cycle were utilized throughout the implementation period of this DNP project. The problem of falls had been identified in a LTC facility. Evidence recommended to conduct an assessment of risk factors through fall management algorithms. The algorithms were then processed and tailored to adapt to the context of the LTC facility. Next, the involvement of the administrators during the planning phase helped identify facilitators and address potential barriers to make necessary modifications. As feedback

was emphasized in the KTA framework, a plan to overcome barriers helped ensure that the unit and staff needs were addressed prior to implementation. Once their needs were addressed, executing and monitoring the implementation of the algorithms was done through the help of the unit champion. After implementation, evaluating the outcomes and analyzing the trends of fall occurrences helped determine the impact of the algorithms on falls. Lastly, the sustainability plan was embedded in the facility's culture.

Literature Review

The evidence to support the different components of the clinical algorithms (Appendix B and C) was the focus of this literature review. The review begins with discussing the importance of assessing the risk factors for falls upon admission and after each resident fall from two different guidelines, followed by discussing the importance of accurate documentation of fall risk factors and post fall assessments, as well as implications for nursing staff. See Appendix A for the Evidence Summary Table.

The American Medical Directors Association [AMDA] (2011) developed a clinical practice guideline (CPG) for falls and fall risk in LTC facilities. The CPG includes a comprehensive step-by-step approach that starts with helping the LTC staff identify and understand risk factors for falls, as well as to select appropriate interventions to address risk factors. The CPG further emphasizes the role of an interdisciplinary team approach, including nurses and providers, as well as selecting champions and creating an implementation team to initiate and implement the CPG. Part of the CPG also includes the systematic approach to conducting post fall assessments, which includes determining the nature and causes of the fall through analyzing the resident's risk factors for falling. Despite being more than five years old,

this guideline was specifically developed for the LTC setting and has provided comprehensive and detailed information that are still adapted by LTC facilities.

In a similar way, Jung et al. (2014) also developed a fall prevention guideline on risk factors and interventions for falls in LTC facilities. The researchers developed a three-stage algorithm to guide nurses on how to assess for fall risk for newly admitted residents. The algorithm starts with identifying common risk factors based on the literature review: history of previous falls, polypharmacy, balance and gait problems, and dementia. Then, the algorithm proceeds with suggesting interventions associated with the risk factors, such as medication management and exercise. Lastly, those who have more risk factors are then prompted for a more comprehensive evaluation by the nurses. Similar to the AMDA guideline, this guideline can be generalized to the LTC population, but there is still a need to evaluate for feasibility across the LTC facilities.

The two guidelines have stressed the importance of assessing risk factors for falls, but Koduru, Saiyed and Goberdhan (2016) stressed the importance of accurately documenting the risk factors for falls in LTC facilities. They conducted a quality improvement study in a 250-bed nursing home and addressed the inaccurate documentation of risk factors which resulted in falls. They designed a new fall assessment protocol and early intervention for nurses, which then resulted in a 6% decrease in falls after three months of implementation.

In line with the AMDA guidelines on post fall assessments, Gray-Miceli, Ratcliffe and Johnson (2010) evaluated the use of post fall assessment tools in assisted living and skilled nursing facilities. They developed a 30-item post fall index (PFI) to prevent falls and to determine perceptions of feasibility by nurses. After a year of implementation, their study resulted in a 29.4% reduction in the fall rate ($p < .001$), 27.6% decline in total falls ($p < .001$) and

34% decline in recurrent fallers (p=.025). The researchers attributed the success of the PFI to 100% compliance of the nursing staff with documentation of PFI. Also, the researchers believe that active involvement of the nurses in determining possible causes of falls and directing plans of care have also contributed to the success of the PFI. Despite lack of randomization, generalizability and the study being more than 5 years old, Gray-Miceli et al. (2010) effectively presented their study with a thorough description and analysis, as well as providing clear limitations of the study.

Literature Synthesis

Overall, there was consistent evidence to support the importance of assessing risk factors before and after a resident fall (AMDA, 2011; Jung et al., 2014). Furthermore, the evidence also suggested the importance of accurate and timely documentation of risk factors for falls to be able implement interventions as necessary (Koduru et al., 2016; Gray-Miceli et al., 2010). Lastly, actively involving the staff in evidence-based interventions may result in promising outcomes as evidenced by the study of Gray-Miceli et al. (2010).

Project Description

This quality improvement project was implemented in the 33-bed LTC unit of a Mid-Atlantic facility, which also consisted of a post-acute unit. In addition to using the Fall Assessment Algorithm as a guide, this project implemented the Post-Fall Algorithm with a sample of nurses, administrators and providers employed to work in the LTC unit of the facility.

Procedures and Timeline

The project was implemented over a ten-week period. The first week consisted of an initial meeting with the Director of Nursing, clinical site representative and the identification of a champion, who was the Assistant Director of Nursing for the LTC unit. In addition, the first and

second weeks included orientation and training on the components of the fall management algorithms conducted by the project leader to the staff nurses, providers and administrators. The certified medicine assistants and geriatric nursing assistants were also given an overview of the project with a focus on the risk factors for falls. Badge cards were given to the staff, and posters of the algorithms were placed in the nurses' station to help serve as a reminder. Weeks three through ten included the implementation of the fall management algorithms, particularly the Post Fall Algorithm, which was to be conducted on every resident fall in the unit. The project leader and champion were available for questions or comments from the staff throughout the implementation period.

Data Collection

Reports on the number of falls were generated by the champion and presented to the project leader bi-monthly. The Post Fall Algorithm consisted of three forms that were completed by the staff within 72 hours after a resident fall to help identify risk factors that may have contributed to the resident's fall. The Fall Incident Report and Physical Assessment forms (see Appendix D and E) were used by the champion and project leader to document the nurse's assessment on a resident after a fall. The Fall Incident Report form consists of details on the resident's fall, such as prior activity, the time of day and location where the fall occurred. The Physical Assessment form allows the nurse to conduct and document the physical exam on the resident after the fall to check for any injuries, and to assess the environment of where the fall occurred. The Comprehensive Assessment form (see Appendix F) allows the administrators and providers to review the resident's medical history, including medications, sensory and functional status, as well as create an action plan to prevent any recurrent falls. The author of these tools

have granted permission to use these forms through electronic mail correspondence for the purpose of this project (see Appendix G).

Data Analysis

After the data was tallied into the different audit tools (see Appendix H), data cleansing was conducted to check for any missing or duplicate values. Descriptive statistics were used to analyze the compliance of staff in each step of the fall algorithm. Content analysis and descriptive analysis seeking common trends in the characteristics of the falls were completed by the project leader. Lastly, the weekly number of falls were arranged in a run chart and analyzed for trends over time. Since the data included a different set of residents from pre- to post-implementation, other statistical tests were not performed. Instead, a run chart was used to analyze the relationship between the number of falls and staff compliance with the algorithms.

Human Subjects Protection

Plans for data security and confidentiality included safekeeping of forms and ensuring de-identified data collection. Upon tallying and documenting the data into the audit tools, each resident was provided a de-identified ID number. The project leader's device that was used for data collection and analysis was a password protected computer and contained an antivirus software to help prevent security breaches. A project description was submitted to the University of Maryland Baltimore Institutional Review Board for a Non-Human Subjects Research Determination. At the same time, approval to implement the project was sought from the Mid-Atlantic facility.

Results

The results discuss the characteristics of the staff in the LTC unit and their compliance rate with the Post Fall Algorithm, the characteristics of the falls that occurred during

implementation, and lastly, the comparison of the number of falls before and after implementation.

Table 1 lists the number and characteristics of staff (n=24) who were trained on the fall management algorithms. Approximately over a third of the staff who work at the LTC unit were geriatric nursing assistants (n=9; 37.5%). Out of the trained licensed practical nurses (n=7), 42.8% (n=3) of them were agency nurses or those who were contracted by the facility to work for a specific amount of time.

A total of 21 falls occurred during the implementation period. Table 2 presents the staff compliance on the steps of the post-fall management algorithm. The staff compliance rate was based on the timeframe submitted (within 72 hours) and completion of all required areas of the forms. Majority (95%) of the Fall Incident Report, Physical Assessment and Comprehensive Medical Evaluation forms were initiated by the nurses and providers. However, it was noted that only 76% of the Fall Incident Report, 86% of the Physical Assessment and 75% of the Comprehensive Medical Evaluation forms have complete documentation. Some of the missing areas included: observed issues prior to falling, speech and mental status assessment, and medication review and evaluation. There was one missing Comprehensive Medical Evaluation form because the provider decided to complete one form since the resident fell twice within two days.

The characteristics of the falls were also explored through descriptive statistics. Figure 1 illustrates the percentage of falls by shift and day. More than half (52%) of the falls occurred during the evening shift (3 to 11 pm) compared to the morning (7 to 3 pm; 29%) and night (11 to 7 am; 19%) shifts. There was no difference to the number of falls that occurred for each day of the week (weekdays 62% vs. weekends 38%). Figure 2 presents the percentage of falls by

location and activity. Out of the 21 falls, most (90%) of the falls happened within the resident's private area, either the room (n=15) or bathroom (n=4). Furthermore, the majority (86%) of the falls happened during an attempted transfer in position by the resident. Examples of transferring activities include attempting to get out of bed to a wheelchair and attempting to stand from a wheelchair to grab items in drawer or closet. The other fall incidences (14%) included an unlatched wheelchair armrest and slipping from sleeping on the wheelchair.

Upon comparing the number of falls before and after implementation, there was a slight decrease in the average number of falls per week. Figure 3 illustrates the run chart that tracked the weekly number of falls before and after training of staff. The first six weeks represents the data from four weeks before implementation and two weeks of training of the staff. There were no major shifts or trends, but there was an unexpected increase in falls from week 11 (n=2) to 12 (n=5). In analyzing the relationship between staff compliance and the number of falls (Figure 4), there was a decrease in staff compliance rate on the post-fall management algorithms during the weeks with the greatest number of falls: weeks 12 (n=5) and 13 (n=6).

Discussion

This quality improvement project provides additional support on the importance of having a proactive multidisciplinary team in fall prevention and management in a LTC unit. In line with the AMDA clinical practice guideline (2011), one of the key drivers in this project was the support and buy-in from the Medical Administrators. Not only leadership support, but also the cooperation of the frontline staff through the assistance of a champion is important in implementing fall management programs (Gray-Miceli et al., 2010; Jung et al., 2014). In addition, the required number of forms were initially seen as a barrier for this project. However, a study on fall documentation quality by Carroll, Dykes and Hurley (2012) supports the notion

that the simplicity of the forms and the convenience of electronic documentation contributed to the increased staff compliance.

Similar to previous studies by Koduru et al. (2016) and Gray-Miceli et al. (2010), identification of fall risk factors and accurate documentation after a resident fall were some of the key points of the implemented Post Fall Algorithm that resulted in a slight overall decrease in the total number of falls during the implementation period. Variations in the number of falls can be brought about by several factors. For this project, there was an inverse relationship between staff compliance and the number of falls on weeks 12 and 13. Unfortunately, staff turnover has also been a factor for decreased staff compliance and increased fall rates for other quality improvement projects (Anderson et al., 2012). Also, changing of unit priorities may also have contributed to these results as evidenced by the visitation of state nursing home inspectors which resulted in the shift of priorities by the champion. In future projects, more than one champion may be beneficial in project implementations to adjust for unexpected situations.

The lack of significance in the fall occurrence to time and day may be attributed to the different change of shift times for nurses and nursing assistants on the unit. However, the increased number of falls in the resident's room or bathroom and during position changes prompts for future projects on this topic area.

Limitations of this project include a shortened implementation time due to changes in leadership, limited generalizability to the nursing home population, social desirability bias, restricted data collection and weekly medical evaluations conducted by the staff. Since the staff were aware of the project timeline, there may have been a potential for social desirability bias that contributed to the increased staff compliance. In agreement with the project policy of the facility, the demographic characteristics and medical history of the residents in the LTC unit

were not disclosed to the project leader. Also, the facility was also conducting weekly medical evaluations on residents with active needs, such as recent falls, infections or transfers to a different level of care. These weekly evaluations included the participation by the Medical Director, Nursing Administrators and Therapy Department Heads. It is important to consider that these limitations may have affected the results of this project.

Future recommendations relate to the limitations in the implementation of the project. First, having a longer implementation time may help the LTC unit analyze the prolonged effectiveness of the algorithms. Second, additional outcomes should be allotted to analyzing the demographic and medical history characteristics of the residents to help determine relatability to other long-term care units. Third, identifying the number of repeated falls and the interventions used may add or supplement to the current evidence on falls management. Lastly, it may also be beneficial to study the feasibility and effectiveness of conducting weekly multidisciplinary medical evaluations on falls, which may be potentially added to the fall management algorithms.

Conclusion

Identifying each individual's risk factors for falls and performing comprehensive evaluation by a proactive multidisciplinary team after a fall are important in developing individualized care plans and may potentially reduce the number of falls. Proactive staff compliance and stakeholder buy-in on fall management is vital in the success of established fall management protocols and policies. Sustainability measures include implementing the algorithms as part of the new staff orientation and using the algorithms as a tool for annual falls management competency. Also, falls data surveillance should be conducted to identify new trends that can result in the need for further investigation to help address fall incidences in a specific unit. The fall management algorithms may be tailored to the capabilities and needs of other LTC settings and may be found useful and beneficial depending on the resident population.

Implications for future projects may include analyzing the relationship between falls and implementation of strengthening programs and transferring techniques on LTC residents.

References

Agency for Healthcare Research and Quality [AHRQ]. (2014). Module 3: falls prevention and management. Retrieved from https://www.ahrq.gov/professionals/systems/long-term-care/resources/facilities/ptsafety/ltcmod3sess1.html#knowing

American Medical Directors Association [AMDA]. (2011). Falls and fall risk clinical practice guidelines.

Anderson, R.A., Corazzini, K., Porter, K., Daily, K., McDaniel Jr., R.R., & Colon-Emeric, C. (2012). CONNECT for quality: protocol of a cluster randomized controlled trial to improve fall prevention in nursing homes. Implementation Science, 7 (11). doi:10.1186/1748-5908-7-11

Booth, V., Hood, V., & Kearney, F. (2016). Interventions incorporating physical and cognitive elements to reduce falls risk in cognitively impaired older adults: a systematic review. *The Joanna Briggs Institute,* 110-135. DOI: 10.11124/JBISRIR-2016-002499

Burland, E., Martens, P., Brownell, M., Doupe, M., & Fuchs, D. (2013). The evaluation of a Fall Management Program in a nursing home population. *The Gerontologist, 53*(5), 828-838. doi:10.1093/geront/gns197

Carroll, D.L., Dykes, P.C., & Hurley, A.C. (2012). An electronic fall prevention toolkit: Effect on documentation quality. *Nursing Research, 61*(4), 309-313. DOI: 10.1097/NNR.0b013e31825569de

Centers for Disease Control and Prevention [CDC]. (2016). Long-Term care providers and services users in the United States: Data from the National Study of Long-Term Care Providers, 2013–2014. Retrieved from https://www.cdc.gov/nchs/data/series/sr_03/sr03_038.pdf

Centers for Disease Control and Prevention [CDC]. (2017). Important facts about falls. Retrieved from https://www.cdc.gov/homeandrecreationalsafety/falls/adultfalls.html

Centers for Medicare and Medicaid Services [CMS]. (2013). Nursing home data compendium 2013 edition. Retrieved from https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/CertificationandComplianc/downloads/nursinghomedatacompendium_508.pdf

Centers for Medicare and Medicaid Services [CMS]. (2015). MDS 3.0 for Nursing Homes and Swing Bed Providers. Retrieved from https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/NHQIMDS30.html

Florence, C. S., Bergen, G., Atherly, A., Burns, E., Stevens, J., & Drake, C. (2018). Medical costs of fatal and nonfatal falls in older adults. *Journal of American Geriatrics Society*. doi:10.1111/jgs.15304

Graham, I.D., Logan, J., Harrison, M.B., Straus, S.E., Tetroe, J., Caswell, W., & Robinson, N. (2006). Lost in knowledge translation: Time for a map? *The Journal of Continuing Education in the Health Professions*, 26, 13-24. DOI: 10.1002/chp.

Gray-Miceli, D., Ratcliffe, S.J., & Johnson, J. (2010). Use of a postfall assessment tool to prevent falls. *Western Journal of Nursing Research, 32* (7), 932-948. DOI: 10.1177/0193945910370697

Huang, T.T., Chung, M.L., Chen, F.R., Chin, Y.F., & Wang, B.H. (2016). Evaluation of a combined cognitive-behavioural and exercise intervention to manage fear of falling among elderly residents in nursing homes. *Aging & Mental Health, 20*(1), 2-12. http://dx.doi.org/10.1080/13607863.2015.1020411

Jung, D., Shin, S., & Kim, H. (2014). A fall prevention guideline for older adults living in long-term care facilities. *International Nursing Review, 61,* 525-533. https://doi.org/10.1111/inr.12131

Koduru, S., Saiyed, S., & Goberdhan, B. (2016). Reduction of falls in nursing home by improvement in fall assessment accuracy and early nursing interventions leading to improved quality of life and substantial cost reduction and improved quality of life. *Journal of American Medical Directors Association, 17,* B12-B22.

Liang, C.K., Chou, M.Y., Chen, L.Y., Wang, K.Y., Lin, S.Y., … , Loh, C.H. (2017). Delaying cognitive and physical decline through multidomain interventions for residents with mild-to-moderate dementia in dementia care units in Taiwan: a prospective cohort study. *Geriatrics Gerontology International, 17*(1), 36-43. doi: 10.1111/ggi.13035

Neyens, J.C., Dijcks, B.P., Twisk, J., Schols, J.M., Van Haastregt, J.C., … , De Witte, L.P. (2009). A multifactorial intervention for the prevention of falls in psychogeriatric nursing home patients, a randomized controlled trial (RCT). *Age and Ageing, 38,* 194-199. doi: 10.1093/ageing/afn297

Nuckols, T.K., Needleman, J., Grogan, T.R., Llang, L., Worobel-Luk, P., Anderson, L…. Walsh, C.M. (2017). Clinical effectiveness and cost of a hospital-based fall prevention intervention. *The Journal of Nursing Administration, 47*(11), 571-580. DOI: 10.1097/NNA.0000000000000545

World Health Organization [WHO]. (2018). Falls. Retrieved from http://www.who.int/mediacentre/factsheets/fs344/en/

Vlaeyen, E., Coussement, J., Leysens, G., Van der Elst, E., Delbaere, K.,… Milisen, K. (2015). Characteristics and effectiveness of fall prevention programs in nursing homes: a

systematic review and meta-analysis of randomized controlled trials. *Journal of American Geriatrics Society, 63*(2), 211-221. DOI: 10.1111/jgs.13254

Tables and Figures

Table 1

Characteristics of Long-Term Care Unit Staff Trained, n = 24

	n	%
Licensed Practical Nurses		
Staff nurses	4	16.7
Agency nurses	3	12.5
Providers/Administrators	4	16.7
Certified Medicine Assistants	4	16.7
Geriatric Nursing Assistants	9	37.5

Table 2

Staff Compliance in Post-Fall Management Algorithms, n = 21

Type of Forms	Initiated		Completed	
	n	%	n	%
Fall Incident Report Form	20	95	16	76
Physical Assessment Form	20	95	18	86
Comprehensive Medical Evaluation Form*	19	95	15	75

*missing value n=1

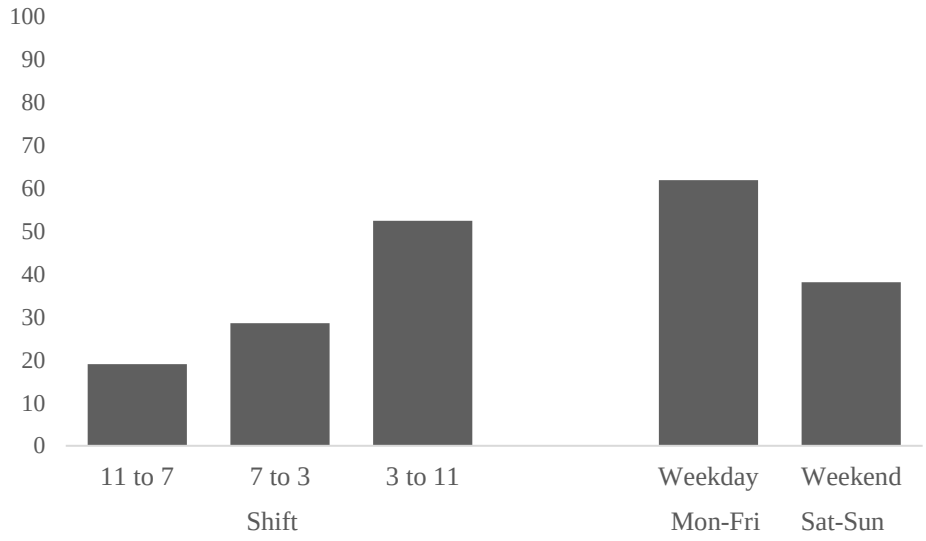


Figure 1. Percentage of falls by shift and day.

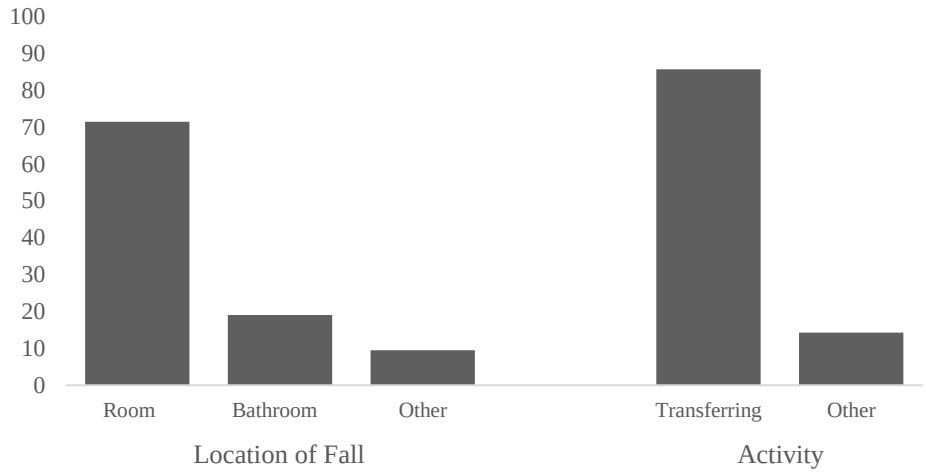


Figure 2. Percentage of falls by location and activity related to fall.

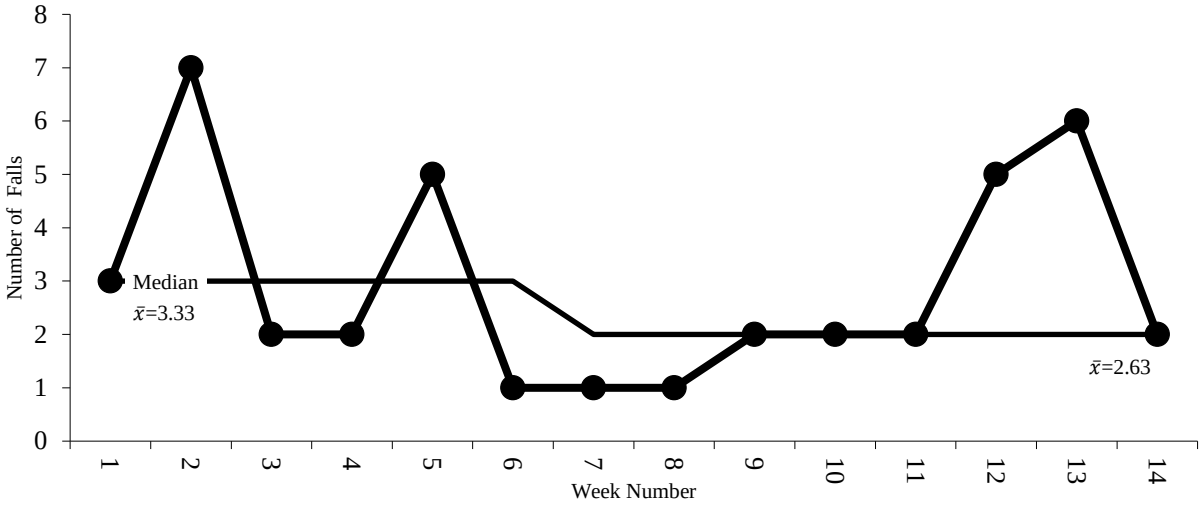


Figure 3. Weekly and average number of falls before (week 1-6) and after (week 7-14) initiation of fall management algorithms.

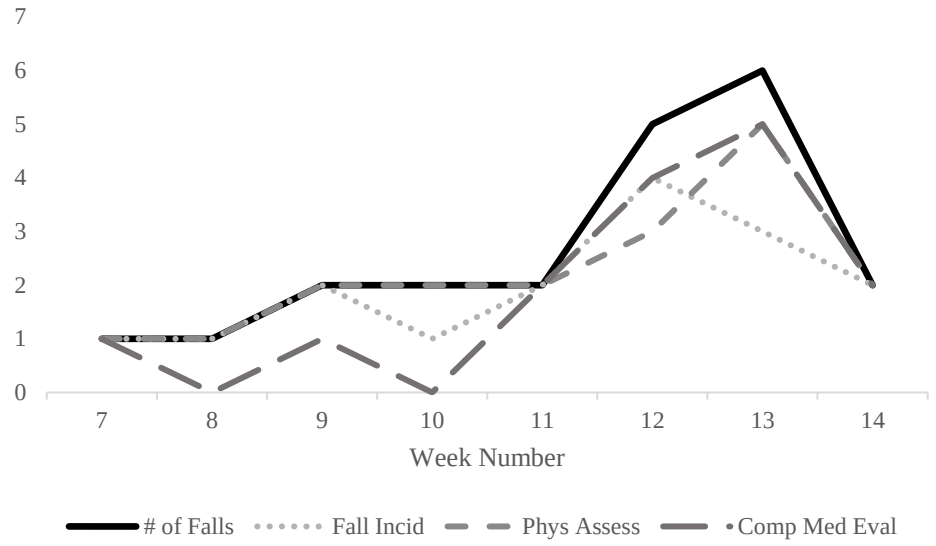


Figure 4. Comparison of the weekly number of falls and staff compliance after the initiation of the fall management algorithms.

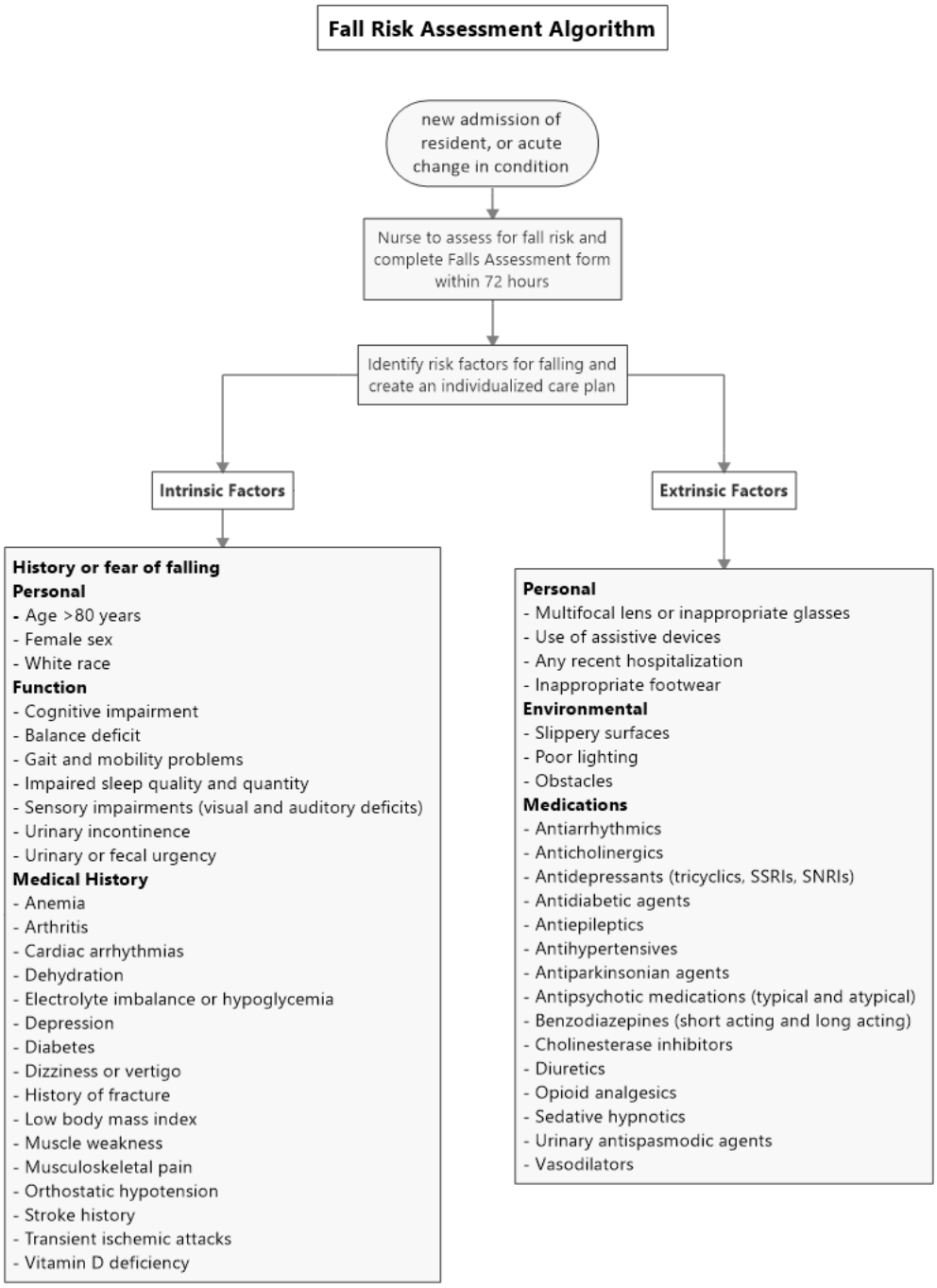
Appendix A
Evidence Summary Table

Author, year	Study objective/intervention or exposures compared	Design	Sample (N)	Outcomes studied (how measured)	Results	*Level & Quality Rating
American Medical Directors Association, 2011	To provide LTC staff an understanding of intrinsic and extrinsic risk factors for falls To also help LTC facilities establish processes for evaluating, managing and preventing falls	Clinical practice guideline	Long term care facilities	N/A	Systematic approach to patient assessment and selection of appropriate interventions 4 phases: -Recognition – identification of risk factors for falling -Assessment – post fall procedure and identification of actual and potential complications of falls -Treatment - developing plan for falls, managing risk factors -Monitoring – monitor falling and establishing quality improvement activities related to fall risk	1 A
Gray-Miceli et al., 2010	To examine the use of a post fall assessment tool	Descriptive prospective study	2 assisted living units 2 skilled nursing units Licensed nursing staff	Fall rate – count	After 1 year of implementation, there was a reduction in fall rate, the number of total falls and recurrent fallers.	6 B
Jung et al., 2014	To develop a practice guideline for fall prevention in long term care facilities	Clinical practice guideline	Long term care facilities	N/A	An algorithm was created for fall prevention in long term care facilities focusing on risk factors, such as previous falls and polypharmacy, and what types of interventions are suggested to prevent falls.	1 B 63%**
Koduru et al., 2016	To decrease fall rate by improving fall assessment accuracy and early nursing interventions	Quality Improvement	250-bed nursing home facility	Fall rate – count Fall assessment accuracy	After 3 months of implementation, there was a decrease in fall rate with the aid of the new fall assessment protocol.	6 B

*Level of Evidence: Melnyk, B.M. & Fineout-Overholt, E. (2014). *Evidence-based practice in nursing & healthcare: A guide to best practice* (3rd ed.). New York: Lippincott, Williams & Wilkins.

*Quality Rating: Newhouse, R.P. (2006). Examining the support for evidence-based nursing practice. *Journal of Nursing Administration, 36*(7-8), 337-40.
**AGREE Next Steps Consortium. (2017). The AGREE II Instrument [Electronic version]. Retrieved from https://www.agreetrust.org/wp-content/uploads/2017/12/AGREE-II-Users-Manual-and-23-item-Instrument-2009-Update-2017.pdf

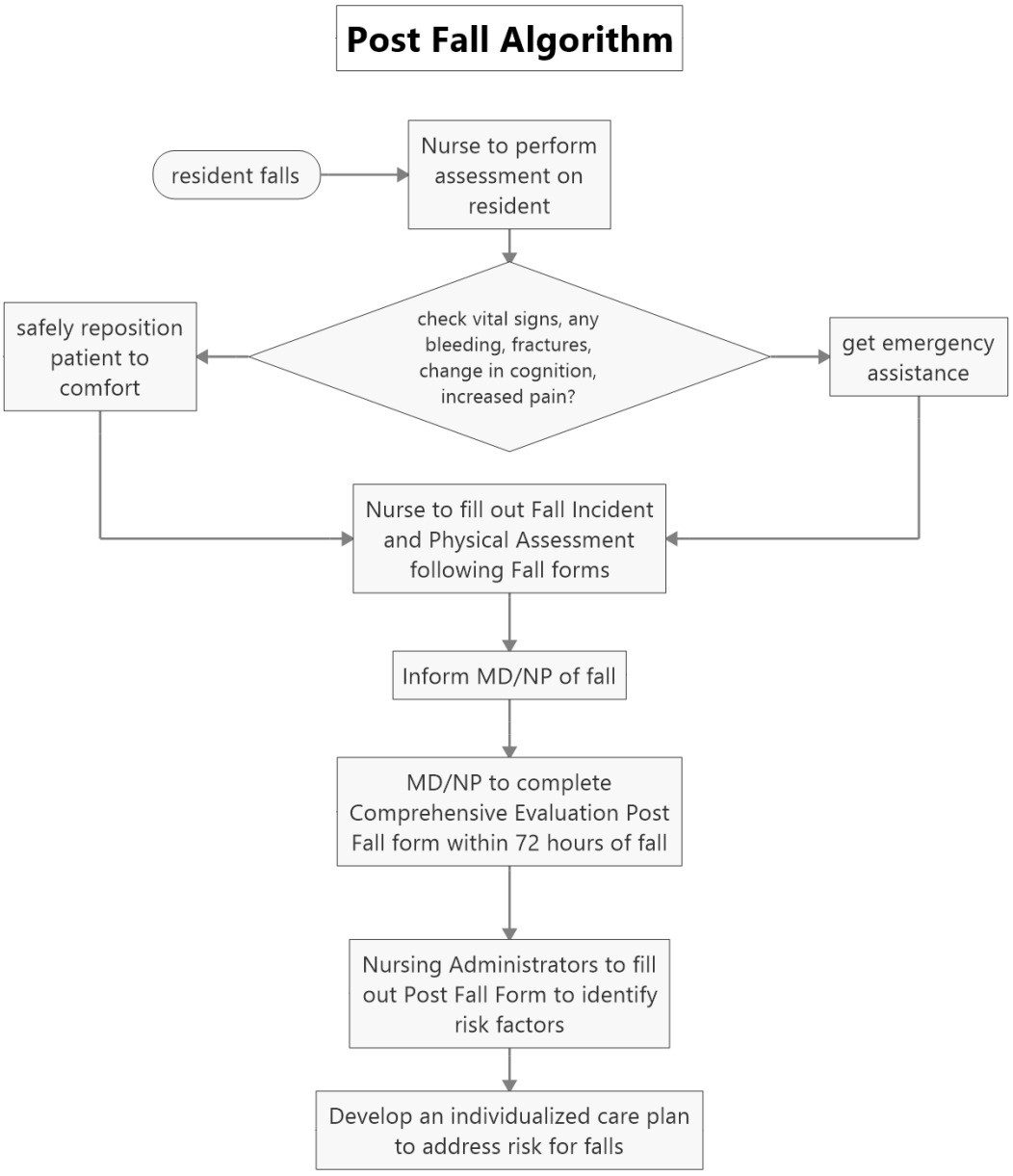
Appendix B
Clinical Algorithm for Assessment of Fall Risk



**Note.* Risk Factors adapted from "Falls and Fall Risk Clinical Practice Guideline" by the American Medical Directors Association (AMDA), 2011.

Appendix C

Clinical Algorithm Post Fall Evaluation



Appendix D
Evaluation of Fall Incident

Name_____Date_____Description of Fall:

Variable	
Fall Location Room Outside Bathroom Facility Dining Room Facility Hallway Activity room Other (Elevator, front lobby, store)	
Activity related to fall Walking Transferring Dressing Bathing Toileting Other Cooking	
Time of Fall 12:01pm-6pm 6:01pm-12midnight 12:01am-6am 6:01am-12noon	
Loss of Consciousness Yes No	
Dizziness Yes No	
Alcohol Use at time of Fall/Sedative Hypnotic Yes No	
Outcome of Fall None Hematoma Skin Tear Fracture Musculoskeletal pain Laceration	

Note. Adapted from "Falls and Fall Risk Clinical Practice Guideline" by the American Medical Directors Association (AMDA), 2011.

Appendix E
Physical Assessment Following Fall

Name_____ Date of Fall_____

I. Vital signs:
   a. Heart rate _____
   b. Heart rhythm : regular_____ irregular_____
   c. Blood pressure: lying_____ standing_____

II. Physical Exam
   a. Active, or independent range of motion
      1. Neck ____yes ____no
      2. Shoulders Rt: _____yes _____no Lt: _____yes _____no
      3. Wrists Rt: _____yes _____no Lt: _____yes _____no
      4. Hands Rt: _____yes _____no Lt: _____yes _____no
      5. Hips Rt: _____yes _____no Lt: _____yes _____no
      6. Knees Rt: _____yes _____no Lt: _____yes _____no
      7. Ankles Rt: _____yes _____no Lt: _____yes _____no
      8. Feet Rt: _____yes _____no Lt: _____yes _____no

   b. Observations of resident:
      1. Shortening and external rotation of lower extremities: Rt_____ Lt_____
      2. Swelling: Location_____
      3. Redness/bruising: Location_____
      4. Abrasions: Location_____
      5. Pain on movement: Location_____
      6. Shortness of breath: yes _____ no_____
      7. Impaired balance: yes _____ no_____
      8. Loss of consciousness: yes _____ no _____
      9. Change in cognition: yes _____ no _____

   c. Assessment of the environment
      1. Dim lighting: yes _____ no _____
      2. Glare: yes _____ no _____
      3. Uneven flooring: yes _____ no _____
      4. Wet or slippery floor: yes _____ no _____
      5. Poor fit of seating device: yes _____ no _____
      6. Inappropriate footwear: yes _____ no _____
      7. Inappropriate eye wear: yes _____ no _____
      8. Loose carpet or throw rugs: yes _____ no _____
      9. Use of full length side rails in bed: yes _____ no _____
      10. Lack of hallway rails in area of fall: yes _____ no _____
      11. Inappropriate assistive devices (fit or condition): yes _____ no _____
      12. Lack of grab bars in bathroom: yes _____ no _____
      13. Cluttered areas: yes _____ no _____
      14. Other environmental causes: _____

Note. Adapted from "Falls and Fall Risk Clinical Practice Guideline" by the American Medical Directors Association (AMDA), 2011.

Appendix F
Comprehensive Medical Evaluation Post Fall

Name_____ Date of fall_____

I. Underlying medical problems:

a. Orthostatic hypotension yes _____ no _____: Management_____
b. Balance problems: yes _____ no _____: Management _____
c. Dizziness/vertigo: yes _____ no _____: Management _____
d. Other: _____: yes _____ no _____: Management:_____

II. Medications:

a. Drugs that may contribute to fall:

Diuretics: yes _____ no _____: Management _____
Cardiovascular medications: yes _____ no _____: Management _____
Antipsychotics: yes _____ no _____: Management _____
Antianxiety agents: yes _____ no _____: Management _____
Sleeping agents: yes _____ no _____: Management _____
Antidepressants: yes _____ no _____: Management _____

III. Functional Status:

a. Impaired sitting balance: yes _____ no _____: Management _____
b. Impaired standing balance: yes _____ no _____: Management _____
c. Independent ambulation: yes _____ no _____: Management _____
d. Independent toileting: yes _____ no _____: Management _____

IV. Sensory Problems:

a. Evidence of impaired vision: yes _____ no _____: Management _____
b. Evidence of impaired sensation: yes _____ no ____: Management _____
c. Evidence of impaired hearing: yes _____ no _____: Management _____

V. Psychological Status:

a. Evidence of depression: yes _____ no _____: Management _____
b. Evidence of change in cognition: yes _____ no _____: Management _____
c. Evidence of impaired judgment: yes _____ no _____: Management _____

Actions taken to address the immediate cause of the fall:

Note. Adapted from "Falls and Fall Risk Clinical Practice Guideline" by the American Medical Directors Association (AMDA), 2011.

Appendix G
Approval for Utilization of Fall Forms

E-mail Correspondence between Project Leader and Author of Forms

To: Barbara Resnick <resnick@umaryland.edu>

From: Bianca Lopez <bianca.lopez@umaryland.edu>

CC:

Date: May 7, 2018 3:13 pm

Re: AMDA handouts for Falls

Comments: "Hi Dr. Resnick,

As I move forward with my DNP project, I just wanted to verify/clarify if it's okay to utilize the AMDA handouts for falls you previously sent me? Or how should I go about asking for permission for those forms?

Thank you,

Bianca"

To: Bianca Lopez <bianca.lopez@umaryland.edu>

From: Barbara Resnick <resnick@umaryland.edu>

CC:

Date: May 7, 2018 6:25 pm

Re: AMDA handouts for Falls

Comments: "fine to use those. they are mine."

Appendix H
Audit Tools

Audit for Fall Algorithm Process

Date of Fall	De-Identified Patient ID	Fall Incident Report		Physical Assessment Form		De-Identified Staff ID	Comprehensive Assessment Form		De-Identified Staff ID
		S	C	S	C		S	C	

*Fall Incident Report and Physical Assessment form to be filled out by nurse
*Comprehensive Assessment form to be filled out by provider/ administrator
*Submitted (S) - means form was filled out and submitted to champion within 72 hours of resident's fall
*Completed (C) - means form was filled out completely without missed information
*Coding: 0-no, 1-yes

Audit for Fall Incidence

De-Identified Patient ID	Fall Location (Room - 0, Bathroom -1, Dining Room - 2, Hallway - 3, Shower Room - 4)	Time of Fall by Shift (11p-7a - 1, 7a-3p - 2, 3p-11p - 3)	Activity related to Fall (Walking – 1, Transferring – 2, Bathing – 3, Toileting 4, Other – 5)