The Individualized Multidisciplinary Immediate Fall Response Program

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Abstract

Falls are common in older residents in the United States. 800,000 falls occur yearly and one in three residents will fall again within a year (Agency for Healthcare Research and Quality [AHRQ], 2017). In Frey Village, approximately 25 falls occur monthly with 1.9% fall-injuries, annually. This project focused on the Individualized Multidisciplinary Immediate Fall Response Program (IMIFRP).

**PICOT Question:** In older adults in a long-term facility (P), does implementation of an individualized multidisciplinary immediate fall response program (I), improve fall care processes and reduce fall rates (O) within 2-months post-intervention (T), compared to 2-months pre-intervention (C)?

**Conceptual and Theoretical Model:** The IHI Plan-Do-Study-Act cycle was the conceptual framework that guided IMIFRP throughout implementation. The Theory of Bureaucratic Caring emphasized the need for quality, ethical, legal and compassionate care.

**Methods:** This pre/post-design quality improvement project included residents in skilled units, ≥ 65 years. The IMIFRP was initiated with each fall. Project outcomes included the utilization of the IMIFRP form ([TRIPS]— Tracking Record for Improving Patient Safety) for fall data collection and analysis, number of falls and repeated falls. Data were analyzed, using descriptive statistics and run chart.

**Results:** There was a 90% compliance rate in utilization of the TRIPS form. Fall rate decreased by 27%, there were 41 falls pre-intervention compared to 30 falls post-intervention. Pearson Chi Square did not show statistical significance.

**Conclusion:** The IMIFRP was well integrated, and the stakeholders implemented IMIFRP into their practice.
Keywords: older residents, home for the aged, nursing home residents
The Individualized Multidisciplinary Immediate Fall Response Program

In the United States of America, over one in four older adults ages 65 years or older experience a fall and one in five of these falls, result in injuries (Centers for Diseases and Control Prevention, 2017; Haddad, Bergen & Luo, 2018). Falls are associated with 60% of all injury-related emergency room visits and over 50% of injury-related deaths in older adults (Haddad, Bergen & Luo, 2018). In the older adults, the death rate from falls increased by 30% from 2007 to 2016, and the projected death rate is seven deaths per hour by the year 2030 (CDC, 2017). Furthermore, fall related injuries among nursing home residents are two to three times higher compared to community-dwelling older adults (Haddad, Bergen & Luo, 2018). Therefore, there is a need for individualized multidisciplinary fall interventions, in order to improve quality of life, and reduce morbidity, mortality, and healthcare cost.

Background and Significance

In 2014, approximately 2.8 million older residents were treated in the emergency department; 800,000 were hospitalized because of fall injuries and 27,000 died from fall-related injuries (Bergen, Stevens & Burns, 2016). Falls in older adults are associated with morbidity, mortality, and high healthcare cost (Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018). In 2015, the healthcare costs spent on fall injuries in older adults was 50 billion dollars, and Medicare and Medicaid paid 75% of the healthcare costs (Florence, Bergen, Atherly, Burns, Stevens, & Drake, 2018; Centers for Diseases Control and Prevention, 2017).

Older adults with fall risk and a fall plan of care, have a lower risk for fall-related hospitalization, compared to older adults without a fall plan of care (Johnston et al. 2018). Furthermore, the implementation of fall risk screening and fall management strategies for older adults, can reduce fall-related hospitalizations, and subsequently reduce fall-related
healthcare cost (Johnston et al. 2018).

Implementation of single intervention can prevent between 9,563 - 45,164 falls, that usually require medical interventions or hospitalization, thereby reducing healthcare cost by $94 million - $442 million, yearly (Stevens & Lee, 2018). However, literature suggests that individualized multidisciplinary fall management is more effective than single fall management intervention (AHRQ 2017; CDC, 2017; RNAO 2017; Vlaeyen et al., 2015).

Furthermore, individualized multidisciplinary falls interventions are recommended by the Centers for Disease Control and Prevention (CDC), Agency for Healthcare Research Quality (AHRQ) and Registered Nurses Association of Ontario (RNAO), 2017, Vlaeyen et al., 2015; Rodriguez-Larrad et al., 2017).

Fall management is a national patient safety goal for nursing homes. Fall-related injuries are reportable and considered by the Centers for Medicare and Medicaid as a “never event” (PSNET, 2019). In addition, falls without injury can be stressful to the older residents, resulting in anxiety, fear of recurrent falls, and deconditioning, thus negatively impacting residents, family members and the nursing staff caring for the residents (PSNET, 2019; Hiyama, 2017).

Falls and fall-related injuries are associated with legal consequences against the nursing home facilities and staff, resulting in a substantial loss of money in lawsuit settlements, increased insurance premiums, increased care requirements and increased documentation on falls incident report. Therefore, there is a need for the individualized multidisciplinary fall interventions for older residents to reduce falls and falls related injuries (AHRQ, 2017).

Problem Statement

The morbidity, mortality and healthcare cost associated with falls are significant,
therefore, there is a need for an individualized multidisciplinary fall intervention for older residents. At Frey Village in Middletown, PA, approximately 25 falls occur monthly with 1.9% of fall-injuries, annually. This project addressed the following PICOT question:

**PICOT Question:**

In older adults residing in a long-term facility (P), does implementation of an individualized multidisciplinary immediate fall response program (I), improve fall care processes and reduce fall rates (O) within 2-month post-intervention (T), compared to 2-month pre-intervention (C)?

**Definition of Terms**

The following terms in the PICOT Question and other terms in this proposal are defined as follows:

*Older Adults*

Older adults are residents ages 65 years and older living in a long-term facility.

*Long-Term Facility*

Long-Term facility provides services that meet the healthcare or personal needs of the residents living in the long-term facility over a short- or long-term period. The long-term facility provides care that encourages independence, based on ability of the residents to safely perform activity of daily living on their own and nursing staff assists residents as needed, while preventing deconditioning (National Institute on Aging, 2017). For this project, long-term care included residents living in the skilled unit in a long-term facility.

*Individualized multidisciplinary falls interventions*

Individualized multidisciplinary fall interventions are fall management interventions provided to the older residents living in the long-term facility by the multidisciplinary team of professionals including physician, nurses, physiotherapist, occupational therapist, dietician and
The individualized interventions selected are based on the identified fall risks of each resident during assessment of fall incident. For this project, the Individualized Multidisciplinary Immediate Fall Response Project (IMIFRP) included a 5-step immediate fall response within 24-hours of a fall. The 5-steps are discussed in detail later.

**Tracking Records for Improving Patient Safety Tool (TRIPS)**

The third step of the 5-step process involves the completion of the TRIPS tool (AHRQ, 2017). In this project, the TRIPS tool was part of the intervention and served to assess a resident’s fall and provide an individualized multidisciplinary intervention, based on fall assessment. Documentation of the utilization of TRIPS was also assessed for this project.

**Literature Review**

The literature search was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for reporting the quality of systematic reviews, meta-analyses and evaluations of interventions (PRISMA, 2020). The literature search was conducted within the fields of nursing, medicine, and allied health. Databases were explored for peer-reviewed journals regarding implementation of individualized multidisciplinary fall management program for the older nursing home residents.

The databases searched include CINAHL, EMBASE, PubMed, Ovid and Cochrane Database of Systemic Reviews. The MeSH term included: “falls prevention”, “nursing home”, “falls”, “falls assessment tools” and “Morse Fall Scale”. The search was further expanded with the term “fall management in the older”, “home for the aged”, “aged care facilities”, “accidental falls”, “falls assessment tool”, “nursing homes”, “skilled nursing facilities”, “assisted living”, “multidisciplinary treatment plan”, “interdisciplinary falls prevention”, and “fall management strategies”.
In EMBASE, the EMTREE preferred term included: “Falls prevention”, “accidental falls”, “falls in the older”, “nursing home personnel”, “nursing home patients”, “home for the aged”, “Morse Fall Risk Scale” and “falls prevention implementation strategies”. Inclusion criteria were: (1) adults population ages 65 and older, (2) articles written in English language, 3) Peer-reviewed journal. Exclusion criteria were: (1) falls in pediatrics, (2) falls in adults less than 65 years old, and (3) case studies, magazines, commentaries and editorials were excluded. The databases yielded 350 studies, narrowed down to thirty-two studies and after review of the titles, abstracts, inclusion and exclusion criteria of the studies, seven articles were retained (Figure 1).

The Johns Hopkins Nursing Evidence-Based Research Appraisal Guidelines (Dearholt, Dang & Sigma Theta Tau, 2012), were used for grading the design and quality of evidence, and articles were assigned an evidence level of I, II, III, IV or V, based on design and were ranked as, A (high quality) B (good quality) or C (low quality or major flaws; Table 1).

Study Characteristics

The seven articles selected for review included randomized controlled trials, retrospective studies, systematic reviews and meta-analyses. All articles were published in peer-reviewed journals between 2015 and 2020. The studies involved single and individualized multidisciplinary fall management strategies such as exercise programs to improve balance and mobility, video monitoring systems with a dedicated rounder, alarm device monitoring, medication review (use of antidepressant, polypharmacy), and physical therapy.
Fall Management Interventions

Falls in the older residents are caused by intrinsic and extrinsic factors (AHRQ, 2017). The intrinsic factors include the effects of aging on gait, balance and strength, acute health challenges, chronic diseases, deconditioning due to lack of activity, behavioral concerns and adverse effects of medications. Extrinsic factors include environmental hazards and unsafe equipment (AHRQ, 2017).

AHRQ (2017) reinforced individualized fall management interventions that include combination of “environmental interventions” (non-skid shoes and non-slip floor, residents within nurses’ view), “clinical interventions” (medication review, avoiding polypharmacy and delirium inducing medications), “care process interventions” (use of a validated fall assessment tool), “cultural intervention” (reinforcing the need for multidisciplinary involvement in falls prevention), and “technological or logistical” intervention (reducing bed height, floor mat by the bedside, use of bed alarm, AHRQ, 2017).

Uymaz & Nahcivan (2016) implemented individualized multidisciplinary fall interventions for older residents. Personalized medication counseling, optometric vision assessment, and educational resources on fall interventions, led to significant reduction in falls. Fall rate in 6-month pre-intervention was 46%, compared to 25.6% in 6-month during individualized multidisciplinary fall interventions.

Vlaeyen and colleagues (2015) conducted a systematic review and meta-analysis to determine the effectiveness of falls prevention program and falls-related outcomes in nursing home residents. The review comprised of thirteen studies with nursing home participants (N = 22,915); six studies utilized a single fall intervention, while seven of the studies provided two or more individualized multifactorial interventions to the older residents. Individualized
multifactorial multidisciplinary interventions resulted in a 33% decrease in fall incidence rate (Vlaeyen et al., 2015).

Meta-analysis revealed statistically significant and lower recurrent fallers in the investigational groups (4 studies, relative risk (RR) = 0.79, 95% confidence interval (CI) = 0.65–0.97), multifactorial multidisciplinary interventions significantly reduced falls (4 studies, RR = 0.67, 95% CI = 0.55-0.82) and the number of recurrent fallers (4 studies, RR = 0.79, 95% CI = 0.65-0.97), while on the contrary, single or multiple interventions did not. The authors found individualized multifactorial falls interventions effective than single intervention and recommended the implementation of individualized multifactorial and multidisciplinary falls interventions, to reduce the number of falls and recurrent falls in older residents.

Gulka and colleagues (2020) conducted systematic and meta-analysis review, evaluated the effectiveness of single and individualized multidisciplinary falls interventions in older residents and generalizability of the interventions to older residents with cognitive impairment. The authors found multiple fall interventions decreased number of falls [risk ratio (RR) = 0.73, 95% confidence interval (CI) = 0.60-0.88], fallers (RR = 0.80, 95% CI = 0.72-0.89), and recurrent fallers (RR = 0.70, 95% CI = 0.60-0.81).

In addition, sub-analyses showed that a single falls intervention resulted in a statistically significant reduction in fallers (RR = 0.78, 95% CI = 0.69-0.89) and recurrent fallers (RR = 0.60, 95% CI = 0.52-0.70), while multiple interventions decreased fallers (RR = 0.69, 95% CI = 0.39-0.97) and individualized multidisciplinary interventions decreased the number of falls (RR = 0.65, 95% CI = 0.45-0.94).
Electronic Monitoring System

Studies show that electronic video monitoring systems are effective in reducing falls among older residents. Votruba and colleagues (2016) conducted a study on remote video monitoring with a dedicated sitter, compared to using sitter alone. 9-month pre-intervention fall rate was 85, compared to 53 falls during a 9-month intervention (p = 0.0001). Fall rate decreased by 35% among patients in the intervention group. In addition, video monitoring resulted in 10% reduction in sitter hours, from 1930 hours per month to 1735 hours (Votruba et al., 2018).

Daley and colleagues (2020) conducted a randomized controlled study that compared the rate of falls between participants on electronic video monitoring system and a dedicated rounder, compared to the participants monitored only with bed alarm and no dedicated rounder. The authors did not find a statistically significant difference in the rate of falls between the two groups (p = 0.289). The authors concluded that using a patient rounder had no significant impact on reducing fall incidence rate (Daley et al., 2020).

Mileski and colleagues (2019) conducted a systematic review, examined alarm devices and their effectiveness in fall management interventions in older residents. The review concluded that bed alarms is ineffective, should not be used as a single fall intervention, but could be included as a component of an individualized multidisciplinary fall interventions (Mileski et al., 2019; Radecki et. al., 2018).

Medication Management

Polypharmacy contributes to falls in the older residents, as a result of multiple medications, taken for management of chronic diseases (Montero-Odasso et al., 2019). There is a need for routine review and monitoring of the side effects of medications that predispose the older residents to falls and fall-related injuries.
Duloxetine was associated with falls in older residents, Selective Serotonin Reuptake Inhibitors (SSRI) are preferable due to minimal adverse effects, when compared to placebo (Sobrieraj et al. 2019). The authors found SNRI was associated with falls, compared to SSRI and warned against using the medication in older residents. In a 24-week trial, the adverse effects led to withdrawal of participants from the study (RR = 1.69; 95% CI= 1.21- 5.73) and Duloxetine was associated with high risk of falls during the acute and maintenance phases of the treatment (RR= 1.69; 95% CI, 1.03-2.76).

Montero-Odasso and colleagues (2019), conducted a prospective cohort study to evaluate cross-sectional and longitudinal associations between polypharmacy and gait performance and association between number of medications and falls incidence. The authors found polypharmacy resulted in slow gait, speed (p < .001), overall gait decline (odds ratio = 1.23; 95% CI = 1.13 -1.33; p < .001) and increased falls incidence (p < .006). Furthermore, each additional medication was associated with gait decline by 12% -16% and fall incidence increased by 5% - 7%. The authors concluded that polypharmacy was “cross-sectionally associated with poor gait and longitudinally associated with gait decline and fall incidence” (Montero-Odasso et al. 2019, p. 1182).

Simmons and colleagues (2010) found major barriers to medication reduction that included family resistance, return or worsening of symptoms, lack of resources or staff education on non-pharmacological strategies and environmental safety concerns. The authors highlighted the benefits of gradual dose reduction of antipsychotic medications, that include improved quality of life, family satisfaction, decreased fall rate and improved quality indicator score (Simmons et al. 2020).
Studies have shown that exercise programs, video monitoring systems, alarm device monitoring, medication review or physical therapy might be effective in reducing falls in the older residents. However, falls interventions based on resident’s identified fall risk factors and multidisciplinary collaboration in developing individualized care plan are more effective. Evidence supports the implementation of individualized multidisciplinary falls interventions, in order to reduce morbidity, mortality and high healthcare cost. There is a need for further studies with focus on the effective fall interventions for older residents with dementia, living in the long-term facilities.

Organizational Assessment

The site of the quality improvement project was Frey Village, a nursing home facility with at least 25 falls, monthly with 1.9% fall-related injuries, annually. The director of nursing was interviewed regarding falls incidence in the facility, and falls were largely attributed to staff shortages, especially worsened during the COVID-19 pandemic because of staff departures from the facility.

The facility currently uses incident report, lowering of beds, and close monitoring of residents with high risk for falls. However, there was a need for implementation of a structured falls program. Upon introduction of the project and proposed intervention, the management team and nurses were receptive to change, and verbalized willingness to change practice to reduce fall incidents and fall-related injuries.

Project Purpose

The purpose of this project was to determine if the implementation of the individualized multidisciplinary immediate fall response program (IMIFRP), including documentation of fall
incidents using the TRIPS tool would, 1) improve fall care processes and outcomes, and 2) reduce falls rate in the older adults, living in the long-term facility.

**Conceptual and Theoretical Framework**

This project was a quality improvement project, guided by the IHI Model for Improvement (Figure 2), which evaluated changes on a small scale using the Plan-Do-Study-Act cycle and examined if the change yielded an improvement in clinical practice (IHI, 2017). The Model for Improvement consists of two parts, the first part includes the three fundamental questions that can be addressed in any order and the second part contains the Plan-Do-Study-Act (PDSA) cycle that tests the change to determine if the change is an improvement (IHI, 2017).

The three fundamental questions include: 1) What are we trying to accomplish? 2) How will we know that a change is an improvement? 3) “What change can we make that will result in improvement?”

The first question “What are we trying to accomplish?” This involved setting aims that are measurable, time-specific, with a clearly defined population (IHI, 2020). We set out to adopt a new fall management program and determine its utilization and impact on falls in the older adults living in a long-term facility.

The second question is “How will we know that a change is an improvement?” A quantitative measure was used to determine if the specific change yielded an improvement. This included the change in number of fall incidents and the uptake of the intervention. Pre- and post-intervention analyses were conducted to determine the significance of the fall management project.

The third question is, “What change can we make that will result in improvement?” This involved evaluation of current practices and the selection of an intervention that reduced
The individualized multidisciplinary immediate fall incidence rate. This led to the identification of the IMIFRP for this project (IHI, 2020). The Plan-Do-Study-Act cycle guided the change in the facility by planning the change, trying the change, evaluating the result of the change and acting on the knowledge gained from the change, to improve practice.

**Theoretical Framework: The Theory of Bureaucratic Caring**

The theory of bureaucratic caring is the theoretical framework for this project. The theory was developed by Dr. Marilyn Ray (1989), with the purpose of generating a theory of “dynamic caring within a complex organization” (p.31). The theory was developed by utilizing professionals and patient questionnaires that emphasizes caring economics (Ray, 2018). The core concept of the theory is the spiritual-ethical concepts, described as bureaucratic caring, interconnected with other concepts: spiritual-ethical caring, social-cultural, physical, educational, economic, technological, and legal concepts (Figure 3).

The theory of bureaucratic caring was chosen for this project based on its applicability to nursing administration and clinical practice. The theory consists of concepts that are important to the successful implementation of the individualized multidisciplinary immediate fall response project. The concepts comprised of caring, economics, ethical, physical, education, legal and technological concepts. The theory of bureaucratic caring (figure 3) depicted interconnectivity of the concepts with spiritual-ethical caring at the core of the theory of bureaucratic caring (Ray, 1989).

The concepts of bureaucratic caring theory that support this project include spiritual-ethical caring, physical, educational, technological, economic, and legal concepts.

**Spiritual-Ethical caring:** This concept focuses on caring, rooted in the spiritual-ethical culture of the organization. It emphasizes the importance of “love, compassion, empathy,
respect and communication that enhances moral choices for the good of self, persons, things and the environment” (Ray, 2018). The Frey Village, the site of the project is associated with a religious organization, thus reinforcing the need for caring, empathy, respect and improved communication between the management staff, clinical staff, residents, and family members.

The chaplaincy service was available in the facility and provided spiritual support to residents and family members when requested. The spiritual-ethical caring improved participation and collaboration between management and clinical staff, aimed at incorporating the use of the individualized immediate fall response including use of TRIPS tool within 24 hours of falls to improve fall care processes and outcomes and reduce falls rate among the older residents. For instance, the management team (Director of Nursing [DON], Assistant Director of Nursing, and unit managers) continued to ensure adequate staffing to meet the needs of residents, avoided staff burnout, and ensured ethical care (Haddad, Annamaraju & Toney-Butler, 2020). During an interview with the DON, staff shortage was attributed to increased fall rate, especially during COVID-19 pandemic, when there was nursing staff shortage and some of the nurses quit.

The clinical team (registered nurses, licensed practical nurses, certified nurse assistant, physiotherapy, and occupational therapy) provided compassionate care and listened attentively to residents and family members, worked collaboratively and ensured that residents’ needs were met. Further ethical considerations in the IMIFRP included autonomy, beneficence, and non-maleficence.

The organization, management team, and clinical team would continually encounter ethical dilemma in fall management, regarding autonomy versus non-maleficence (Hiyama, 2017). However, the ethical considerations in this fall management project focused on autonomy and
non-maleficence, through proactive involvement of residents and family members in fall management interventions, to provide ethical, resident-centered care to the older residents and decreased falls and fall-related injuries.

**Physical:** The physical concept involved creating a healing and conducive environment that included, physical, mental, and emotional wellbeing in health, illness or dying of the residents (Ray, 2018). The physical environment was free of objects or equipment that increased risk for falls or fall-related injuries.

During this project, nurses conducted routine (daily, weekly and monthly) environmental assessment for faulty equipment such as wheelchair, walker or bed, lighting, monitoring of bed height, ensuring adequate lightning in the room, monitoring at-risk residents and formulation of individualized multidisciplinary care plan to reduce falls and falls injuries (AHRQ, 2017). This raised awareness about culture of safety, by ensuring a safe physical environment for the older adults. “Culture is invisible, but its effect can be seen and felt (Walker & Soule, 2017). The clinical and management team collaborated during daily and weekly fall risk meeting and created supportive environment that fostered reduced falls rate among the older residents.

**Economic:** The economical concept was defined as the “exchange of goods, services, money, insurance system, and healthcare laws, management of budget, maintaining viability of the organization” (Ray, 2018). Falls and falls-related injuries are one of the Centers for Medicare and Medicaid Services’ (CMS) “never events” (PSNET, 2019).

Falls involve a high healthcare cost that might affect income, and budget of the organization, subsequently results in negative impact on staffing, increased insurance premium and penalty, which could impact the viability of the organization. However, if fall
incident rates decline, the organization would reduce healthcare cost, decreased rehospitalization rate from repeated falls, and might qualify for incentive from the value-based reimbursement by the CMS. Thus, increased profitability of the organization, improved staffing, increased staff’s satisfaction, and decreased falls and fall-related injuries. Falls and fall-related injuries are preventable therefore, substantial healthcare cost averted, increased independence and quality of life of the older residents (Stevens & Lee, 2018).

**Educational:** Education is defined as formal or informal method of learning new knowledge. For this project, it involved audiovisual aids, used for training and shared information on fall management interventions, immediate 24-hour fall response, use of the TRIPS tool and other required training during the project. Staff education has proven to reduce falls and fall-related injuries and therefore was included in fall management intervention (RNAO, 2017; Vlaeyen et al., 2015). Staff education focused on the scope of practice of the staff. The training included the “importance of falls prevention and fall-injuries reduction, universal fall precaution, post fall procedures and debriefing, and the importance of communicating falls risk, and care plan interventions at all care transitions” (RNAO, 2017).

**Legal:** The legal concept of caring involves accountability, responsibility and compliance with rules and regulations that guide clinical practice and professional conduct (Ray, 2018). This concept is pertinent to falls and fall-injury prevention to avoid lawsuits that could result in large monetary settlements due to injuries sustained from falls.

**Technological:** Technology is defined as equipment and procedure, such as diagnostic test, medications administration, computer documentation, knowledge and ability to use the technological devices (Ray, 2007). The technological concept is important in falls management, documentation by the fall nurse in the electronic medical record and
communication with providers when a fall occurred to provide timely intervention to the residents. The clinical staff (nurses and CNA) ensured that equipment such as walkers, wheelchair, bed, were not faulty and repaired on timely manner to prevent falls due to faulty equipment. Adequate lightning in the room, functioning call bell and alarm system were well maintained and serviced to reduce fall rate among the older nursing home residents.

Methods

Setting

This project was a quality improvement project that included a pre-and-post-intervention design. The fall management project took place in a 136-bed nursing home facility in Middletown, Pennsylvania. The population within this nursing home consists of primarily Caucasians and ≤ 10% other race. The facility consists of a rehabilitation unit, skilled unit, personal care unit and independent living unit. The nursing facility has professionals that include physicians, nurse practitioners, registered nurses, certified nursing assistants, physiotherapist, occupational therapist, dietician and chaplain with expertise in geriatric care. More than 100 older residents live in the skilled unit of the nursing home and 25 falls occur monthly with 1.9% major fall-related injuries, annually.

Residents ≥ 65 years, living in the skilled unit were included and residents in the rehabilitation, personal care and independent living units were excluded from the project. The IMIFRP involved a multidisciplinary team of professionals working in the facility during the implementation of the project. The professionals were physicians, nurse practitioner, physiotherapist, and the assigned falls champions (RN- nurse coordinator, two falls certified nursing assistants, a falls therapist and a falls engineer).
Participants

The participants included potential pool of 100 residents, male and female. As this project was targeted for adults, inclusion criteria were age ≥ 65 years, nursing home residents in the skilled unit, and English-speaking. Although, 100 residents had potential of becoming participants in the IMIFRP, only residents who experienced a fall during the project period were exposed to the program and therefore only 21 residents were true participants of the intervention. Exclusion criteria included age < 65 years old, non-English speaking and residents in the rehabilitation, personal care and independent living units. Site staff/stakeholders were also participants of this project, as they were responsible for project implementation and use of the IMIFRP. Staff included a nurse practitioner (project lead), physician, two falls coordinator (registered nurses), Nurse Managers, Director of Nursing (DON), Licensed Practical Nurses and Certified Nursing Assistants.

Intervention

The AHRQ (2017) endorses an eight-step fall response program as a comprehensive approach to establishing a Fall Management Program [FMP] (AHRQ, 2017). For this project, the first five-steps of the fall response protocol, guided the project intervention. The five-steps included: 1) evaluation and assessment of resident within 72 hours post fall, 2) investigation of falls incidence, 3) documentation of falls circumstances, resident outcomes and response of staff (using TRIPS tool), 4) notification of provider immediately post fall incidence, and 5) implementation of interventions within the first 24 hours post fall (AHRQ, 2017). This 5-step process is referred to as IMIFRP within this project paper.
**Project Implementation**

In order to prepare for this practice change of implementing the IMIFRP, staff training was necessary. Training and education were delivered in two separate modules for training staff and the management team on the IMIFRP. In module one the project lead (nurse practitioner) presented a 30-minute Microsoft PowerPoint presentation to the stakeholders (Executive Director, DON, ADON, Physiotherapist, Occupational Therapist, Dietician, Social Worker, Unit Managers and Registered Nurses). The presentation content included: 1) facts about falls, intrinsic and extrinsic fall risks, consequences of falls, staff strategies to reduce fall risk and how to intervene [AHRQ, 2017], 2) TRIPS Tool for falls data collection and analysis, 3) the 5-step immediate fall response process map was discussed.

Module 2 included Microsoft PowerPoint slides and a pamphlet explaining the five-step processes and the TRIPS form was e-mailed to the registered nurses and licensed practical nurses so they could familiarize themselves with the form. The copies of the PowerPoint slides were printed and placed in the RN Supervisor’s training binder for each RN to review and acknowledge reviewing the content by their signature. The project lead (nurse practitioner) had face-to-face meeting thrice weekly with the nursing team, phone calls with the registered nurse fall coordinator and answered questions from nursing staff. There was weekly face-to-face booster training for nursing staff that required further clarification about the TRIPS or any other part of the IMIFRP.

After staff training and presentation to stakeholders, the Immediate Multidisciplinary Individualized Fall Response Project (IMIFRP) was initiated. The project involved a five-step fall response processes, that served as the foundation for the comprehensive fall management program (AHRQ, 2017). Details of each step of the intervention are provided below:
1. Evaluation and Monitoring of Residents within 72-hour Post-Fall Incident

When fall occurred, the residents were immediately evaluated thoroughly, review of systems conducted, vital signs and blood glucose monitoring, documentation of assessment, response to treatment, worsening or improvement and the treatment provided to alleviate symptoms (AHRQ, 2017). During each shift, the residents were monitored closely for 72 hours post-fall, documentation of fall and residents’ response to treatment were clearly documented in the electronic medical record. Laboratory test and diagnostic tests were obtained when indicated.

2. Investigation of Fall Circumstances

The investigations of fall circumstances were conducted by registered nurse supervisors or unit managers. The information was not collected for punitive purpose, but used by multidisciplinary team, to identify resident’s fall risks and developed individualized fall interventions, to reduce repeated falls.

3. Record Fall Circumstances, Outcome and Staff Response

The TRIPS (Figure 5) was utilized for documentation of falls circumstances, resident outcomes, staff response and a written explanation of all external circumstances. The unit manager or registered nurse supervisors completed the TRIPS form. Fall data was obtained from resident’s nurse to find out residents’ risk factors that caused the fall incident. Thereafter, TRIPS form was reviewed by the Project Lead (nurse practitioner) for error or missing data.

4. Fax Alert or Phone the Primary Care Provider

The primary care providers were notified when residents fell and informed about repeated fall as indicated. If resident was not enrolled in the IMIFRP, they would be enrolled post-fall incidents.
5. Implementation of Immediate Intervention Within First 24 Hours

The immediate fall interventions were initiated by residents’ nurses during the shift of the fall incidents. The implementation of the immediate fall interventions within the first 24 hours post-fall were based on residents’ risk factors. Examples of immediate intervention included “toileting schedule, increased assistance during high-risk time, using alarms or monitoring devices, rounding during high-risk time, effective pain management, wearing protective devices or clothing, non-slip footwear, low bed, floormat beside bed, and behavioral management” (AHRQ, 2017). Documentation of these interventions were important for patient safety, reduction of repeated falls and prevention of lawsuits against the organization or staff.

The result of falls assessment, primary care provider’s orders and recommendations were utilized by the multidisciplinary team to develop a comprehensive falls care plan within one to seven days post-fall incident. Fall intervention care plan was used by nurses as a worksheet to record the final intervention chosen for the resident by the multidisciplinary team. The interventions were based on the five risks highlighted in fall assessment that included: 1) medications -“antidepressant, antipsychotics, benzodiazepines, sedative or hypnotics and digoxin, 2) orthostatic hypotension, 3) poor vision, 4) impaired mobility and 5) unsafe behavior” (AHRQ, 2017).

Residents’ involvement was important in providing individualized resident-centered interventions (AHRQ, 2017). The debilitating effects of falls and fall-injuries are felt by residents, family members, healthcare team and organizations. Therefore, it is important to provide individualized, multidisciplinary, resident-centered fall interventions, by seeking the perspectives of residents and family members, to find out their concerns, needs and expectation
and ensured their stated needs were met, and concerns addressed to their satisfaction (AHRQ, 2017; RNAO, 2017; Schoberer et al, 2016).

**Measures**

Outcome measures for this project included: 1) utilization of the TRIPS tool, and 2) the number of falls and repeated falls, pre- and post-intervention. These variables were pertinent indicators of the success of the fall management project. Demographic data was also collected and included age and gender of the residents. Details of each measure described below.

*Tracking Record for Improving Patient Safety (TRIPS) Form*

The TRIPS (Figure 5) was used for collection of fall data and analysis, to inform the choice of appropriate individualized multidisciplinary interventions, based on the resident’s identified fall risks. The TRIPS consisted of two sections. Section A included: 1) Name, date of incident, time of incident, day of the week, severity level, location, treatment administered, notification of physician and family, documentation of fall occurrence in the medical record, plan of care and medical record flagged for follow up (AHRQ, 2017).

Section B consisted of 17 questions about the fall: 1) if the fall incident was witness, unwitnessed, near fall or self-reported fall, 2) the causes of the fall, 3) activity during the incident, 4) presence of staff during the fall incident, 5) type of footwear worn at the time of fall, 6) ambulatory aid used at the time of fall incident, 7) use of restraint at the time of fall, 8) Were bed rails used, 9) use of alarm, if yes, did the alarm sound? 10) any change in mental status, 11) any loss of consciousness, 12) was the blood glucose assessed? 13) was resident’s pulse assessed, 14) was the blood pressure assessed, 15) was the resident’s temperature assessed, 16A) what was the outcome of the fall incident, if there is an injury, section 16, part B must be completed that includes injury site and type of injury sustained, 17) inquired if the resident was
enrolled in the Individualized Immediate Fall Response at the time of fall. If not, the resident
would be enrolled in the program and communicated to the physician regarding recent fall or
repeated falls (AHRQ, 2017).

The data collected on the TRIPS form guided the choice of the individualized fall
intervention, based on the resident’s identified fall risks. Furthermore, utilization of the TRIPS
form by staff was analyzed, to determine if the TRIPS tool was used for each fall.

Documentation of the fall incident was assessed for the presence of an accompanying completed
TRIPS form—each fall incident was either marked completed or incomplete with regard to an
accompanying TRIPS form. This measure of utilization helped determine the successful uptake
of the intervention and more confidently indicated if the change in fall rates from pre-
intervention to post-intervention was as a result of the fall program.

**Number of Falls**

A fall is an unintended descent to the floor, with or without injury. Falls are comprised of
assisted or unassisted falls that occur from either physiological or environmental variables
(Morse, Morse & Tylko, 1989). Falls can include residents that slipped out of chair and landed
on the floor, residents found lying on the floor, or assisted falls, such as a resident caught by a
staff while falling and lowered onto the floor; thus, the impact of the fall was lessened, but still
considered a fall (Morse, Morse & Tylko, 1989).

The pre-intervention data on falls was collected from the completed incident report forms
at the facility and the electronic health record. Post-intervention data on number of falls was
obtained from the incident report forms. Number of falls were compared to the number of
completed TRIPS form to evaluate utilization of the TRIPS, for documentation of each fall
during the 8-week project. The pre-and-post fall data included: 1) number of falls per week, 2)
number of falls month, 3) number repeated falls, defined by the number of residents with two or more falls per month (AHRQ, 2017). The total number of falls as defined above, were collected weekly and analyzed descriptively and statistically at the end of the 8-week intervention period.

Data Management

Prior to the implementation of the immediate fall response project, when a fall occurred, an incident report would be completed by the registered nurse or licensed practical nurse that cared for the resident. The completed form would be reviewed and signed by the DON and Medical Director. The fall data for the 8-week pre-intervention was available in the electronic health record and provided by the DON to the project lead.

The post-intervention data were collected weekly from incident reports and completed TRIPS form, completed by the DON or RN Supervisor during the 8-week intervention of the IMIFR. The pre-and-post fall data included: 1) number of falls per week, 2) number of falls per month, 3) number of residents with falls per month and 4) repeated fall defined by the number of residents with two or more falls per month (AHRQ, 2017). This pre-and-post data on falls was entered into an excel file on the University of Pennsylvania secured server, where the data was behind the firewall and secured.

Data on details of a fall collected at the time of fall using the TRIPS tool, included clinically relevant data such as name and gender of the resident and were collected only on the form but identifying data were not entered into database, steps were taken to protect their identity.

The demographic variables of the residents were collected from the TRIPS tool and measured at the nominal level. The demographic variables included: ages from 65 years and older, (1=Y, 2= N); gender (1= F, 2 = M); location of the fall incidents (1 = Resident’s room, 2 =
Resident’s bathroom, 3 = Another resident’s room); treatment (1 = Resident sent to PCP for evaluation, 2 = To emergency room, 3 = Admit to hospital, 4 = Sutures); falls: (1 = Found on the floor [unwitnessed], 2 = Fall to the Floor [witnessed], 3 = Near Fall, 4 = Rolled out of low bed onto floor or mat); and ordinal variables assigned to the severity of injury: (1 = No injury; 2 =Minor injury, 3 = Major injury, 4 = Death).

The participants were assigned an identification number (ID) in the dataset and a master list of the participants including their study ID was created, in order to track repeated fall incidents. The master list was stored electronically in a folder in the University of Pennsylvania secured server and required a two-factor authentication. Access was granted to the project lead and faculty lead. The completed TRIPS forms were stored in a locked cabinet within the facility, with access granted to the project lead and falls coordinator (RN). The falls coordinator is a registered nurse supervisor, that regularly supervises other RN and LPN within the facility.

The data from the TRIPS form was entered into Microsoft Excel by the project lead (Nurse Practitioner). Data entries were verified visually to ensure error-free data prior to data analysis. The data set values were printed out and visually compared to the original data in the TRIPS form to rule out discrepancies and coding errors (Portney & Watkins, 2009). The printed data was shredded after comparison and verification. The TRIPS forms were stored in a locked cabinet within the facility and after the TRIPS forms were reviewed for accuracy, the forms were destroyed at the end of the 8-week fall management program. The data in the Microsoft Excel sheet was exported into SPSS for statistical data analysis.

Analysis

The project lead consulted an expert statistician for guidance to ensure data veracity. Descriptive statistics included frequencies and measures of central tendency (means/standard
deviation; median/interquartile range, as appropriate) to summarize sample descriptions, falls, and utilization of TRIPS. Descriptive statistics of the dependent variables (number of falls, fall with injuries and recurrent falls) were examined for normality by visualizing the distributions via histograms and bar charts.

This QI project involved 8-week pre-intervention data (number of falls and number of repeated falls) and post-intervention data (number of falls, number of repeated falls and utilization of TRIPS tools for each fall). Pearson Chi square test of independence was conducted between pre-and-post intervention fall rates to determine if there was significant association between the implementation of the IMIFRP and reduced fall rate, statistical analysis conducted using SPSS, Inc. (Version 27, IBM).

Ethical Considerations
The University of Pennsylvania Institutional Review Board (IRB) approved the IMIFRP as a quality improvement project on February 11, 2021.

Results

Sample and setting description

The sample included 21 residents, 14 females (67%) and 7 (33%) males (Table 2) in the skilled unit, all participants were ≥ 65 years of age.

Utilization of TRIPS tool (primary outcome)

During the intervention phase, staff compliance with the IMIFRP was defined by the completion of the TRIPS form with each documented fall (n = 30 total fall incidents). Of the 30 falls reported during the intervention period, 90% (n = 27) had an associated, completed TRIPS form. Three falls (10%) did not have associated TRIPS form. For clarification purpose, 21 residents experienced a fall during the intervention period, however, the fall rate was 30 falls,
due to repeated falls (Table 3). Additionally, TRIPS forms were assessed for completeness and accuracy of each required section of the form. Forms were filled out accurately and completely for 100% of the completed TRIPS forms.

**Falls (secondary outcome)**

The pre-intervention data (weeks 1-8) as shown in the run chart (Figure 6), included 41 total falls (including repeated falls; Table 3). Of the 41 total falls, 15 falls (37%) comprised of 15 residents that fell once, 18 falls (44%) involved 9 residents that fell two times, and one resident had 8 falls (20%; Figure 7).

The intervention period (weeks 9-16) included the implementation of the IMIFRP. During this phase of the project, amongst 21 residents, there were 30 fall incidents. 14 falls, (47%), included 14 residents that fell one time, 6 residents fell two times, accounting for 12 falls (40%), and one resident fell four times, contributing to 4 falls (13%) (Figure 8, Figure 9 & Figure 10).

The total number of falls decreased from 41 falls pre-intervention to 30 falls post-intervention. Also, repeated falls during the intervention, was lower than pre-intervention period (10 vs. 7 residents with repeated falls) (Figure 8, Figure 9 & Figure 10). There was no statistically significant difference in the number of falls pre-and-post fall intervention, Pearson Chi square: $\chi^2 (1) = .153$, $p = .695$. However, the run chart (Figure 6) showed that the quality improvement project, resulted in decreased fall rates during the intervention period of eight weeks, and would potentially continue to trend lower over a longer period.
Discussion

Summary

This project met and exceeded the goals of the project purpose, which was to improve fall care processes at the site. Uptake of IMIFRP was strongly supported by the key stakeholders, including the multidisciplinary team of registered nurses, registered dietician, physiotherapist, occupational therapist, registered social worker, nursing home administrator, DON, ADON, unit managers, nurse educator, nurse practitioner, physicians, executive director and vice president. There was buy-in and commitment from the DON, ADON, unit manager and nursing supervisors to complete TRIPS forms. The management team acknowledges the importance of TRIPS form and informed registered nurse supervisor to document each fall using the TRIPS form.

As a result of this project, there was an improvement in the fall care processes at the site, as the facility created an organized multidisciplinary falls team, held weekly meetings to discuss fall incidents, and developed individualized interventions and care plans for the residents by implementing the IMIFRP. An unanticipated, but extremely positive result of this project is the DON and management team are planning to incorporate the TRIPS tool into the fall management policy.

Another purpose of the project was to reduce fall rates, there was a 27% reduction in the number of falls and fall rate is trending downward as shown in the run chart (Figure 6). Fall rate pre-intervention was 41, compared to the intervention phase with 30 falls and the fall rate may continue to decrease over a longer period of time. Furthermore, the number of residents with repeated falls during the intervention was lower than the number with repeated falls during the pre-intervention period. Additionally, the management team developed a program to reward the units with low fall rates monthly and continued the reward program post-implementation, to raise
awareness about the importance of fall management as a priority at the facility, aimed for continual reduction of falls and fall-related injuries.

The general acceptance of the project was a promising finding, as at the beginning of the project, some of the registered nurses verbalized concern regarding increased workload as the current policy already requires the completion of an incident report when a resident sustains a fall. The project lead met with registered nurses and reiterated the importance of using the TRIPS form to identify resident’s fall risks and guide individualized interventions to prevent a recurrent fall and fall-injury. Regular communication on falls, presence of the project lead in the facility and meeting with nurses to address their concerns or questions was critical to the acceptance of the IMIFRP.

The major limitation of the project was duration of the project. The project was eight weeks, with short duration, thus, statistical analysis did not show statistical significance difference in fall rate (p-value >.05). However, there was clinical significance with decreased fall rate and repeated falls. Of note, at the onset of the project, between week eight to week nine, fall rate was higher than the usual fall rate. This might be attributed to the increased awareness among the nursing staff and multidisciplinary team about the need to identify resident’s fall risks, develop individualized fall interventions, to reduce fall, repeated fall or fall-injuries.

Over a longer duration, it is hypothesized that the fall rate would reduce due to increasing acceptance and utilization of the IMIFRP. The IMIFRP is intended to identify an individual’s fall risk and create a care plan which reduces that individuals chances of falling again. Seeing changes in fall numbers, by way of reducing repeated falls, likely takes longer than eight weeks to notice a significant change in both recurrent and total fall numbers.
Opportunities for Sustainability

During the project, it was discovered that having frequent contact with nursing staff was important in ensuring the IMIFRP protocol was followed, and TRIPS forms were completed. Given the site’s interest in continuing to use this protocol and the TRIPS form, it will be important for individuals of the newly formed falls committee to regularly huddle to discuss falls and engage with nursing staff frequently to provide guidance and support to nurses that might have questions or concerns, and ensure their questions were answered in a timely manner. This would ensure provision of quality care to the older resident, reduce fall rate and enhance continuity of the IMIFRP including the use of the TRIPS form.

Implication for Practice and Policy

The IMIFRP led to comprehensive fall assessments and data collection related to fall incidents and enhanced immediate individualized fall interventions to reduce falls in older residents. Based on the success of the project, the project site stakeholders chose to continue implementing the use of the TRIPS tool and the IMIFRP protocol beyond the project period and the tool is now being used in addition to the previous practice of completing an incident report. This project directly led to a change in policy at the site. Furthermore, the facility formed a fall management committee to ensure there continues to be ongoing conversations about falls and adherence to the IMIFRP protocol and new policy. The IMIFRP change practice at this site and improved the quality of care provided to the older residents.

The IMIFRP will be used in the personal care units and other nursing homes within the organization, this would eventually result in discontinuation of the incident report and utilization of the TRIPS form in all the nursing home within the organization. The IMIFRP will be
replicated in the other locations and beyond the organization. This project can serve as a foundation for other quality improvement project on fall management in other nursing homes.

**Conclusion**

The purpose of this project to improve fall care processes, far exceeded expectations. The IMIFRP undoubtedly improved practice in this setting. The project raised awareness among staff and improved knowledge regarding the need to create a healing and safe environment for the residents. The project was well received by stakeholders within the facility and led to practice and policy changes within the facility, including the sustainment of the IMIFRP beyond project end date, policy changes regarding the use of the TRIPS tool for documenting falls incidents, and the development of a falls committee to ensure the sustainability of the program. These policy and practice changes, as a result of this project, will undoubtedly benefit the residents in the facility by creating a safer environment due to informed staff, implementation of explicit fall-incident protocols, and the application of individualized interventions to reduce risks of repeated falls.

**Funding:** This project was not funded by the organization.

**Acknowledgements**

First and foremost, I want to thank God Almighty for all He has done for me. I am truly grateful to Dr. Watach, Faculty Lead and Dr. DeMutis, Project Lead for their guidance and support throughout this project, they were always available to answer my questions or concern and offered constructive feedback, that culminated to the success of this project. Furthermore, I acknowledged the support of the facility stakeholders - Brian Sullivan, DON, Rita Shesko RN Supervisor/Fall Coordinator & Taylor Brnik, RN, Supervisor/Fall Coordinator, Brian Schoffstall, RN Unit Manager, Matt Pavalko, Nursing Home Administrator, Julie Craft, Executive Director
and other registered nurse supervisors, physicians, vice president and multidisciplinary team in
the fall management committee for their commitment to compassionate, quality healthcare and
ensuring a safe and healing environment for our residents. Last but not the least, my appreciation
goes to my beloved husband and children for their support and love.
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Vlaeyen, E., Coussément, J., Leysens, G., Van der Elst, E., Delbaere, K., Cambier, D., Milisen,


Figures

Figure 1

PRISMA Flow Diagram

Records identified through database searching
(n = 350)

Additional records identified through other sources
(n = 100)

Records after duplicates removed
(n = 250)

Records screened
(n = 100)

Records excluded
(n = 150)

Full-text articles assessed for eligibility
(n = 10)

Full-text articles excluded, with reasons
(n = 90)

Studies included in quantitative synthesis
(meta-analysis)
(n = 7)

Qualitative Studies - not included in the table of evidence
(n = 3)
Figure 2

IHI Model for Improvement

Figure 3

Theory of Bureaucratic Caring

Figure 4

*A Five-Step Immediate Fall Response Process Map*

1. Evaluate & monitor
2. Investigate Circumstances
3. Using TRIPS: Record circumstances, resident outcomes, and staff response
4. Fax Alert to PCP
5. Immediate Intervention of the Fall Management Response

*Initiate immediate intervention within 24 hours of falls incident*
Figure 5

Tracking Record for Improving Patient Safety (TRIPS)

<table>
<thead>
<tr>
<th>TRIPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking Record for Improving Patient Safety</td>
</tr>
</tbody>
</table>

| Name: _____________________________ | Medical Record Number: ______________________ |

<table>
<thead>
<tr>
<th>SECTION A</th>
</tr>
</thead>
</table>

Date of Incident ____________________________ | Time of Incident ____________________ □ AM □ PM |

Day of Week

- □ Sunday
- □ Monday
- □ Tuesday
- □ Wednesday
- □ Thursday
- □ Friday
- □ Saturday

Severity Level (Check highest level of injury)

- □ No injury
- □ Minor injury/first aid only (ex: bruise, abrasion, skin tear)
- □ Major injury (ex: laceration with suture, closed head injury, fracture)
- □ Death

Treatment (Check all that apply)

- □ To primary care provider for evaluation
- □ To emergency room
- □ Admit to hospital
- □ Sutures
- □ X-ray
- □ Blood work
- □ Urinalysis
- □ Other (specify): ______________________ |

YES □ NO

- □ Physician notified

  Name of MD: ____________________________
  Date of notification: _____________________
  Time of notification: _____________________

- □ Family/POA notified

  Name of contact: _________________________
  Date of notification: _____________________
  Time of notification: _____________________

- □ Medical record flagged & occurrence documented accordingly

- □ Plan of care updated

- □ Medical record flagged for follow-up documentation

Signature: ____________________________ Date: ______________________

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October, 2016

THE INDIVIDUALIZED MULTIDISCIPLINARY IMMEDIATE FALL

SECTION B

1. Was the incident a:
   - Found on the floor (unwitnessed)
   - Fall to the floor (witnessed)
   - Near fall (patient lowered to floor by staff/other or stabilized)
   - Self reported fall

2. The cause of the incident was:
   - Lost Balance
   - Slipped (specify): ____________________________
   - Lost strength/weakness
   - Tripped
   - Lost consciousness/seizure
   - Equipment malfunction (specify): ____________________________
   - Environmental factor (specify): ____________________________
     (i.e. clutter, inadequate lighting, floor)
   - Other (specify): ____________________________

3. The activity during the incident was:
   - Ambulating in bedroom
   - Ambulating to/from bathroom
   - Transferring on/off toilet
   - Ambulating in hallway
   - Sliding out of wheelchair
   - Getting up from chair/wheelchair
     - Brakes unlocked
   - Getting in/out of bed
     - Bed wheels unlocked
   - Out of low bed to floor/mat
   - Changing clothes/other ADLs
   - Getting in/out of tub or shower
   - Reaching for something
   - Other (specify): ____________________________

4. Was there staff present during this activity?
   - Yes  □  No □

5. The footwear at the time of the incident was:
   - Shoes
   - Slippers
   - And if applicable
     - No tread or tread too high/thick
     - High/narrow heel
     - Poor fit/loose
   - Plain socks only
   - Non-skid socks
   - Bare feet
   - Other (specify): ____________________________

6. Indicate aid in use at the time of the incident:
   - None
   - Care
   - Wheelchair
   - Walker
   - Merry walker
   - Hip protectors
   - Other (specify): ____________________________

7. Part A.
   - Was a restraint in use at the time of the incident?
     - Yes  (complete Part B)
     - No □

   Part B.
     - Vest/trunk restraint
     - Wrist/hand mitten
     - Seat belt/Roll belt/waist restraint
     - Geri chair with table
     - Lap Buddy/Lap tray
     - Other (specify): ____________________________

8. Part A.
   - Were the side rails up?
     - Yes  (complete Part B)
     - No □

   Part B.
     - Full length side rails (2 full or 4 half rails
       on both sides of bed)
     - Other side rails: ____________________________

9. Part A.
   - Was alarm present?
     - Yes  (complete Part B)
     - No □

   Part B. (Check all that apply)
     - Bed alarm sounded during event
     - Bed alarm did not sound during event
     - Chair alarm sounded during event
     - Chair alarm did not sound during event
     - Other (specify): ____________________________

AS A RESULT OF THIS INCIDENT

10. Did the patient’s mental status change?
    - Yes □  No □

11. Did the patient’s level of consciousness change?
    - Yes □  No □

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12. Was the patient's blood glucose level checked?  
   □ Yes  □ No  
   If yes, indicate: ____________________________

13. Was the patient's pulse checked?  
   □ Yes  □ No  
   If yes, indicate: ____________________________

14. Was the patient's BP taken?  □ Yes  □ No  
   If yes, indicate value: __________/_________ systolic / diastolic  
   If postural BP indicated, record value:  
   sitting __________/_________ systolic / diastolic  
   standing __________/_________ systolic / diastolic

15. Was the patient's temperature taken?  
   □ Yes  □ No  
   If yes, indicate value: ________________  
   And check  
   □ oral □ rectal □ axillary

16. Part A. What was the incident outcome?  
   □ Injury (complete Part B)  □ Non-injury

16. Part B. If injury, indicate site(s) injured in first column, and the type of injury for each site checked ("X" all that apply):

<table>
<thead>
<tr>
<th>INJURY SITE</th>
<th>TYPE OF INJURY</th>
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<tbody>
<tr>
<td>Head</td>
<td>Left or Right</td>
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<tr>
<td>Neck</td>
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<td>Upper Spine</td>
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<tr>
<td>Chest</td>
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<td>Abdomen</td>
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<td>Pelvis</td>
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<td>Hip</td>
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<tr>
<td>Leg</td>
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<tr>
<td>Ankle</td>
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<td>Foot</td>
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<tr>
<td>Other site</td>
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<tr>
<td>Other site (specify):</td>
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</tbody>
</table>

17. Was this person in The Falls Management Program at the time of the fall?  
   □ Yes  □ No  
   If yes, send fax alert to MD  
   If no, consider enrollment in The Falls Management Program.

If necessary, please provide a brief narrative of this incident:

--------------------------------------------------------------------------------------------------

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Figure 6

Run Chart on Pre-and-Post Intervention Fall Rate

Note. Preintervention = week 1 - week 8, post-intervention = week 9 – week 16
Figure 7

Sample Demographics and Falls Pre-Intervention

Note. F = 18 (72%) Females, M = 7 (28%) males
Figure 8

Sample Demographics and Falls/Repeated Falls Pre-Intervention

*Note.* F1 = 15 falls (37%), 15 residents one time, F2 = 18 falls (44%), 9 residents fell two times, F8 = > 8 falls (20%), 1 resident fell eight times.
Figure 9

Sample Demography and Falls during the Intervention

Note. F = 14 (67%) female, M = 7 (33%) males
Figure 10

*Sample Demography and Falls/Repeated Falls during the Intervention*

*Note.* F1 = 14 falls (47%), 14 residents fell once, F2 = 12 falls (40%), 6 residents fell twice, F4 = 4 falls (13%), 1 resident fell 4 times
### Tables

#### Table 1

**Table of Evidence**

<table>
<thead>
<tr>
<th>Citation or Study Number</th>
<th>Research Aim, Question, Hypothesis</th>
<th>Setting, Sample, and Sampling</th>
<th>Design</th>
<th>Variables and Measures</th>
<th>Findings</th>
<th>Level of Evidence</th>
<th>Conclusions</th>
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<tbody>
<tr>
<td>Daley et. al. (2020)</td>
<td>Compared the effects of two staffing patterns with rate of falls between video monitoring system + rounder and Neuro/med-surg N= 1032 Randomization Not blinded</td>
<td>RCT</td>
<td>Falls measures: Falls/1000 patients-days Falls without injuries/1000</td>
<td>(+) rounder: Rate of falls/1000 patient –days = 1.02 (-) rounder: 3.05 No significant difference noted, ( P = 0.289 ) (-) rounder: n = 2 falls in 3-mo.</td>
<td>Level I Grade B</td>
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<td>Setting</td>
<td>Fall Prevention Strategies</td>
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<td>Nursing home, N = 28</td>
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<td>2011 – 2018, SR (N = 981)</td>
<td>multicomponent fall strategies</td>
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<tr>
<td>ICU</td>
<td>↓ falls rate: 85 to 53 (p. 0001, 95% CI)</td>
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</table>
al. (2016) monitoring with a dedicated sitter and reduce cost spent on the use of a sitter in the in-patient unit. Neuroscience Adults units Sample: All 3 units were eligible Pt. discharges N = 5,109 N = 828 adults N = 992 video monitoring episodes the falls per discharge and 1:1 patient sitter hour Descriptive statistic and paired t-test Falls ↓ 35%. Falls: N = 13 (+)patients, (1.6%) falls compared to 4,213 patients excluded. 1:1 sitter usage: ↓10%, without ↑ falls ↓ cost reported Grade B +
<table>
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<tr>
<th>Study</th>
<th>Objective</th>
<th>Methodology</th>
<th>Findings</th>
<th>Level</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>Montero-Odasso et al. (2019)</td>
<td>To evaluate cross-sectional and longitudinal associations between polypharmacy and gait performance. Assess whether gait</td>
<td>Geriatric Clinic Sample: Community-living older adults ≥ 65 years N = 249</td>
<td>Number of medications Gait parameters Fall Incidence</td>
<td>Number of medications (-) poor gait: Slow gait, speed p &lt; .001 ↑ medications = (-) overall gait decline (odds ratio = 1.23; 95% CI = 1.13-1.33; p &lt; .001) ↑ falls incidence (p &lt; .006)</td>
<td>Level I</td>
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</tbody>
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<table>
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<tr>
<th>Patient/Hour of Monitoring: N = 12 / 24 hours</th>
<th>PDS</th>
<th>Number of medications</th>
<th>Level I</th>
<th>Grade A</th>
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<tr>
<td>Montero-Odasso et al. (2019)</td>
<td>To evaluate cross-sectional and longitudinal associations between polypharmacy and gait performance. Assess whether gait</td>
<td>Geriatric Clinic Sample: Community-living older adults ≥ 65 years N = 249</td>
<td>Number of medications Gait parameters Fall Incidence</td>
<td>Number of medications (-) poor gait: Slow gait, speed p &lt; .001 ↑ medications = (-) overall gait decline (odds ratio = 1.23; 95% CI = 1.13-1.33; p &lt; .001) ↑ falls incidence (p &lt; .006)</td>
</tr>
</tbody>
</table>
impairments could mediate associations between number of medications and falls incidence.

Each additional medication = ↑ gait decline by 12%-16% and fall incidence↑ by 5%-7%.

| Sobrieraj et al. (2019) | Examined adverse effects of antidepressants for treatment of MDD in adults ≥65 years | Age ≥ 65 years with MDD Setting: Outpatient Sampling: IVG PCG | SR & MA | Adverse events, CVD > QTc Neurological Falls, fractures, | AE: SSRI = Placebo (-) AE: SNRI (+)↑ adverse reactions. Duloxetine ↑ falls rate in both acute and maintenance phases of treatment. | Level 1 Grade A | + |
Gulka et al. (2020) evaluated the effectiveness of fall management programs in nursing homes and the generalizability of the interventions to the older nursing home residents with cognitive impairment and dementia.

| Setting: NHs homes in 12 countries | Sample: N=30,057 age ≥ 65 years | Sampling: 36 studies | SR & MA | Staff education: polypharmacy | Environment: ↑ activity, Person-centered care | Falls ↓ 27%, RR 0.73, 95% CI 0.60 – 0.88 | Fallers ↓ 20%, RR 0.78, 95% CI 0.69-0.89 | Recurrent fallers RR 0.60, 95% | MFI: ↓ falls rate: RR 0.65, 95% CI = 0.45-0.94 | Exercise interventions dementia. | Level 1 | Grade A | + |

- Exercise interventions (-) for dementia.
| Vlaeyen et al. (2015) | Determine the effectiveness of prevention program on fall related outcomes. | Setting: Nursing homes | Sample: N(22, 915) | Sampling: Randomization on 1) TG 2) CG | Outcome measures: Falls Fallers Recurrent Fallers | MFI:SE (+) ↓ falls (4 studies, RR 0.67, 95% CI = 0.55 - 0.82 & ↓ Recurrent fallers: (4 studies, RR = 0.79, CI 0.65-0.97) | Grade I Level A | (+) significant ↓ number of recurrent fallers by 21% |
The Individualized Multidisciplinary Immediate Fall

<table>
<thead>
<tr>
<th>SI</th>
<th>MCI</th>
<th>MFI</th>
<th>TC</th>
<th>GRP 1</th>
<th>GRP 2</th>
<th>SI &amp; MCI (-)</th>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>intervention had no effect.</td>
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</table>

*Note.* SI = Single Intervention, MCI = Multicomponent Intervention, MFI = Multifactorial Intervention, TC = Treatment Group, GRP 1 = Group 1, GRP 2 = Group 2, NHs = Nursing Homes, SR = Systematic Review, MA = Meta-analyses, PDS = Prospective Descriptive Study, RCT = Randomized Controlled Trial, AE = Adverse Effect, > QTc = QTc Prolongation, conclusion (+) = significant.
Table 2

Participant Characteristics: Pre-intervention (n = 25), Intervention (n = 21)

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<tr>
<th>Characteristics</th>
<th>Pre-intervention n (%)</th>
<th>Intervention n (%)</th>
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<tbody>
<tr>
<td>Gender</td>
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<tr>
<td>Female</td>
<td>18 (72%)</td>
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<tr>
<td>Male</td>
<td>7 (28%)</td>
<td>7 (33%)</td>
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<tr>
<td>Age: &gt;65</td>
<td>25 (100%)</td>
<td>21 (100%)</td>
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Table 3

Number of Falls/Repeated Falls: Pre-intervention (n=41), Intervention (n=30)

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<th>Intervention</th>
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</thead>
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<td>N (%)</td>
<td>N (%)</td>
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<tr>
<td>Number of falls</td>
<td>41</td>
<td>30</td>
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<tr>
<td>F1 = 15 falls (37%)</td>
<td>F1 = 14 falls (47%)</td>
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<tr>
<td>Repeated Falls</td>
<td>F2 = 18 falls (44%)</td>
<td>F2 = 12 falls (40%)</td>
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<tr>
<td>F8 = 8 falls (20%)</td>
<td>F4 = 4 falls (13%)</td>
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Note. Pearson Chi square: $\chi^2 (1) = 1.153$, $p = .695$

F1 = Resident fell once, F2 = Fell two times, F4 = Fell four times, F8 = Fell eight times.
Appendix A

DNP Team and Project Implementation Form

University of Pennsylvania  
School of Nursing  
Doctor of Nursing Practice Program

DNP Team and Project Implementation Form

This form is to be completed by the student(s), institutional/organization project member(s), and school of nursing project lead and submitted for approval to the DNP Program Director.

Student Name: Ademilu Awolongun

Project Title: Individualized Multidisciplinary Fall Management Project

School of Nursing DNP Project Faculty Lead: Dr. DeMottis

Institutional/Organization DNP Project Member(s): Ojwue Dr. Dillard Elmore, Brian Sullivan, Brik Taylor, Rita Shesko

I hereby accept the following proposed project pending IRB approval (completed by student(s)):

Project Site: Frey Village, Middletown, PA
Project Purpose:
The purpose of the project is to determine if the implementation of individualized fall management interventions, including use of the TRIPS tool, will improve residents’ care process and reduce fall incidence rate among the older residents.

Project Activities:
- Request for 2-month pre-intervention data January 2021
- IRB application and determination that project is CI and not experimental research by February 1, 2021
- Staff training regarding the use of TRIPS tool, immediate 24-hour interventions February to March 2021
- Implementation and data collection March-April 2021
- Data analysis and presentation to the team and stakeholders April 2021

Participants (Describe target group; approximate # in project):
- 80 Older residents, ages 65 years and older, living in the skilled unit at Frey Village

Site(s) Support (Resources):
- Staff that will be involved in the falls team

Data Management Plan:
Data from the TRIPS form will be entered into the master list, with names of the participants replaced with ID. The master list will be stored electronically in the secured at the University of Pennsylvania’s server. The hard copy of the TRIPS tools will be stored in a locked cabinet in Frey Village.

Anticipated Start Date: February 2021

Anticipated End Date: April, 2021

I hereby consent to serve on the DNP Project Committee.
I hereby consent to serve on the DNP Project Committee.

We understand that this site's participation will only take place during the project's active IRB approval period. All project activities must cease if IRB approval expires or is suspended. We understand that any activities involving Personal Private Information of Protected Health Information may require compliance with HIPAA laws and the University of Pennsylvania's policy. Our organization agrees to the terms and conditions stated above. If we have any concerns related to this project, we will contact the project team. For concerns regarding IRB policy or human subject welfare, we may also contact the UPENN IRB.

As a doctoral student member of this team, I agree to conduct the project to the best of my abilities with professionalism.

Student Signature:

Student Signature:

Student Signature:

As an institutional/organization member of this project team, I agree to read and review all drafts of the project within a timely turnaround (approximately 2 weeks).

Team Member Signature: Dr. Fidelis Ojevwe
OjevweF@diakon.org

Contact Information (email and phone number):

Team Member Signature: Brian Sullivan
SullivanB@diakon.org

Contact Information (email and phone number):

Team Member Signature: Dr. Dillard Elmore
Contact Information (email and phone number): ElmoreD@diakon.org

Team Member Signature:

Contact Information (email and phone number):
As the School of Nursing DNP Project faculty lead, I agree to meet with the student(s) and consult throughout the project.

Faculty Lead Signature: Dr. DeMutiis

Contact information (email and phone number):

demutis@nursing.upenn.edu  (215) 373-2391

APPROVED BY DIRECTOR, DOCTOR OF NURSING PRACTICE PROGRAM:

Director Signature:

Date Approved:
### Appendix B

#### Project Charter

**AIM**

| **Primary Aim:** Improve residents’ care process by using accurate measurement system for assessment of falls (i.e., TRIPS tool) for data collection and analysis.  
**Secondary Aim:** To reduce falls and fall-related injuries by 20% in the older adults in the skilled unit within 8 weeks of intervention.  
**Project overview:**  
1. 100 residents from ages 65 and older in skilled unit are the sample population for this quality improvement project.  
2. Implement the individualized multidisciplinary immediate fall interventions for residents with falls. The intervention will be using the 5-step immediate fall response interventions, including use of TRIPS tool for falls data collection and analysis to inform appropriate interventions. |

**PROBLEM**

| The site has a falls rate of 25 falls per month with 1.9% resulting in major fall-injuries, annually. There is a need for individualized multidisciplinary falls interventions to improve care process and reduce falls rate and fall-injuries. |

**IMPORTANCE**

| Falls in older adults from ages 65 years and older are associated with high healthcare cost, morbidity and mortality. An individualized multidisciplinary fall intervention can improve quality of life, reduce anxiety related to falls, prevent deconditioning and improve residents’ independence. AHRQ and CMS provide valuable evidence-based data and toolkits for fall management programs in nursing homes and hospitals. This project will utilize the immediate fall response, including the TRIPS tool, provided by AHRQ to deliver the individualized multidisciplinary intervention. The 24-hour immediate fall interventions and the use of TRIPS tool will guide the team in developing an individualized multidisciplinary care plan, consisting of assessment, investigation of fall, prompt intervention by the fall champions, documentation of falls using the TRIPS tool on a timely manner and notification of the provider regarding falls, residents’ follow up and close monitoring to prevent recurrent falls. |

**EXPECTED OUTCOMES**

| For older adults from age 65 years, living in the skill unit at Frey Village, and have high risk for fall or history of falling:  
100% of the participants with recent or history of falls will be enrolled in the fall management program  
100% will receive individualized multidisciplinary interventions and referral to professionals based on their identified falls risk  
100% of falls data will be collected using the TRIPS tool  
100% participants will have medication review weekly, medications will be titrated or discontinue medications that predispose residents to falls  
20% reduced falls rate with clinical significance. Statistical significance may not be determined due to the short duration of the 8-week project. The deliverables include presentation of the QI project and contribution to evidence-based practice. |

**MEASURES**

| The outcome measures: 1) number of TRIPS tool used for each fall, 2) number of falls, 3) number of fall-injuries, and number of repeated falls.  
Weekly audit of electronic health records and charts to review falls documentation and assess the use of the TRIPS tool for documentation of each fall. Daily Discussions regarding falls and discuss any barrier identified by staff. |

**RISKS/BARRIERS**

| Potential barriers to project implementation include attitude of staff in accepting the project. This is expected, as a change in practice/documentation will be required. To help mitigate this issue, I will arrange regular |
THE INDIVIDUALIZED MULTIDISCIPLINARY IMMEDIATE FALL

meetings to discuss their concerns, be available through e-mail and phone call, and arrange booster trainings as needed to address concerns or question. Daily huddles will be conducted with the unit managers to discuss falls documentation and review interventions based on the assessed risk as documented in the TRIPS and findings. Weekly fall risk meetings will be held on the facility with the RN coordinator and unit managers.

STAKEHOLDERS
The key stake holders include the medical director, physicians, nursing staff, resident and family members. The assigned falls champions will include registered nurses and licensed practical nurses. RN’s LPN’s and certified nursing assistants will be trained prior to implementation of the fall management projects. Regular communication with the multidisciplinary team during the weekly falls risk meeting and review of individualized care plan to meet the needs and preference of the residents and family members.

SCOP

<table>
<thead>
<tr>
<th>In Scope:</th>
<th>Out of Scope:</th>
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<td>Older nursing home residents, ages from 65 years and older in the skilled nursing unit</td>
<td>Age&lt;65, or community dwelling older adults</td>
</tr>
<tr>
<td></td>
<td>Older adults living in personal care or independent living units</td>
</tr>
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SCHEDULE:
IRB application and determination that project is QI and not experimental research by February 1, 2021
Request for 2-month pre-intervention data by February 2021
Staff training regarding the use of TRIPS tool, the five-step immediate fall response interventions from February to March 2021
Project implementation and data collection March-April 2021
Data analysis and presentation to the team and stakeholders April 2021

<table>
<thead>
<tr>
<th>Team Member</th>
<th>Project Role (sponsor, lead, SME, coordinator, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Ojevwe</td>
<td>Medical Director &amp; Sponsor</td>
</tr>
<tr>
<td>Brian Sullivan</td>
<td>Director of Nursing</td>
</tr>
<tr>
<td>Dr Elmore Dillard</td>
<td>Clinical Director</td>
</tr>
<tr>
<td>Adenike Awotundun</td>
<td>Project Lead</td>
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<tr>
<td>Dr. DeMutis</td>
<td>Faculty lead</td>
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<tr>
<td>Brnik Taylor</td>
<td>Unit Manager/RN Coordinator</td>
</tr>
<tr>
<td>Rita Shesko</td>
<td>Registered Nurse Supervisor</td>
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Appendix C

N852 Gantt Chart
Appendix D

N853 Gantt Chart

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### THE INDIVIDUALIZED MULTIDISCIPLINARY IMMEDIATE FALL

#### Project Title: The Individualized Multidisciplinary Immediate Fall Response Project

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</tr>
<tr>
<td>Meeting with Brian G.</td>
<td>done</td>
<td>done</td>
<td>03-03-21</td>
<td>03-03-21</td>
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<td>Fall Management Co.</td>
<td>done</td>
<td>done</td>
<td>05-03-21</td>
<td>05-03-21</td>
<td></td>
</tr>
<tr>
<td>Create Data Base for the</td>
<td></td>
<td></td>
<td>14-02-21</td>
<td>24-02-21</td>
<td>10.0</td>
</tr>
<tr>
<td>Meeting with the Site</td>
<td>done</td>
<td>done</td>
<td>24-02-21</td>
<td>24-02-21</td>
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</tr>
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<td>Creating data base for the</td>
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<td>done</td>
<td>22-02-21</td>
<td>22-02-21</td>
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<td>Project Charter to be</td>
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<td>done</td>
<td>15-03-21</td>
<td>15-03-21</td>
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<tr>
<td>Contacts to work on P.</td>
<td>done</td>
<td>done</td>
<td>14-02-21</td>
<td>14-02-21</td>
<td>5.0</td>
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<tr>
<td>Working on PowerSys.</td>
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<td>done</td>
<td>20-02-21</td>
<td>20-02-21</td>
<td>5.0</td>
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<tr>
<td>Meeting with Dr. Nota</td>
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<td>done</td>
<td>17-02-21</td>
<td>17-02-21</td>
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</tr>
<tr>
<td>Meeting with Dr. DeKee</td>
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<td>done</td>
<td>19-02-21</td>
<td>19-02-21</td>
<td>10.0</td>
</tr>
</tbody>
</table>

#### Task Update

- **Calendar event**: Due data (pending)
- **Due data (done)**: See data (pending)
- **Due data (planned)**: Change day event
Appendix D

IRB QI Project Determination Letter

From: IRB Quality Initiative <PROVOST-IRB-QUALITY@pobox.upenn.edu>
Sent: February 11, 2021 2:45 PM
To: Awotundun, Adenike Yetunde <adenikea@nursing.upenn.edu>; IRB Quality Initiative <PROVOST-IRB-QUALITY@pobox.upenn.edu>
Subject: RE: Penn QI IRB Application

Hello,

It was determined that this project entitled: The Individualized Multidisciplinary Immediate Fall Response Program qualifies as a quality improvement initiative that does not meet the definition of human subjects’ research and therefore further IRB review is not required.

NOTE: This email serves as your documentation. Please save a copy of it for your records.

NOTE: Changes to the purpose, methods, or design of this project may alter the QI status and may require re-review.

Please note that the QI application form has been updated. Please remember to utilize the most up to date version from the website in the future: https://irb.upenn.edu/mission-institutional-review-board-irb/guidance/quality-performance-improvement-project-guidance

Human Research Protections Program
Office of the Institutional Review Board
University of Pennsylvania
3600 Civic Center Blvd., 9th Floor
Philadelphia, PA 19104
www.upenn.edu/IRB