

Stopping Elderly Accidents, Deaths and Injuries: Fall Prevention for Community-Dwelling

Older Adults

by

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Abstract

Problem & Purpose: Falls are the leading cause of death due to injury among older adults, yet most older adults who fall fail to report falling to their provider. Lack of routine fall screening and management among community-dwelling older adults places them at risk for future falls and injuries. The purpose of this 12-week quality improvement project was to implement the Centers for Disease Control and Prevention's Stopping Elderly Accidents, Deaths, and Injuries protocol in a primary care office to screen older adults for falls and address modifiable risk factors for those at increased risk.

Methods: A literature review supported the protocol in reducing falls among older adults. Publicly available resources were adapted into training presentations and case scenarios for providers and staff. Staff screened eligible older adults during their office visit. Providers assessed gait and balance for those with a positive screen and identified fall risk (low, moderate or high). Moderate- and high-risk patients received a risk assessment and fall plan of care. Protocol steps were recorded on checklists reviewed weekly by the project leader to evaluate protocol adherence. Ongoing chart reviews, case scenarios, and a mid-project training session reinforced the protocol. Data was analyzed in three four-week time intervals with a goal of 80% adherence to all protocol steps.

Results: The majority of protocol steps remained above goal over all time intervals or improved with training. All moderate- and high-risk patients received a fall care plan, despite risk assessments dropping below goal in the final interval. Moderate-risk patients were difficult to correctly identify. Overall protocol adherence was highest for low-risk patients (97%) and lowest for high-risk patients (80%) compared to moderate-risk (81%).

Conclusion: With continued staff education and protocol reinforcement, the Stopping Elderly Accidents Deaths and Injuries protocol can be successfully implemented in the primary care daily workflow. Protocol adherence may be complicated by fall risk level. This project's results support the 2019 modified protocol in removing stratified risk levels. Barriers to implementation include lack of protocol reimbursement and time to complete the protocol. Future studies should assess effectiveness of the protocol in reducing falls at one-year follow-up.

Introduction

Among older adults (≥ 65 years old) in the United States, falls are the leading cause of death due to injury and may double by 2030 (Burns & Kakara, 2018). Annually, falls among older adults have resulted in approximately \$50 billion of healthcare spending (Florence et al., 2018), 2.8 million emergency department visits and 800,000 hospitalizations due to injuries (Bergen, Stevens, & Burns, 2016). Older adults who fall may suffer from impaired functioning, are at increased risk for nursing home placement, and experience increased fear of falling (Resnick, 2016). Despite the significant clinical and financial burden of fall-related injuries, less than half of older adults who fall report falling their provider (Stevens et al., 2012).

The Centers for Disease Control and Prevention's (CDC) (2017a) Stopping Elderly Accidents, Deaths, and Injuries (STEADI) initiative helps primary care providers implement fall prevention guidelines from the American and British Geriatric Societies (AGS/BGS) (2011), including a multifactorial approach to prevent future falls (e.g. cognitive screen, medication review, postural hypotension assessment, vision assessment, podiatry/specialist referral, home safety assessment, etc). The United States Preventative Services Task Force (2018) recommends all community-dwelling older adults at risk for falling participate in a fall prevention exercise program and selectively receive multifactorial assessments and interventions.

The problem at a primary care office in suburban Maryland was that older adults were not routinely screened for falls. Therefore, those at risk for falling may not have been identified to receive appropriate fall prevention management. The purpose of a quality improvement (QI) project was to have the staff and providers implement the STEADI protocol with all eligible older adult patients over 12 weeks.

Literature Review

The STEADI protocol (Figure 1) described in detail in the Methods section, screens older adults for falls, assesses fall-related risk factors, and implements tailored interventions based on risk level in addition to an exercise intervention. A literature review of the studies summarized in Table 1 supported STEADI as an evidence-based fall prevention protocol for community-dwelling older adults. This literature review addresses the following themes associated with the protocol: 1) predictive ability to identify future fall risk, 2) appraisal of the multifactorial approach to prevent falls, and 3) effectiveness of exercise in reducing falls and risk for falling. First, STEADI's screening, assessment and classification system was validated in predicting future fall risk as older adults classified as moderate- and high-risk were 2.62 and 4.76 times more likely to fall in four years, respectively compared to low-risk participants (Lohman et al., 2017). The Timed-Up and Go (TUG) which assesses mobility, gait and balance was also found to be one of the best performance-based tests in predicting future fall risk (Lusardi et al., 2017).

STEADI's multifactorial approach to prevent falls was supported because these interventions were overall associated with statistically significant reductions in fall rates between 21% and 28% (Gillespie et al., 2012; Guirguis-Blake, Michael, Perdue, Coppola, & Beil, 2018; Hopewell et al., 2018; Palvanen et al., 2014). Increased risk for falling among older adults stems from a combination of multifactorial causes including intrinsic factors (e.g. cognitive decline, poor vision, balance disorders, chronic diseases), external factors (e.g. polypharmacy) and environmental factors (e.g. home safety hazards) (Reuben et al., 2017; Resnick, 2016). Addressing these risk factors is recommended by the AGS/BGS (2011) and endorsed by the Centers for Medicare and Medicaid Services (CMS) (2019) as a quality metric to prevent future falls for older adults at high-risk. While multifactorial interventions were less efficacious in

reducing risk of falling (Gillespie et al., 2012; Guirguis-Blake et al., 2018; Hopewell et al., 2018), study limitations including differences in baseline fall risk between control and intervention groups, heterogeneity in intervention methods, and selection bias (e.g. healthy participants), may have impacted statistical significance.

Exercise interventions were statistically significant in reducing fall incidence between 23% (Sherrington et al., 2019) and about 30% (Gillespie et al., 2012) with one systematic review reporting an pooled 19% reduction in injurious falls among ten trials (n=4622) (incidence rate ratio = 0.81) (Guirguis-Blake et al., 2018). Exercise interventions also reduced risk of falling by 11% to 22% (Gillespie et al., 2012; Guirguis-Blake et al., 2018; Sherrington et al., 2019). Additionally, both multifactorial interventions and exercise-only interventions demonstrated some improvements in other fall-related outcomes including reducing fall-related injuries by 26% (Palvanen et al., 2014), and hospitalizations by 40% (Johnston et al., 2018).

Based on this literature review, STEADI was considered to be a valid evidence-based protocol for the primary care office in identifying older adults at risk for falls, and preventing future falls with a tailored multifactorial treatment plan that included an exercise component. However, the adapted STEADI algorithm (Figure 1) varies slightly from the original CDC (2017a) protocol. Vitamin D supplementation did not improve fall-related outcomes overall (Gillespie et al., 2012; Guirguis-Blake et al. 2018) and was excluded. The adapted algorithm also assesses appropriate risk factors for moderate-risk patients (no recurrent or injurious fall on screening but an abnormal TUG) because these patients may have unidentified fall risk factors. Furthermore, AGS/BGS (2011) guidelines recommend an older adult who has a gait/balance impairment receive a risk assessment to identify fall-related risk factors.

Theoretical Framework

The project was guided by the revised Health Promotion Model (HPM), which illustrates the interacting internal and external factors that influence individual health promoting behavior (Pender, 1996). HPM's first concept, "prior individual characteristics and experiences," includes existing behaviors as well as the physical and psychosocial variables that influence the health behavior of interest (Pender, 1996). The second concept, "behavior-specific cognitions and affect," involves individual beliefs, interpersonal influences, and environmental influences that enable or deter the behavioral change (Pender, 1996). These cognitive influences are modifiable through interventions that motivate individuals to take action in changing their behavior (Pender, 1996). The final concept, "behavioral outcome," involves strategies for behavioral change and reducing competing influences that prevent the behavior (Pender, 1996).

The QI project utilized the HPM to facilitate fall prevention behavior changes among older adults. The adapted STEADI screening form and multifactorial fall risk assessment identified "individual characteristics" that increased each patient's risk for falls. After identifying at-risk patients, the "behavior-specific cognition and affect" concept reflected in the factsheet "Talking about fall prevention with your patients" (CDC, 2017c) assists providers in modifying patients' beliefs about fall prevention behaviors that can reduce their risk of falls and injury. Physician-patient discussions at this stage also identified and addressed interpersonal and situational influences that interfere with the behavioral change. Finally, the patient's fall plan of care (FPOC), STEADI patient resources (CDC, 2019b), and community exercise resource guide specified strategies to promote fall prevention behaviors to help older adult patients commit to an action plan that incorporated behavior outcome changes to reduce their future risk of falling.

Methods

The STEADI protocol was implemented at a small primary care office in suburban Maryland. Eligible patients were community-dwelling adults ≥ 65 years old. Exclusion criteria included non-ambulatory older adults, those living in long-term care, and hospice. Significantly cognitive impaired patients unable to answer screening questions or follow directions were excluded as efficacy of STEADI interventions to reduce falls in this population is lacking (AGS/BGS, 2011).

Office staff (one medical assistant, three secretaries) and providers (one physician and two nurse practitioner students) implemented the STEADI workflow (Figure 2) by completing STEADI packet forms (Appendices A-C) over 12 weeks. Staff screened eligible patients on admission. Negatively screened patients (low-risk) received a fall prevention brochure. The provider performed the TUG to assess gait, balance and mobility (Appendix D) on all patients who answered yes to one screening question (positive screen), determined fall risk level per protocol, and completed a risk assessment checklist for moderate- and high-risk patients. Providers then addressed identified risk factors and prescribed an exercise intervention for moderate- and high-risk patients on the FPOC. Staff provided brochures, referrals, and follow-up appointments. Packet forms with the cover sheet (Appendix E) were uploaded in the electronic health record (EHR) as part of the patient's medical record.

Between March 2019 and August 2019, online CDC STEADI resources (CDC, 2017b) were adapted into STEADI packet forms. An exercise resource guide which included exercise programs from the county's Office on Aging was developed. Staff and providers were trained in STEADI (Appendix F) two weeks prior to implementation. Providers received additional training on multifactorial fall risk assessments (including TUG and Mini-Cog [Appendix G]), FPOC components, and strategies to

facilitate fall prevention behaviors among patients. Case scenarios (Appendix H) tested protocol knowledge and allowed staff and providers to practice the process prior to implementation.

The project was implemented between September 9, 2019 and December 1, 2019. To improve protocol adherence, the project leader reviewed de-identified completed packets with the office monthly. A mid-project meeting during week six identified areas for improvement and included two additional case scenarios to reinforce protocol adherence. A lunch was given to staff after implementation to thank them for their efforts and to discuss protocol sustainability.

STEADI documentation packets, with a de-identified number, served as a data collection method to assess protocol adherence measures. The project leader reviewed packets weekly and recorded results in a spreadsheet process tool (Appendix I). The following short-term project goals were recorded with a goal of 80% for all outcomes: 1) percentage of positively screened patients with the TUG recorded on the risk assessment checklist, 2) percentage of moderate- and high-risk patients with a risk assessment checklist and FPOC, 3) percentage of patients with correct fall risk identification and 4) average protocol adherence score per a protocol fidelity checklist (Appendix J). Outcomes were analyzed in three 4-week time intervals to assess whether the 80% goal was achieved. Outcomes were also analyzed by fall risk level. To protect patient confidentiality, the cover sheet was removed by staff before data collection. Forms were stored in a locked filing cabinet. The project was declared Non-Human Subjects Research by the University of Maryland Baltimore Institutional Review Board.

Results

The project modified existing office structures such as utilizing STEADI packets during the encounter. Environmental changes included stopwatch and tape in each room to complete the

TUG. A reference folder for providers was conveniently placed in patient rooms that included a one-page sheet about fall risk level criteria, the STEADI workflow (Figure 2), TUG and Mini-Cog instructions. Brochures and exercise resource guides were moved near the front office desk for convenience. Changes to increase patient awareness about fall prevention included a CDC STEADI poster in the waiting room and a statement about falls being preventable on the screening form. The project also changed the check-in process for staff to screen eligible older adults for falls, followed by a fall assessment during the encounter if warranted per protocol.

As described in Table 2, at the completion of the 12-week project, a total of 123 older adults were screened for falls. Among those screened, 87 were identified as low-risk, 16 were identified as moderate-risk, and 20 were identified as high-risk. The median age was between 71 and 75 years old. A majority of patients screened positive for falls (54%) with 44% reporting at least one fall in the past year. Additionally, among those with a positive screen, 91% reported either being worried about falling and/or feeling unsteady when walking or standing.

The analysis of STEADI outcomes in meeting the 80% goal over the 12-week project are displayed in Figure 3. The percentage of positive screened patients with the TUG was below goal in the first time interval (79%), but improved to above goal in the remaining intervals (100% and 92%, respectively). The percentage of moderate- and high-risk patients with a risk assessment checklist remained above goal in the first two time intervals (88% and 100%, respectively), but dropped to 57% in the final interval despite 100% of moderate- and high-risk patients receiving a FPOC throughout the project. Correct fall risk identification was just at goal in the first time interval (80%), and improved to 89% during the second and third interval. Average protocol adherence scores via the fidelity checklist remained stable above goal throughout all time intervals (90%, 95%, and 91%, respectively).

Outcome measures varied among fall risk levels as shown in Figure 4. While 94% of moderate-risk and 100% of high-risk patients received the TUG, only 77% of patients identified as low-risk with a positive screen received the TUG. Patients identified as moderate-risk were less likely to receive a fall risk assessment checklist (75%) compared to high-risk patients (95%), although all moderate- and high-risk patients received a FPOC. Correctly identifying moderate-risk patients was most challenging, as only 44% of moderate-risk patients were actually moderate-risk, compared to correct fall risk identification rates for low- and high-risk groups (94% and 80%, respectively). Overall protocol adherence was highest for low-risk patients (97%) and lowest for high-risk patients (80%) compared to moderate-risk patients (81%).

Results were affected by unintended consequences including barriers and facilitators to implementation. One barrier was that the nurse practitioner students left the office during the middle of implementation, leaving more responsibility for the physician. Communication barriers also existed between the providers and staff, resulting in some patients leaving without referrals, brochures or follow-up. Discussions with staff and the physician identified sustainability barriers including time required to complete the protocol, lack of reimbursement, and printing costs. Reported facilitators included increase awareness about the significance of falls and simplicity of the protocol. A positive unexpected consequence was establishing a relationship between the Office on Aging and the primary care office, resulting in plans to develop a referral checklist for older adult patients to get better access to community resources.

Discussion

This QI project supports STEADI as a feasible fall prevention protocol in primary care as a majority of short-term goals remained above 80% throughout the project or improved overtime. Screening results also support protocol continuation as a majority of patients screened positive

for falls and many indicated fall-related concerns. TUG scores improved over time, likely due to clarifying the definition of a fall per CMS (2019) criteria to include mechanical falls (e.g. trip-and-fall). Excluding patients with one trip-and-fall in the last year explained lower TUG compliance for the low-risk group with a positive screen. As a result, less than a quarter of low-risk patients may have been at higher risk for falling. TUG results for this project were higher than reported in a larger STEADI 12-month trial, where 52% of positively screened patients (n=1534) received the TUG (Stevens, Smith, Parker, Jiang, & Floyd, 2017).

The low number of moderate-risk patients in the final eight weeks (n=4) compared to other risk groups may have led to variations in risk assessment completion. Yet, all moderate- and high-risk patients received a FPOC, which is encouraging as staff recognized these patients needed fall interventions and at least offered an exercise referral. In a similar study, 64% of high-risk patients (n=170) received fall risk assessments and interventions (Eckstrom et al., 2017).

A lower proportion of moderate-risk patients may have resulted because incorrect risk identification was more common in this group. Providers began interpreting the TUG time as a continuous measure of fall risk. For example, a moderate-risk patient would be misclassified as high-risk if their TUG score was much higher than the 12 second cut off. Once this inaccuracy was addressed during the mid-project meeting, correct identification rates improved. Moreover, providers and staff were more inclined to over-estimate risk, suggesting most moderate-risk patients either received appropriate FPOC treatment or more treatment than was required.

Average protocol adherence scores suggest fall risk level may impact implementation of the protocol, with higher risk patients at greater odds for missed opportunities in appropriate fall prevention management. Low-risk patients were less complicated and often had a negative screen, which may have inflated overall adherence scores by time. Moderate- and high-risk

patients however, required more steps and opportunities for error. High-risk patients were most complex. Common protocol inaccuracies for high-risk patients included no 30-day follow-up and not addressing positive risk assessment findings on the FPOC (e.g. a positive Mini-Cog). The long-term goal to reduce overall falls cannot be assessed at this time. Number of falls recorded on screening forms during this project may be used as a baseline to compare fall rates on screening forms at one-year follow-up for those who received the STEADI protocol and FPOC.

During implementation, the CDC modified the STEADI protocol simplifying risk as “not at risk” and “at risk” based on screening (CDC, 2019a). Those at risk receive an assessment and intervention. The results of this project support the change as determining three differing risk levels was challenging, and per AGS/BGS (2011) guidelines, fall risk factors in both moderate- and high-risk groups should be assessed. However, this change may increase the number of patients requiring a multifactorial risk assessment and thus add time to their encounter.

Strengths of the project that promote sustainability included publicly available STEADI resources. Packet forms and STEADI brochures were sent electronically to the office to be printed for patients as needed. Additionally, STEADI packets uploaded in the patient’s EHR served as point-of-care documentation so the physician did not have to document STEADI results in the clinical note. The Office on Aging also agreed to provide updated community exercise program schedules upon request.

The project also had a few limitations. Implementation strategies and results may not be generalizable to other primary care practices as this was a single physician practice with few clinical staff members and a small sample of patients. Staff and providers were also not directly monitored in implementing STEADI. Efforts to improve validity of the STEADI protocol in practice included multiple case scenario run-throughs before and during implementation and a

detailed fidelity checklist to ensure the protocol was implemented as intended. Similar to another STEADI operationalization study, it is also difficult to assess whether patients followed FPOC recommendations (Johnston et al., 2018).

Conclusion

The purpose of this QI project was to implement the STEADI protocol in a primary care office for annual routine fall risk screening, assessment and management among community-dwelling older adults. This project supports the feasibility of implementing STEADI in primary care, as a majority of short-term goals were achieved. Adherence did vary with fall risk and thus supports changes from the CDC in simplifying fall risk level in the new algorithm (CDC, 2019a). In this project, educating providers on the fall definition improved TUG completion for low-risk patients with a positive screen. Classifying moderate-risk patients was difficult due to incorrectly interpreting the TUG and risk level criteria confusion. High-risk patients had lowest overall adherence scores.

Reinforcement strategies such as case scenarios and chart reviews during implementation improved adherence, suggesting ongoing education and training is necessary in implementing STEADI. Future research should include more long-term effectiveness studies to evaluate whether the STEADI protocol results in reduced numbers of falls among those included at one-year follow-up. To sustain STEADI in clinical practice, providers should utilize publicly available resources such as the CDC and local health departments (e.g. Office on Aging). Finally, removing reimbursement barriers by adding a billing code for the TUG and multifactorial assessments may promote sustainability of STEADI in this primary care office and other primary care practices.

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older-adults-interventions

Table 1

Evidence Level and Quality of Studies That Evaluated Fall Prevention Screening and Interventions Among Community-Dwelling Older Adults

Author, year	Aim and Interventions	Design	Sample (N)	Outcomes	Results	Level/Quality
Gillespie et al., 2012	<p><u>Aim:</u> To evaluate the impact of fall prevention interventions in community-dwelling older adults.</p> <p><u>Interventions Compared:</u> Exercise-only or multifactorial interventions, vitamin D supplementation, home environment assessment, vision interventions, psychotropic drug modification, podiatry interventions, fall prevention education and cognitive behavioral therapy.</p>	Systematic Review and Meta-analysis of RCTs	<p>Total: 159 RCTs (N=79,193)</p> <p>Exercise: 59 RCTs</p> <p>Multifactorial: 40 RCTs</p>	<p>1) Rate of falls (e.g. falls per person year).</p> <p>2) Risk of falling measured as number of people sustaining a fall.</p> <p>Timing of outcomes measured varied by study, however many were at least 1 year from randomization.</p>	<p>1) Group and home-based exercise programs each reduced the rate of falling by about 30%. Multifactorial interventions reduced fall rates by 24%.</p> <p>2) Group and home-based exercise interventions reduced risk of falling by 15% and 22%, respectively. Multifactorial interventions did not differ in risk of falling compared to controls.</p> <p>Vitamin D only reduced falls and risk for falling (43% and 30%, respectively) when given to participants with low Vitamin D levels, but did not reduce these outcomes overall.</p>	I B
Guirguis-Blake et al., 2018	<p><u>Aim:</u> To update the United States Preventative Task Force on the health outcomes and harms associated with multifactorial interventions, exercise-only interventions, and vitamin D supplementation for fall prevention in community dwelling older adults.</p> <p><u>Interventions compared:</u> Multifactorial interventions varied between trials. Exercise interventions were on average</p>	Systematic Review and Meta-analysis of individual cluster RCTs	<p>Total: 62 RCTs (N=35,058)</p> <p><u>1) Health outcomes</u></p> <p>Multifactorial: 26 RCTs</p> <p>Exercise: 21 RCTs</p> <p>Vitamin D: 7 RCTs</p>	<p>1) <u>Health outcomes:</u> Number of falls, people falling, injurious falls, people with injurious falls, fractures, people experiencing fractures, and overall mortality from falling.</p> <p>2) <u>Harms:</u> As reported by the trial.</p>	<p>1) <u>Health outcomes:</u> Multifactorial interventions reduced the number of falls by 21% but had no statistically significant impact on injurious falls, people falling, people with injurious falls, or mortality. Exercise interventions were associated with an 11% reduction in number of people falling, a 19% reduction in number of injurious falls, and bordered on statistical significance in reducing number of falls. However, exercise had no statistically significant impact mortality. Vitamin D trials showed no overall impact related to fall incidence, people falling, or</p>	I C

Author, year	Aim and Interventions	Design	Sample (N)	Outcomes	Results	Level/Quality
	<p>three sessions per week over 12 months. Vitamin D3 was administered at various dosages and formulations between nine months and five years.</p>		<p>2) <u>Harms:</u> Multifactorial: 4 of 26 RCTs Exercise: 8 of 21 RCTs Vitamin D: 5 of 7 RCTs</p>	<p>The longest follow-up reported was used in the analysis. Multifactorial intervention follow-up time ranged from 6-36 months. Exercise follow-up ranged from 6-60 months. Vitamin D follow-up ranged from 9- 60 months.</p>	<p>mortality. An inadequate number of trials evaluated fracture outcomes for analysis. 2) <u>Harms:</u> Harms in the multifactorial intervention group and exercise group were rare and minor. Only one exercise trial reported a low rate of serious injury (2.6/100,000 sessions). While results were mixed, one trial of annual high dose vitamin D were associated with an increased risk of injurious falls.</p>	
<p>Hopewell et al., 2018</p>	<p><u>Aim:</u> To evaluate the effectiveness of multifactorial interventions and multiple component interventions in preventing falls and fall-related outcomes in community-dwelling older adults.</p> <p><u>Interventions Compared:</u> Multifactorial interventions consisted of a tailored plan (exercise, medication review, environment modification, and psychological components). Multiple component interventions delivered the same components regardless of individual risk. Control arms usually consisted of usual care, social visits, or exercise-only interventions.</p>	<p>Systematic review and Meta-analysis of individual and cluster RCTs</p>	<p>Total: 62 RCTs (N= 19,935) Multifactorial: 44 RCTs Multiple component: 18 RCTs</p>	<p>The primary outcome was rate of falls (e.g. falls per person year). Other fall-related outcomes included risk of falling (people with ≥ 1 fall), recurrent falls, hospital admission, fall requiring medical visit, or fracture risk. Most trials reported follow-up at 12 months.</p>	<p>Multifactorial interventions reduced rate of falls by 23% compared to controls. However, no or nonsignificant differences were found between multifactorial interventions and controls in relation to other fall-related outcomes. Twelve episodes of adverse outcomes related to multifactorial interventions included minor musculoskeletal issues such as back pain.</p> <p>Multiple component interventions reduced rate of falls by 26% and risk of falling by 18%. For other fall-related outcomes, low-quality evidence indicated no or nonsignificant differences between multiple component interventions and controls. Six minor adverse outcomes related to multiple component interventions were reported.</p>	<p>I C</p>

Author, year	Aim and Interventions	Design	Sample (N)	Outcomes	Results	Level/Quality
Johnston et al., 2018	<p><u>Aim:</u> To evaluate the ability of adapted STEADI FPOC in preventing medically treated falls (ED visit or hospitalization) among community-dwelling older adults.</p> <p><u>Interventions Compared:</u> Cohort groups: 1) at-risk for falling and no FPOC 2) at-risk for falling with FPOC and 3) not at risk for falling. Results of the STEADI screening questionnaire determined risk.</p>	Pre-post experimental study	N= 10,479 in analysis (85% of original sample [12,346]) Older adults ≥ 65 years old with a primary care visit at one of 14 clinics in a single Upstate New York county.	Number of fall-related ED visits and hospitalizations for each participant pre- and post-intervention were attained through the county’s health department EHR system over the three-year study period.	Participants at risk for falling with a FPOC were 40% less likely to have a fall-related hospitalization compared to participants at risk of falling without a FPOC ($p= .041$), however, no difference in fall-related ED visits was found between the two groups. Participants at-risk for falling with a FPOC had similar odds of a fall-related hospitalization compared to participants not at risk for falling.	II C
Lohman et al., 2017	<p><u>Aim:</u> To assess the validity of the STEADI algorithm classification in accurately predicting future falls and mortality.</p>	Retrospective Cohort Study STEADI screening questions, strength & balance exam, and adapted risk classification algorithm was applied to the sample at baseline and then recorded annually over the following 4 years.	N= 7,392 Analytic sample NHATS survey data: A representative sample of community-dwelling older adults ≥ 65 who annually report health status and receive cognitive and functional examinations.	1) Likelihood of having one fall (OR). Participants reported whether they had one fall or recurrent falls annually over a four-year period. 2) Mortality	In at least one follow-up year, 81.0% of high-risk participants reported one fall compared to 66.2% of moderate-risk participants, and 38.1% of low-risk participants. The STEADI classification system’s sensitivity and specificity in correctly identifying high versus low fall risk was 0.65. Moderate- and high-risk participants were 2.62 and 4.76 times more likely to have one fall in four years, respectively, compared to low-risk participants; and 4.05 and 13.7 times more likely to have recurrent falls. STEADI risk stratification did not predict mortality.	III B

Author, year	Aim and Interventions	Design	Sample (N)	Outcomes	Results	Level/ Quality
Lusardi et al., 2017	<p><u>Aim:</u> Evaluate the post-test ability of historical and performance-based indicators in predicting future falls among community-dwelling older adults ≥ 65 years old.</p>	Meta-analysis (including retrospective studies)	N= 57 articles used for analysis (n ≥ 30 participants per study were included)	PoTP of history question indicators and performance-based measures in predicting falls (at a minimum of 6 months) assuming an estimated 30% pre-test probability of falling among community-dwelling older adults and a pre-test probability of 0.43.	Health questions that increased the PoTP of experiencing at least one future fall included a history of previous falls, psychoactive medication history, requiring assistance with ADLs, fear of falling, and assistive mobility device use. The two performance-based measures found to increase the PoTP of experiencing at least one future fall the most included the Berg Balance Scale (PoTP if positive test= 59%, if negative test= 23%) and the Timed Up and Go Test (PoTP if positive test = 47%, if negative test= 25%).	II B
Palvanen et al., 2014	<p><u>Aim:</u> Evaluate the effectiveness of a multifactorial fall prevention clinic program among home-dwelling older adults at high-risk for falling or sustaining fall-related injuries.</p> <p><u>Interventions compared:</u> Individualized clinic-based multifactorial interventions (strength and balance training, medication reconciliation, geriatric assessment and referral, nutrition advisement, and home safety interventions). Control included printed fall prevention education.</p>	RCT (non-blinded)	N= 1,314 Older adults > 70 years old referred to one of two clinics in Finland. Other inclusion criteria: one risk factor for falls including three or more falls in the past year, limitations in function/mobility, or at risk of fracture. Participants underwent stratified randomization into the interventional group (n= 661) and control group (n= 653).	Incidence of falls, participants who fell (fallers), and fall-related injuries (all measured per 100-person years) collected at 12 months or sooner if the participant died or withdrew from the trial.	The multifactorial program was statistically significant in reducing rates of falling, fallers, and fall-related injuries by 28%, 22%, and 26%, respectively; but did not reach statistical significance in rates of fractures compared to the control group.	II C

Author, year	Aim and Interventions	Design	Sample (N)	Outcomes	Results	Level/Quality
Sherrington et al., 2019	<p><u>Aim:</u> To evaluate the effectiveness of exercise interventions in preventing falls among community dwelling older adults.</p> <p><u>Interventions Compared:</u> Exercise interventions of all types were compared to control interventions (not known to reduce falls). Exercises included balance & functional training, Tai Chi, and multiple exercises (often balance and functional with resistance training) were also compared to control arms.</p>	Systematic Review and Meta-analysis of RCTs	Total: 108 RCTs (N=23,407)	Primary outcome was rate of falls. Other fall-related outcomes included number of people sustaining ≥ 1 fall, fracture, fall requiring a medical visit, hospital admission, and quality of life—measured by the study-specific quality of life scale (follow-up 3-24 range months).	<p>Exercise interventions of all types reduced rate of falls by 23% compared to control arms, and reduced the number of people sustaining ≥ 1 fall by 15%. Exercise reduced the number of people sustaining ≥ 1 fall-related fracture by 27% and the number of people requiring a medical visit by 39%. The effects of exercise on other fall-related outcomes could not be determined due to a limited number of studies and small sample sizes.</p> <p>27 trials reported adverse events from exercise interventions (n=6,019), of which two events were serious (pelvic stress fracture and inguinal hernia requiring surgery). The remaining episodes were mainly minor musculoskeletal events.</p>	I B

Note. ED= emergency department, EHR= electronic health record, FPOC= fall plan of care, MMSE= Mini-Mental State Exam, NHATS= National Health and Aging Trends Study, OR= Odds Ratio, PoTO=Posttest odds, PrTO=pretest odds STEADI= Stopping Elderly Accidents, Deaths, and Injuries (<https://www.cdc.gov/steady/index.html>)

Evidence ratings were assigned using the Rating System for Hierarchy of Evidence from 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 ratings were assigned using the Rating Scale for Quality of Evidence from Newhouse, R.P. (2006). Examining the support for evidence-based nursing practice. *Journal of Nursing Administration*, 36(7-8), 337-40.

Table 2

Characteristics of STEADI Participants (N=123)

Characteristic	n	%
Age		
65-70	47	38%
71-75	32	26%
76-80	22	18%
81-85	12	10%
86 or older	9	7%
Unidentified	1	<1%
Fall Risk Level		
Low	87	71%
Moderate	16	13%
High	20	16%
Positive Fall Screen		
No falls in the past year	37	56%
One fall in the past year	19	29%
Two or more falls in the past year	10	15%
Feels unsteady when walking or standing	13	20%
Worries about falling	15	23%
Does not feel unsteady or worry about falling	6	9%
Feels unsteady and worries about falling	32	48%

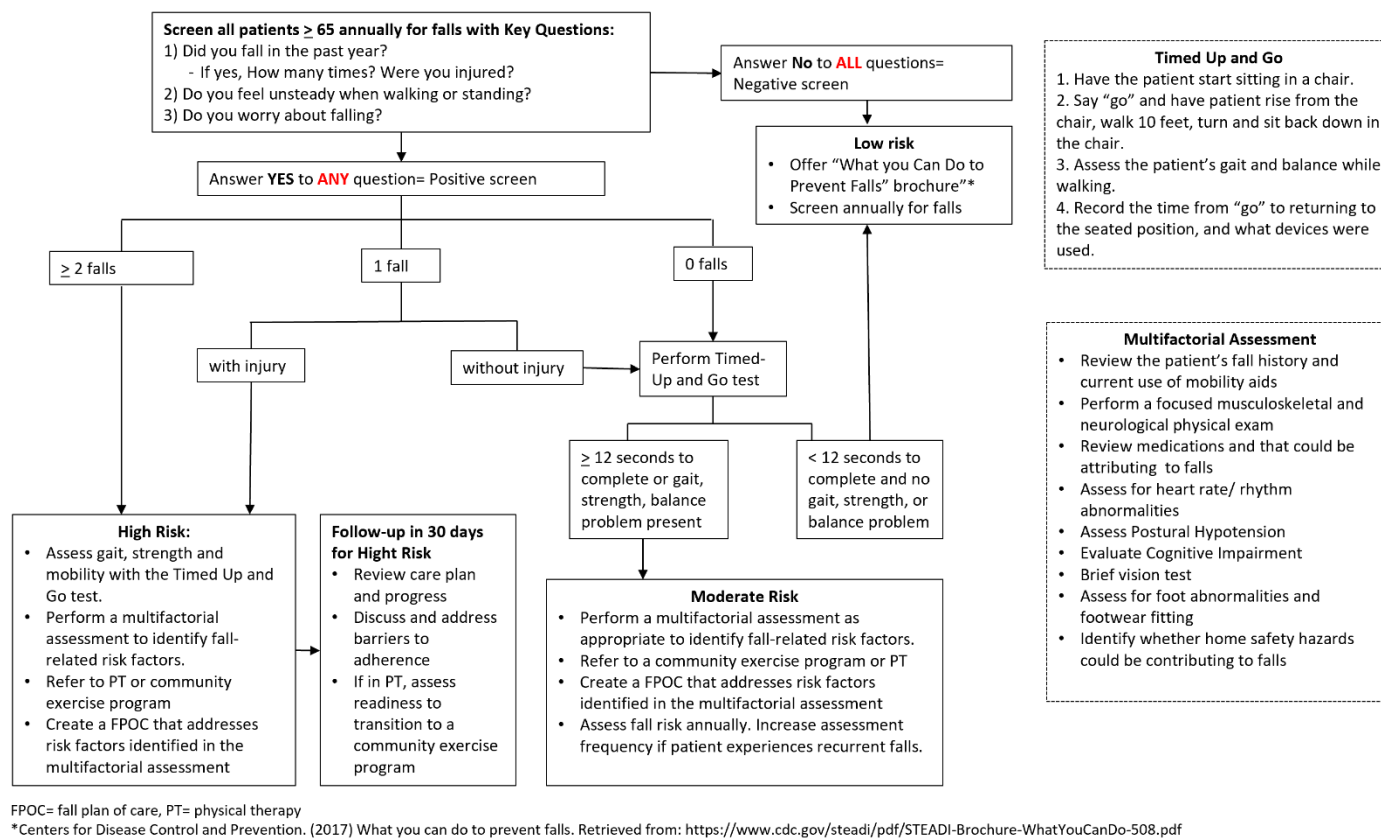


Figure 1. A modified Stopping Elderly Accidents Deaths and Injuries (STEADI) algorithm to screen and assess community-dwelling older adults for falls. Interventions to prevent falls are tailored based on individual risk factors and include an exercise intervention or physical therapy.

- STEADI algorithm adapted from: Centers for Disease Control and Prevention. (2017). Algorithm for fall risk screening, assessment, and intervention. Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Algorithm-508.pdf>.
- Multifactorial assessment adapted from: Centers for Disease Control and Prevention. (2017). Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Poster-IntegratingFallPrev-508.pdf>
- Timed Up and Go adapted from: Centers for Disease Control and Prevention. (2015 April 21). *Timed up and go test (TUG)* [Video file]. Retrieved from: https://www.youtube.com/watch?v=BA7Y_oLEIGY

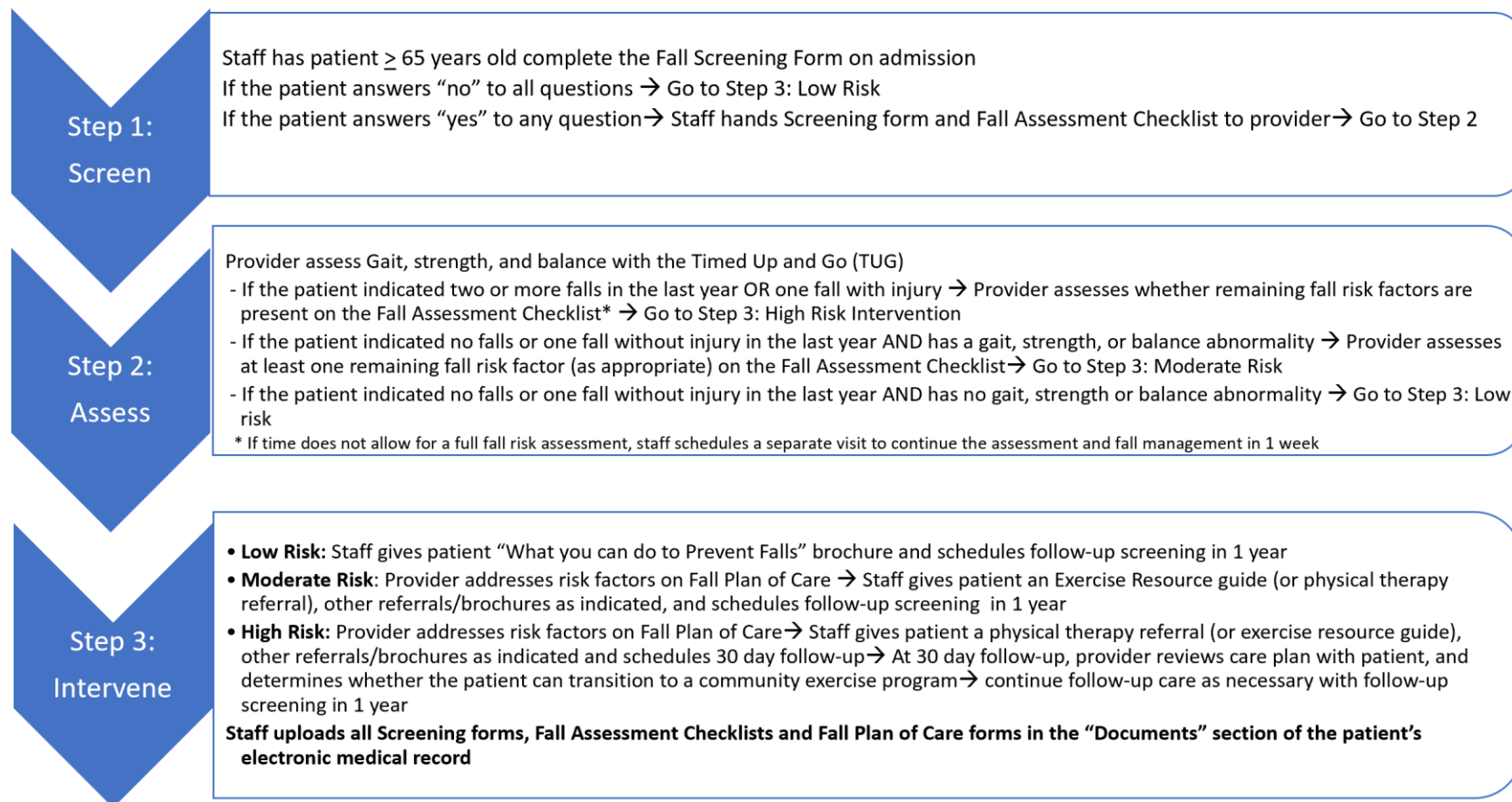


Figure 2. STEADI workflow process to screen, assess, and intervene to prevent falls among older adults at a small primary care office. The process modifies the adapted CDC STEADI algorithm (Figure 1) into a workflow process for providers (physicians, nurse practitioner students) and staff (receptionists, medical assistants) to follow in daily practice. Refer to Appendices for examples of a Screening form, Fall Assessment Checklist, and Fall Plan of Care form. Adapted from: Centers for Disease Control and Prevention. (2017). Algorithm for fall risk screening, assessment, and intervention. Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Algorithm-508.pdf>

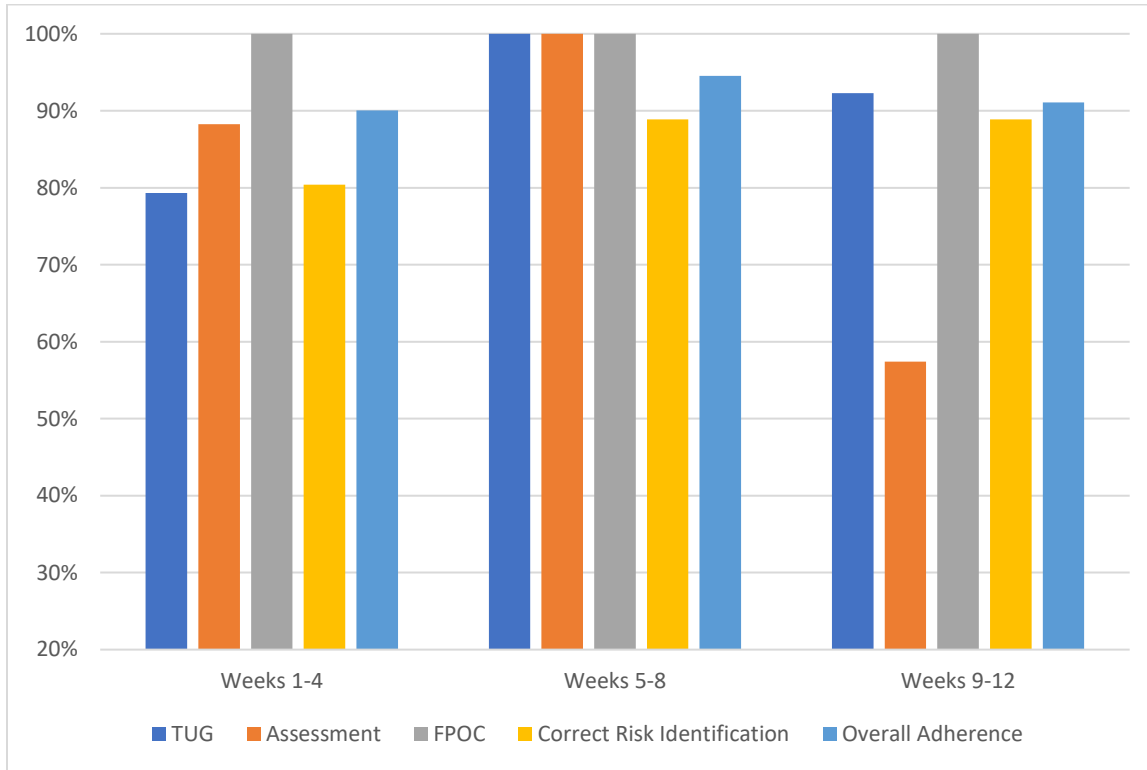


Figure 3. Percentage of correctly performed protocol steps and overall adherence scores for a primary care office that implemented the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) fall prevention protocol over 12-weeks. The goal for all steps was 80%. Timed Up and Go (TUG) scores are the percentage of positively screened patients who received the TUG (gait/balance assessment). Assessment and fall plan of care (FPOC) measures represent percentage of moderate- and high-risk patients with a fall risk assessment checklist and FPOC, respectively. Correct risk identification represents the percentage of patients whose fall risk level (low, moderate, or high) was correctly identified based on protocol criteria. Overall adherence scores are the percentage of correctly performed STEADI components per a fidelity checklist.

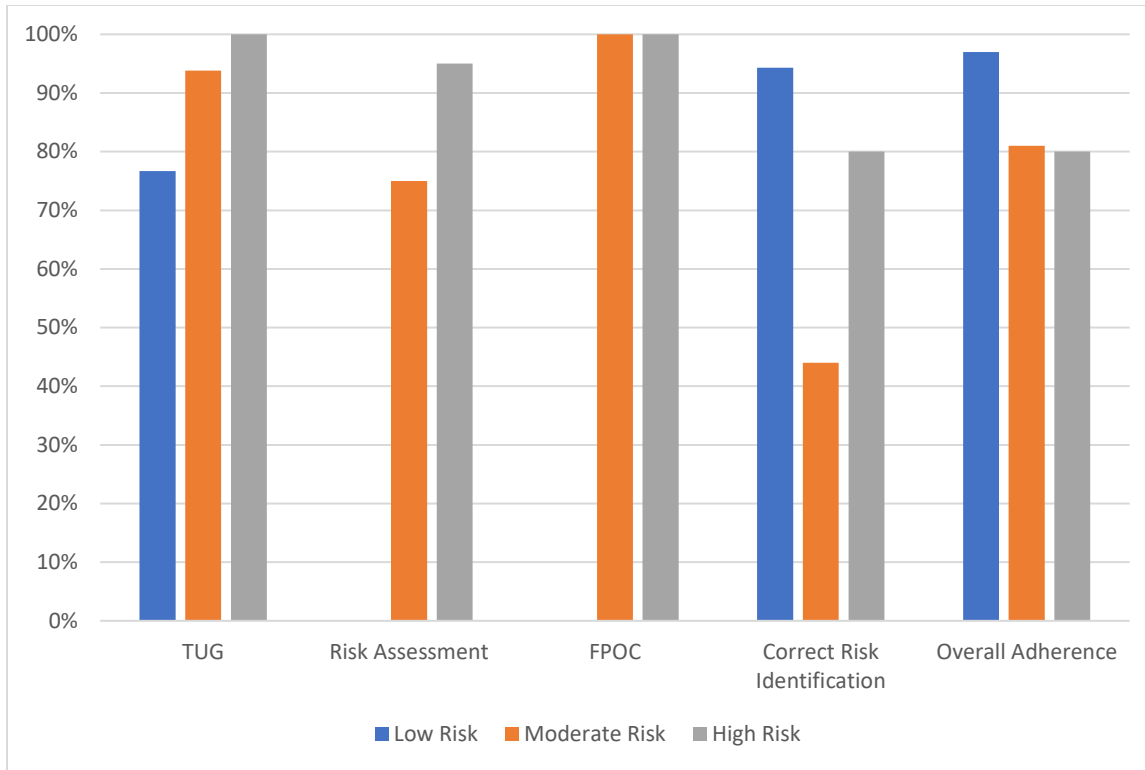


Figure 4. Percentage of correctly performed protocol steps and overall adherence scores for a primary care office that implemented the Stopping Elderly Accidents, Deaths, and Injuries (STEADI) fall prevention protocol by fall risk level as identified by staff and providers. The goal for all steps was 80%. Timed Up and Go (TUG) scores are the percentage of positively screened patients who received the TUG (gait/balance assessment). Assessment and fall plan of care (FPOC) measures represent percentage of moderate- and high-risk patients with a fall risk assessment checklist and FPOC, respectively. Correct risk identification represents the percentage of patients whose fall risk level (low, moderate, or high) was correctly identified based on protocol criteria. Overall adherence scores are the percentage of correctly performed STEADI components per a fidelity checklist.

Appendix A. Fall Screening Form

Please indicate your age:

65-70 71-75 76-80 81-85 86 or older

1. Have you fallen in the last year?

Yes, I have fallen in the past year.

How many times did you fall? _____

Were you injured? Yes No

No, I have not fallen in the past year.

2. Do you worry about falling?

Yes

No

3. Do you feel unsteady when walking or standing?

Yes

No

One older adult (65 years and older) falls ***every second*** in the United States².

Falls are NOT a normal part of aging. Falls are also preventable! Ask about how you can reduce your risk.

From: Centers for Disease Control and Prevention (2017)

Get more information at: <https://www.cdc.gov/steady/patient.html>

¹<https://www.cdc.gov/steady/pdf/STEADI-Algorithm-508.pdf>

²https://www.cdc.gov/steady/pdf/STEADI_MediaFactSheet-a.pdf

Adapted from: Centers for Disease Control and Prevention. (2017). Algorithm for fall risk screening, assessment, and intervention. Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Algorithm-508.pdf>.

Appendix B. Fall Risk Assessment Checklist

Directions: If patient screened positive for falls; document “gait, strength, and balance” results. Then if high risk (≥2 falls or 1 fall with injury), identify whether the remaining fall risk factors are present. If moderate risk (0 or 1 fall without injury; and a gait, strength, or balance abnormality is present), assess additional risk factors as appropriate (at least one). Follow with a Fall Plan of Care for all high and moderate risk patients.

Fall Risk Factors	Present?		Notes
Gait, Strength & Balance			
Timed-up and Go: ≥12 seconds, or gait/balance abnormality?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Mobility aid used: Other notes:
Medications Attributing to falls? (Rx, OTC, supplement)			
Psychoactive	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Opioid	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Cause sedation/confusion	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Cause Hypotension	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Medical condition or physical exam abnormality contributing to falls?			
Heart rate/rhythm abnormality	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Cognitive Impairment (e.g. Mini-Cog score 0 to 3 points)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Musculoskeletal or Neurological impairment (e.g. tone, sensation)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Incontinence (per report)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Foot problems (sensation, proprioception, footwear)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Other:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Postural Hypotension			
Lightheaded/dizzy when standing, or systolic BP drop ≥20mmHg, or diastolic BP drop ≥10mmHg	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Home fall Hazards contributing to falls?			
Concern about home safety? (falling at home, throw rugs, lights burnt out, etc.)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
Vision impairment			
Snellen <20/40 or no eye exam in last year	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Adapted from:

- Centers for Disease Control and Prevention. (2017). Checklist: Fall risk factors. Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Form-RiskFactorsCk-508.pdf>
- Centers for Disease Control and Prevention. (2017). Practice fall prevention. Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Poster-Integrating-508-2019.pdf>

Appendix C. Fall Plan of Care

Provider: Select high risk (≥ 2 falls or 1 fall with injury) or moderate risk (0 falls or 1 fall without injury), exercise intervention, and addresses risk factors (identified in the Fall Risk Assessment Checklist).

Staff: For High risk, schedule follow-up in 30 days. Select exercise forms, referrals & brochures provided as indicated by physician. Other educational brochures can be given as appropriate

Exercise Intervention			
Patient fall risk (check 1)	Balance, strength, gait training referral ordered (check 1)	Schedule Follow-up	Exercise form provided
<input type="checkbox"/> High	<input type="checkbox"/> PT referral (preferred) <input type="checkbox"/> Exercise resource guide	<input type="checkbox"/> 30 days <input type="checkbox"/> Patient refused	<input type="checkbox"/> PT referral <input type="checkbox"/> Exercise guide <input type="checkbox"/> Patient refused
<input type="checkbox"/> Moderate	<input type="checkbox"/> PT referral <input type="checkbox"/> Exercise resource guide	1 year for screening follow-up	

Risk Factor Interventions		
Risk factor	Intervention	Referral/brochure provided
Medications contributing to falls	<input type="checkbox"/> Medication reduced or discontinued <input type="checkbox"/> Other plan (describe): _____	
Medical Condition or physical exam abnormality	<input type="checkbox"/> Specialist referral (e.g. cardiology, podiatry, etc.): _____ <input type="checkbox"/> Other plan (describe): _____	<input type="checkbox"/> Referral form
Postural hypotension	<input type="checkbox"/> Medication Adjustment <input type="checkbox"/> Postural Hypotension brochure <input type="checkbox"/> Other plan (describe): _____	<input type="checkbox"/> Postural Hypotension brochure
Home fall hazards	<input type="checkbox"/> Occupational Therapy Referral <input type="checkbox"/> "Check for Safety" brochure <input type="checkbox"/> Other plan (describe): _____	<input type="checkbox"/> Occupational Therapy Referral <input type="checkbox"/> "Check for Safety" brochure
Vision impairment	<input type="checkbox"/> Ophthalmology Referral <input type="checkbox"/> Other plan (describe): _____	<input type="checkbox"/> Ophthalmology Referral
Education	<input type="checkbox"/> Educated patient about fall prevention measures and answered all questions. <input type="checkbox"/> What you can do to prevent falls <input type="checkbox"/> Caregiver brochure _____	<input type="checkbox"/> What you can do to prevent falls <input type="checkbox"/> Caregiver brochure _____

Note. PT= Physical Therapy.

Adapted from: Centers for Disease Control and Prevention. (2017). Integrating fall prevention into practice. Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Poster-IntegratingFallPrev-508.pdf>

Appendix D. Timed Up & Go Test

ASSESSMENT

Timed Up & Go (TUG)

Purpose: To assess mobility

Equipment: A stopwatch

Directions: Patients wear their regular footwear and can use a walking aid, if needed. Begin by having the patient sit back in a standard arm chair and identify a line 3 meters, or 10 feet away, on the floor.

① **Instruct the patient:**

When I say “Go,” I want you to:

1. Stand up from the chair.
2. Walk to the line on the floor at your normal pace.
3. Turn.
4. Walk back to the chair at your normal pace.
5. Sit down again.

NOTE:
Always stay by the patient for safety.

- ② **On the word “Go,” begin timing.**
- ③ **Stop timing after patient sits back down.**
- ④ **Record time.**

Time in Seconds: _____

An older adult who takes ≥12 seconds to complete the TUG is at risk for falling.

Patient _____

Date _____

Time _____ AM PM

OBSERVATIONS

Observe the patient’s postural stability, gait, stride length, and sway.

Check all that apply:

- Slow tentative pace
- Loss of balance
- Short strides
- Little or no arm swing
- Steadying self on walls
- Shuffling
- En bloc turning
- Not using assistive device properly

These changes may signify neurological problems that require further evaluation.

Copied from: Centers for Disease Control and Prevention. (2017). Timed-Up and Go. Retrieved from: <https://www.cdc.gov/steady/pdf/STEADI-Assessment-TUG-508.pdf>

Appendix E. STEADI Cover Sheet

Patient's Name: _____

DOB: ____/____/____

Date of Encounter: ____/____/2019

Remove and shred after scanning into the EHR

Appendix F. Staff/Provider Education and Training

Learning Objectives	Content Outline	Method of Instruction	Time Spent	Method of Evaluation
Understand the significance of falls among older adults and proven preventative strategies.	- Fall incidence, projections - Myths/Facts about falls in older adults - Multifactorial and exercise interventions -STEADI overview	PowerPoint presentation	5 minutes	Post-presentation multiple choice questions
Identify low-, moderate- and high-fall risk.	- Eligibility criteria for STEADI - Review screening questions to identify positive screen - Criteria for low-, moderate-verses high-fall risk	PowerPoint presentation Provider training presentation	15 minutes	Post-presentation multiple choice questions Post-training case scenarios and fidelity checklist for continued compliance
Perform the Timed Up and Go assessment; and correctly identify criteria for gait, balance, or strength abnormalities.	Refer to Appendix D	Provider training presentation	10 minutes	Observation (teach-back)
Mini-Cog Assessment	Refer to Appendix G	Provider training presentation	10 minutes	Observation (teach-back)
Demonstrate ways to talk to patients about fall prevention.	Review “Talking about fall prevention with your patients” (CDC, 2017c) and Stages of Change Model	Provider training presentation	20 minutes	Post-training questions
Demonstrate ability to complete documentation forms and upload in the patient’s electronic medical record.	Review Screening form, Fall Risk Assessment Checklist, and Fall Plan of Care form components	PowerPoint presentation Provider training presentation	25 minutes	Post-training case scenarios prior to implementation and during mid-project meeting

Appendix G. Mini-Cog Assessment

Mini-Cog[®]
Instructions for Administration & Scoring

ID: _____ Date: _____

Step 1: Three Word Registration

Look directly at person and say, "Please listen carefully. I am going to say three words that I want you to repeat back to me now and try to remember. The words are [select a list of words from the versions below]. Please say them for me now." If the person is unable to repeat the words after three attempts, move on to Step 2 (clock drawing).

The following and other word lists have been used in one or more clinical studies.¹⁻³ For repeated administrations, use of an alternative word list is recommended.

Version 1	Version 2	Version 3	Version 4	Version 5	Version 6
Banana	Leader	Village	River	Captain	Daughter
Sunrise	Season	Kitchen	Nation	Garden	Heaven
Chair	Table	Baby	Finger	Picture	Mountain

Step 2: Clock Drawing

Say: "Next, I want you to draw a clock for me. First, put in all of the numbers where they go." When that is completed, say: "Now, set the hands to 10 past 11."

Use preprinted circle (see next page) for this exercise. Repeat instructions as needed as this is not a memory test. Move to Step 3 if the clock is not complete within three minutes.

Step 3: Three Word Recall

Ask the person to recall the three words you stated in Step 1. Say: "What were the three words I asked you to remember?" Record the word list version number and the person's answers below.

Word List Version: _____ Person's Answers: _____

Scoring

Word Recall: _____ (0-3 points)	1 point for each word spontaneously recalled without cueing.
Clock Draw: _____ (0 or 2 points)	Normal clock = 2 points. A normal clock has all numbers placed in the correct sequence and approximately correct position (e.g., 12, 3, 6 and 9 are in anchor positions) with no missing or duplicate numbers. Hands are pointing to the 11 and 2 (11:10). Hand length is not scored. Inability or refusal to draw a clock (abnormal) = 0 points.
Total Score: _____ (0-5 points)	Total score = Word Recall score + Clock Draw score. A cut point of <3 on the Mini-Cog [™] has been validated for dementia screening, but many individuals with clinically meaningful cognitive impairment will score higher. When greater sensitivity is desired, a cut point of <4 is recommended as it may indicate a need for further evaluation of cognitive status.

Copied with permission from: Borson, S., Scanlan, J.M., Chen., P., & Ganguli, M. (2003). The Mini-Cog as a screen for dementia: Validation in a population-based sample. *Journal of the American Geriatrics Society*, 51, 1451-1454. doi:10.1046/j.1532-5415.2003.51465

Appendix H. Case Scenarios

Low- Risk Case:

Patient: Mrs. P, a 72-year-old female who lives at home presents to the office for a cough.

- Staff member gives patient screening form to complete in waiting room, with patient Name, date of birth, and date of encounter completed.

Screening form: Answers “yes” to feeling unsteady when walking or standing.

- Staff member identifies this is a positive screen and gives form to the provider.
- Provider identifies that this is either a low-risk or moderate-risk patient and conducts the TUG

TUG: 10 seconds. No gait, strength, or balance abnormality

- Provider selects “No” for “gait, strength, & balance” risk factor on Fall Assessment Checklist
- Provider hands the Screening form and Falls Assessment Checklist to staff member
- Staff member hands patient “What you can do to prevent falls” brochure
- Staff member scans the Screening form and Falls Assessment Checklist in the patient’s electronic medical record.

High-Risk Case:

Patient: Mrs. A, an 81-year-old female who lives in an adjacent apartment next to her son’s house presents to the office with her son for follow-up of her chronic conditions.

- Staff member gives patient screening form to complete in waiting room, with patient Name, date of birth, and date of encounter.

Screening form: Ms. A answers “yes” to #1 (1 fall), indicates she was injured, and #3 (worries about falling)

- Staff member identifies a positive screen, and hands form to provider.
- Provider identifies patient as a high-fall risk, asks patient and son about her falls during the encounter, and completes the TUG and full Fall Risk Assessment Checklist

History: Mrs. A says: “I used to walk just fine, but then started falling for no reason two years ago.” Her son states that she was seen in the hospital three months ago because she fell getting out of the shower and hit the back of her head against the wall. He says she had an X-ray and a CT scan in the emergency room, which he was told were normal. She was released from the emergency room with a bruise on the back of her head, which has resolved. Mrs. A uses a rolling walker. She says she rarely goes outside because she’s afraid she’ll fall and break her hip.

Past Medical History: Type 2 Diabetes, hypertension, coronary artery disease status post myocardial infarction, macular degeneration, osteoarthritis.

Medications:

- Novolog 3 units subcutaneously before meals and at bedtime
- Lantus 20 units subcutaneous in the morning and at bedtime

- Lisinopril 20mg daily
- Metoprolol 100mg daily
- Aspirin 81mg daily
- Tylenol 1g three times a day as needed for pain

Review of Systems:

- General: Lack of energy
- Eyes: Wears glasses, denies changes in vision
- Genitourinary: Nocturia once at night.
- Musculoskeletal: Occasional bilateral knee pain. Improves with Tylenol.

Physical Exam:

- General: Frail, alert, elderly woman in no apparent distress
- Vitals: Supine-129/53 (heart rate [HR]= 59), Sitting-103/40 (HR=60), Standing-101/51(HR=62), Body Mass Index= 19.
- Eyes: Snellen test 20/40 with glasses bilaterally
- Cardiovascular: Regular rate and rhythm, normal S1/S2 without murmur, rub or gallop
- Respiratory: Clear to auscultation throughout
- Gastrointestinal: Normal bowel tones, soft, non-tender, non-distended
- Musculoskeletal: No knee joint laxity or joint swelling.
- Neurological: Alert and oriented x3, Cranial nerves II-XI grossly intact. Diminished sensation and proprioception in both feet. Deep tendon reflexes normal and symmetric
- Psychiatric: Mini-Cog score = 5

Fall Risk Assessment Checklist:

- TUG: 18 seconds with rollator walker (Provider indicates risk factor on checklist)
- Provider indicates other risk factors including:
 - Medications: hypotension
 - Medical condition: Musculoskeletal/Neurological impairment (and/or) foot problems
 - Postural hypotension
 - Home safety: falling at home

Fall Plan of Care selections:

- Provider selects high-risk and physical therapy referral. Staff indicates follow-up in 30 days and referral given.
 - Medication: Provider indicates whether Lisinopril or Metoprolol can be reduced
 - Referral to podiatrist for foot exam
 - Postural hypotension: Postural hypotension brochure given, medication adjustment
 - Home fall hazards: “Check for safety” brochure given
 - Education provided
-

Adapted from: Centers for Disease Control and Prevention. (n.d.). Case study 3. Retrieved from: https://www.cdc.gov/steady/pdf/case_study_3-a.pdf

Appendix I. Data Collection: Process Tool

Date	ID	Age	Screen	Risk	True risk	TUG	Assessment	FPOC	Adherence Score
9/9	1	2	1	2	2	1	1	1	80%

Variable	Label	Values	Meaning
Date	Date of encounter	Month/day	
ID	Patient's de-identified number		
Age	Patient's age	1	65-70
		2	71-75
		3	76-80
		4	81-85
		5	86 or older
Screen	Screening form completed	0	No
		1	Yes
Risk	Identified fall risk level	1	Low-risk
		2	Moderate-risk
		3	High-risk
True Risk	Risk level as identified by screening form and/or TUG result	1	Low-risk
		2	Moderate-risk
		3	High-risk
TUG	Completion of Timed-Up and Go test (for all positive screens)	0	No
		1	Yes
Assessment	Completion of risk assessment checklist (for moderate- and high-risk)	0	No
		1	Yes
FPOC	Fall plan of care form completed (for moderate- and high-risk)	0	No
		1	Yes
Score	Fidelity checklist score	%	

Appendix J. Fidelity Checklist

Date patient evaluated:

De-identified form #:

Fall Risk Identification	
<input type="checkbox"/> yes <input type="checkbox"/> no	All (3) questions on screening form are complete
<input type="checkbox"/> yes <input type="checkbox"/> no	Patient who answered “no” to all questions was correctly identified as low risk (no associated assessment or FPOC).
<input type="checkbox"/> yes <input type="checkbox"/> no	Patient who fell more than once or had one fall with injury was correctly identified as high-risk on FPOC.
<input type="checkbox"/> yes <input type="checkbox"/> no	Patient who fell once without injury, or answered “yes” to question #2 or #3 and had an abnormal TUG was correctly identified as moderate-risk on FPOC.
<input type="checkbox"/> yes <input type="checkbox"/> no	Patient who fell once without injury, or answered “yes” to question #2 or #3 and has a normal TUG was correctly identified as low-risk (no additional risk factors assessed and no FPOC)
Assessment/FPOC	
	Patient at <i>moderate-risk</i> has the following:
<input type="checkbox"/> yes <input type="checkbox"/> no	TUG result on risk assessment checklist
<input type="checkbox"/> yes <input type="checkbox"/> no	At least one additional assessment component completed on Falls Risk Assessment
<input type="checkbox"/> yes <input type="checkbox"/> no	FPOC with exercise resource guide or PT referral provided
<input type="checkbox"/> yes <input type="checkbox"/> no	FPOC addresses appropriate risk factors identified in Fall Risk Assessment Checklist
	Patient at <i>high-risk</i> has the following:
<input type="checkbox"/> yes <input type="checkbox"/> no	TUG result on risk assessment checklist
<input type="checkbox"/> yes <input type="checkbox"/> no	Complete Fall Risk Assessment completed
<input type="checkbox"/> yes <input type="checkbox"/> no	FPOC with PT referral (preferred) or Exercise resource guide
<input type="checkbox"/> yes <input type="checkbox"/> no	FPOC addresses positive risk factors identified on Fall Risk Assessment Checklist
<input type="checkbox"/> yes <input type="checkbox"/> no	30-day follow-up is scheduled

yes =

Total =

Score (%) =