

A Pilot Survey of Massachusetts Primary Care Providers: Older Adult Fall-Risk Assessment, Intervention & Referral



PREPARED BY THE INJURY PREVENTION CENTER AT BOSTON MEDICAL CENTER
IN COLLABORATION WITH
THE MASSACHUSETTS FALLS PREVENTION COMMISSION
AND
THE MASSACHUSETTS EXECUTIVE OFFICE OF ELDER AFFAIRS
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Executive Summary

In this pilot study, we surveyed a convenience sample of all primary care providers (N=136) at two multispecialty practice groups in Massachusetts. The aim was to assess primary care providers' knowledge, attitudes, beliefs, and practices regarding fall-risk assessment, intervention, and referral for their older adult patients. The survey response rate was 71% overall. Ninety-two percent of respondents were Doctors of Medicine (MDs). The two provider groups were not significantly different on almost all measures, suggesting that our results may be generalizable to other Massachusetts primary care providers.

Major findings are as follows:

- 87% of respondents agreed with the statement, *"I can do things for my independently-living older adult patients to reduce their risk of falling."*
- 96% agreed with the statement, *"All patients ages 65 and older should be assessed for falls risk."*
- 85% agreed with the statement, *"A falls risk assessment will uncover risks that can be modified."*
- 94% thought it likely true that, *"An evidence-based community falls prevention program can reduce the risk for falls among older adult patients identified as high risk."*
- 52% agreed with the statement, *"I have the expertise to do fall risk assessments of my patients ages 65 and older."*
- 68% agreed with the statement, *"It is the prevailing community standard among my professional peers to assess risk for falls of older adult patients."*
- 14% answered "yes" to the question, *"Are you aware of the falls risk assessment toolkit developed by the Centers for Disease Control and Prevention called STEADI?"*
- 15% reported familiarity with the *Matter of Balance* program; 43% reported familiarity with *Tai Chi: Moving for Better Balance*; and, less than 1% reported familiarity with the *Otago* program. 39% of respondents were familiar with at least one of these programs.
- 50% agreed with the statement, *"I have the time to do fall risk assessments of my patients ages 65 and older."*
- 24% agreed with the statement, *"I am adequately reimbursed for doing fall risk assessments of my patients ages 65 and older."*
- Providers reported that during the past year they had conducted a falls history, a fall risk medication review, and a test for Vitamin D deficiency for at least half of their older adult patients; they had educated almost half of their older patients about specific risk factors for falling.
- In the past year, respondents estimated that among their independently-living older adult patients, they had assessed visual acuity in less than 40%, conducted the Timed Up and Go Test (for strength and mobility) in approximately 20%, conducted the 4-Stage Balance Test in 4%, and referred less than 10% of them to community fall prevention programs.

An exploratory analysis of variables predicting a summary score of best practices for fall risk assessment indicated that important factors were: (1) provider belief that they could effectively reduce fall risk for their older adult patients; (2) provider belief that fall risk assessment was standard practice among their peers; and, (3) the proportion of the provider's patients that were older adults.

Introduction

Falls among older adults are common. Each year, a quarter of those 65 years of age or older fall. These falls can result in debilitating, sometimes fatal, injuries and affect psychosocial status and quality of life. Among older adults, falls are the leading cause of fatal and non-fatal injuries (McCarthy, 2016). In 2015, 2.5 million older adults were treated in emergency departments (EDs) for non-fatal fall-related injuries and more than 734,000 of these patients were hospitalized. In that year, estimates of the direct medical costs for older adult falls ranged from \$31.3 to \$36.8 billion, adjusted for inflation (Deilman et al., 2016). Even when falls do not require medical attention, the experience can result in fear of falling, which can be psychologically disabling (Howland et al., 1998) and lead to future falls through physical deconditioning (Bell, Talbot-Stern, Hennessy, 2000; Delbaere, et al., 2004).

Over recent decades, community-based fall prevention interventions have been developed and subject to randomized trials (Gillespie et al., 2012). These low cost, low-tech programs can result in 25-30% reductions in falls one-year post-program (Gillespie et al., 2012). These programs, however, are not well-integrated into clinical practice and are most often offered by public and private organizations that serve older adults. Because these programs are typically marketed directly to the public rather than through referrals from healthcare providers, they consequently may not serve many older adults with the most to benefit from participation.

Recent studies have also shown these programs are cost-effective. The Centers for Medicare and Medicaid Services conducted a retrospective cohort study evaluating *Matter of Balance (MOB)*, a program developed to reduce fear of falling and increase mobility in older adults (Tennstedt et al., 1998; Zijlstra et al., 2007). Compared to matched controls, older adults who had participated in the *MOB* program had significantly lower total health care costs during the post-participation year (Center for Medicare and Medicaid Services, 2013). A recent study estimated the net benefit and return on investment (ROI) of three evidence-based fall prevention programs. *Otago*, a program targeting frail older adults that is delivered in the home by a physical therapist or other healthcare provider, had a one-year net benefit of \$121.85 and a ROI of 36% for each dollar invested. *Tai Chi: Moving for Better Balance*, a group program for enhancing strength and balance, had a one-year net benefit of \$529.86 and a ROI of 509% for each dollar invested. *Stepping On*, a program combining community-based group sessions with follow-up home visits by a healthcare provider, had a 14-month net benefit of \$134.37 and a ROI of 64% for each dollar invested (Carande-Kulis et al., 2015). In a separate study, Howland et al. (2015) estimated a ROI of 144%, if all older adults presenting with a fall injury at Massachusetts EDs were referred to *MOB*, and assuming 50% complied and completed the program.

In addition to the development and evaluation of interventions to reduce fall risk, new risk assessment algorithms have been developed and promoted. Most notable among these is the *STEADI* (Stop Elderly Accidents, Deaths and Injuries) Toolkit (Stevens, 2013), which was developed by the Centers for Disease Control and Prevention (CDC) for use in clinical settings. The *STEADI* algorithm outlines a standardized approach for healthcare providers to conduct fall risk screening, assessment, and intervention in older adults. Among the assessment tools recommended by *STEADI* are the *Timed Up and Go Test (TUG)*, a test for mobility and recommended for all patients who screen positive to the screening questions, and the 4-Stage Balance Test, an optional test for assessment of balance.

The present study was conducted by the Boston Medical Center Injury Prevention Center (BMCIPC), in collaboration with the Massachusetts Commission on Falls Prevention (MCFP), the Massachusetts Executive Office on Elder Affairs (MEOEA), and the Massachusetts Department of Public Health's (MDPH) Injury Prevention and Control Program. The aim of the study was to assess beliefs, knowledge, attitudes, and clinical practices among Massachusetts primary care providers with regard to the assessment and intervention for risk of falling among their older adult (≥ 65 years of age) patients. A secondary aim was to explore covariates of providers' clinical practice with regard to fall risk assessment and intervention. The overarching purpose of the study was to provide members of the MCFP, MEOEA, MDPH and other Massachusetts policy-makers with information to guide further development of fall prevention initiatives for the state.

Methods

Derivation of questionnaire

Survey questions were derived from several sources. Some questions replicated or modified survey questions developed for the National Council on Aging's Evaluation Guidelines for Falls Prevention Coalitions. Other questions replicated or modified questions from the CDC's Clinician Baseline Questionnaire which was developed for evaluating an on-line physician training program for the *STEADI* Toolkit, and from the American Geriatric Society/British Geriatric Society Clinical Practice Guideline: Preventing Falls in Older Persons (2010). Other questions were adapted from a study by Nyrop et al. (2012). Some questions were developed specifically for the present study.

Questions reflected four dimensions relative to older adult fall risk assessment and intervention: provider beliefs, knowledge, attitudes, and clinical practices. Questions about beliefs aimed to determine the extent to which providers believed that they could effectively mitigate their older adult patients' risk for falling. Knowledge questions asked about providers' expertise relative to fall risk assessment and intervention; their awareness of assessment tools; and, their awareness of several evidenced-based community programs for preventing falls and reducing fear of falling. Attitude questions focused on adequacy of time and reimbursement for assessing older adult fall risk. Practice questions asked about the frequency with which respondents conducted various fall assessment and intervention practices. Table 1 shows the questions and

their derivations as they relate to primary care physicians' beliefs, knowledge, attitudes, and clinical practices. We also collected information on respondents' demographics and on the characteristics of their patients.

Table 1: Select Survey Questions and Sources	
1. I can do things for my independently-living older adult patients to reduce their risk of falling.	NCOA Evaluation Guidelines for Fall Prevention Coalitions
2. All patients ages 65 and older should be assessed for falls risk.	Nyrop Physician Perspective on Fall Prevention in Assisted Living (modified)
3. A falls risk assessment will uncover risks that can be modified	Nyrop Physician Perspective on Fall Prevention in Assisted Living (modified)
4. An evidence-based community falls prevention program can reduce the risk for falls among older adult patients identified as high risk.	Unique to project
5. Are you aware of the falls risk assessment toolkit developed by the Centers Disease Control and Prevention called <i>STEADI</i> ?	Unique to project
6. Do you (or your office staff) routinely use the <i>STEADI</i> Toolkit to assess your older adult patients for fall risk?	Unique to project
7. Are you familiar with any of the following evidence-based community fall prevention programs?	Unique to project
<i>Matter of Balance</i>	
<i>Tai Chi: Moving for Better Balance</i>	
<i>The Otago Exercise Program</i>	
8. I (or my office staff) have the time to do fall risk assessments of my patients ages 65 and older	CDC <i>STEADI</i> Toolkit: Clinician Baseline Questionnaire (modified)
9. I am adequately reimbursed for doing fall risk assessments of my patients ages 65 and older.	Unique to project
10. I (or my office staff) have the expertise to do fall risk assessments of my patients ages 65 and older.	Unique to project
Over the past 12 months, for approximately what percent of your independently-living patients ages 65 and older have you (or your office staff) ...	AGS/BGS Clinical Guideline (2010) (modified)
11. conduct a falls history	
12. review medications for falls risk	
13. assess visual acuity	
14. conduct the <i>Timed Up and Go (TUG)</i> test	
15. conduct the <i>4-Stage Balance</i> test	
16. educate about specific fall risk factors	
17. screen for Vitamin D deficiency	
18. refer to evidence-based community fall	CDC <i>STEADI</i> Toolkit: Clinician

prevention programs	Baseline Questionnaire (modified)
19. It is the prevailing community standard among my professional peers to assess the risk for falls in older adult patients.	Unique to project
20. Over the next six months, for approximately what percent of your new patients ages 65 and older do you intend to assess for risk for falls?	Unique to project

Survey administration

A convenience sample of five healthcare provider organizations was identified by the BMCIPC staff. The executive director of each organization was sent an information package, including a copy of the questionnaire with a cover letter, signed by the Commissioner of the MDPH and by the Secretary of MEOEA. The cover letter introduced the study, requested a response about willingness to consider participation, and requested designation of a contact person with whom BMCIPC staff could discuss survey aims, content, and implementation. Four organizations responded, of which two agreed to participate (henceforth referred to as P1 and P2) and two discontinued dialogue regarding participation. During the original conversations, the BMCIPC staff emphasized to the organizations that the purpose of the survey was to inform future programming by MDPH and MCFP and that results were not being used for auditing organization performance.

The BMCIPC staff worked with the designated point person within the organization to distribute the survey. Physicians engaged in the primary care of adults were the target of the survey. As such, the organizations determined the appropriate clinicians to whom the survey would be distributed, however, in some cases, nurse practitioners and physician assistants were included in the distribution. In the case of P1, the clinicians received a cover e-mail from the BMCIPC staff that explained the study and included a link to the survey. The survey was completed on-line and anonymously using the survey tool Qualtrics. Three reminder follow-ups were sent to non-respondents as determined by survey software.

At P2, the identified point person determined which clinicians qualified to participate and distributed hard copies of the survey to those individuals. The hard copies were returned anonymously to the point person and subsequently sent by mail to the BMCIPC staff.

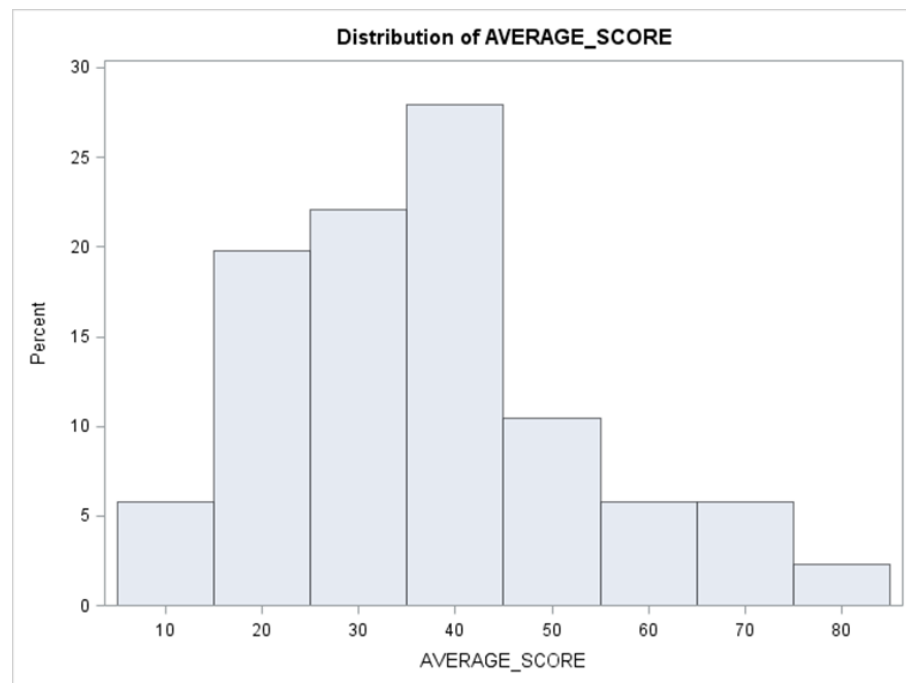
Data analyses:

For some questions, a six-point agreement/disagreement response scale was used, with 1 being “strongly disagree” and 6 being “strongly agree”. For these questions, responses were dichotomized such that 1-3 were defined as disagreement and 4-6 as agreement on the figures, whereas they were not dichotomized in the regression analysis. Figures in this report present the distribution of responses by each level of the 6-point scale. Percentages presented in the figures are rounded up.

We calculated a “composite” variable, which was the average of the 8 individual fall assessment procedures each respondent reported he/she had conducted on their older patients in the past year (see Table 3). We used linear regression to explore if

select respondent attributes were predictive of their composite score. If respondents did not answer a question, it did not factor into the calculation of their mean score. The distribution of the composite variable was slightly non-parametric, with a test for normality at < 0.05 (skewness 0.74; Kurtosis 0.26). Accordingly, we ran regression models using both the original score and a log-transformed mean score (due to its non-parametric nature). Since both models had the same significant and non-significant independent variables, we report the results for the non-transformed dependent variable (original score) for ease of interpretation (Fig. 1)

Figure 1: Distribution of Composite Provider Practice Score (non-Log-Transformed)



Independent variables were: practice group (P1 or P2); provider gender; other degree (Doctor of Medicine (MD) and Doctor of Osteopathic Medicine (DO) vs. Physician Assistant (PA) and Nurse Practitioner (NP)); medical degree (MD vs. DO); years since graduation from medical school; belief that they could effectively reduce patients' fall risk; perception of adequacy of reimbursement for fall-risk assessment; perception of peers' practices relative to falls risk assessment; proportion of provider's patients that were older adults; and, proportion of provider's patients that are non-English-speaking.

Data was analyzed using Microsoft Excel and SAS.

Human subjects

This study was reviewed by the Institutional Review Boards at Boston Medical Center and the MDPH.

Results

Sites

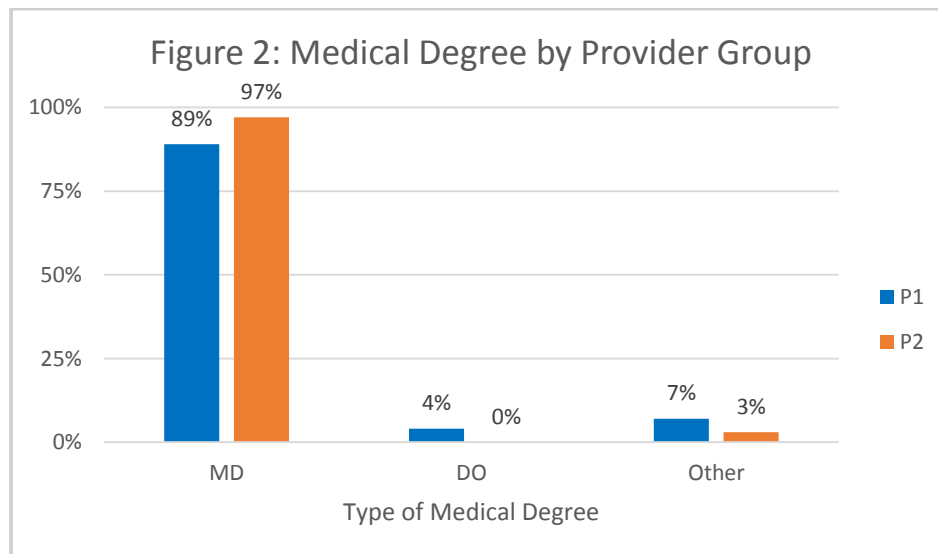
Two provider groups participated in this study. One group (P1) is a healthcare provider that serves communities in Eastern Massachusetts. P1 offers services including primary care, specialty care, mental health, and substance abuse services. The other group (P2) provides primary and specialty care services to Central Massachusetts and Boston MetroWest communities.

Response rates

In total, 136 surveys were distributed (90 to P1 providers; 46 to P2 providers). Overall, 97 of 136 (71%) of targeted providers responded to the survey (66 of P1 [73%] and 31 [67%] of P2, $p=.47$).

Respondent characteristics

Fifty-six of 66 (85%) of P1 respondents and 29 of 31 (94%) of P2 respondents answered the question, “*What type of medical degree do you have?*” Response options were: MD, DO, Other (specify). Overall, 92% (89% of P1 and 97% of P2) of respondents were MDs. All those who responded “Other” were Physician Assistants, Nurse Practitioners or did not specify (Fig. 2)



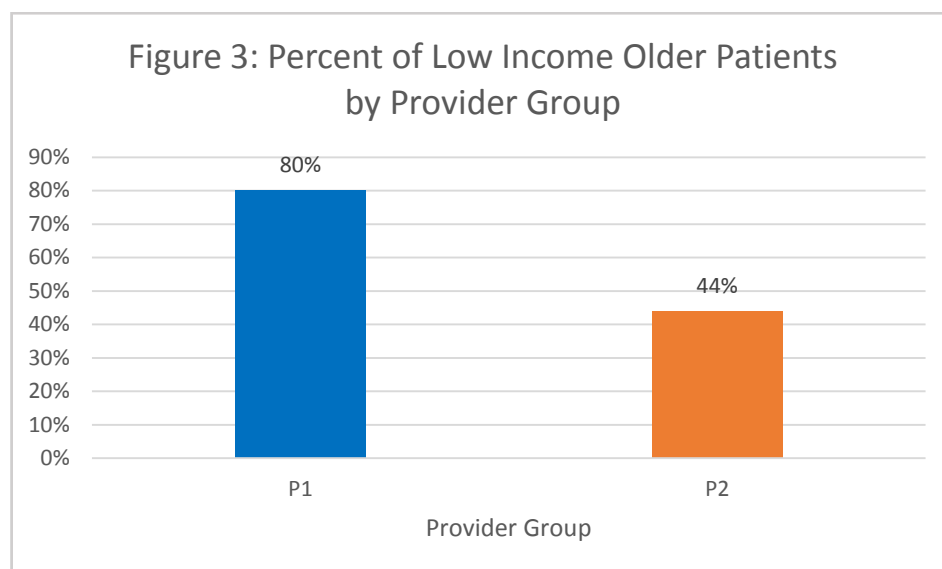
Respondents at P1 and P2 did not differ significantly with respect to gender and medical vs. other degrees but did differ with respect to years since graduation from medical school and specialty (Table 2).

Table 2: Respondent Characteristics by Provider Group			
Questions	P1	P2	P Value
% Male	33.93% (N=19)	51.61% (N=16)	0.11
Years since Graduation	Mean=15.2 SD=12.7	Mean=23.1 SD=12.3	0.01
% MD	89.29% (N=50)	87.10% (N=27)	0.76
Specialty			
Geriatrics	4.84% (3)	12.12% (4)	0.05
Internal Medicine	51.61% (32)	69.70% (23)	
Family Practice	33.87% (21)	18.18% (6)	
Other	9.68% (6)	0.00% (0)	

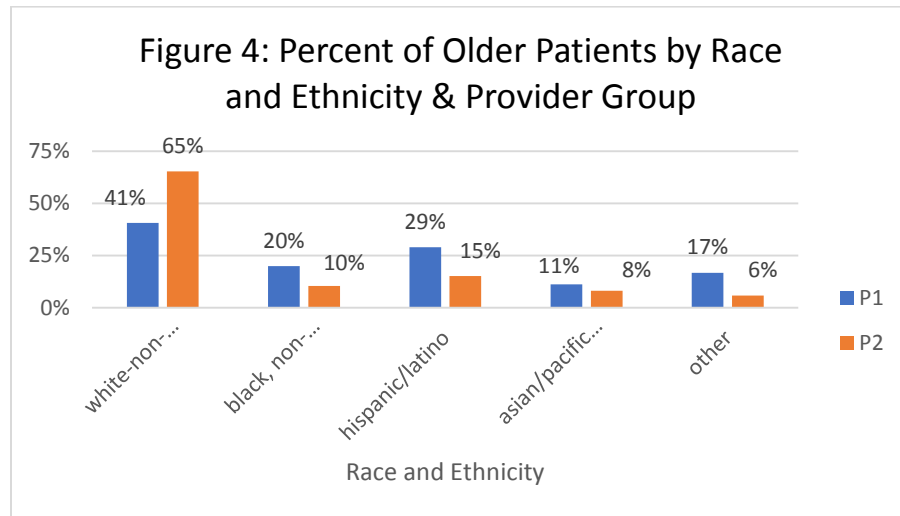
Site characteristics

Forty-eight of 66 (73%) of P1 respondents and 31 of 31 (100%) of P2 respondents answered the question, “*Approximately what percent of your office visits are patients ages 65 and older?*” Mean percent at P1 and P2 differed significantly (25.6% vs. 43.2%; $p=0.00$) with respect to percent of office visits by patients who were ≥ 65 years.

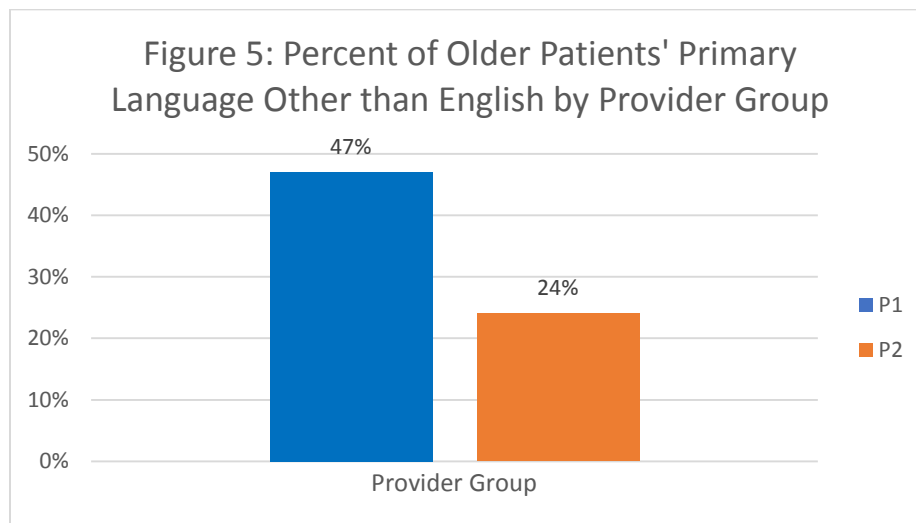
Fifty of 66 (76%) of P1 respondents and 25 of 31 (81%) of P2 respondents answered the question “*Approximately what percent of your patients ages 65 and older would be considered “low income” (\$30,000/year or lower)?*” 80% of P1 respondents and 44% of P2 respondents reported that at least 50% of their older patients were low income ($p=0.00$) (Fig. 3).



Forty-seven of 66 (71%) of P1 respondents and 31 of 31 (100%) of P2 respondents answered the question, “Approximately what percent of your older adult patients fall into the following racial/ethnic categories: White, non-Hispanic; Black, non-Hispanic; Hispanic/Latino; Asian/Pacific Islander; and Other”. Overall, P1 respondents reported a greater proportion of minority patients than P2 respondents (59% vs. 35%; $p=0.00$) (Fig. 4).

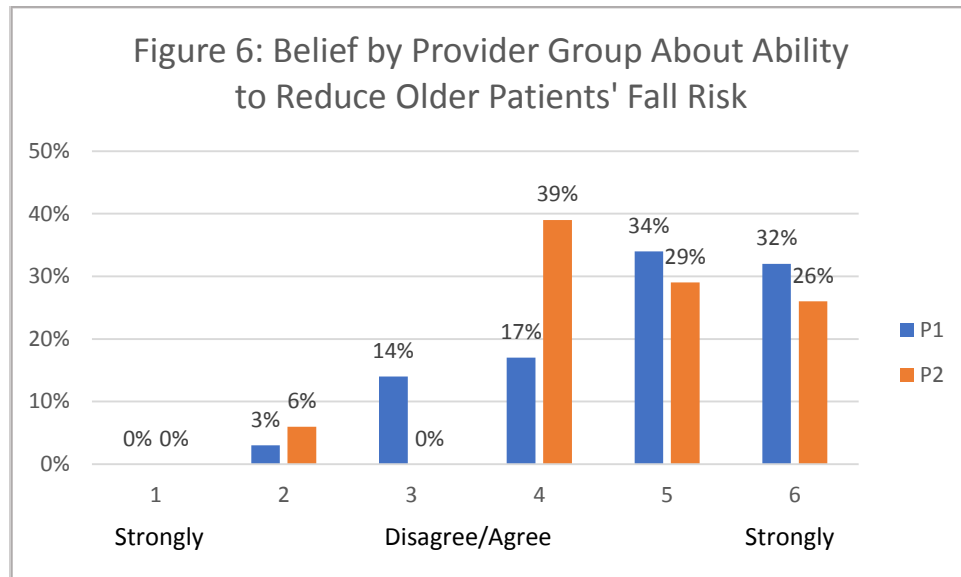


Fifty-four of 66 (82%) of P1 and 31 of 31 (100%) of P2 respondents answered the question, “Approximately what percent of your older adult patients use a primary language other than English?” Mean percent at P1 and P2 differed significantly (47% vs. 24%; $p<0.00$) with respect to patients’ primary language (Fig. 5).

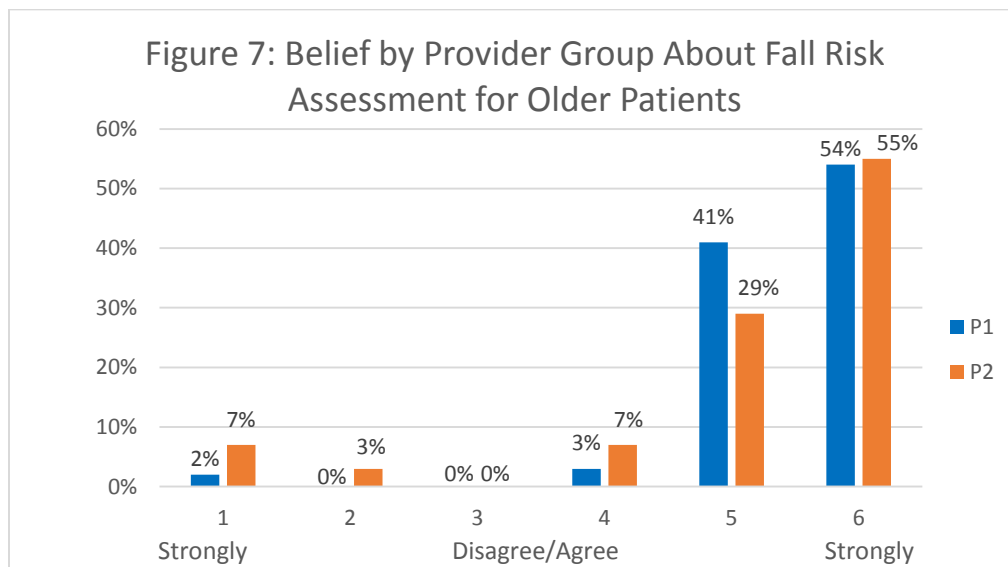


Respondent beliefs

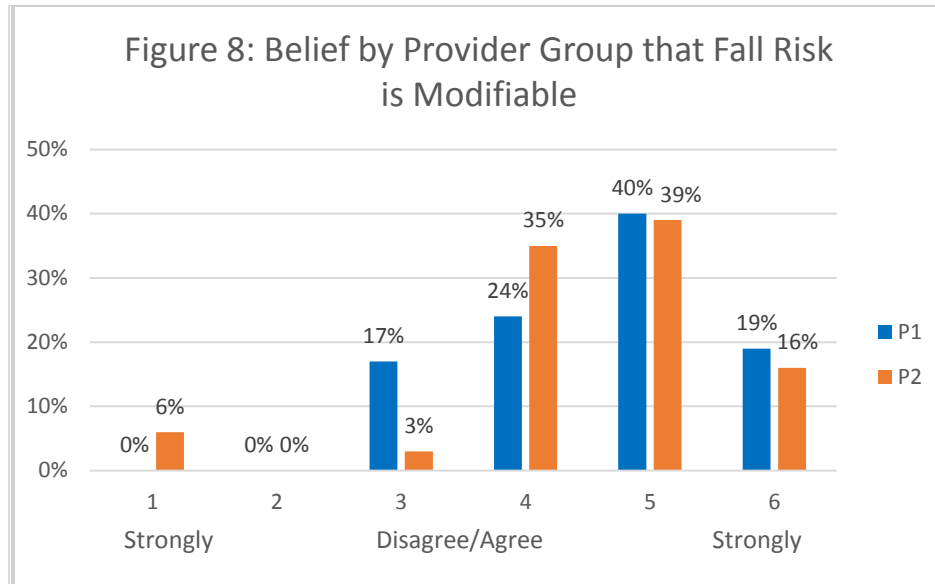
Fifty-nine of 66 (89%) of P1 respondents and 31 of 31 (100%) of P2 respondents responded to the statement, *“I can do things for my independently-living older adult patients to reduce their risk of falling.”* Overall, 87% (83% of P1 and 94% of P2; $p=0.16$) agreed with this statement (Fig. 6).



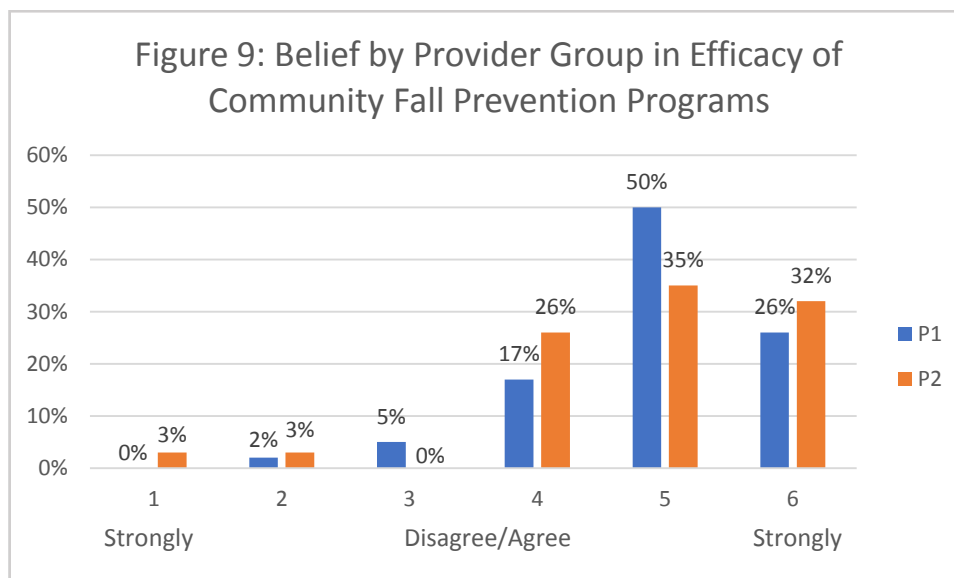
Fifty-nine of 66 (89%) of P1 respondents and 31 of 31 (100%) of P2 respondents responded to the statement, *“All patients ages 65 and older should be assessed for falls risk.”* Overall, 96% (98% of P1 and 90% of P2; $p=0.08$) agreed with this statement (Fig. 7).



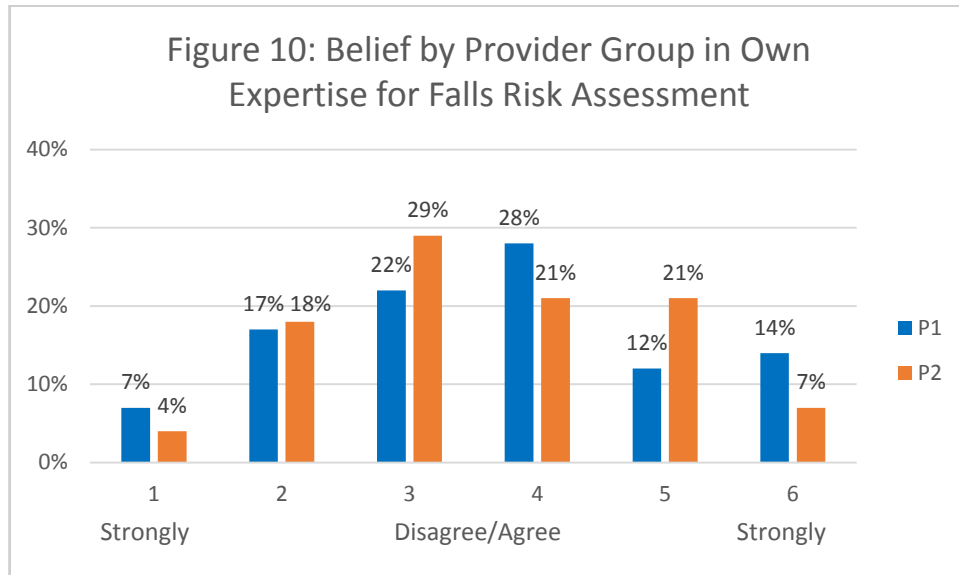
Fifty-eight of 66 (88%) of P1 respondents and 31 of 31 (100%) of P2 respondents responded to the statement, “*A falls risk assessment will uncover risks that can be modified.*” Overall, 85% (83% of P1 and 90% of P2; $p=0.34$) agreed with this statement (Fig. 8).



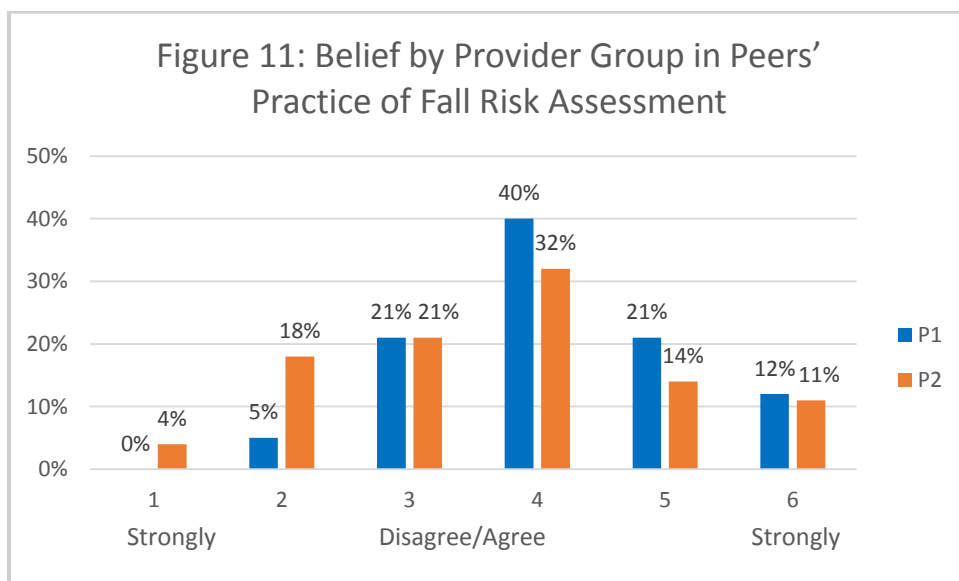
Fifty-eight of 66 (88%) of P1 respondents and 31 of 31 (100%) of P2 respondents responded to the statement, “*An evidence-based community falls prevention program can reduce the risk for falls among older adult patients identified as high risk.*” Overall, 94% (93% of P1 and 94% of P2; $p=0.94$) assessed this statement as likely to be true (Fig.9).



Fifty-eight of 66 (88%) of P1 respondents and 28 of 31 (90%) of P2 respondents responded to the statement, *“I have the expertise to do fall risk assessments of my patients ages 65 and older.”* Overall, 52% (53% of P1 and 50% of P2; $p=0.76$) agreed with this statement (Fig. 10).



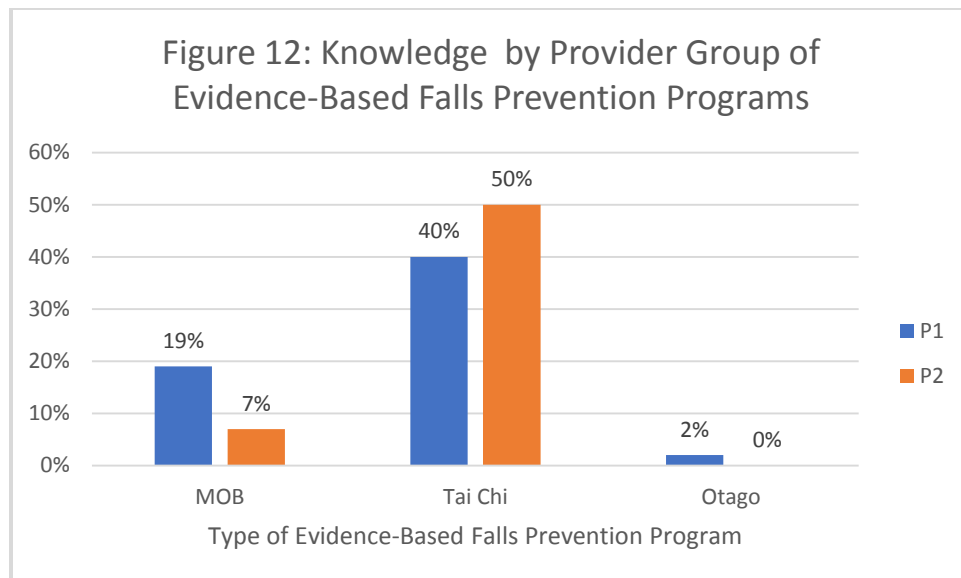
Fifty-seven of 66 (86%) of P1 respondents and 28 of 31 (90%) of P2 respondents responded to the statement, *“It is the prevailing community standard among my professional peers to assess risk for falls of their older adult patients.”* Overall, 68% (73% of P1 and 57% of P2; $p=0.12$) agreed with this statement (Fig. 11).



Respondent knowledge

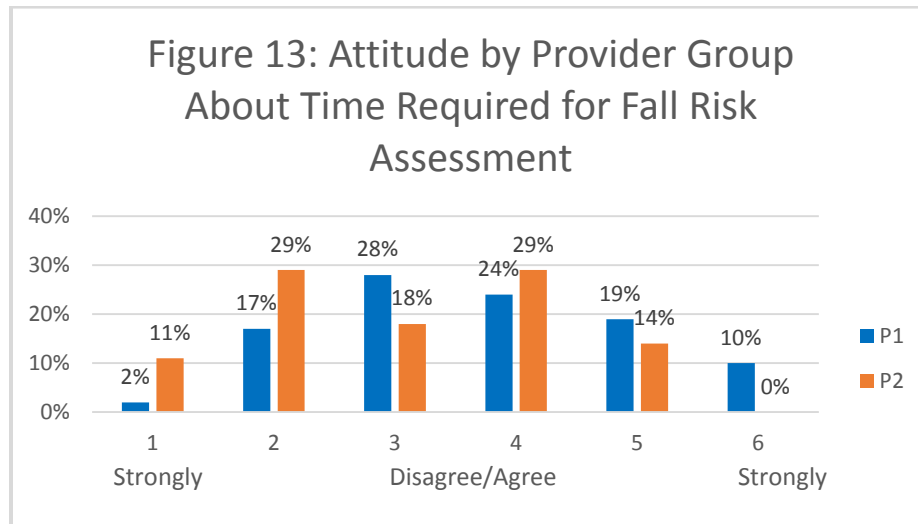
Fifty-eight of 66 (88%) of P1 respondents and 28 of 31 (90%) of P2 respondents answered the question, “Are you aware of the falls risk assessment toolkit developed by the Centers for Disease Control and Prevention called STEADI?” Overall, 14% (14% of P1 and 14% of P2; $p=0.95$) answered “yes” to this question.

Fifty-seven of 66 (86%) of P1 respondents and 28 of 31 (90%) of P2 respondents answered the question, “Are you familiar with any of the following evidence-based fall prevention programs?” Overall, 15% (19% of P1 respondents and 7% of P2 respondents; $p=0.20$) reported familiarity with *Matter of Balance*. Forty-three percent (40% of P1 respondents and 50% of P2 respondents; $p=0.49$) reported familiarity with *Tai Chi: Moving for Better Balance*. Less than 1% (2% of P1 respondents and 0% of P2 respondents) reported familiarity with *Otago* (Fig. 12).

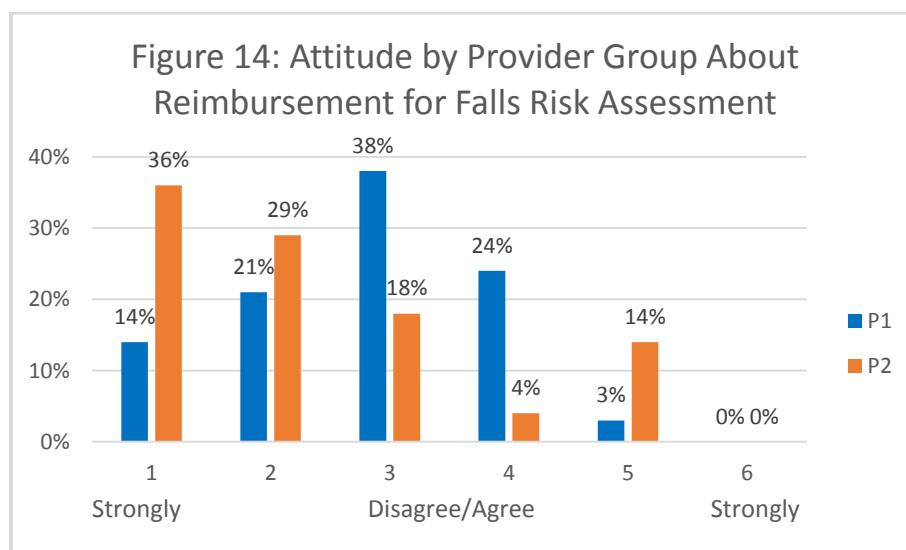


Respondent attitudes

Fifty-eight of 66 (88%) of P1 respondents and 28 of 31 (90%) of P2 respondents responded to the statement, *“I have the time to do fall risk assessments of my patients ages 65 and older.”* Overall, 50% (53% of P1 and 43% of P2; $p=0.36$) agreed with this statement (Fig. 13).



Fifty-eight of 66 (88%) of P1 respondents and 28 of 31 (90%) of P2 respondents responded to the statement, *“I am adequately reimbursed for doing fall risk assessments of my patients ages 65 and older.”* Overall, 24% (27% of P1 and 18% of P2; $p=0.33$) agreed with this statement (Fig. 14).



Respondent practices

Of those who reported awareness of the *STEADI* Toolkit (N=8), 50% (63% of P1 and 25% of P2; $p=0.30$) answered “yes” to the question, “*Do you (or your office staff) routinely use the STEADI Toolkit to assess your older adult patients for fall risk?*”

Fifty-eight of 66 (88%) of P1 respondents and 28 of 31 (90%) of P2 respondents answered the question, “*Over the past 12 months, for approximately what percent of your independently living older adult patients have you conducted a fall history?*” On average, respondents reported conducting a falls history for 59.8% (57.8% for P1 and 63.8% for P2; $p=0.38$) of their patients in the past year.

Fifty-eight of 66 (88%) of P1 respondents and 28 of 31 (90%) of P2 respondents answered the question, “*Over the past 12 months, for approximately what percent of your independently living older adult patients have you conducted a falls risk medication review?*” Overall, respondents had conducted a medications review for 61.5% (57.8% for P1 and 68.1% for P2; $p=0.12$) of their patients in the past year.

Fifty-seven of 66 (86%) of P1 respondents and 28 of 31 (90%) of P2 respondents answered the question, “*Over the past 12 months, for approximately what percent of your independently living older adult patients have you conducted vision assessment?*” Overall, respondents had conducted a vision assessment for 38.8% (35.6% for P1 and 45.1% for P2; $p=0.14$) of their patients in the past year.

Fifty-seven of 66 (86%) of P1 respondents and 28 of 31 (90%) of P2 respondents answered the question, “*In the past 12 months for approximately what percent of your independently living older adult patients have you conducted TUG Test?*” Overall, respondents had conducted a *Timed Up and Go Test (TUG)* for 20.6% (19.1% for P1 and 23.8% for P2; $p=0.48$) of their patients in the past year.

Fifty-seven of 66 (86%) of P1 respondents and 27 of 31 (87%) of P2 respondents answered the question, “*In the past 12 months, for approximately what percent of your independently living older adult patients have you conducted the 4-Stage Balance Test?*” Overall, respondents had conducted the 4-Stage Balance Test for 3.6% (2.6% for P1 and 5.7% for P2; $p=0.34$) of their patients in the past year.

Fifty-seven of 66 (86%) of P1 respondents and 27 of 31 (87%) of P2 respondents answered the question, “*Over the past 12 months, for approximately what percent of your independently living older adult patients have you conducted patient education on falls risk?*” Overall, respondents had conducted patient education for 47% (46.3% for P1 and 48.6% for P2; $p=0.70$) of their patients in the past year.

Fifty-eight of 66 (88%) of P1 respondents and 28 of 31 (90%) of P2 respondents answered the question, “*In the past 12 months, for approximately what percent of your independently living older adult patients have you screened for Vitamin D deficiency?*”

Overall, respondents had screened 50.9% (50.3% for P1 and 52.3% for P2; $p = 0.78$) of their patients in the past year.

Fifty-seven of 66 (86%) of P1 respondents and 26 of 31 (84%) of P2 respondents answered the question, “*In the past 12 months, for approximately what percent of your independently living older adult patients have you referred to an evidence-based falls prevention program?*” Overall, respondents had made program referrals for 9.1% (7.1% for P1 and 13.4% for P2; $p=0.20$) of their patients in the past year.

Questions	P1		P2		p-value	Mean %
	Mean % (SD)	n	Mean % (SD)	n		
Conduct falls history	57.8 (26.6)	58	63.8 (33.3)	28	0.38	59.8
Review medications	57.8 (29.3)	58	68.1 (35.5)	28	0.12	61.5
Assess vision	35.6 (26.0)	57	45.1 (30.0)	28	0.14	38.8
Conduct TUG	19.1 (26.9)	57	23.8 (31.2)	28	0.48	20.6
Conduct balance test	2.6 (13.6)	57	5.7 (14.7)	27	0.34	3.6
Educate for fall risk	46.3 (29.7)	57	48.6 (28.6)	27	0.70	47.0
Screen for Vitamin D	50.3 (29.2)	58	52.3 (30.1)	28	0.78	50.9
Refer to evidence based programs	7.1 (13.0)	57	13.4 (23.3)	26	0.20	9.1

Covariates of assessment practices

The dependent variable for our exploratory analysis of covariates of falls-risk assessment practices was a created composite variable of the mean proportion of patients for which the provider had conducted the 8 fall-risk assessment procedures detailed in Table 3.

In our regression model, practice group (P1 or P2), gender, other degree (MD/DO vs. PA, NP), medical degree (MD vs. DO), years since graduation from medical school, attitude about reimbursement, and proportion of patients that were non-English-speaking were not significantly associated with the composite practice score. Provider belief that they could effectively reduce patients’ fall-risk, perception of peer practices relative to fall risk assessment, and proportion of patients that were older adults were significantly associated with the composite practice score (Table 4). In other words, providers who had a higher proportion of elderly patients, who believed in their ability to reduce their patients’ risk of falling, and who perceived fall risk assessment as

normative among their peers, were more likely to have higher composite practice scores than those who did not hold those beliefs and perceptions.

The adjusted R-Squared for the model was 0.31, indicating that the independent variables explained about a third of the variance in the composite practice score.

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	3.67363	8.82289	0.42	0.68
P1 (Ref=P2)	1	-5.40129	3.97586	-1.36	0.18
MALE (Ref=Female)	1	-5.47575	3.33859	-1.64	0.11
Degree other than md (Ref=MD)	1	-4.80010	7.03138	-0.68	0.50
MD vs.DO	1	-1.87069	9.50933	-0.20	0.85
Years since graduation	1	0.08390	0.13556	0.62	0.54
Can reduce patient fall risk	1	4.92978	1.39991	3.52	0.00
Adequate reimbursement	1	-1.15794	1.35910	-0.85	0.40
Perception of prevailing standard among peers to assess fall risk	1	4.30320	1.47844	2.91	0.01
Proportion of older patients in practice	1	0.20667	0.07992	2.59	0.01
Percent patients non-English-speaking	1	-0.03221	0.08346	-0.39	0.70

Discussion

Summary of findings

Providers' beliefs about the efficacy of fall risk assessment and intervention were mixed. Most believed that they could be effective in reducing fall risk among their older adult patients. Most believed that all older adults should be assessed for fall risk; and most believed that this assessment would identify fall risk factors that could be modified. Nonetheless, only about half believed that they had the expertise to conduct fall risk assessment and only about two thirds believed that assessing older adult patients for fall risk was the prevailing standard of practice among their peer providers.

Although most providers believed it likely that an evidence-based program could reduce fall risk among their patients, only 14% were aware of the CDC's *STEADI* Toolkit, and only 15% were familiar with *Matter of Balance*, the most widely disseminated community fall risk prevention program in Massachusetts (Howland et al., 2015).

Half of the providers felt that they did not have adequate time with patients to conduct fall risk assessment and three quarters felt that they were not adequately reimbursed for this procedure. Despite these perceptions, providers reported that during the past year they had conducted a falls history, a fall risk medication review, and a test for Vitamin D deficiency for at least half of their older adult patients, and had educated almost half of their older adult patients about risks for falling. Less than 40% of these older adult patients, however, were vision tested, only about 20% were tested for strength and mobility (*TUG Test*), less than 4% received the 4-Stage Balance Test, and less than 10% were referred to community fall prevention programs.

Context of findings

It is useful to consider these findings within the context of the environment in which they were observed. In several respects, Massachusetts has been a leader in older adult falls prevention. In 2010, the state legislature passed legislation creating the Massachusetts Commission on Falls Prevention with the mandate to study the effects of falls on older adults and the impact on health care costs in Massachusetts and report their policy recommendations on best fall reduction strategies for the state. This 13-member commission consists of representatives of MDPH, provider professional organizations (physicians, physical and occupational therapists), Elder Affairs (state and Boston), senior care organizations, and AARP. To our knowledge, no other state has a comparable commission dedicated solely to the prevention of older adult falls.

Massachusetts is among many states that have a fall prevention coalition. The Massachusetts coalition was founded in 2007 and has been meeting regularly since. The coalition includes over 80 organizations and over 130 individuals, including healthcare providers, administrators, advocates, and representatives of Councils on Aging (COAs) and Area Service Access Points (ASAPS).

In 2011, the MDPH received a five-year injury prevention program grant from the CDC. This grant provided funding for a falls prevention coordinator as well as several programmatic initiatives, including training facilitators for a *Tai Chi* program that was approved as evidence-based by the CDC.

In 2013, MDPH sponsored a nine-community demonstration program (funded by the Massachusetts Prevention & Wellness Trust Fund [PWTF]) that aimed to increase clinical referrals to community-based fall prevention and chronic disease management programs. Eight of the nine communities implemented *Matter of Balance (MOB)* programs in coordination with outreach to local physicians. *MOB* is an 8-session, 16-hour group program developed by researchers at Boston University and evidence-based for reduction of fear of falling, enhancement of activity levels (Tennstedt et al., 1998), and reduction of falls among repeat fallers (Zijlstra et al., 2007). Although the PWTF program lasted only four years, residual fall prevention infrastructure remains in many of the participating communities.

Even before the PWTF demonstration program, *Matter of Balance* was offered in many Massachusetts communities. In a statewide survey conducted by the BMC IPC on behalf of the Massachusetts Commission on Falls Prevention, investigators identified 107 fall prevention programs, serving an estimated 1,127 older adults, implemented during 2012. Of these, 93% were *MOB* programs (Howland et al., 2015). Since 2006,

MaineHealth, the organization that licenses Master Trainers for *MOB*, has trained and certified 162 Massachusetts *MOB* Master Trainers. These Master Trainers have, in turn, trained numerous *MOB* facilitators in the state.

Since 2007, Massachusetts has conducted a falls awareness day at the statehouse and the MEOEA has received several grants from the federal Administration on Community Living (formerly, Administration on Aging) to disseminate and support falls prevention programs throughout the state.

Despite extensive and leading-edge fall prevention initiatives in Massachusetts, our findings indicate that further effort is required to increase integration of evidence-based fall prevention assessment algorithms and community fall prevention programs into primary care. In a recent study of fall prevention activities undertaken by older adults (n=87) 60 days post-discharge from an urban Massachusetts emergency department, only 37% had spoken to their healthcare provider about fall prevention, 22% had spoken to their provider about medication risk for falls, 15% had spoken to their provider about their vision, two percent had attempted to contact a community-based falls prevention program, and none had participated in a falls prevention program (Shankar et al., 2017).

Strategies Going Forward

New strategies that more directly target providers are needed to accelerate integration of fall risk assessment and intervention into primary care practice. For example, initiatives could be implemented to enhance education and training about older adult falls for medical students, and other relevant providers, at educational institutions throughout the state. Similarly, CME on fall prevention could be made a requirement for initial licensure and renewal for relevant Massachusetts healthcare providers. The MDPH or the MEOEA could create and maintain a website that listed the time, place, and sponsor of community-based fall prevention programs, so that older adults and their healthcare providers could locate these programs for referral. Insurance coverage for community-based fall prevention programs by private and public third-party payors could do much to stimulate provider referrals. In the absence of reimbursement, however, Accountable Care Organizations might consider offering or sponsoring fall prevention, and other chronic disease self-management programs, to reduce utilization among their covered patients. Clearly, many other approaches could be developed and the MDPH, MEOEA, the Massachusetts Medical Society, and other entities could collaborate to convene stakeholders and researchers to create an action plan for moving the state towards integration of fall risk assessment and intervention into clinical practice.

Covariates of provider practices

The explanatory power of the regression model for predicting provider practices was moderate, suggesting that further research is needed to understand why some healthcare providers are more apt to assess their older adult patients for falls risk than other providers. Nonetheless, these results are interesting in that they are consistent

with social learning theory (Bandura, 1977), which posits that behavior is predicted by self-efficacy and perceptions of peer norms.

Limitations

The investigators acknowledge several limitations of this study. First, the study used a convenience sample that included only two group practices, and therefore generalizability (external validity) of findings to all Massachusetts primary care providers cannot be made definitively. We invited five group practices to participate in this study. One never responded, two responded, but subsequently ceased communicating about the study, and two participated. We could have opted for drawing a sample of physicians from the Massachusetts physician registry, but this approach has yielded poor response rates in the past. Thus, the methodological dilemma was a choice between a valid sampling procedure that risked a small response rate versus a convenience sample, of limited generalizability, that yielded acceptable response rates and thus valid data for those practices that participated. We chose the second option.

Despite the limitation on generalizability, it is noteworthy that in most respects, the two practices surveyed were very similar in terms of knowledge, beliefs, attitudes, and practices, with few statistically significant differences. This suggests that because most findings were consistent across the participating practices, findings may apply to other primary care providers in the state.

Nonetheless, even if there were reason to believe that our findings might be generalizable to most Massachusetts primary care providers, our sample included no other state and thus we have no indication that our results reflect characteristics of providers beyond the state.

Second, as with any survey, responses can be biased by social desirability, the tendency of respondents to distort answers towards what they perceive to be normative. Many of our findings, however, remain important, even if they are inflated towards socially desirable answers. For example, even if some respondents indicated that they were aware of the *STEADI* Toolkit, when they were not aware, the finding that only 14% said they were aware remains a small proportion.

Third, while we asked providers if they referred their older adult patients to community-based fall prevention programs, we did not ask about fall prevention referrals to other providers, such as physical or occupational therapists, or general exercise programs such as those offered by YMCAs or Councils on Aging. This omission may have resulted in a failure to develop a complete picture of providers' fall prevention practices for their older adult patients.

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