



Final Progress Report: ASPIRE (Advancing Fall Assessment and Prevention Patient-Centered Outcomes Research Findings into Diverse Primary Care Practices) Care Planning Tool

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1. Abstract:

Purpose: To develop a novel fall prevention tool that links clinical decision support with patient engagement to promote patient safety.

Scope: Falls in older adults are common and preventable by assessing patient risk factors and providing tailored prevention plans. We engaged patients and providers in developing a fall prevention care planning tool/Clinical decision support(CDS) for use during a primary care visit.

Methods: Semi-structured exploratory interviews, design feedback sessions, formative and summative usability sessions with primary care providers and community dwelling older adults to understand end-user needs. A CDS prototype was developed, formative usability testing was conducted with primary care providers.

Summative usability testing was conducted where facilitators and patient-actors walked through the ASPIRE tool with a provider participant to assess the real-world use of the ASPIRE tool in the primary care setting.

Pilot testing was conducted with trained clinicians. Patients age ≥ 60 years with a positive fall risk screen were eligible to receive the ASPIRE computerized clinical decision support (CCDS) during their primary care visit. Following the visit, trained research staff surveyed patients in a private setting. A focus group was conducted with clinicians to learn about their experience using ASPIRE.

Results: Content analysis from information gathering identified seven themes (with both positive and negative components) relating to provider perceptions of the ASPIRE tool. Providers reported that the implementation of ASPIRE was successful, the tool helped to engage patients in fall prevention, and that the system had value in the primary care setting.

Key Words: clinical decision support, older adults, fall prevention, primary care

2. Purpose:

The purpose of this study was to design, test, and implement the *ASPIRE (Advancing Fall Assessment and Prevention Patient-Centered Outcomes REsearch Findings into Diverse Primary Care Practices) Care Planning Tool*, a shareable and interoperable CCDS, to support identifying older adults at risk of falling and support rapid clinical decisions by linking the fall prevention evidence to practice and engaging patients in this process.

Scope: Falls among older adults represent the leading cause of fatal and nonfatal injuries in the United States (US) (1). Falls are persistent among both rural and urban older adults with more than 1 out of every 4 older adults reporting falling in the previous year (2). These preventable incidents cost the US healthcare system an estimated \$50 billion each year (2). Despite growing evidence that falls can be prevented, deaths from falls continue to rise.

The challenge is to ensure that older adults at risk of falling receive appropriate interventions and referrals from their primary care providers (PCP). Despite recognizing the need, PCPs do not ask their older patients about falls and associated risk factors as part of their routine assessment (3). Less than half of older adults discuss their falls with their PCPs (4). Because of the multi-factorial nature of falls, identifying and prioritizing effective care plans to prevent falls is challenging. Computerized clinical decision support that could quickly and easily guide PCPs to the most effective fall prevention strategies for an individual patient and engage patients in fall prevention decision-making are needed to ensure that evidence-based fall strategies are routinely implemented in clinical practice (5).

To the best of our knowledge, there has been little or no research on creating shared, interoperable, dynamic decision-making tools for community-based fall risk assessment and prevention. The AHRQ CDS Connect repository has great potential for disseminating fall risk assessment and prevention CDS artifacts. To date, CDS artifacts for more than a dozen health domains have been created but none focus on community-based fall prevention. Health IT in primary care can enable workflow and well-integrated evidence-based CDS can improve patient outcomes (6,7).

3. Scope:

Falls in older adults are common and preventable by assessing patient risk factors and providing tailored prevention plans. We engaged patients and providers in developing a fall prevention care planning tool/CDS for use during a primary care visit.

4. Methods:

4.1 Design and development: Data collection

Our team used an iterative human centered design approach to obtain input from users. The following activities (semi-structured interviews, exploratory interviews, design feedback sessions, and summative usability sessions) were designed to better understand end-user needs, iteratively gather their feedback on the CDS design, and evaluate its overall usability. At Brigham & Women's Hospital (BWH), a user experience expert conducted each of these interview types on virtual video calls. At the University of Florida (UF) site, a registered nurse with user experience training collaborated with the site principal investigator to conduct in-person and virtual interviews.

Additional research team members took notes while observing each of these interview activities. At the conclusion of each interview, other research staff who were present had the opportunity to ask questions to clarify any statements or observations. All interviews were video and audio recorded. The de-identified audio from each interview was transcribed. While the reliance on remote technologies to conduct this study (due to the COVID-19 public health emergency) produced some barriers to participant recruitment, it did allow patients to participate in interviews without needing to travel. Additionally, it allowed our team to review recorded interviews and make increasingly detailed notes and observations.

4.2 Semi-structured interviews with primary care staff

Primary care team staff (primary care providers, care coordinator nurses, licensed practical nurses, and medical assistants) associated with BWH affiliated primary care clinics and University of Florida Health Archer Family Health Care clinic were eligible to participate in this study. Primary care staff participants at both sites received an emailed or physical copy of a recruitment letter that described the purpose of the study and participation details. Due to COVID-19 restrictions, recruitment largely took place virtually. All participants consented to participate in the study and received reimbursement in the form of a gift card.

The semi-structured interview guide for primary care staff included questions to elicit perspectives on what staff need for effective fall prevention and the development and use of personalized fall prevention plans, and current state practices for addressing pre-identified fall injury risk factors. Our goal was to gain a detailed understanding of current-state fall prevention practices in clinics so that we may identify the gaps and needs in those processes and address them in our CDS design. Based on a review of the literature, the availability of related data in the EHR, previous experience, clinical members of the project team identified three fall injury risk factors (mobility limitations, fall risk increasing drugs, and osteoporosis) to be addressed in the CDS tool. These risk factors were vetted and approved by the study advisory board. Team members examined each risk factor individually to determine which were identifiable through data extracted from the EHR, with the goal of creating an electronic tool that could automatically identify individual fall risk factors and provide personalized recommendations (i.e., discuss starting bisphosphonates medication for patients with osteoporosis). Our team designed the semi-structured interview questions to help us understand what direct users, or staff who engage with the decision support, would require from the tool when addressing these risk factors. At BWH, a user experience expert conducted all interviews on virtual video calls. At the UF site, a registered nurse with user experience training collaborated with the site principal investigator to conduct in-person semi-structured interviews.

4.3 Semi-structured interviews with community-dwelling older adults

Adults aged 60 or older associated with BWH affiliated primary care clinics and the UF clinic were also eligible to participate in this study. Primary care staff participants referred their patients 60 years of age and older, interested in participating in the study, to the study team. A research team member contacted these patients by email or in-person and provided them the patient-facing recruitment letter. All participants consented to participate in the study and received reimbursement in the form of a gift card.

The semi-structured interview guide for patient participants comprised questions to elicit insights from their personal experiences with falls and fall prevention. Our team designed these questions to help us understand what indirect users, or the recipients of recommendations supported by the CDS, would require from the tool. At BWH, a user experience expert conducted all interviews on virtual video calls. At the UF site, a registered nurse with user experience training collaborated with the site principal investigator to conduct in-person semi-structured interviews.

4.4 Exploratory interviews

Primary care providers (physicians, physician's assistants, nurse practitioners) associated with BWH affiliated primary care clinics and the UF clinic were eligible to participate in exploratory interviews. Our team designed the exploratory interview guide for primary care staff to facilitate a virtual workflow observation where the provider would demonstrate the activities, steps, and thought processes involved in fall risk assessment and prevention planning using their EHR during a patient encounter. At BWH, a user experience expert conducted all interviews on virtual video calls. At the UF site, a registered nurse with user experience training collaborated with the site principal investigator to conduct virtual exploratory interviews.

4.5 Formative usability testing (design feedback sessions)

After identifying key user needs, our team developed an initial CDS prototype. We conducted design feedback sessions with primary care providers (n=14) with the goal of receiving feedback on the prototype. At BWH, our team's user experience expert conducted all interviews on virtual video calls. At the UF site, a registered nurse with user experience training collaborated with the site principal investigator to conduct virtual sessions. The first three design feedback sessions were conducted using a static CDS prototype and the remaining 11 sessions were conducted using a semi-functioning, clickable prototype. During these sessions, provider participants were given a fictitious patient scenario and instructed to use this scenario to help them walk through the steps of the tool. This allowed our research team to collect comments, feedback, and observations from participants that contributed to the iterative design and refinement of a CDS prototype for future summative usability testing.

4.6 Summative usability testing

Participants were recruited using purposive sampling from two sites. The first site is a large urban healthcare system serving the Boston area. The second is a federally designated rural health clinic associated with a near-by academic medical center in north-central Florida. Staff at both sites and were eligible to participate if they were primary care providers who cared for older adults. Sample estimation for usability studies is a balance between cost and time to expose the most of potential errors (8). This study planned for 20 total summative testing participants which would uncover a minimum of 95% of errors (9). However, due to challenges recruiting, final sample size was 14 (10 urban, 4 rural), which should reveal nearly 90% of errors (9).

Summative testing sessions were video recorded and consisted of a participant, facilitator, and patient-actor. The facilitator and patient-actor were members of the research team. At the beginning of the session the facilitator provided a brief introduction of ASPIRE and gave the participant remote control of the screen. Participants were advised that questions about the tool would be answered after the session and to complete tasks to the best of their abilities. Each testing session included two clinical scenarios and participants were randomized to determine which scenario they would see first. Each scenario

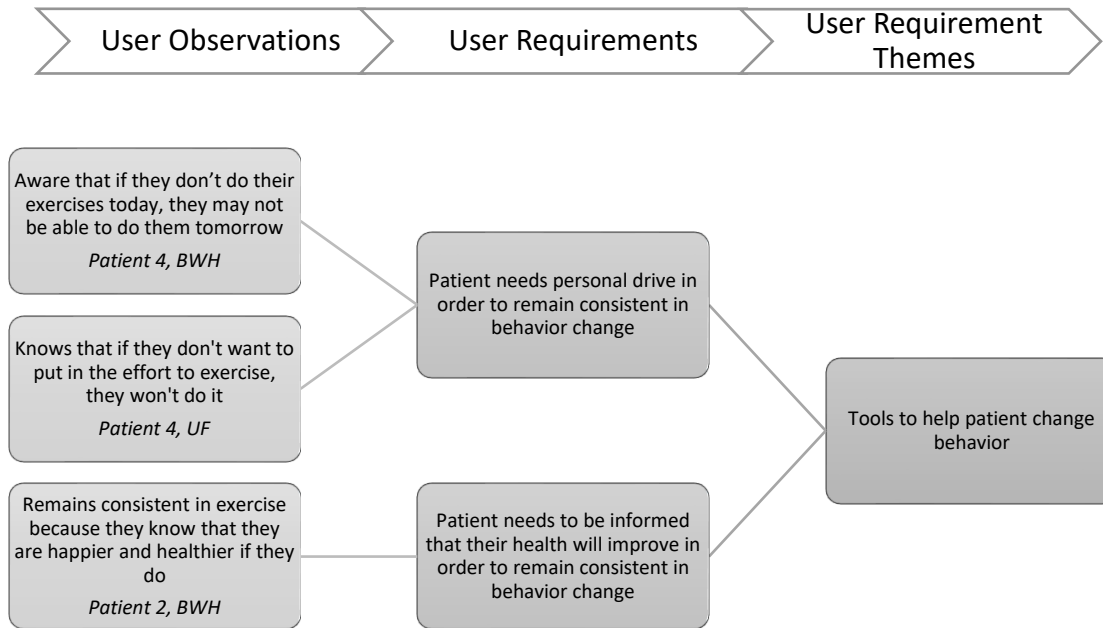
included information about age, gender, chronic diseases, general activity levels, the use of assistive devices, medications, and any history of osteoporosis or osteopenia. During both scenarios the patient-actor used predetermined personas that tried to anticipate provider questions. If a participant asked a question that was not anticipated, they were instructed to answer “I don’t know” for consistency. Each participant completed four tasks: 1) Launch and Landing, 2) Risk Factors, 3) Recommendations, 4) Document and Print. Hints related to system use were only given if participants were unable to complete the task or if an error would have prevented the completion of subsequent tasks. During the launch and landing task the user was expected to navigate to a button integrated into their respective EHR and review the information on the landing page, see **Figure 1**. During the risk factors task the provider was presented with risk factors identified by ASPIRE from the EHR, which they were expected to validate with the patient. During the third task the provider was presented with recommendations, including talking points, based on previous selections. Recommendations were grouped by risk factor with exercise first, fall risk increasing drugs (FRIDS) second, and bone health third. During this task the provider was presented a recommended exercise level but could choose a different level based on clinical judgement. Participants were also able to preview handouts, and de-select any items they did not want to use. When the participant hovered their mouse over the different levels of exercise a description of who that level was intended for appeared. In the medication section all recommendations were based on the class of medication the drugs selected in the previous step belonged to. For example, if the participant selected diazepam recommendations for de-prescribing benzodiazepines were provided. In the document and print task, the provider had a summary of resources that they could print, recommended orders, and a pre-populated note that summarized the fall prevention plan. All items in this task were the result of selections made in previous steps and the pre-populated note could be sent to the EHR, reducing the need for double documentation.

4.7 Data analysis

4.7.1 Semi-structured interviews with primary care staff, semi-structured interviews with community-dwelling older adults, and exploratory interviews

Previous studies have shown content analysis to be an effective method for classifying and deriving meaning from qualitative data (10-12). Our team conducted a content analysis on the data from the semi-structured interviews with primary care staff and older adults and exploratory interviews to identify user needs for CDS to prevent falls (**Figure 1**). At BWH, trained research staff independently reviewed transcripts to identify key ideas and develop a preliminary coding system for user needs. Our team’s user experience expert and research assistant met regularly to iteratively review, modify, and validate the codes and emerging themes. Once they reached a consensus, the research assistant grouped and sorted common responses into major themes according to similarity. Throughout this process, the research assistant presented their findings to the broader research team at weekly meetings, where they reviewed, validated, and finalized the codes and their themes. This process also occurred at the UF site, and their team members validated and added supporting data to the end-user needs identified at their site.

Figure 1. Using content analysis to define user requirement themes.



4.7.2 Formative usability testing (design feedback testing)

The research team reviewed the recordings and notes taken during each formative usability session. A trained research member from both sites highlighted user comments and observations. These observations were mapped and shared with the broader research team, who collectively brainstormed potential solutions to these issues. Once potential solutions were identified, changes were made accordingly to the prototype and tested with the next feedback session participant. If these changes were validated by the user, they remained part of the design. If not, the research team brainstormed additional solutions. This occurred as a cyclic, iterative design process that followed human centered design principles and allowed our team to identify key usability criteria for a final prototype.

4.7.3 Summative testing

Recorded summative testing sessions were analyzed using NVivo version 12. An a-priori code book was developed by trained research staff in consultation with the team’s usability expert and reviewed by the team. The code book was developed to allow analysis of the summative testing measures in **Table 1**. Descriptive statistics were calculated for the total sample, each site, and each scenario order. A paired t-test to assess within-subject time on task between scenarios was performed. The Wilcoxon ranked sum test was used to compare number of recommendations seen by participants compared to number of recommendations included in the fall prevention plan. Statistics were calculated using R Studio.

Table 1. Usability metrics and operational definition.

Metric	Operational Definition	Measure(s)
Usability	Usability (measure of the ease of use) to be measured via the SUS	SUS questionnaire
Accessibility	Ease of access	Single Ease question for landing page

Learnability	Learnability is the ability of users to quickly become familiar with and be able to use the tool / system. Total Time on task is the sum of the time coded for the 4 tasks (launch & landing, risk factors, recommendations, and document and print)	Difference in total time on task between scenario 1 and 2 per user
		Ratio of number of hints needed to complete task
		Number of errors by task per user
Acceptability	Acceptability - Measured by number of default recommendations changed per risk factor. And “Would you recommend”: question in post-test.	Number of default recommendations unchanged per risk factor (exercise; osteoporosis) plus number of FRIDS selected

4.7.4 Pilot testing and observations: Data collection

Prior to system use in the primary care pilot sites at BWH and UF, clinicians were trained on ASPIRE’s use and the process of fall prevention shared care planning. The site PI from each study conducted the training with the providers at each pilot site. Clinic staff and providers helped identify patients who were ≥60 years of age and suggested the use of ASPIRE during their clinic visit. A trained research team member reviewed records of patient’s fall risk screening results. Patients identified as being 60 years of age or older with a positive fall risk screening result were marked for the use of ASPIRE in their upcoming visit. If a patient agreed to proceed with the use of ASPIRE and have their visit observed by a member of the research team, then the trained research staff member obtained informed consent. During the visit, the trained research member collected a series of observational data on the provider’s use of the ASPIRE tool (**Appendix A**). Upon completion of the clinic visit, the trained research staff member met with the patient in a private setting to ask a small set of demographic questions (**Appendix B**) and administer a patient-provider communication (Health Care Relationship Trust Scale) (**Appendix C**) and shared decision-making questionnaire (Shared Decision-Making Questionnaire-9) (**Appendix D**). Once the 40 observations were completed, a focus group was conducted with clinicians at each site to gather individual perceptions of their experience using ASPIRE. At the end of both focus groups, the Health-ITUES survey (**Appendix E**) was administered to each participating clinician in order to help gauge clinical feasibility and acceptability of the software in the primary care environment.

4.7.5 Limitations

The major limitation of this work is that the ASPIRE tool was evaluated a single urban and single rural site. This limits our ability to generalize the overall findings, since there might be different factors that would facilitate or be barriers to the use of ASPIRE if it was evaluated in a larger group of practices. We are also limited in making inferences about whether differences were due to being rural or urban sites, since there were other differences such as different geographical regions, EHR systems being used and patient case mix that might have contributed to the differences observed. While the i-TUES is a validated instrument, there are also limitations in its ability to be sensitive to differences between groups. It also might have not captured some aspects of the experience of using ASPIRE that were important to patients and providers.

5. Results:

5.1 Patient clinic visit observations

Tables 2, 3, and 4 show the ASPIRE generated CDS and use patterns of primary care providers by risk factor (i.e., mobility, FRIDS, and osteoporosis) for Steps 1 and 2 of the fall management care planning

process (i.e., risk factor identification, care planning recommendations, and care plan summary and final recommendations) in urban (n = 11) and rural (n = 10) primary care visits.

Mobility (Table 1). In Step 1, at the urban and rural clinics, providers did not always accept the CDS. While five and two urban and rural patients, respectively, were identified by ASPIRE as having a gait disturbance, this decision was changed in both urban and rural patients by providers. This similar pattern was only observed among rural providers for gait disturbance. In Step 2, ASPIRE provided care planning recommendations, specifically tailored exercise level and exercise talking points. Tailored exercise levels were recommended for all of the urban patients and 9 of the 10 rural patients. This reflects an unexpected system error during one of the rural patient observations. Eight of the recommendations were accepted by urban providers and six by rural providers. During clinic visits, rural providers utilized the ASPIRE generated evidence-based talking points and previewed evidence-based resources and materials to printed more than providers in the urban setting.

Mobility	Urban (n = 11)	Rural (n = 10)		Urban (n = 11)	Rural (n = 10)
ASPIRE Preselected CDS			PCP CDS Use		
<i>Step 1: Risk Factor</i>					
Gait disturbance (dark blue button)	5	2	Accepted gait disturbance	8 For 8 patients, providers kept the CDS and for 3 it was changed	4
Symptoms with exercise	8	2	Accepted symptoms with exercise	8	4
			Accepted not homebound	11	9
<i>Step 2: Care Planning Recommendations – based on data from step 1.</i>					
Tailored exercise level	Chair = 0 L1 = 11 L2 = 0 L3 = 0	Chair = 2 L1 = 7 L2 = 0 L3 = 0	Accepted exercise recommendation	Chair = 0 L1 = 8 L2 = 0 L3 = 0	Chair = 2 L1 = 4 L2 = 0 L3 = 0
Exercise talking points	11	10	Utilized evidence-based talking points	4	7
			Previewed evidence-based exercise resources during visit	3	7
			Printed materials from preview	2	4

FRIDS (Table 2). In Step 1, the CDS identified one urban and five rural patients at risk of falling due to prescribed FRIDS. Providers did not always accept the CDS to deprescribe FRIDS. In Step 2, when rural providers chose to deprescribe FRIDS, they did not provide patients deprescription resources because they were not available to them via the CDS. However, rural providers did make use of the CDS evidence-based FRIDS talking points to guide the decision to deprescribe.

Fall risk increasing drugs	Urban (n = 11)	Rural (n = 10)		Urban (n = 11)	Rural (n = 10)
ASPIRE CDS – only drugs prescribed shown to provider that needed to select to move on to step 2			Provider CDS Use		
<i>Step 1: Risk Factor</i>					

FRIDS prescribed to patient	1	5	FRIDS selected for deprescribing	0	2
<i>Step 2: Care Planning Recommendations – based on data from step 1.</i>					
FRIDS tailored deprescription resources	N/A because deprescribing was not used	0 some drugs did not have handouts	Accepted recommended handouts	NA	NA
FRIDS talking points	N/A	2	Utilized evidence-based talking points	NA	1
			Previewed evidence-based FRIDS tapering resources during visit	NA	NA – no resources in left column
			Printed tapering materials	NA	NA – no resource in left column

Osteoporosis (Table 3). In Step 1, the CDS identified seven urban and four rural patients at risk of falling due to their osteoporotic status and providers at both locations accepted the decision support as a risk factor. In Step 2, the CDS pushed tailored osteoporosis management resources to the providers for all 11 patients. Providers in the urban location accepted the use of the recommended handouts for all seven patients. However, providers in the rural location accepted the use of the recommended handouts for only one patient. While providers had the option to preview the resources during the visit and before printing them, this function was used only once at the rural location. Lastly, the decision support evidence-based talking points were not used by urban providers and twice by rural providers.

Osteoporosis	Urban (n = 11)	Rural (n = 10)		Urban (n = 11)	Rural (n = 10)
ASPIRE CDS			Provider CDS Use		
<i>Step 1: Risk Factor</i>					
Osteoporosis status	7	4	Accepted osteoporosis status	7	4
<i>Step 2: Care Planning Recommendations</i>					
Osteoporosis tailored management resources	Osteoporosis = 1 Osteoporosis bisphosphonate = 6	Osteoporosis bisphosphonate = 4	Accepted recommended handouts	7	1
			Previewed evidence-based osteoporosis resources during visit	0	1
			Printed materials from preview	0	0
			Utilized evidence-based talking points	0	2

Based on the Health-ITUES, providers at the urban and rural primary care clinics leaned towards strongly agreeing on average (i.e., $M = 4$ on a Likert scale of 1–5, with 1 strongly disagree and 5 strongly agree) about the overall usability of the ASPIRE tool. More specifically, providers perceptions converged more closely around the tool’s impact and perceived usefulness (i.e., $M = 4.3$) and less so around perceived ease of use ($M = 3.9$) and user control ($M = 3.0$). **Table 5** displays patients’ perceptions of patient-provider shared decision-making and trust. Overall, the average score on shared decision-making was 93

out of 100. Rural patients rated shared decision making higher ($M = 95$) than urban patients ($M = 89$). The average score on patient-provider trust was 51.5 out of 60. The difference in trust was smaller between rural ($M = 52$) and urban ($M = 49.5$) patients than in share decision-making.

	Urban		Rural		Total	
	Mean	SD	Mean	SD	Mean	SD
Shared decision-making	89	17.0	95	10.8	93	15.0
Health care relationship trust	49.5	6.6	52	0.8	51.5	1.3

5.2 Providers real-world experience using ASPIRE

Based on the content analysis, our team identified seven themes with both negative and positive components that provide insight into provider perceptions of the ASPIRE tool: (1) access, (2) use, (3) ASPIRE features, (4) implementation, (5) patient engagement, (6) system value, and (7) enhancements needed (Table 6).

5.2.1 Access

Both physicians and advanced practice nurses identified easy access to the ASPIRE tool within their EHR workflows as important. Providers at the rural site were satisfied with their ability to access the tool directly on the fall risk assessment module that is completed during a primary care visit. At the urban site, providers had difficulty remembering where the ASPIRE tool was located, and they made recommendations to make the tool 'pop-up' or integrate into the commonly used health maintenance area of the EHR.

5.2.2 Use

Providers at the rural and urban sites talked about their context of use and barriers to use of the ASPIRE tool. Most providers reported using the ASPIRE tool during the Medicare annual wellness visits on older patients who have a history of falls or balance problems. They reported that fall prone patients often have co-morbidities such as obesity, neuropathy, limited mobility, arthritis, pain, and hypertension. Providers reported taking 4-5 minutes to use the tool. Some providers reported using it for longer if they demonstrate the exercises to the patient.

Providers also talked about time being a barrier to use of the ASPIRE tool. They reported that addressing fall risk in addition to all the other issues that need to be covered for older patients with multiple chronic conditions is challenging. Other barriers included the extra time it took to complete steps that were not completely automated, e.g., copying the note into the after-visit summary (rural site) and entering recommended orders manually (both sites).

5.2.3 ASPIRE Features

In all focus groups, providers spoke of their perceptions of the following ASPIRE features: prediction accuracy of the CDS, the fall prevention modules (exercise, osteoporosis, fall risk increasing drugs), evidence-based talking points, patient handouts, encounter note and after-visit summary. In general providers found the features useful but found that some were more applicable than others. The preselection accuracy related to a patient's mobility status often required updating but they did not mind doing this. Providers found the evidence-based talking points helpful for supporting their fall prevention discussions with patient and for conveying the evidence behind the recommendations. There was both positive and negative feedback related to the fall prevention modules. Overall providers liked

the exercise recommendations and handout, and some even used them to demonstrate strength, gait, and balance exercises to their patients. Providers also reported finding the FRIDS module useful but more as a reminder about what FRIDS the patient was taking. However, several noted that they already routinely address medications and that deprescribing is a process that often takes time and cannot be addressed in a single visit. The osteoporosis module was found to be less useful since the EHR already provides regular reminders and they found that they often had to edit the auto-generated text since it did not reflect their discussion with the patient. There was also positive and negative feedback about the patient handouts with many providers reporting that the exercise and the bisphosphonate handout were used frequently but the medication tapering handout was less useful because patients as noted above, deprescribing is a process and patients are less willing to agree to tapering when this is first addressed. Most providers reported that they liked the prepopulated note and after-visit summary even if they often had to change or delete text because they felt it saved some typing time and effort.

5.2.4 Implementation

Providers in urban and rural sites reported that the implementation of ASPIRE was successful overall despite a few technical issues that were address. Some had suggestions for improving the implementation process such as providing additional follow-up after go-live, and additional training using simulated patients, guides and teach-back.

5.2.5 Patient Engagement

Providers reported that ASPIRE helped to engage patients in fall prevention. They found that the system was helpful for convincing their patients to make changes. They also found that using ASPIRE during a patient visit helped motivate some patients by bringing up the discussion and highlighting the importance of fall prevention.

5.2.6 Value of System

Providers expressed several positive perceptions of the value of the tool on their decision making, patient discussions, and as a teaching tool. A few providers mentioned that it prompted more physical therapy referrals, reminded providers to have discussions about high risk medications, bisphosphonate use, and exercise. Some reported that ASPIRE was valuable as a teaching tool for fall prevention. Other positive perceptions included that it was visually appealing, simple, and quick to use.

5.2.7 Enhancements Needed

Providers made several suggestions for enhancements including greater integration with the health maintenance area of the EHR (urban only), direct ordering from the tool, automatically sending the note to the visit summary (rural only) and utilizing the tool as a system for identifying and reaching out to high-risk patient panels.

Table 6: Provider interview themes and example quotes

Theme	Example quotes
<p>Access</p>	<ul style="list-style-type: none"> • "Because it doesn't say Aspire tool here that I couldn't quite remember the first-time web button I had to click on, so you might wanna rename it or add Aspire tool on there or something." • "You can look at the icon or you can look at the fall screening results, but it doesn't sort of like pop up in your face to say, hey, use this tool. So, I've used it less recently I have to admit." • "There are two other places that we look a lot in every physical and that is we're looking at all of our questionnaires. So, with our primary care bundle, we are doing fall risk. So, I'm looking there at every physical and then everyone looks at health maintenance. And so, if you know, I know there's a red icon, but is there any way to link the ASPIRE to one of those areas?"
<p>Use</p> <ul style="list-style-type: none"> • Barriers to use • Context of use 	<ul style="list-style-type: none"> • "You know there's just so many different items we have to deal with at each visit. With that being there it just moves it up a little bit and unfortunately, it's usually at the expense of something else" • "There's a lot of demands for every minute of the meetings of the patient meetings and so it is it is hard, but I think that the importance is there" • "It would be a huge benefit if it [orders] could be sent directly at the touch of a button" • "Well, I've used it a fair amount. I find it very helpful for my elderly patients who clearly have issues with falls or balance and it's nice to be able to give them something" • "I think if I added the time on that I spend going through the exercises 'cause usually, once I print it, I go back in, and I go through the exercises, so I think that part adds on extra" • "I mostly used them during annual wellness visits"
<p>ASPIRE Features</p> <ul style="list-style-type: none"> • Preselection accuracy • Evidence-based talking points • Exercise • FRIDS 	<ul style="list-style-type: none"> • "Probably two out of five. I've had to change it probably twice." • "Maybe 50 percent. I don't know. I feel like I've changed that one a few times, so I don't know, but maybe it was just the home-bound one that's throwing me off." • "Just reading that sentence that DP was talking about with the study show that yada yada yada, fall risk decreases with physical therapy. By n of three, two of them were like, oh, OK, we should do this." • "Hearing that it was proven or so to speak was I guess at least helpful in the moment" • "I think it was more of them hearing the words come out of my mouth. That it was evidence based and that the studies have shown that it actually does work." • "I do. I always go through them." • That's made things a lot easier for me, 'cause typically I would go back and Google and find appropriate exercises that I wanted to give my patients, so it's been really nice to have that available • "Reminder of pulling out those medications that make the patient high risk." • "It does bring attention to it for our purposes, which a lotta times that's the only thing that you can do is start the conversation" • "I didn't get very many interactions and the ones they did get usually I was aware of like somebody was on a benzo, but we've been talking about getting them off the benzo and it's just a long process. And so, there isn't an easy fix, you know, nice to raise awareness, but it's not usually something you didn't know about before."

<ul style="list-style-type: none"> • Osteoporosis • Patient handouts • Pre-populated note and after-visit summary 	<ul style="list-style-type: none"> • "As far as osteoporosis we get automatic reminders on that, we follow through with that anyway so. But that's obviously one of the risks that puts people, brings the icon up" • "Occasionally it was telling me to treat them for osteoporosis that the patient was already on treatment with, something like a once-a-year reclass." • "Just change the verbiage from prescribing to discussed" • "The problem that I had a little bit is with the tapering one because the problem is that I really like the tapering one, but the patients have been really unwilling to taper off of these medicines which has nothing to do with the handout itself" • "I think I would definitely use the bisphosphonate one if I had—with the patients that I've seen for this so far I haven't been reviewing a recent bone density that was significant enough that we needed to talk about 'em but if I had to I definitely would have printed out the bisphosphonate and given it to them" • "You can do it either way, it certainly will print out in patients instructions, it'll print out in the record that you've done it if you want to, and if you go back to your printer, you can always print it out there and hand it to them. I like to actually hand it to them because I know they're actually gonna look at it. I know what happens when I get papers at the end of my visit." • "I particularly loved having those exercise handouts." • "Don't have to type it twice, and we can copy and paste it" • "I usually delete a substantial amount 'cause it feels a little wordy for some of my patients to read at the end. If I didn't go over something or if I'm not gonna taper their medicines then 'cause they've already said no, then I'll just delete that part. Other than that, it's okay." • "The only problem that I have about it is when it says we'll be prescribing the bisphosphonates today, and if I forget to delete that piece of it. That's the only piece of it. The rest of it doesn't—I mean if I printed out the handouts or whatever if I forget to go in and like, "We discussed adding a bisphosphonate today," instead of I'm prescribing it."
	<ul style="list-style-type: none"> • "Since it's hard to edit what you wanna share with the patient and what you don't want to, or it's not quite clear what's gonna get shared and what's not going to get you know, shared with them."
Implementation	<ul style="list-style-type: none"> • "Maybe a follow up, you know, kind of communication in a week or two to say, you know, have you, have you used it since we spoke?" • "I thought it went pretty smooth though as far as the implementation of it in comparison to the development of it." • "I think we're pretty persistent in trying to integrate new things. Especially since there's actually beneficial." • "I think like they were saying if you had a pretend patient to go through and practice it on and just get an idea of the flow of it beforehand, it would be beneficial. Other than that, I think the little crash course in it it's pretty self-explanatory. It's not too confusing. It's pretty simple and straightforward to be able to figure it out." • "Think pictures of what it should—like you had the visual of what should happen. I think that is important when you're training somebody, so they see what it should look like."
Patient Engagement	<ul style="list-style-type: none"> • "It got one of my patients to be okay with a DEXA scan. She hadn't had one, and then CA went through the whole thing. Then she was like, "Well, I guess I do need—or whatever, and I ordered one. She was amenable to a screening exam, which she wasn't prior to that or the last time she'd come in. She was like, "Not doing that anymore." • "I think it certainly has motivated at least from my point of view, more time spent addressing the issue of fall risk and balance" • "That could be helpful at least then that will help get people who are more motivated to make a change to realize, oh, that there's something wrong. I should really look into this more."
Value of System	<ul style="list-style-type: none"> • "I think it's just once people start using it and realize it's just a matter of clicking on the icon and then it comes up and you can go through it step by step and you can skip right to the end, it goes very quickly. And really, you can pick which one of the instructions you want to give out based on how much they'll follow through, and it really is, is very easy. It doesn't add much to the visit, and I think that the impact is real." • "I mean, I think I do pay attention to you know the MWV if they've had falls and you know to their guidelines for osteoporosis and that, but I haven't really been using the app that much and talking more about it now makes me think I should review it again because it's it is important"

Enhancements Needed	<ul style="list-style-type: none"> • "If you could get that into health maintenance list then the patients see it themselves that it's already a flag on their chart that they're at risk, they send us emails, they'll bring it up and say hey I saw that I'm a risk for falls what does that mean what can I do about it ." • "Maybe on a broader scale searching patient panels who are at higher risk, or you know giving them more resources or having some you know, maybe future program of having a nurse or someone in the medical field reach out to them to discuss their options, may ask them to come in for an appointment specifically for their fall risk maybe." • "If we were able to get you straight to the order system and link the order system to this, then the node could also be linked to the order system so if you didn't change the medication prescription" • "Then you know if you want to do physical therapy, it's a good reminder, but then go in and put the order for it" • "if you want to order like a DEXA scan, I think it's, I think it's adding in a couple extra clicks"
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5.3 Discussion:

Through the use of primary care fall prevention CDS, physicians and advanced practice nurses in urban and rural locations, respectively, were guided through evidence-based identification and care planning based on significant fall risk factors (i.e., mobility, fall risk increasing drugs, and osteoporosis status). Physicians and advanced practice nurses realized the value of automated point-of-care fall prevention to support patient-provider communication and patient education. These are clinically significant outcomes of CDS as many older adults make the choice to age in place or stay in their homes and have concerns about mobility, safety, and independence.

There are limitations to using CDS to prevent community-based falls among older-adults in primary care. First, while there is a broad base of empirical evidence related to community-based fall prevention, there is less strength in the significance of this evidence to develop evidence-based CDS. Second, the CDS for this project was implemented and available only during annual wellness, chronic disease management, and medication management visits with patients 60 and older in two general primary care clinics during a 3-month period. The decision to limit observations to these groups ensured that the CDS would be automatically pushed to providers, based on fall risk, and activate fall prevention care planning. However, limiting CDS use by patient condition can result in suboptimal use because providers will likely address more than one issue during a clinic visit. Additionally, if manual processes exist in addition to automated functions with the CDS, time can be a barrier to full implementation of decision support. Developing interoperable and sharable primary care CDS for fully automated care planning remains a challenge. Local context (i.e., urban versus rural, electronic health record brand, physician versus advanced practice nurse work flow, etc) can be a primary facilitator and/or barrier to CDS use. Unique barriers existed for each site in this project including less than ideal integration of the CDS in the EHR (i.e., ease of use) at the urban site, and missing automation (e.g., direct ordering) at the rural site (i.e., usability).

Our study identified variations in use patterns of primary care fall prevention CDS between physicians at an urban clinic and advanced practice nurses at a rural clinic. This is consistent with previous research showing significant differences in practice patterns and patient populations across urban and rural primary care (13, 14). Despite their differences, both urban and rural providers rated the CDS as usable, useful and easy to use and control. Urban providers expressed concerns about uneasy access to the CDS and recommended using the typical approach (i.e., pop-up) to accessing other systems in their EHR ecosystem. Research has showed that urban primary care providers use EHRs at higher maturity levels compared to rural, which may account for higher emphasis on integration to their current EHR ecosystem. Rural providers had issues with the CDS not being fully automated. Patients at both urban and rural clinics rated shared decision making and trust as high with their health care providers. Overall, providers reported that the CDS improved patient engagement with anecdotal evidence of motivating discussions about behavior change to reduce the risk of falling.

Usability testing indicated that the usability of ASPIRE was above average based on usability benchmarks for the System Usability Scale metric, with high scores for accessibility and learnability (15). However, acceptability of recommendations varied widely. Exercise was the most accepted recommendation, which may be partially explained by the strong evidence backing this recommendation and the fact that primary care-specific guidelines exist for this recommendation (16). Significantly lower acceptability was identified for recommendations to consider prescribing bisphosphonates in cases of osteopenia. The ASPIRE tool recommendations are consistent with bisphosphonate recommendations from the American College of Endocrinology (17), and therefore this discrepancy may represent a difference in clinical practice between primary and specialty care providers.

To our knowledge, the ASPIRE tool is the only tailored fall prevention tool designed for use in primary care. Our review of the literature found one published CCDS tool focused on fall prevention in primary care. This was a redesign of a clinical reminder to conduct fall risk screening within a specific EHR. That CCDS did not include tailored recommendations nor was it available for integration into other EHRs (18). While there are clinical practice guidelines (19) and meta-analyses (20, 21) that provide evidence for the value of fall prevention management in primary care settings, there are limited examples of integrating this evidence into practice using CDS. Existing evidence-based fall prevention resources and decision support tools that target community dwelling older adults and their providers, such as the Stopping Elderly Accidents, Deaths & Injuries (*STEADI*) Toolkit (22) or the National Council on Aging (23), exist on websites that are not integrated into provider workflow and are difficult to access in the context of a busy office visit (24). The Integrated Solutions for Sustainable Fall Prevention (iSOLVE) team is developing a multicomponent intervention that will include computer software that aims to integrate fall prevention CDS into primary care, but this intervention is currently under development (25). The ASPIRE CDS is based on interviews and observations of primary care providers, staff, and older patients. It is interoperable with diverse EHR systems, and targets common fall risk factors that can be addressed in the context of a visit. Provider and patient-facing tools are integrated into the software and can be shared with the patient during a visit or provided within the patients after visit documentation. The ASPIRE CDS was developing using informatics standards and is now available on the AHRQ CDS Connect website so others can benefit from this work.

5.3.1 Clinical implications

Fall prevention CDS is generally lacking in primary care practices today. Tools like ASPIRE that integrate fall prevention CDS, and patient resources may better support patient self-care and adoption of evidence-based recommendations. Although further work disseminating ASPIRE is needed, our team has demonstrated integration in two different EHR systems and the ASPIRE CDS algorithms are available on the AHRQ CDS Connect website to support dissemination. Further demonstrations are needed over longer periods of time to show the impact of the ASPIRE CDS on older patients seen in primary care settings.

5.3.2 Conclusion:

Falls are a serious concern for older adults; integration of fall prevention tools in the primary care setting and clinical decisions support technology can be used to prevent future fall events and promote patient safety. The ASPIRE tool underwent iterative testing in two U.S. healthcare facilities and was shown to engage patients in fall prevention education within primary care contexts.

6. List of Publications and Products:

Manuscripts:

1. Shear K, Rice H, Garabedian PM, Bjarnadottir R, Latham N, Horgas AL, Harle CA, Dykes PC, Lucero R. Usability Testing of an Interoperable Computerized Clinical Decision Support Tool for Fall Risk Management in Primary Care. *Appl Clin Inform.* 2023 03; 14(2):212-226. PMID: [36599446](#); PMCID: [PMC10017195](#).
2. Shear, K, Rice, H, Garabedian, P, Dykes, P, Latham, N, Bjarnadottir, R, Horgas, A, Harle, C, and Lucero RJ. (in press). Experts perspectives on use of fast healthcare interoperable resources (FHIR) for computerized clinical decision support. *Computers, Informatics, Nursing.*
3. Schentrup, D, Middlemas, A, Shear, K, Bjarnadottir, RI, and Lucero, RJ. 2022. Fall risk management using clinical decision support in a rural nursing-led primary care practice. *Journal of the American Association of Nurse Practitioners.* 34(8): 1033-1038
4. Rice H, Garabedian PM, Shear K, Bjarnadottir RI, Burns Z, Latham NK, Schentrup D, Lucero RJ, Dykes PC. Clinical Decision Support for Fall Prevention: Defining End-User Needs. *Appl Clin Inform.* 2022 05; 13(3):647-655. PMID: [35768011](#); PMCID: [PMC9242739](#).

Under review:

5. Shear, K, Rice, H, Garabedian, P, Dykes, P, Latham, N, Bjarnadottir, R, Horgas, A, Harle, C, and Lucero, RJ. Management of fall risk among older adults in diverse primary care settings. *Journal of Applied Gerontology.*

Presentations:

1. Fall Prevention in Primary Care: The ASPIRE Project. BWH Primary Care Associates of Brookline (Webex), 2021, Boston, MA
2. Building a Program of Nursing and Patient Safety Research at Brigham and Women's Hospital and Mass General Brigham (Keynote Address). Karsh Visiting Scholar Program, BWH, 2022, Boston, MA.
3. Improving Patient Safety Through Informatics and Data Science Research. Norwegian Nurses Organization Study Tour, BWH, 2022, Boston, MA.
4. Challenges and Opportunities for Improving Patient Safety Through Data Science and Informatics. Cassatt (Patient Safety Organization), 2022, Webex.
5. Fall Prevention in Community Dwelling Older People. Cassatt (Patient Safety Organization), 2022, Webex.
6. Challenges and Opportunities for Improving Patient Safety Through Data Science and Informatics (Keynote address), European Federation for Medical Informatics, Athens Greece. 2021, Webex due to pandemic
7. Challenges and Opportunities for Improving Patient Safety Through Data Science and Informatics. University of Eastern Finland, 2022, Kuopio, Finland.
8. Challenges and Opportunities for Improving Patient Safety Through Data Science and Informatics. Kaija Saranto Emerita Seminar, 2022, University of Eastern Finland, Kuopio, Finland.
9. Computerized clinical decision support for fall prevention: Defining end-user requirements for primary care staff and patients, *2022 AMIA Informatics Summit, 2022, Chicago, IL*

CDS Connect Artifacts:

1. Exercise Guidance for Primary Care Fall Prevention: <https://cbs.ahrq.gov/cdsconnect/artifact/exercise-guidance-primary-care-fall-prevention>

2. Osteoporosis Management Guidance for Primary Care Fall Prevention: <https://cde.ahrq.gov/cdsconnect/artifact/osteoporosis-management-guidance-primary-care-fall-prevention>
3. Primary Care Management Guidance for Fall Risk-Increasing Drugs: <https://cde.ahrq.gov/cdsconnect/artifact/primary-care-management-guidance-fall-risk-increasing-drugs>

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Appendices:

Appendix A: Observational data on the provider’s use of the ASPIRE tool

Instructions: Please enter any time field in minutes, rounded to nearest minute. Please use Y -or- N for any yes no question. If something was unobserved please enter Not Obs. For handouts / orders please use the abbreviations on the data collection sheet. If a section is not indicated please enter n/a (e.g. no osteoporosis section indicated).

Date & Time: _____ Observation Site & Provider: _____
 Visit Type: _____ Observation # _____

Invivo Usability Observation Data Collection Sheet

OVERALL			
	Start	Stop	Comment
Time w/ Provider (MD/ NP/ PA)			
Time using ASPIRE			
Order Entry	During ASPIRE	After ASPIRE	
Did the provider share screen w/ pt	Yes	No	
Landing Pg do not show checked	Yes	No	
Patient info box			
Viewed screener results in tool?	Yes	No	
Step 1			
Homebound selected	Yes	No	
Gait disturbance preselected	Yes	No	
Gait disturb preselection KEPT <small>(not changed)</small>	Yes	No	
Symptoms w/ exercise preselected?	Yes	No	
Symptoms w/ exercise preselection KEPT? <small>(not changed)</small>	Yes	No	
Number of FRIDS shown	0	1	2 3 4 5
Number of FRIDS selected	0	1	2 3 4 5
Osteoporosis preselection	Osteoporosis	Osteopenia	Fracture
Osteoporosis preselect KEPT? <small>(not changed)</small>	Yes	No	
If NO what was selected?	Osteoporosis	Osteopenia	Fracture
Step 2			
Recommended Exercise level	Chair	L1 L2 L3	
Exercise recommendation KEPT?	Yes	No	
If NO what was selected?	Chair	L1 L2 L3	
Preview Used?	Yes	No	
Printed from preview?	Yes	No	
*Talking Points Used?	Yes	No	
Medication Handouts recommended	Benzo TCA Opioid	Week Taper Month Taper	
Med handout recommendations KEPT	Yes	No	
If NO what was selected?	Benzo TCA Opioid	Week Taper Month Taper	
Preview Used?	Yes	No	
Printed from preview?	Yes	No	

Date & Time: _____ Observation Site & Provider: _____
 Visit Type: _____ Observation # _____

*Talking Points Used?	Yes	No
Recommended Osteoporosis Handouts	General Bisphosphonate Holiday	
Osteo handout recommendations KEPT?	Yes	No
If NO what was selected?	General Bisphosphonate Holiday	
Preview Used?	Yes	No
Printed from preview?	Yes	No
*Talking Points Used?	Yes	No
Step 3		
Handouts recommended	Chair L1 L2 L3 Benzo TCA Opioid WkTaper MonthTaper GenOsteo Bisphosphonate Holiday	
Handouts all KEPT?	Yes	No
If NO what was deselected?	Chair L1 L2 L3 Benzo TCA Opioid WkTaper MonthTaper GenOsteo Bisphosphonate Holiday	
Preview Used?	Yes	No
Printed from preview?	Yes	No
Printed from send to printer?	Yes	No
Recommended Orders	PT Med Bisphosphonate Consult	
Orders entered?	PT Med Bisphosphonate Consult	
Prepopulated Note edited?	Yes	No
Note to Progress Note?	Yes	No
Note to Visit Summary?	Yes	No
*Note easily found once sent to EHR?	Yes	No
What was next step once completed ASPIRE?		

*Denotes items that may be more difficult to capture, simply capture what you can observe
Observation Notes
 (Especially r/t Communication, Computer Interaction & Fall Assessment / Prevention Plan)

Appendix B: Patient Demographics

ASPIRE Primary Care Patient Demographic Form	
1. Age - years	_____ years
2. Gender	<input type="checkbox"/> Male
	<input type="checkbox"/> Female
3. Ethnic Group	<input type="checkbox"/> Hispanic
	<input type="checkbox"/> Non-Hispanic
	<input type="checkbox"/> Not reporting
4. Race:	<input type="checkbox"/> American Indian/Alaska Native
	<input type="checkbox"/> Asian
	<input type="checkbox"/> Native Hawaiian or Pacific Islander
	<input type="checkbox"/> Black or African American
	<input type="checkbox"/> White
	<input type="checkbox"/> More than one race
	<input type="checkbox"/> Not reporting
5. Are you afraid of falling?	_____ yes _____ no
6. Have you fallen 2 or more times in the past year?	_____ yes _____ no
7. Were you injured from a fall in the past year?	_____ yes _____ no

Appendix C: Healthcare Relationship Trust Scale

HCR Trust Scale

Directions: Listed below are a number of statements about patient and Health Care Provider (HCP) trust. Read each item and decide which of the following response *best* describes how you feel about your HCP (the doctor, nurse practitioner, physician assistant, or other primary care provider that manages the majority of your health care).¹

Response Options: 0 = none of the time
 1 = some or a little of the time
 2 = occasionally or a moderate amount of the time
 3 = most of the time
 4 = all of the time

How often does your HCP:

(1) Talk over your head?.....

(2) Discuss options and choices with you before health care decisions are made?.....

My HCP is:

(3) Committed to providing the best care possible.....

(4) Sincerely interested in me as a person.....

(5) An excellent listener.....

My HCP:

(6) Accepts me for who I am.....

(7) Tells me the complete truth about my health-related problems.....

(8) Treats me as an individual.....

(9) Makes me feel that I am worthy of his/her time and effort.....

(10) Takes the time to listen to me during each appointment.....

I feel:

(11) That other patients get better care from their HCPs.....

(12) Comfortable talking to my HCP about my personal issues.....

(13) Better after seeing my HCP.....

How often:

(14) Do you think about changing to a new HCP?.....

(15) Does your HCP consider your need for privacy?.....

¹SCORING: Higher scores equal greater collaborative trust. Therefore, items 1, 11, and 14 must be reverse coded and then a total score calculated (possible range of scores = 0-60).

Appendix D: SDM-Q-9 Shared Decision Making Questionnaire

The 9-item Shared Decision Making Questionnaire (SDM-Q-9)

[Example] Please indicate which health complaint/problem/illness the consultation was about:

[Example] Please indicate which decision was made:

Nine statements related to the decision-making in your consultation are listed below. For each statement please indicate how much you agree or disagree.

1.	My doctor made clear that a decision needs to be made.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
2.	My doctor wanted to know exactly how I want to be involved in making the decision.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
3.	My doctor told me that there are different options for treating my medical condition.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
4.	My doctor precisely explained the advantages and disadvantages of the treatment options.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
5.	My doctor helped me understand all the information.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
6.	My doctor asked me which treatment option I prefer.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
7.	My doctor and I thoroughly weighed the different treatment options.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
8.	My doctor and I selected a treatment option together.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐
9.	My doctor and I reached an agreement on how to proceed.		completely disagree	strongly disagree	somewhat disagree	somewhat agree	strongly agree	completely agree
		☐	☐	☐	☐	☐	☐	☐

Appendix E: Health-ITUES Survey

ASPIRE Health-ITUES

Strongly Agree 5 4 3 2 1 Strongly Disagree

Impact

1. I think ASPIRE would be a positive addition to my clinical practice
2. I think ASPIRE would be a positive addition to our organization
3. ASPIRE would be an important part of our fall prevention practice
4. Using ASPIRE makes it easier to manage fall risk

Perceived Usefulness

5. Using ASPIRE enables me to recommend fall prevention interventions more quickly
6. Using ASPIRE makes it more likely that I will make fall prevention recommendations to my patients who are at risk for falling
7. Using ASPIRE is useful for fall prevention care planning
8. I think ASPIRE presents a more equitable process for providing fall prevention recommendations
9. I am satisfied with ASPIRE for fall prevention care planning
10. I engage in fall prevention with my patients in a timely manner because of ASPIRE
11. Using ASPIRE increases fall prevention care planning
12. I am able to make fall prevention recommendations whenever I use ASPIRE

Perceived Ease Of Use

13. I am comfortable with my ability to use ASPIRE
14. Learning to operate ASPIRE is easy for me
15. It is easy for me to become skillful at using ASPIRE
16. I find ASPIRE easy to use
17. I can always remember how to use ASPIRE

User Control

18. ASPIRE gives error messages that clearly tell me how to fix problems
19. Whenever I make a mistake using ASPIRE, I recover easily and quickly
20. The information such as online help, on screen messages, and other documentation provided with ASPIRE is clear