Canadian Journal on Aging / La Revue canadienne du vieillissement

www.cambridge.org/cjg

Developing the Patient Falls Risk Report: A Mixed-Methods Study on Sharing Falls-Related Clinical Information from Home Care with Primary Care Providers

Amanda A. Nova[1], George Heckman[1,2], Lora M. Giangregorio[1,2] and Mohamed Alarakhia[3,4]

[1]University of Waterloo, Waterloo, ON, Canada, [2]Schlegel-UW Research Institute for Aging, Waterloo, ON, Canada, [3]eHealth Centre of Excellence, Kitchener, ON, Canada and [4]McMaster University, Michael G. DeGroote School of Medicine (Waterloo Regional Campus), Waterloo ON, Canada

Article

Cite this article: Nova AA, Heckman G, Giangregorio LM, & Alarakhia M. (2023). Developing the Patient Falls Risk Report: A Mixed-Methods Study on Sharing Falls-Related Clinical Information from Home Care with Primary Care Providers. *Canadian Journal on Aging / La Revue canadienne du vieillissement* **42**(2), 337–350.
https://doi.org/10.1017/S0714980822000228

Received: 14 October 2021
Accepted: 03 April 2022

Mots-clés:
vieillissement; interRAI-HC; partage d'informations; chutes; utilisabilité; utilité; soins de première ligne

Keywords:
aging; interRAI-HC; information sharing; falls; usability; utility; primary care

Corresponding author:
La correspondance et les demandes de tirés-à-part doivent être adressées à : / Correspondence and requests for offprints should be sent to: Amanda A. Nova, University of Waterloo, 200 University Ave W, Waterloo, ON N2L 3G1, Canada (aanova@uwaterloo.ca)

Résumé

Si les informations recueillies lors des soins à domicile avec l'évaluation clinique interRAI étaient partagées avec les cliniciens de première ligne, la prestation et l'intégration des soins pourraient être améliorées. L'objectif de cette étude était de développer un outil de partage d'informations cliniques basé sur l'interRAI (appelé le 'Patient Falls Risk Report' ou le rapport sur le risque de chutes chez les patients). Cette étude utilise des méthodes mixtes: entretiens semi-structurés pour documenter le développement du Patient Falls Risk Report et des enquêtes en ligne basées sur l'instrument 'System Usability Scale' (Échelle d'utilisabilité des systèmes) pour tester sa facilité d'utilisation. La plupart des personnes interrogées (n = 9) ont estimé que le rapport pouvait contribuer aux soins des patients par le partage d'informations pertinentes utiles en matière de chutes. Toutefois, des critiques ont été formulées, notamment le manque de détails, de clarté et de soutien à la planification des soins partagés. Après avoir intégré les suggestions d'amélioration, l'échantillon de l'enquête (n = 27) a considéré que le rapport avait une excellente utilisabilité avec une note d'utilisabilité de 83,4 (IC à 95 % = 78,7 – 88,2). En priorisant les besoins des utilisateurs finaux, des interventions viables d'interRAI peuvent être développées pour soutenir les soins de première ligne.

Abstract

If interRAI home care information were shared with primary care providers, care provision and integration could be enhanced. The objective of this study was to co-develop an interRAI-based clinical information sharing tool (i.e., the Patient Falls Risk Report) with a sample of primary care providers. This mixed-methods study employed semi-structured interviews to inform the development of the Patient Falls Risk Report and online surveys based on the System Usability Scale instrument to test its usability. Most of the interview sample ($n = 9$) believed that the report could support patient care by sharing relevant and actionable falls-related information. However, criticisms were identified, including insufficient detail, clarity, and support for shared care planning. After incorporating suggestions for improvement, the survey sample ($n = 27$) determined that the report had excellent usability with an overall usability score of 83.4 (95% CI = 78.7–88.2). By prioritizing the needs of end-users, sustainable interRAI interventions can be developed to support primary care.

Introduction

Integration is an organizational strategy for connecting the health system, enhancing performance, and improving quality of care (Kodner, 2009). Important components of integration include communication in a standardized clinical language, interdisciplinary collaboration, integrated electronic information systems, and appropriate funding mechanisms (Suter, Oelke, Adair, & Armitage, 2009). For persons with chronic and complex health conditions, enhanced integration can contribute to better health outcomes, cost-effectiveness, and quality of care (Martínez-González, Berchtold, Ullman, Busato, & Egger, 2014).

The real-world application of integrated approaches has been suboptimal. Despite a large body of international literature on best practices, surveys show that only 24 per cent of Canadian primary care providers communicate with home care providers about the needs and services of their patients (Doty, Tikkanen, Shah, & Schneider, 2019). Additionally, one American study found that 96 per cent of home care providers felt that their inability to obtain outside clinical

information about their patients was problematic, and 73 per cent said that with access to outside clinical information, they would need to make fewer referrals to emergency departments (Vaidya et al., 2012). The fragmentation between home care and primary care may prevent health care providers from fully appreciating a patient's clinical complexity and, as a result, limit their ability to provide optimal care. Fragmentation is also associated with delayed care provision, repeat hospitalization, duplicate assessment, and other leading causes of adverse events (Masotti, McColl, & Green, 2010; Porter, Herring, & Levinton, 2007; Toscan, Mairs, Hinton, Stolee, & InfoRehab Research Team, 2012). However, this subject has been poorly researched in Canadian contexts. Therefore, generating evidence on innovations for enhancing the integration of care was identified as a strategic priority in the Canadian Institute of Health Services and Policy Research Strategic Plan for 2021 to 2026 (Canadian Institutes of Health Research, 2021).

One opportunity for enhancing integration between home care and primary care may be reinventing how results from the interRAI Home Care (interRAI-HC) assessment are used. The interRAI-HC is a valid and reliable comprehensive clinical assessment instrument used by trained assessors in home care to support care provision and improve health care quality (De Almeida Mello, Hermans, Van Audenhove, Macq, & Declercq, 2015; Gray et al., 2009; Landi et al., 2001). It uses open- and closed-ended questions to obtain an overall picture of client health. As an instrument that is part of a suite of instruments used in multiple health care sectors, the interRAI-HC can be used to establish a shared understanding of patient needs between care settings, support care planning and transitions, reduce assessment duplication, and support the provision of high-quality integrated care (Nova, Zarrin, & Heckman, 2020b). More information on interRAI and the interRAI suite of instruments can be found at https://interrai.org.

However, the interRAI-HC is not being used to its full potential. While interRAI instruments are used across most of the Canadian health sector, many primary care providers in Ontario are unfamiliar with the interRAI-HC or are unaware of the functionalities and information available within the tool to support care planning (Nova et al., 2020b). Additionally, insufficient attention has been paid to the usability of interRAI information in clinical contexts (LUCAS KU Leuven, 2019). Usability is defined in this paper as the ability for users to learn, understand, and operate a tool or system (Nielsen, 2017). The most common criticisms of the interRAI-HC among clinicians who use it are that it is delivered inconsistently and there is a disconnect between the assessment results and goals of care (Stolee et al., 2010).

The Patient Falls Risk Report

The Patient Falls Risk Report is a one-page report that was originally designed by the researchers of this study with knowledge from preliminary research and the Behaviour Change Wheel theoretical framework (Guthrie et al., 2014; Michie, Atkins, & West, 2014; Nova, Zarrin, & Heckman, 2020a, 2020b). It relays information derived from the interRAI-HC assessment about home care client falls risk, particularly if the client is at moderate or high risk of future falls. This measure has high predictive accuracy and is based on a prior report of one fall (moderate risk) or multiple falls (high risk) over the last 180 days (Norman & Hirdes, 2020). The original report held structured falls-related information derived from the interRAI-HC, including previous falls, cognitive impairment, pain, foot problems, inappropriate medication use, and physical activity levels. It also listed recommended interventions from the American Geriatrics Society and British Geriatrics Society Clinical Practice Guidelines for Prevention of Falls in Older Persons (Panel on Prevention of Falls in Older Persons, American Geriatrics Society, & British Geriatrics Society, 2011). Each of the concerns listed in the Patient Falls Risk Report are prevalent among home care clients (Canadian Institute for Health Information, 2018), can be addressed in primary care settings, and may go undiscussed, undisclosed, undetected, or deprioritized (AuYoung et al., 2016; Howland et al., 2018; Inouye, 1994; Mackenzie & McIntyre, 2019; Mueller et al., 2010; O'Brien, Shields, Oh, & Fowles, 2017; Panel on Prevention of Falls in Older Persons et al., 2011; Schofield, 2018; Williams et al., 2017; Wilson, Kirwan, Dures, Quest, & Hewlett, 2017). The original Patient Falls Risk Report is shown in Figure 1. See supplementary material for a rationale for why each actionable component is included.

In theory, upon implementation, untrained primary care providers would receive the report by fax via the Client Health and Related Information System (CHRIS), a Web-based electronic decision support and document management system still in use as of mid-2022 that allows for the automated exchange of records (Health Shared Services Ontario, 2017; Ontario Association of Community Care Access Centres, 2016). Recipients would then schedule an appointment with the patient to discuss their results, collect missing information, and develop a care plan, as would be expected in normal primary care practice. Since falls are highly preventable with timely screening and assessment, we believed that sharing the report with primary care providers in a usable, actionable, and context-appropriate manner could enhance falls-related care planning (Guthrie et al., 2014; Nova et al., 2020b; Stolee et al., 2010). The purpose of this study was to develop and test the usability of the Patient Falls Risk Report for sharing clinical information from home care to primary care in partnership with primary care providers.

Methods

This two-part, mixed methods pilot study employed in-depth interviews and short surveys to inform the development of the Patient Falls Risk Report. Using qualitative and quantitative methods to provide complementary perspectives on the report was expected to strengthen the reliability of our findings (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). AN, GH, LG, and MA all carried out the methods of this study.

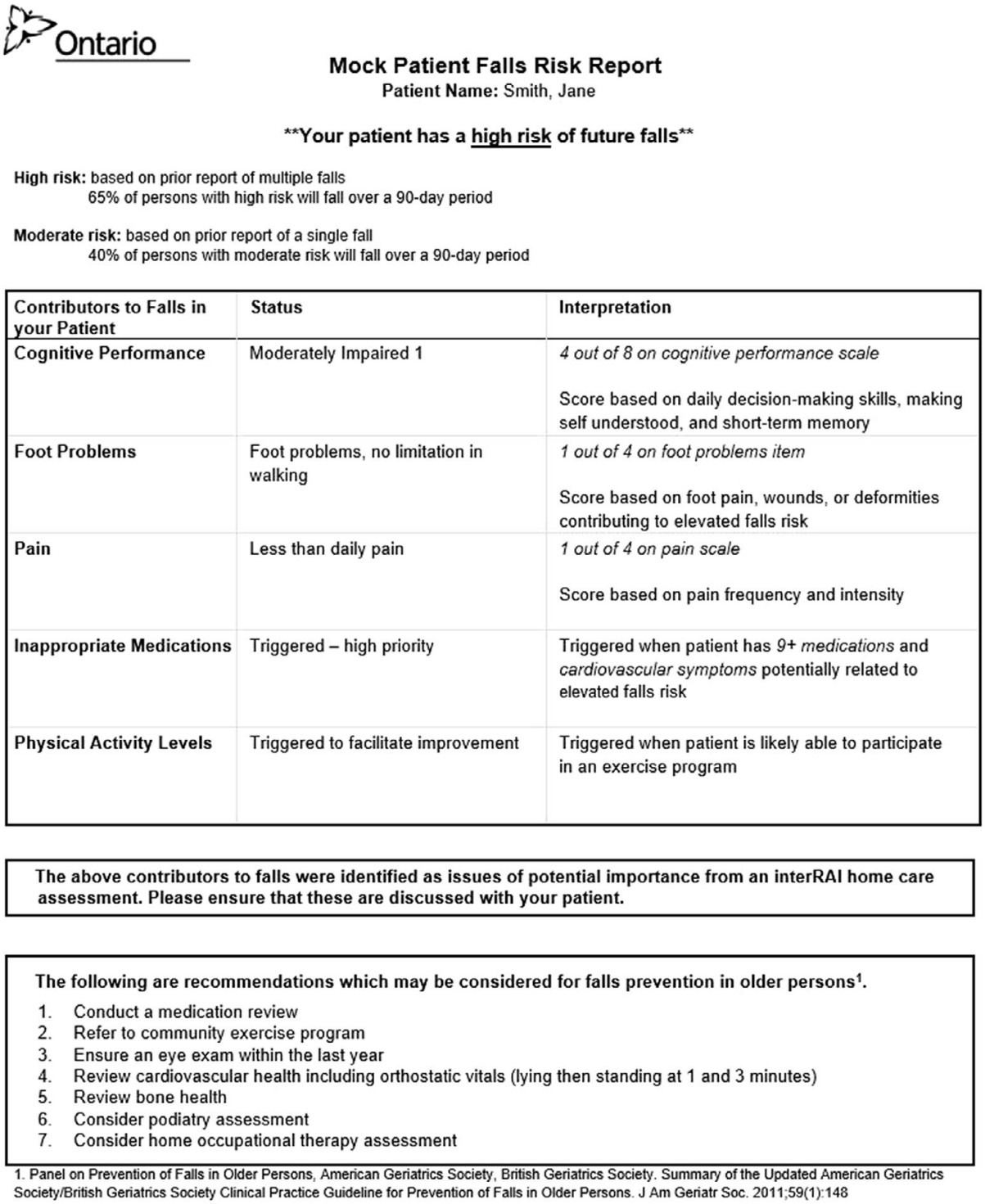
Interviews

The purpose of the interviews was to develop the Patient Falls Risk Report using the feedback of practising primary care providers. Research shows that interventions are more likely to achieve their intended outcomes when the contexts, needs, and preferences of end-users are considered (Barnum, 2011).

Sample

From September to December 2019, we recruited 9 self-identified, English-speaking primary care providers for interviews who were practicing as family doctors, general practitioners, or nurse practitioners. A sample size of up to 10 was considered appropriate because, according to Kushniruk and Patel (2004), 10 participants are enough to identify up to 80 per cent of surface level issues of usability. Additionally, a sample size of up to 10 was considered attainable given recruitment challenges identified in previous studies (Johnston et al., 2010). As a clinician and leader in his chosen field, GH can be considered an insider in the clinical sphere.

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press



Ontario

Mock Patient Falls Risk Report

Patient Name: Smith, Jane

****Your patient has a high risk of future falls****

High risk: based on prior report of multiple falls
65% of persons with high risk will fall over a 90-day period

Moderate risk: based on prior report of a single fall
40% of persons with moderate risk will fall over a 90-day period

Contributors to Falls in your Patient	Status	Interpretation
Cognitive Performance	Moderately Impaired 1	*4 out of 8 on cognitive performance scale* Score based on daily decision-making skills, making self understood, and short-term memory
Foot Problems	Foot problems, no limitation in walking	*1 out of 4 on foot problems item* Score based on foot pain, wounds, or deformities contributing to elevated falls risk
Pain	Less than daily pain	*1 out of 4 on pain scale* Score based on pain frequency and intensity
Inappropriate Medications	Triggered – high priority	Triggered when patient has *9+ medications* and *cardiovascular symptoms* potentially related to elevated falls risk
Physical Activity Levels	Triggered to facilitate improvement	Triggered when patient is likely able to participate in an exercise program

The above contributors to falls were identified as issues of potential importance from an interRAI home care assessment. Please ensure that these are discussed with your patient.

The following are recommendations which may be considered for falls prevention in older persons[1].

1. Conduct a medication review
2. Refer to community exercise program
3. Ensure an eye exam within the last year
4. Review cardiovascular health including orthostatic vitals (lying then standing at 1 and 3 minutes)
5. Review bone health
6. Consider podiatry assessment
7. Consider home occupational therapy assessment

1. Panel on Prevention of Falls in Older Persons, American Geriatrics Society, British Geriatrics Society. Summary of the Updated American Geriatrics Society/British Geriatrics Society Clinical Practice Guideline for Prevention of Falls in Older Persons. J Am Geriatr Soc. 2011;59(1):148

Figure 1. Original patient falls risk report.

Therefore, GH was better connected to key informants and led recruitment. We used snowball and maximum variation sampling methods and sought to attain maximum variation on clinical background and training. Specifically, we aimed to include at least one nurse practitioner, one rural provider, one provider not in an interprofessional team, and one provider in an interprofessional health team. There were no exclusion criteria, and recruitment continued until the maximum variation aims were met and saturation was achieved.

Data collection procedures

From December 2019 to February 2020, AN performed one-on-one qualitative interviews with primary care providers in Ontario and Alberta, Canada. As an early career researcher and Canadian graduate student, AN can be considered an outsider to the clinical research context; AN understood the topic of study but was not assumed to understand the day-to-day activities of a primary care provider. Consequently, participants were primed to provide more explanation on topics that would have been familiar to an insider

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

(Holmes, 2020). Data collection was guided by usability testing methods and a constructivist theoretical approach, which posits that knowledge is jointly constructed and exists relative to social, historical, and cultural contexts (Barnum, 2011; Guba & Lincoln, 1994).

Prior to interviews, AN shared an information letter and consent form with participants. This document explained the value of obtaining their individual perspective as a primary care provider, informed them that confidentiality would be maintained, and emphasized that they could withdraw from the study at any time. The information letter is shown in Figure 2. Once written consent was obtained, data were collected with semi-structured interviews over the telephone or at the location of the participants' choosing.

The first interview questions explored participant experiences with falls prevention to prepare the participants to respond to subsequent questions. The findings from this portion of the study have been published elsewhere (Nova, Heckman, Giangregorio, & Alarakhia, in press). Next, AN provided participants with a copy of the Patient Falls Risk Report with mock data and asked them to propose care planning options, if necessary. No training on how the Patient Falls Risk Report should be used in practice was provided before the interview so that the researchers could better ascertain the usability of the stand-alone report. Participants were then asked to describe their individual thoughts and feelings about using the report, if they would use it in their practice, and whether they believed it would change what they normally do in a patient encounter. Following this, participants were asked about their preferences for design and delivery of the report, potential barriers to implementation, and medicolegal risk. Finally, participants' type (family doctor, general practitioner, or nurse practitioner) and duration in practice were identified, and additional comments and questions were solicited. The interview schedule is shown in Figure 3.

The interviews were audio-recorded by a fingerprint-locked smartphone and, following each interview, reflexive notes on researcher thoughts, insights, and assumptions were taken by AN to improve dependability of the research process (Tobin & Begley, 2004). Within two weeks following each interview, the data were deidentified, transcribed, and stored by AN on a password-locked computer.

Data analysis

AN analysed the transcripts with NVivo 12 using iterative thematic analysis. Each iteration of analysis began with a combination of

Pilot study on sharing falls-related clinical information from home care with primary care providers

Hello [insert name here],

My name is [redacted] and I am a student in the [redacted] at [redacted] conducting a Masters thesis with [redacted], MD. I would like to provide you with more information about this project and what involvement would entail if you decide to take part.

The purpose of this study is to assess the *Patient Falls Risk Report*, a new tool for sharing falls-related information collected in home care with primary care providers. When introducing the *Patient Falls Risk Report*, we knew it was important to understand the primary care provider perspective. This way, we can make it more acceptable, useful, and relevant. I would like to include you as one of several primary care providers to be involved in my study. I believe that because you are actively involved in the medical community, you are best suited to speak to the various issues, such as if and how communication with home care needs change.

Participation in this study is voluntary. It will involve an interview of approximately 15 minutes to take place in a mutually agreed upon location. You may decline to answer any of the interview questions if you so wish. Further, you may decide to withdraw from this study at any time without any negative consequences by advising the researcher. With your permission, the interview will be audio recorded to facilitate collection of information, and later transcribed for analysis. All information you provide is considered completely confidential. Your name will not appear in any thesis or report resulting from this study, however, with your permission anonymous quotations may be used. Data collected during this study will be encrypted and retained for five years in a password-locked laptop. Only researchers associated with this project will have access. There are no known or anticipated risks to you as a participant in this study.

This study has been reviewed and received ethics clearance through a [redacted] Research Ethics Committee [redacted]. If you have questions for the Committee contact the Office of Research Ethics, at [redacted] For all other questions or if you would like additional information to assist you in reaching a decision about participation, please contact me at [redacted] You can also contact [redacted] at [redacted]

I hope that the results of my study will be of benefit to those primary care providers directly involved in the study, as well as to the broader research community. I very much look forward to speaking with you and thank you in advance for your assistance in this project.

Sincerely,

[redacted]

Figure 2. Information letter for interviews.

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

Interview Schedule

The following are the interview questions that we asked participants during interviews.

Part 1

1. How do you usually find out if a patient is at risk of falling?
   a. Prompt: What pieces of information do you need to make the call that a patient is at high risk of falling?
   b. Prompt: What makes it easier or harder to manage falls in your patients?

Scenario 1: Flip over the PFRR

2. What is your first impression of this report?

Scenario 2: Use this form (mock Patient Falls Risk Report) to come up with care planning options for this patient, if you believe it is necessary. If you believe that you need more information or help navigating this document let me know. Also, while going through this scenario, please think out loud (provide report card example on thinking out loud). Flip over the report when you're ready to begin and please let me know when you feel like you're done. What can I clarify about this activity?".

Part 2

3. What thoughts or feelings did you have about using this report?
4. Would you use the Patient Falls Risk Report in your practice? Why?
5. Would the Patient Falls Risk Report change what you would normally do in a patient encounter? If yes, how? If no, why not?
6. What barriers might keep you from implementing the report in your practice?
   a. Prompt: Do you feel that the report impacts your medicolegal risk? If yes, why?
7. What changes would you like to see made to the Patient Falls Risk Report?
   a. Prompt: What are your thoughts on the length of the report?
   b. Prompt: What are your thoughts on the content of the report?
   c. Prompt: How do you feel about using the fax to get the Patient Falls Risk Report?
8. Are you a family doctor, general practitioner, or nurse practitioner?
9. For how many years have you been a primary care provider?
10. What else would you like to add that we didn't get a chance to talk about in this interview?
11. What questions do you have for me?

Figure 3. Full interview schedule.

deductive and open coding. Specifically, a coding framework based on the behaviour change wheel, usability testing, and preliminary research guided but did not constrain coding (Barnum, 2011; Michie et al., 2014; Nova et al., 2020a, 2020b). AN then grouped useful codes into themes and reviewed and mapped each theme to ensure a relationship to the overarching research topic. At the end of each iteration, the findings were summarized, and the Patient Falls Risk Report was revised accordingly. While reflecting on their outsider and insider perspectives, the authors jointly made decisions about changing the report based on availability of items within the interRAI-HC, critique frequency, and relevance to falls prevention in primary care. Following the final analysis, AN linked the findings to direct quotes and created a one-page infographic of the synthesized and analysed data. This easy-to-read document, shown in Figure 4, was shared with participants via e-mail for member checking, to make sure that the findings resonate with the experiences of participants and enhance trustworthiness of the findings (Birt, Scott, Cavers, Campbell, & Walter, 2016).

Surveys

The purpose of the surveys was to evaluate the usability of the revised Patient Falls Risk Report, shown in Figure 5, and strengthen the reliability of the qualitative findings with a complementary quantitative perspective (Carter et al., 2014).

Sample

Ongoing survey recruitment was conducted by AN, GH, and MA from March to May 2020. We aimed to recruit at least 20 primary care providers or primary care residents using voluntary response sampling via newsletter, e-mail, and Twitter. The minimum sample size of 20 was determined using the System Usability Scale Calculator (Barnum, 2011; Sauro, 2011). Additionally, our ability to recruit primary care providers was heavily limited by the coronavirus disease (COVID-19) pandemic. In the end, we concluded that a sample of at least 20 would allow for an acceptable margin of error of about 10 points with a 95 per cent confidence interval (Sauro, 2011).

Data collection procedures

Data collection for the surveys was led by AN and took place from March to May 2020. To evaluate the revised Patient Falls Risk Report, participants were invited to five-minute anonymous surveys. When participants opened the link to the survey on the Qualtrics XM platform, the purpose and procedures of the study, a description of the Patient Falls Risk Report, researcher contact

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

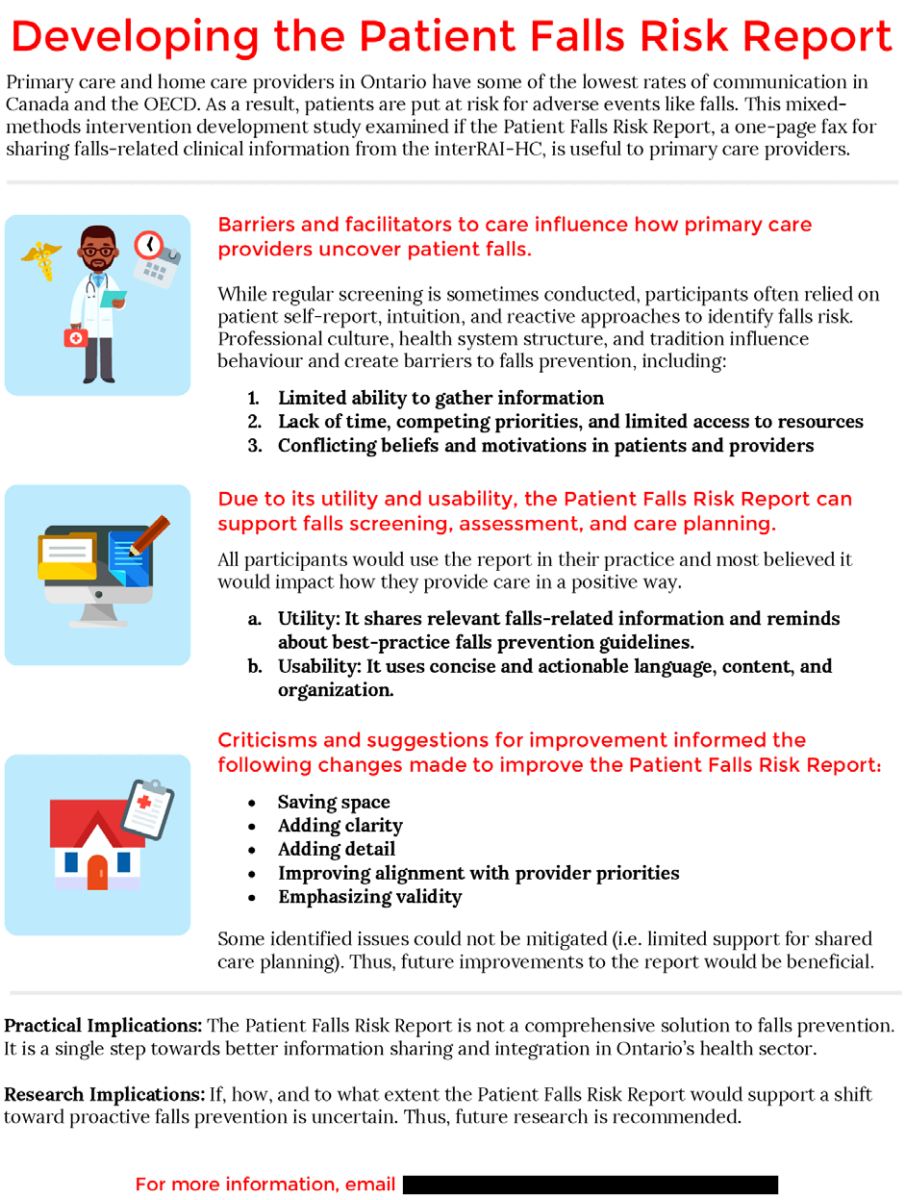


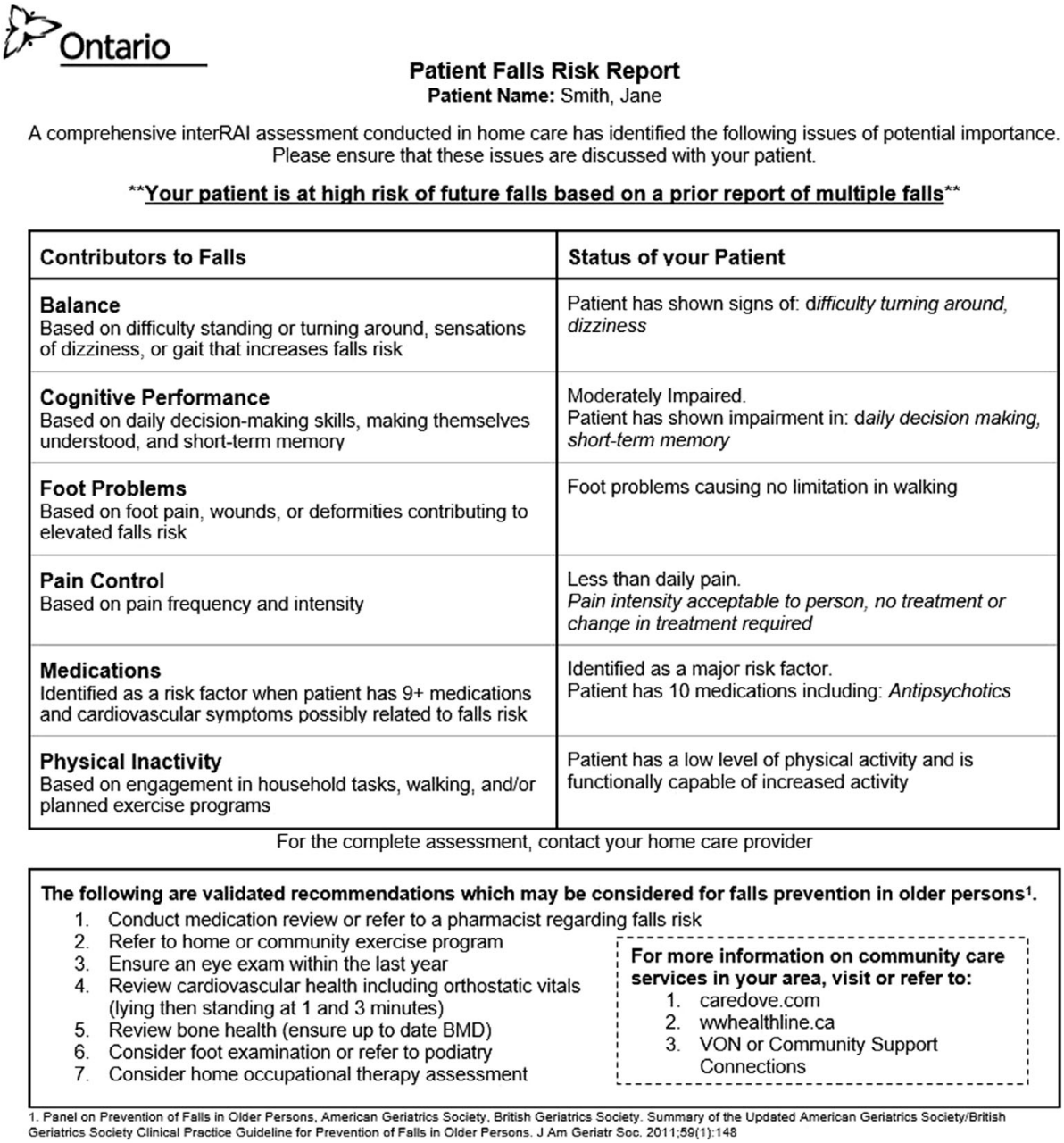
Figure 4. Infographic summary of the synthesized and analysed findings.

details, and an informed consent question were displayed. Consent could be withdrawn at any time prior to survey submission. Once consent was provided, participants were shown the revised Patient Falls Risk Report with mock data and asked to identify at least two care planning options. According to usability expert John Brooke, a participant should use the subject of evaluation before reporting on its usability to improve the chances that their true perceptions are captured (Brooke, 1996). To test usability, we used the survey questions listed in the System Usability Scale, a robust, reliable, and valid industry standard (Bangor, Kortum, & Miller, 2008; Sauro, 2011). The System Usability Scale is used to score the usability of products and services on a scale of 0 to 100, where 100 represents the best possible usability (Bangor et al., 2008). The survey, which is shown in Figure 6, asked participants to rate 10 statements about the usability of the Patient Falls Risk Report on a Likert scale of 1 to 5 (from "strongly disagree" to "strongly agree", respectively). If uncertain on the best response, participants were told to select the middle of the scale (Brooke, 1996). Following completion of the survey, participants were given the option to provide additional comments in an open-ended comment box. The survey data were stored by AN in an Excel file on a password-locked laptop.

Data analysis

To prepare the quantitative data, individual scores on the System Usability Scale were calculated for each survey by AN, using Excel 2004. Next, AN generated a histogram, box-and-whisker, and probability plot using SAS University Edition to evaluate the distribution of the scores. AN also conducted a Shapiro-Wilk test to determine whether the sample was selected from a population with a normal distribution and, in turn, determine whether the System Usability Scale was used appropriately (Sauro, 2011). If the scores were not normal, then there would have been concern around reporting percentile ranks, confidence intervals, and error, and sampling would need to continue (Sauro, 2011). Next, the range, maximum, minimum, median, and average of System

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press



Ontario

Patient Falls Risk Report
Patient Name: Smith, Jane

A comprehensive interRAI assessment conducted in home care has identified the following issues of potential importance. Please ensure that these issues are discussed with your patient.

****Your patient is at high risk of future falls based on a prior report of multiple falls****

Contributors to Falls	Status of your Patient
Balance Based on difficulty standing or turning around, sensations of dizziness, or gait that increases falls risk	Patient has shown signs of: d*ifficulty turning around, dizziness*
Cognitive Performance Based on daily decision-making skills, making themselves understood, and short-term memory	Moderately Impaired. Patient has shown impairment in: d*aily decision making, short-term memory*
Foot Problems Based on foot pain, wounds, or deformities contributing to elevated falls risk	Foot problems causing no limitation in walking
Pain Control Based on pain frequency and intensity	Less than daily pain. *Pain intensity acceptable to person, no treatment or change in treatment required*
Medications Identified as a risk factor when patient has 9+ medications and cardiovascular symptoms possibly related to falls risk	Identified as a major risk factor. Patient has 10 medications including: *Antipsychotics*
Physical Inactivity Based on engagement in household tasks, walking, and/or planned exercise programs	Patient has a low level of physical activity and is functionally capable of increased activity

For the complete assessment, contact your home care provider

The following are validated recommendations which may be considered for falls prevention in older persons[1].

1. Conduct medication review or refer to a pharmacist regarding falls risk
2. Refer to home or community exercise program
3. Ensure an eye exam within the last year
4. Review cardiovascular health including orthostatic vitals (lying then standing at 1 and 3 minutes)
5. Review bone health (ensure up to date BMD)
6. Consider foot examination or refer to podiatry
7. Consider home occupational therapy assessment

For more information on community care services in your area, visit or refer to:
1. caredove.com
2. wwhealthline.ca
3. VON or Community Support Connections

1. Panel on Prevention of Falls in Older Persons, American Geriatrics Society, British Geriatrics Society. Summary of the Updated American Geriatrics Society/British Geriatrics Society Clinical Practice Guideline for Prevention of Falls in Older Persons. J Am Geriatr Soc. 2011;59(1):148

Figure 5. Revised patient falls risk report.

Usability Scale scores were determined, and the standard deviation and confidence intervals for the average System Usability Scale score were calculated. Finally, AN performed benchmarking of the average score with the System Usability Scale curved grading scale (Sauro & Lewis, 2016). This valid and reliable scale compares the usability of an innovation to thousands of other innovations (Sauro & Lewis, 2016). Our aim was to achieve a score of at least 70, as recommended by Bangor et al. (2008). Finally, responses to the care planning activity and comments were reported for descriptive purposes. They would be analysed more thoroughly if quantitative analysis indicated a need to improve usability of the Patient Falls Risk Report. In this situation, comments would be analysed with thematic analysis, similar to the interviews.

Ethical Considerations

This study was reviewed for ethics clearance through a university research ethics committee and conforms to the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS2).

Results

Interviews

After analysing nine interviews, which were 26 minutes in length on average, and employing two iterations of qualitative analysis, we concluded that saturation was achieved since no new information

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

Part 1

Please read the Mock Patient Falls Risk Report on the previous page. Then, in the box below, record at least 2 care planning options for Jane Smith, a mock patient who receives home care and was identified as having a high risk of future falls.

Part 2

For each statement, please assign a score of 1 to 5 from strongly agree to strongly disagree. Please respond to every item. If you feel that you cannot respond to a particular item, please assign a score of 3.

	Strongly Disagree 1	2	3	4	Strongly Agree 5
1. I think that I would like to use this report frequently.					
2. I found the report unnecessarily complex.					
3. I thought the report was easy to use.					
4. I think that I would need the support of a technical person to be able to use this report.					
5. I found the various functions in this report were well integrated.					
6. I thought there was too much inconsistency in this report.					
7. I would imagine that most people would learn to use this report very quickly.					
8. I found the report very awkward to use.					
9. I felt very confident using the report.					
10. I needed to learn a lot of things before I could get going with this report.					

If you have any additional comments, feedback, and explanation, please write your response in the space below.

Thank you for your participation!

Figure 6. Usability testing survey.

emerged from the data. Four out of nine participants were nurse practitioners, one had worked in a rural practice, most practised or had previously practised as part of an interprofessional health team, and several had worked in a practice without an interprofessional team. The sample had practised primary care for 21.7 years on average. One participant was based in Alberta, Canada, and the rest were in Ontario, Canada.

Two overarching themes were identified from the interviews. The first was "Perspectives on enhancing utility of the Patient Falls Risk Report" and the second was "Perspectives on enhancing usability of the Patient Falls Risk Report". "Utility" is defined as the quality of having the right features to solve a user need, and "usability" is the ability for users to learn, understand, and operate a tool or system (Nielsen, 2017).

Theme 1: Perspectives on enhancing utility of the Patient Falls Risk Report

"It would help me provide really good care". All nine participants claimed that they would use the Patient Falls Risk Report in their practice, and seven said that the tool would impact how they interact with patients. To illustrate, one nurse practitioner described that the Patient Falls Risk Report could facilitate their conversations with patients: *I would probably show [my patient] the assessment and say 'I'm really concerned about this for you… Let's work together to try and make some changes to… decrease your risk and improve your health'* (NP1). The perception of utility stemmed from several described strengths of the report: It offers novel information from the home environment, supports critical thinking in assessment, prompts providers to address key risk factors in an evidence-informed way, and reminds them of recommended interventions and community resources. Most participants indicated that they would welcome the Patient Falls Risk Report: *It would help me provide really good care* (NP1). When asked about the impact of potential medicolegal risks of implementation, one physician explained: *I don't feel that as a problem. I mean anytime we get anything, be it a laboratory report, a consultant report, a nursing report. You know, if you ignore what it says then [laughs] that's not good* (MD5).

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

"It should provide more information". To enhance utility of the Patient Falls Risk Report, several participants requested that it be *more detailed* (MD1). In particular, to *tease out the serious falls* (MD4), some participants wanted more detail around fracture risk, injuries, circumstances of the fall (e.g., loss of consciousness), and the patient's ability to stand, sit, and walk around. Other general suggestions included the addition of narrative notes from the home care providers and information on demographics, drug and alcohol abuse, relevant chronic diseases (e.g., heart failure), and the state of the home environment. There were also several suggestions made regarding the list of risk factors. Four participants expressed the need for *more investigation* (NP3) around cognitive impairment. In terms of foot problems, one physician wanted more detail because, *pain versus wounds versus deformities are very different things* (MD1). Similarly, there was a suggestion to list the classes of high-risk medications prescribed to the patient and to indicate the prescriber. Participants also wanted to know more about pain – specifically: *Where's the pain? When does it happen? What makes it better? What makes it worse?* (MD1). *Is their pain well managed? … how is it managed? [and] Does it manage through physiotherapy?* (NP3). Finally, some participants suggested changes to the list of recommendations, such as including a list of local services or health providers who could be referred to, key pieces of knowledge (i.e., bone mineral density, orthostatic vital thresholds), and the actions that home care had taken. To facilitate access to outside support in particular, a nurse practitioner suggested emphasizing an eReferral management platform: … *because I think people forget that you can go onto [the platform] and actually find the falls programs in our area* (NP4). While all of the suggestions can be considered important, it was not possible to add all of the details that participants requested without *getting bogged down in detail* (MD4) and exceeding a one-page length. Changes made to the utility of the report are listed in Table 1.

"It's just another paper to file". Despite improvements made to the original report, two participants stated that receiving it would not change what they normally do in a patient encounter. One or these individuals indicated that they already collect the information in the report with custom-built comprehensive instruments and claimed to already know about the risk factors that their patients face. Specifically, one physician working in an interdisciplinary practice expressed the preference for an internally developed case finding program. The other provider felt that information provided was insufficient to support their needs. Instead, this nurse practitioner emphasized that more support was needed in managing the health of patients with complex conditions. The health care worker explained:

> I think one of the struggles is time management. Trying to have the time to put towards these patients… It's a great tool, but the bottom line is: what are the resources that [the report is] going to get for me?… It's just another paper to file… it's not helping me get any resources… I didn't need a tool to tell me there's a problem with this person. I just need some help to figure out how I'm going to take care of them. (NP3)

In the same vein, other participants seemed to agree that being overwhelmed by a heavy workload was an important concern: *If everybody gives me a report like this for cognitive impairment, for mental health things, and… I have a hundred reports and I can't do it, then I'd rather have zero reports* (MD1). Therefore, several participants called for enhanced shared care planning: *I think if it is more of a community responsibility… you don't feel completely responsible, because oftentimes… it does come back on to you* (MD4). However, challenges with shared care were identified: *Shared care planning and interdisciplinary care, collaborative care, means different things to different people. And I think we all think we're doing it, but we don't do it very well* (MD2). Suggestions for preferred interventions included an automatic community referral system or a report that identified a list of actions taken by home care providers.

Theme 2: Perspectives on enhancing usability of the Patient Falls Risk Report

"It's easy to read". Overall, the usability of the report was evaluated positively: *I like how it's laid out… I could look at this report in less than a minute and find out whether I need to act on it* (MD1). Characteristics reported to increase usability and make the report *easy to read* (NP1, NP2, NP4, MD2) included its one-page length, intuitive organization, simplicity of language and content, selection and emphasis of a limited number of key risk factors, and action items.

The information in the report is "not entirely clear". Several critiques on the usability of the report itself were also identified. The few participants who commented on the falls overview section of the report sought clarification and quickly found the answers to their questions within the report:

> So, did my patient [pause] have a fall? I'm assuming they probably did – 'high risk is based on report of multiple falls' – So, then I'm assuming my patient did have a fall at least – I guess more than one. I guess that's not entirely clear maybe with the statements below. (MD3)

Additionally, one participant explained that they would perform their own cognitive assessment based on the mock data, despite receiving the results of a valid cognitive assessment within the Patient Falls Risk Report, because: *I didn't get that they did a full cognitive assessment, because I don't know what they did to get that answer* (NP3).

The most prominent issue of usability that could be improved upon was lack of clarity around jargon in the report. In the first round of interviews, one participant expressed confusion around the interRAI jargon "moderately impaired 1" under the section on cognitive performance. In fact, several participants indicated confusion with the numbers on the report:

> I guess moderately impaired would mean something, but the 1 beside it means absolutely nothing to me and wouldn't to most primary care providers… most primary care people do not see RAI stuff at all… Is higher score worse or better?… That might want some clarification in case people needed to know. (MD3)

The word "triggered" within the medications and physical activities sections faced the same critique. Also in this section, the term 'Inappropriate Medications' was labelled a *'judgmental term'* (MD1) since it implies blame on the prescriber and ignores contextual factors that may make the medication appropriate. Additionally, the meanings of the physical activities section in terms of lifestyle, physical condition, and motivations were unclear. Due to this lack of usability, the usefulness of the Physical Activities section was doubted by several participants. One participant, in particular, indicated that having conversations about exercise preferences are essential to developing an understanding of the item. To account for each of these critiques without increasing length, the information was reworded and rearranged. The changes made based on these critiques can be found in Table 2.

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

Table 1. Changes made to the Patient Falls Risk Report for improving utility

Changes in utility	Justification
Added number of medications and list of high-risk mediations to medications status	Identifying the number and class of medications facilitates the medication review and related care planning.
Added "refer to pharmacist" to "conduct a medication review" in recommendations list	Suggesting this concrete action for providers to take directly prompts them to reach out to allied health care providers.
Added "home exercise program" to "refer to community exercise program" in recommendations list	Broadens the conversation around exercise as prevention
Added "consider foot examination" to "consider podiatry assessment" in recommendations list	Opens opportunity for provider to investigate whether the foot problem is a wound, defect, or deformity since the interRAI-HC does not include this information
Added balance items to risk factors list	To provide understanding around patient's ability to stand, sit, and walk around and *tease out the serious falls* (MD4)
Added areas of impairment under cognitive performance status	While this may not eliminate the need for a comprehensive cognitive assessment, it provides more details on where the problems lie.
Added "for the complete assessment, contact your home care provider" under risk factors list	If the provider is seeking additional detail about the state of the home environment, drug and alcohol abuse, etc., they can request the complete assessment. These details were not included in the report to prevent "information overload".
Added pain control item to pain status and changed "pain" to "pain control"	Providing more detail around the pain can help in the prioritization of concerns for care planning.
Added "ensure up to date BMD" to "review bone health" in recommendations list	Suggesting this concrete action for providers to take directly prompts them to evaluate fracture risk.
Added box on "ways to get more information on community care resources in your area"	This informs providers on how they can access relevant community resources that can support falls prevention efforts.

Table 2. Changes made to the Patient Falls Risk Report for improving usability

Changes in usability	Justification
Removed numerical scores under interpretations	While the numerical scores conveyed important information and may have increased utility of the report for those who understand them, they also decreased usability and created confusion for those who did not. Rather than adding a second page with interpretations of each score, which may also lower usability, it was agreed that the written descriptions were sufficient to support care planning.
Removed the "1" in "moderately impaired 1" under cognitive performance status	The "1" has little meaning to clinicians who are unfamiliar with interRAI-HC jargon.
Changed "foot problems, no limitation in walking" to "foot problems causing no limitation in walking"	Minor grammatical change
Changed "triggered" to "major risk factor" or "opportunity"	"Triggered" has little meaning to clinicians who are unfamiliar with interRAI-HC jargon.
Moved medications section to the top of contributors to falls	Aligned report with what was most discussed by participants
Changed "inappropriate medications" to "medications" in medications section	Changing interRAI-HC jargon considered a *judgmental term* (MD1) without changing the meaning of the title
Condensed/re-worded the falls overview to emphasize validity and meaning of the measure	While saving space, this change also enhances usability by summarizing the assessment findings, interpretations, and high-level recommendations in one place. The section became more similar to an executive summary.
Changed "physical activity" to "physical inactivity"; modified interpretation	These changes were made to convey how this item was measured and what it means about the patient in a concise and specific manner.

"Fax is fine". Another key issue of usability was delivery of the Patient Falls Risk Report. While fax was described as a *fine* means of delivery by four participants (NP1, NP2, NP4, MD3), electronic medical record integration of the report *would be helpful* (MD5), according to those with the systems that allowed for it. One physician with decades of primary care experience summarized personal views on the matter:

> There's lots of people want to eliminate the fax. But I think the reality is it's pretty much in common use. I like it… The fax machine I think works for quite a few physicians still… I'm not the best person to ask because I depend on faxes. I still continue to get most of my messaging from other providers by fax. I have a process in place, but I think this is how people feel: that the fax machine is out of date, and they would rather there was electronic messaging. So, if I had a fully integrated [electronic medical record]. I may choose another method, but yeah, sorry. (MD2)

While most would need to manually scan faxes into their systems, a task requiring time and effort, some participants reported using the Health Report Manager, which automatically uploads faxes into their electronic medical record: *Through health report manager it actually comes in electronically. But fax is fine* (MD3). In summary, for most participants, integration with electronic medical records

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

was preferred due to easier incorporation of the tool into their workflows.

Surveys

The sample size achieved for quantitative evaluation of the revised Patient Falls Risk Report was 27 primary care providers, or primary care residents. The data from these participants were approximately normally distributed (W-Statistic = 0.94); therefore, use of the System Usability Scale was considered appropriate (Sauro, 2011).

The overall System Usability Scale score for the revised Patient Falls Risk Report was 83.4 (SD = 11.99) which is considered excellent on the System Usability Scale Benchmarking Scale at the 90th to 95th percentile (Sauro & Lewis, 2016). Additionally, the 95 per cent confidence interval was within the range of acceptable scores (Sauro & Lewis, 2016). In other words, the survey determined that the report is highly usable. Descriptive statistics for System Usability Scale scores are shown in Table 3. Additionally, all participants completed the optional step and suggested care planning options. The most popular interventions suggested by survey participants were medication reviews, pharmacy referral, and referral to an exercise or balance program. There were also nine comments on the survey. Seven were short positive evaluations (e.g., *Great report!*), two were questions about the report (*Who would complete this?* and *Were the recommendations lists at the bottom just general suggestions for everyone or were they specifically recommended for my patient situation?*), and one was a suggestion to present risk factors in a more concise way.

Discussion

This research shows that the Patient Falls Risk Report has the potential to support primary care providers in identifying risk factors and care planning options for patients receiving home care. The report was also determined to be usable and easy to understand. However, the participants suggested that poor shared care planning should be a key consideration for the development and implementation of frailty-related information sharing tools.

Using structured approaches to sharing information between home care and primary care may motivate "good care" by enhancing informational continuity, which refers to the ability of clinicians use information about patient medical history, conditions, context, and values to provide appropriate care (Haggerty et al., 2003; Nova et al., 2020b). Using interRAI-HC information in clinical practice is proven to be beneficial in supporting high-quality health care provision (De Almeida Mello et al., 2015; Gray et al., 2009; Landi et al., 2001). Proven benefits are integral for innovation sustainability (Fleiszer, Semenic, Ritchie, Richer, & Denis, 2015). However, in information sharing, balance is key. While many participants in this study wanted more detail to be displayed in the report or had the means to conduct their own comprehensive case finding programs, many participants also described facing significant time constraints, burdensome workloads, and lack of support with managing complexity. Most primary care providers face heavy workloads (Agarwal, Pabo, Rozenblum, & Sherritt, 2020), and addressing the complex needs of home care patients requires an interplay of clinical judgment and analytical thinking (Dhaliwal & Detsky, 2013). Therefore, we adjusted the report so that only information perceived as relevant and actionable to primary care was provided (Nova et al., 2020a). Of course, this adjustment was subjective and limited to information available within the original interRAI-HC assessment.

Table 3. Descriptive statistics for System Usability Scale scores

Mean	**83.4**
95% confidence interval	78.7, 88.2
Standard deviation (SD)	11.99
Median	82.5
Mode	100.0
Max.	100.0
Min.	62.5

Max. = maximum; Min. = minimum.

While the communication of relevant information is a necessary component of integration, providing more responsibility without minimizing burden in other ways can lead to loss of motivation, dissatisfaction, or burn-out in primary care providers (Agarwal et al., 2020). Since the Patient Falls Risk Report provides information without offering direct support to address falls risk, some participants felt as though work would be "dumped" on them if this report were implemented. This view is justifiable. Adding detail on the actions of home care providers would have been beneficial for providing a more holistic view of patients, reducing the number of repeated referrals, and showing that home care is addressing patient health concerns (Heckman et al., 2013). Additionally, burden could be reduced by enhancing team-based care between primary care and allied health care providers (rather than care that is dominated by one provider), defining clear and manageable scopes of responsibility, and addressing electronic medical record limitations (Agarwal et al., 2020).

The one-page length, intuitive organization, simplicity, and actionability of the Patient Falls Risk Report were usability-related strengths described by participants. Through the interviews, we were able to address many of the key criticisms of the interRAI-HC in the Patient Falls Risk Report (Stolee et al., 2010). For example, we attached information on community resources to the assessment results to support improved care planning. Engaging in usability-related changes may support incorporation of the report into existing primary care processes and structures, and, in turn, enhance sustainability of the innovation (Fleiszer et al., 2015). Additionally, usability of the tool among participants was improved by decreasing interRAI jargon. While the use of a common interRAI language is a key characteristic of the instruments (Gray et al., 2009), "translating" the assessment results made it easier for participants to understand the assessment results presented to them. In the end, we found that the revised report was highly usable. High scores on the System Usability Scale correlate with greater task success (Bangor et al., 2008; Kortum & Peres, 2014), and usability itself can lead to ease of learning, ease of use, and intuitiveness, thus saving users time and increasing satisfaction with a product (Barnum, 2011). In future research, we intend to pilot the Patient Falls Risk Report regionally to obtain feedback from primary care providers, patients, and clinicians beyond primary care and use a more rigorous investigation to measure whether receiving the intervention has an impact on care provision. Additionally, we recommend that future researchers intending to develop sustainable interRAI-HC innovations seek the perspectives of a diverse group

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press

of potential end users throughout the development process and on an ongoing basis as needs change.

As a final comment, fax delivery may limit the usability of the Patient Falls Risk Report. Electronic records are an effective, practicable, and acceptable means of delivery due to easier integration of information into primary care workflows and enhanced decision support capabilities for improving patient outcomes (Dhaliwal & Detsky, 2013; Heckman et al., 2013; Martínez-González et al., 2014; Nova et al., 2020a). However, electronic medical records as a delivery mechanism may also be unaffordable and inequitable since information sharing is an expensive functionality, limited to few system vendors (Canadian Institute for Health Information, 2013). Ontario's primary care sector needs more standardized data collection and management before delivery of the Patient Falls Risk Report by electronic medical record becomes feasible (Kortum & Peres, 2014). Ongoing development of the tool in terms of delivery (as well as usability and general utility) will be key in ensuring that the report is a sustainable intervention (Fleiszer et al., 2015).

Strengths of this study included method triangulation, end-user involvement, and overall trustworthiness. By mirroring how humans naturally collect information, the combination of qualitative and quantitative data offered rich information that would not have been possible otherwise (Wisdom & Cresswell, 2013). In contrast, there were some notable limitations. This research may have been susceptible to volunteer bias (e.g., social desirability bias) due to nonprobability sampling. Most of the participants in this study practised in Ontario and were likely to be more interested in system integration than the general population of primary care providers (Sedgwick, 2013). There was also limited information collected on the survey sample. Therefore, as a limitation, the findings of this study may not be representative of all primary care providers in Ontario. Additionally, since most of the interview participants practised in interprofessional health teams, this study may overestimate primary care providers' knowledge of and connectedness with community resources. As an attempt to mitigate the issues that arose from nonprobability sampling, we used maximum variation sampling and assurance of confidentiality or anonymity (Salkind, 2010).

Moreover, the analysis of interviews and reporting of this study were shaped by the world-views of the researchers involved (Anderson, 2010; Holmes, 2020). To improve credibility, we provided thick descriptions of themes, used data triangulation, and employed member checking to ensure that participant views were represented accurately. Finally, this study was limited by small sample sizes. Recruitment was challenging throughout this study due to limited time, resources, and motivation among primary care providers to participate in research, exacerbated by the COVID-19 pandemic (Heckman, Saari, McArthur, Wellens, & Hirdes, 2020). To try and mitigate this challenge, we used snowball sampling in interview recruitment, and the survey inclusion criteria were broadened to include primary care residents.

Conclusion

This research suggests that the Patient Falls Risk Report is a useful way to convey information derived from interRAI-HC assessments. It has the capacity to support primary care providers in identifying risk factors and engaging in care planning for patients with clinical complexity. The report also has the capacity to be sustainable. However, further consideration of clinician workloads, supportive resources (i.e., technological or human resources), and team-based approaches to care is needed. We also learned that, with the appropriate systems in place, sharing high-quality standardized information does not require imposing a standardized format. Utility and usability can support primary care frailty management and should be prioritized to benefit older persons with complex needs.

Supplementary Materials. To view supplementary material for this article, please visit http://doi.org/10.1017/S0714980822000228.

References

Agarwal, S. D., Pabo, E., Rozenblum, R., & Sherritt, K. M. (2020). Professional dissonance and burnout in primary care: A qualitative study. *JAMA Internal Medicine*, **180**(3), 395–401. https://doi.org/10.1001/jamainternmed.2019.6326

Anderson, C. (2010). Presenting and evaluating qualitative research. *American Journal of Pharmaceutical Education*, **74**(8), 7.

AuYoung, M., Linke, S. E., Pagoto, S., Buman, M. P., Craft, L. L., Richardson, C. R., *et al.* (2016). Integrating physical activity in primary care practice. *The American Journal of Medicine*, **129**(10), 1022–1029. https://doi.org/10.1016/j.amjmed.2016.02.008

Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An empirical evaluation of the system usability scale. *International Journal of Human–Computer Interaction*, **24**(6), 574–594. https://doi.org/10.1080/10447310802205776

Barnum, C. M. (2011). *Usability testing essentials: Ready, set… test!* Burlington, MA: Elsevier.

Birt, L., Scott, S., Cavers, D., Campbell, C., & Walter, F. (2016). Member checking: A tool to enhance trustworthiness or merely a nod to validation? *Qualitative Health Research*, **26**(13), 1802–1811. https://doi.org/10.1177/1049732316654870

Brooke, J. (1996). SUS - A quick and dirty usability scale. In *Usability evaluation in industry* (p. 7). London: Taylor and Francis.

Canadian Institute for Health Information. (2013). *Insights and lessons learned from the PHC VRS prototype* (p. 16). Ottawa, ON: Author.

Canadian Institute for Health Information. (2018). Profile of clients in home care, 2017–2018. Retrieved 27 May 2019 from https://www.cihi.ca/sites/default/files/…/hcrs-quickstats-2017-2018-en-web.xlsx.

Canadian Institutes of Health Research. (2021). *Institute of health services and policy research strategic plan 2021–2026* (p. 29). Ottawa, ON: Author. Retrieved 22 July 2021 from https://cihr-irsc.gc.ca/e/52481.html#section_9.

Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., & Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, **41**(5), 545.

De Almeida Mello, J., Hermans, K., Van Audenhove, C., Macq, J., & Declercq, A. (2015). Evaluations of home care interventions for frail older persons using the interRAI Home Care instrument: A systematic review of the literature. *Journal of the American Medical Directors Association*, **16**(2), 173.e1–10. https://doi.org/10.1016/j.jamda.2014.11.007

Dhaliwal, G., & Detsky, A. S. (2013). The evolution of the master diagnostician. *JAMA*, **310**(6), 579–580. https://doi.org/10.1001/jama.2013.7572

Doty, M. M., Tikkanen, R., Shah, A., & Schneider, E. C. (2019). Primary care physicians' role in coordinating medical and health-related social needs in eleven countries. *Health Affairs*, **39**(1), 115–123. https://doi.org/10.1377/hlthaff.2019.01088

Fleiszer, A. R., Semenic, S. E., Ritchie, J. A., Richer, M.-C., & Denis, J.-L. (2015). The sustainability of healthcare innovations: A concept analysis. *Journal of Advanced Nursing*, **71**(7), 1484–1498. https://doi.org/10.1111/jan.12633

Gray, L. C., Berg, K., Fries, B. E., Henrard, J.-C., Hirdes, J. P., Steel, K., & Morris, J. N. (2009). Sharing clinical information across care settings: The birth of an integrated assessment system. *BMC Health Services Research*, **9**, 71. https://doi.org/10.1186/1472-6963-9-71

Guba, E., & Lincoln, Y. (1994). Competing paradigms in qualitative research. In *Handbook of qualitative research*, **2**(163–194), 105.

Guthrie, D. M., Pitman, R., Fletcher, P. C., Hirdes, J. P., Stolee, P., Poss, J. W., *et al.* (2014). Data sharing between home care professionals: A feasibility study using the RAI Home Care instrument. *BMC Geriatrics*, **14**, 81. https://doi.org/10.1186/1471-2318-14-81

Haggerty, J. L., Reid, R. J., Freeman, G. K., Starfield, B. H., Adair, C. E., & McKendry, R. (2003). Continuity of care: A multidisciplinary review. *BMJ (Clinical Research Ed.)*, **327**(7425), 1219–1221. https://doi.org/10.1136/bmj.327.7425.1219

Health Shared Services Ontario. (2017). Meet CHRIS. Retrieved 1 August 2019 from https://hssontario.ca/News/Pages/Meet-CHRIS.aspx.

Heckman, G., Hillier, L., Manderson, B., McKinnon-Wilson, J., Santi, S. M., & Stolee, P. (2013). Developing an integrated system of care for frail seniors. *Healthcare Management Forum*, **26**(4), 200–208. https://doi.org/10.1016/j.hcmf.2013.09.003

Heckman, G., Saari, M., McArthur, C., Wellens, N. I. H., & Hirdes, J. P. (2020). COVID-19 outbreak measures may indirectly lead to greater burden on hospitals. *Canadian Medical Association Journal*, **192**(14), E384–E384. https://doi.org/10.1503/cmaj.75230

Holmes, A. (2020). Researcher positionality—A consideration of its influence and place in qualitative research—A new researcher guide. *Shanlax International Journal of Education*, **8**, 1–10. https://doi.org/10.34293/education.v8i4.3232

Howland, J., Hackman, H., Taylor, A., O'Hara, K., Liu, J., & Brusch, J. (2018). Older adult fall prevention practices among primary care providers at accountable care organizations: A pilot study. *PloS One*, **13**(10), e0205279. https://doi.org/10.1371/journal.pone.0205279

Inouye, S. K. (1994). The dilemma of delirium: Clinical and research controversies regarding diagnosis and evaluation of delirium in hospitalized elderly medical patients. *The American Journal of Medicine*, **97**(3), 278–288.

Johnston, S., Liddy, C., Hogg, W., Donskov, M., Russell, G., & Gyorfi-Dyke, E. (2010). Barriers and facilitators to recruitment of physicians and practices for primary care health services research at one centre. *BMC Medical Research Methodology*, **10**(1), 109. https://doi.org/10.1186/1471-2288-10-109

Kodner, D. L. (2009). All together now: A conceptual exploration of integrated care. *Healthcare Quarterly (Toronto, Ont.)*, *13 Spec No*, 6–15. https://doi.org/10.12927/hcq.2009.21091

Kortum, P., & Peres, S. C. (2014). The relationship between system effectiveness and subjective usability scores using the system usability scale. *International Journal of Human–Computer Interaction*, **30**(7), 575–584. https://doi.org/10.1080/10447318.2014.904177

Kushniruk, A. W., & Patel, V. L. (2004). Cognitive and usability engineering methods for the evaluation of clinical information systems. *Journal of Biomedical Informatics*, **37**(1), 56–76. https://doi.org/10.1016/j.jbi.2004.01.003

Landi, F., Onder, G., Tua, E., Carrara, B., Zuccalá, G., Gambassi, G., *et al.* (2001). Impact of a new assessment system, the MDS-HC, on function and hospitalization of homebound older people: A controlled clinical trial. *Journal of the American Geriatrics Society*, **49**(10), 1288–1293.

LUCAS KU Leuven. (2019). 21/03/2019—From interrail to BelRAI [YouTube]. Leuven, Belgium. Retrieved 1 September 2020 from https://www.youtube.com/channel/UCBR8-60-B28hp2BmDPdntcQ.

Mackenzie, L., & McIntyre, A. (2019). How do general practitioners (GPs) engage in falls prevention with older people? A pilot survey of GPs in NHS England suggests a gap in routine practice to address falls prevention. *Frontiers in Public Health*, **7**, 32. https://doi.org/10.3389/fpubh.2019.00032

Martínez-González, N. A., Berchtold, P., Ullman, K., Busato, A., & Egger, M. (2014). Integrated care programmes for adults with chronic conditions: A meta-review. *International Journal for Quality in Health Care*, **26**(5), 561–570. https://doi.org/10.1093/intqhc/mzu071

Masotti, P., McColl, M. A., & Green, M. (2010). Adverse events experienced by homecare patients: A scoping review of the literature. *International Journal for Quality in Health Care*, **22**(2), 115–125. https://doi.org/10.1093/intqhc/mzq003

Michie, S., Atkins, L., & West, R. (2014). *The behaviour change wheel: A guide to designing interventions*. Great Britain: Silverback.

Mueller, C. A., Klaassen-Mielke, R., Penner, E., Junius-Walker, U., Hummers-Pradier, E., & Theile, G. (2010). Disclosure of new health problems and intervention planning using a geriatric assessment in a primary care setting. *Croatian Medical Journal*, **51**(6), 493–500. https://doi.org/10.3325/cmj.2010.51.493

Nielsen, J. (2017). Usefulness, utility, usability: 3 goals of UX design. Retrieved 10 September 2019 from https://www.youtube.com/watch?v=VwgZtqTQzg8.

Norman, K. J., & Hirdes, J. P. (2020). Evaluation of the predictive accuracy of the interRAI Falls Clinical Assessment Protocol, Scott fall risk screen, and a supplementary falls risk assessment tool used in residential long-term care: A retrospective cohort study. *Canadian Journal on Aging/La Revue Canadienne Du Vieillissement*, **39**(4), 521–532. https://doi.org/10.1017/S0714980820000021

Nova, A. A., Heckman G., Giangrogorio, L. M., & Alarakhia, M. (in press). A qualitative exploration of proactive falls prevention by Canadian primary care providers. *Canadian Geriatrics Journal*, **25**(3).

Nova, A. A., Zarrin, A., & Heckman, G. A. W. (2020a). Physician views on a computerized decision support system for home care information exchange. *Journal of the American Medical Directors Association*, **21**(3), 426–428. https://doi.org/10.1016/j.jamda.2019.10.004

Nova, A. A., Zarrin, A., & Heckman, G. A. W. (2020b). Physician views on the resident assessment instrument for home care information exchange. *Journal of the American Medical Directors Association*, **21**(3), 428–429.e1. https://doi.org/10.1016/j.jamda.2019.10.003

O'Brien, M. W., Shields, C. A., Oh, P. I., & Fowles, J. R. (2017). Health care provider confidence and exercise prescription practices of exercise is medicine Canada workshop attendees. *Applied Physiology, Nutrition, and Metabolism*, **42**(4), 384–390. https://doi.org/10.1139/apnm-2016-0413

Ontario Association of Community Care Access Centres. (2016). *Connecting care: OACCAC's eHealth assets* (pp. 1–7). Retrieved 27 May 2019 from https://files.ontario.ca/9._ontario_association_of_community_care_access_centres.pdf.

Panel on Prevention of Falls in Older Persons, American Geriatrics Society, & British Geriatrics Society. (2011). Summary of the updated American Geriatrics Society/British Geriatrics Society clinical practice guideline for prevention of falls in older persons. *Journal of the American Geriatrics Society*, **59**(1), 148–157. https://doi.org/10.1111/j.1532-5415.2010.03234.x

Porter, J., Herring, J., & Levinton, J. L. (2007, January 15). CIHI survey: Avoidable admissions and repeat admissions: What do they tell us? Retrieved 8 January 2021 from Healthcare Quarterly website: http://www.longwoods.com/content/18645/healthcare-quarterly/cihi-survey-avoidable-admissions-and-repeat-admissions-what-do-they-tell-us-.

Salkind, N. J. (2010). *Encyclopedia of research design*. Thousand Oaks, CA: SAGE.

Sauro, J. (2011). *A practical guide to the system usability scale: Background, benchmarks & best practices*. Denver, CO: CreateSpace Independent Publishing Platform.

Sauro, J., & Lewis, J. R. (2016). *Quantifying the user experience: Practical statistics for user research* (2nd ed.). Amsterdam: Morgan Kaufmann.

Schofield, P. (2018). The assessment of pain in older people: UK national guidelines. *Age and Ageing*, **47**(suppl_1), i1–i22. https://doi.org/10.1093/ageing/afx192

Sedgwick, P. (2013). Questionnaire surveys: Sources of bias. *BMJ*, **347**, f5265. https://doi.org/10.1136/bmj.f5265

Stolee, P., Steeves, B., Manderson, B. L., Toscan, J. L., Glenny, C., & Berg, K. (2010). Health information use in home care: Brainstorming barriers, facilitators, and recommendations. *Home Health Care Services Quarterly*, **29**(1), 37–53. https://doi.org/10.1080/01621424.2010.487040

Suter, E., Oelke, N. D., Adair, C. E., & Armitage, G. D. (2009). Ten key principles for successful health systems integration. *Healthcare Quarterly (Toronto, Ont.)*, **13**(Spec No), 16–23.

Tobin, G. A., & Begley, C. M. (2004). Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*, **48**(4), 388–396. https://doi.org/10.1111/j.1365-2648.2004.03207.x

Toscan, J., Mairs, K., Hinton, S., Stolee, P., & InfoRehab Research Team. (2012). Integrated transitional care: Patient, informal caregiver and health care

provider perspectives on care transitions for older persons with hip fracture. *International Journal of Integrated Care*, **12**, e13–e13.

Vaidya, S. R., Shapiro, J. S., Papa, A. V., Kuperman, G., Ali, N., Check, T., & Lipton, M. (2012). Perceptions of health information exchange in home healthcare. *Computers, Informatics, Nursing*, **30**(9), 503–509. https://doi.org/10.1097/NXN.0b013e3182573a91

Williams, A. E., Blake, A., Cherry, L., Alcacer-Pitarch, B., Edwards, C. J., Hopkinson, N., *et al.* (2017). Patients' experiences of lupus-related foot problems: A qualitative investigation. *Lupus*, **26**(11), 1174–1181. https://doi.org/10.1177/0961203317696590

Wilson, O., Kirwan, J., Dures, E., Quest, E., & Hewlett, S. (2017). The experience of foot problems and decisions to access foot care in patients with rheumatoid arthritis: A qualitative study. *Journal of Foot and Ankle Research*, **10**, 4. https://doi.org/10.1186/s13047-017-0188-3

Wisdom, J., & Cresswell, J. W. (2013). *Mixed methods: Integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models*. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved 15 June 2020 from https://pcmh.ahrq.gov/page/mixed-methods-integrating-quantitative-and-qualitative-data-collection-and-analysis-while.

https://doi.org/10.1017/S0714980822000228 Published online by Cambridge University Press