

# COMmunity-Based Nutrition RISK Screening in Older Adults Living Independently (COMRISK): Feasibility, Acceptability, and Appropriateness of Community Partnership Models in Alberta, Canada

## Article

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## Résumé

Cette étude de faisabilité sur le dépistage routinier du risque nutritionnel chez les personnes âgées vivant à domicile, menée grâce à un partenariat entre des organismes de soins de santé et des organismes communautaires, visait à : (1) évaluer la capacité des partenariats communautaires de fournir des services de dépistage du risque nutritionnel et d'orienter les personnes concernées vers des soins de suivi, et à (2) déterminer les obstacles et les facteurs de facilitation liés au dépistage. Des membres du personnel de deux établissements de soins de santé primaire et d'un organisme communautaire ont évalué des patients âgés de 65 ans et plus à l'aide de l'outil de dépistage du risque nutritionnel SCREEN-8. Les dépisteurs, administrateurs d'organismes et diététistes autorisés qui ont participé à l'étude ont répondu à des sondages sur l'administration du questionnaire SCREEN-8, les processus de recommandation et les interactions au sein du partenariat. Le partenariat a apporté une valeur ajoutée malgré les limites dans les communications. Nous concluons qu'une plus large mise en œuvre de ce programme par l'intermédiaire de partenariats communautaires peut contribuer à la prévention de la malnutrition chez les personnes âgées.

## Abstract

This feasibility study of routine nutrition risk screening in community-dwelling older adults using a partnership between health care and community-based organizations (CBO) aimed to (1) evaluate the ability of community-based partnerships to provide screening for nutrition risk, and appropriately refer at-risk individuals for follow-up care and (2) determine the barriers to and facilitators of screening. Adults 65 years of age and older were screened by staff in two primary care and one CBO setting using the Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN)-8 nutrition risk screening tool. Screeners, organization administrators, and registered dietitians responded to surveys regarding SCREEN-8 administration, referral processes, and partnership interactions. All found the SCREEN-8 initiative feasible, acceptable, and appropriate. Sustainability requires strengthening of community resources, referral processes, and telephone assessments. The partnership added value despite limitations in communications. We conclude that broader implementation of this program using community-based partnerships has the potential to aid in the prevention of malnutrition in older adults.

## Introduction

Poor nutrition is a highly prevalent issue among older adults, as 63 per cent of older adult patients 65 years of age and older are malnourished on admission to acute care in Canada (Allard et al., 2015; Keller et al., 2015). More than 50 per cent of a sample of community-dwelling older adults in Alberta were at moderate or high nutrition risk (Fedoruk et al., 2023). The number of seniors in Alberta, as well as other similar jurisdictions with aging populations, is expected to double in the next 20 years (Government of Alberta Treasury Board and Finance, 2021), making malnutrition a growing and high-priority concern. Nutrition risk precedes malnutrition and is influenced by physical, socio-economic, psychosocial, and environmental factors (Ramage-

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Morin, Gilmour, & Rotermann, 2017). Malnutrition is defined as a lack of the nutrients required for mental and physical functioning, which decreases quality of life and negatively impacts clinical outcomes (Jensen *et al.*, 2019). One way to prevent or slow the progression of nutrition risk to malnutrition is through routine screening, which specifically analyzes the factors contributing to nutrition risk and allows for referral and targeted intervention (Laur & Keller, 2017).

The majority of health care in Canada is publicly funded and managed by provincial authorities (Government of Canada, 2019). Although the greatest proportion of health care spending is concentrated in the hospital setting, there is a trend towards more preventative services in the community with public health initiatives (Government of Canada, 2019). Still, there is no routine process in place for nutrition screening in the community or outside of inpatient settings. Whereas most acute care and long-term care settings have access to registered dietitians (RDs), surveillance tends to be lacking in the community. Targeting community sites presents an opportunity for identification of nutrition risk, as 93 per cent of adults at risk for malnutrition live in the community (Stratton, Smith, & Gabe, 2018). Recently, a nutrition care pathway for older adults living independently in the community was developed in a Canadian context (Keller, Donnelly, Laur, Goharian, & Nasser, 2022) that provides guidance on implementing screening in community settings.

The Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN) II nutrition risk screening tool is recommended for use in the general population in Alberta (Alberta Health Services Nutrition and Food Services, *n.d.*). The SCREEN® form has construct validity in comparison with a full nutrition assessment and nutritional risk rating completed by an RD (Keller, Goy, & Kane, 2005). SCREEN tools have been shown to be effective in identifying and stratifying nutrition risk in several studies (Akhtar, Keller, Tate, & Lengyel, 2015; Borkent, Keller, Wham, Wijers, & de van der Schueren, 2020; Keller, 2007; Laur, Carew, & Keller, 2021; Lengyel, Tate, & Bayomi, 2014; Pavlovic *et al.*, 2021). SCREEN-8, the abbreviated 8-question form, is more time and resource efficient than the original 14-question version (Akhtar *et al.*, 2015; Keller, 2007). Systematic use of this tool, therefore, represents a possible effective intervention to screen for nutrition risk in the primary care or other community settings.

Primary care is the starting point for patients to receive general care and referrals to specialized services (Government of Canada, 2019). Primary care networks (PCNs) are made up of family doctors and a variety of other health care professionals (HCPs). There are 40 PCNs across Alberta, uniquely situated to recognize and meet the needs of the local community (Alberta Health Services, *n.d.*). Community-based organizations (CBOs) provide social activities, community dining, and support resources (including meal provision or transportation to buy food) that help older adults stay healthy in their homes (Employment and Social Development Canada, 2019; Siegler, Lama, Knight, Laureano, & Reid, 2015).

Studies assessing the feasibility and perspectives on nutrition risk screening in the community have been conducted elsewhere in Canada (Keller, 2007; Lengyel *et al.*, 2014; Reimer, Keller, & Tindale, 2012) and other countries (Gaboreau *et al.*, 2013; Hamirudin *et al.*, 2013; Hamirudin *et al.*, 2014), but none have considered the role of community-based partnerships. Utilizing a partnership model could broaden the reach of screening initiatives as well as increase referrals to RDs, services, and resources provided by CBOs. To address this, we conducted a pilot intervention of

nutrition risk screening in two settings: primary health care and a CBO, with referral available to provincially funded RDs. Clients who were interviewed following the pilot overwhelmingly reported that discussing nutrition was appreciated (Fedoruk *et al.*, 2023). Here, the aims are to determine the feasibility, acceptability, and appropriateness of screening to identify nutrition risk in community-dwelling older adults. The objectives of our study are to (1) evaluate the ability of community-based partners to provide screening for nutrition risk and appropriately refer individuals at nutrition risk for follow-up care and (2) assess support for routine nutrition screening from screeners and organization leadership, in order to support recommendations for sustainable implementation.

## Methods

### Ethics

The research ethics board at the University of Alberta approved this study entitled “Community-based screening for nutrition risk in older Albertans: pilot study” (Pro00108949), referred to here as COMRISK. Participants provided informed consent, implied by completion of the surveys.

### Design

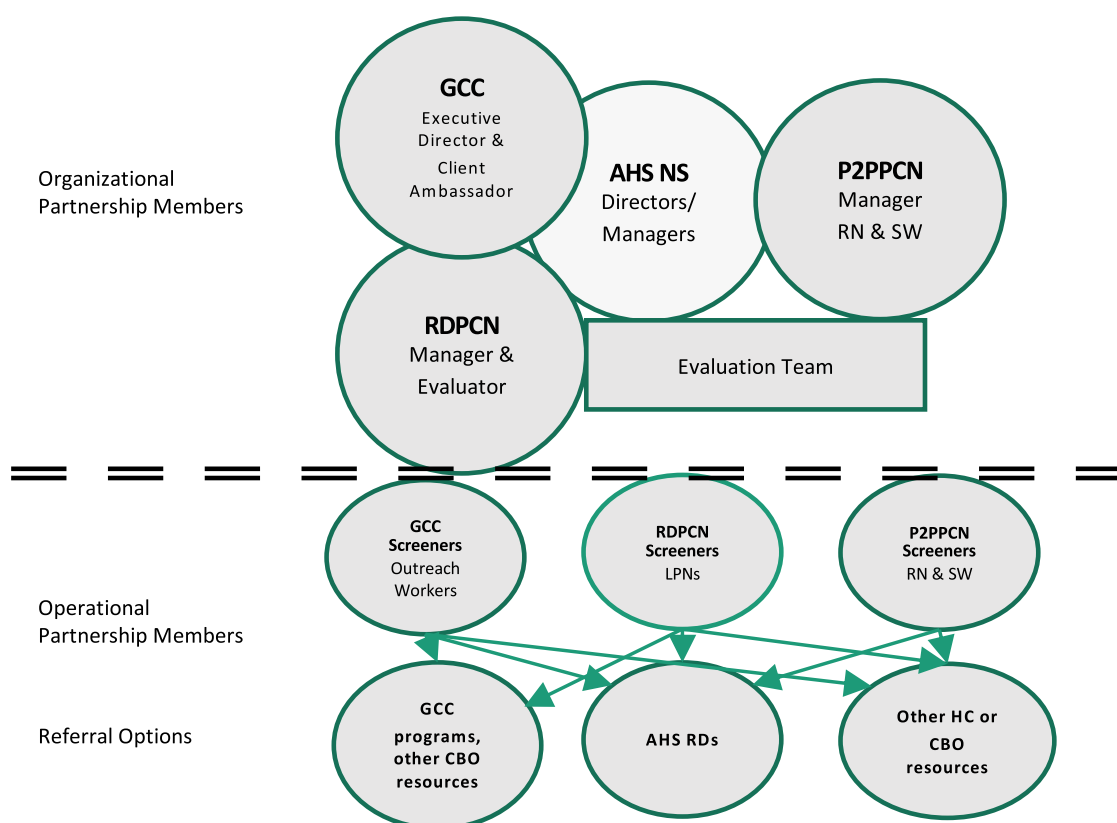
The study design was an observational, cross-sectional survey conducted at completion of the COMRISK study.

### Participants and Recruitment

Potential participants included all involved staff from the partner organizations in the COMRISK project. Surveys were e-mailed by researchers to senior administrators at each of the participating organizations, including Alberta Health Services Nutrition and Food Services (AHS), the Golden Circle Seniors Resource Centre (GCC), Peaks to Prairies Primary Care Network (P2PPCN) and Red Deer Primary Care Network (RDPCN), who were responsible for forwarding the surveys to appropriate staff. Two reminders to complete the surveys were provided.

### COMRISK Pilot Program: Description of the Partnerships

The COMRISK pilot study was developed to address the lack of consistent nutrition risk screening in community-dwelling older adults (focusing on those  $\geq 65$  years of age, although younger individuals could be included at the screener's discretion) in Alberta. The initiative utilized the newly developed Primary & Community Care Malnutrition Toolkit developed by the Canadian Malnutrition Task Force (Keller *et al.*, 2022). Pre-existing partnerships were leveraged following identification of community partners as important contributors to maintaining nutritional health in older adults (Chan *et al.*, 2021). Figure 1 depicts the relationships among the partners at the organizational and operational levels. All partners, including the client ambassador, co-developed materials specifically for the COMRISK pilot (e.g., referral algorithm and community resource list [Fedoruk *et al.*, 2023]): a communications plan and the evaluation framework. AHS Nutrition Services (NS) provided expertise in nutrition screening, access to referrals to RDs, and development of and access to an Alberta Health Living Program called “Staying Strong and Healthy as We Age”. This is a virtual, interactive nutrition and physical activity class for older



**Figure 1.** Partnerships in COMRISK at the organizational and operational levels. The organizational partners planned the pilot intervention and developed processes adapted to each site. The screeners interacted directly with older adults, providing screening and referrals. Available referral options at each site are also depicted. Abbreviations: AHS NS, Alberta Health Services Nutrition Services; CBO, community-based organization; GCC, Golden Circle Senior Resource Centre; HC, healthcare; LPN, licensed practical nurse; P2PPCN, Peaks to Prairies Primary Care Network; RD, registered dietitian; RDPCN, Red Deer Primary Care Network; RN, registered nurse; SW, social worker.

adults led by an RD and a kinesiologist. The PCNs and GCC provided screeners, conducted the screening, and provided administrative and managerial support. The GCC also offered outreach services as part of the resources available to RDPCN for referral. A client ambassador from the GCC provided an older adult perspective, suggested communication strategies, and reviewed all materials. Both PCNs provided primary care (physicians, allied health) services to the individuals screened. Partnerships with RDPCN-GCC and P2PPCN were coordinated separately with AHS NS in order to customize the initiative to the local environment.

Video conferences were held regularly, initially monthly, and then quarterly or as needed. The initial meetings, which included members of the evaluation team, were focused on co-design of the COMRISK protocol and optimization of site-specific materials (Fedoruk et al., 2023), evaluation framework, training strategy, and communications plan (among the partners as well as referral-related communications). While the pilot initiative was underway, meetings were tailored to troubleshoot and solve evolving issues. Meetings after the pilot concluded focused on maintenance of the initiative and evaluation of outcomes.

### COMRISK Pilot Program Intervention

SCREEN-8 uses 8 questions to assess nutrition risk (Keller, n.d.). The lower the score, the higher the risk, which was stratified as high, moderate, or low nutrition risk. Two additional questions were part of the questionnaire at the request of the PCNs and community organization but were not used in the calculation of the score; these

questions assessed financial strain and ability to get groceries. Details of the use of SCREEN-8 in COMRISK are reported elsewhere (Fedoruk et al., 2023). Screeners were trained by an RD and were provided with a desk reference flow chart to aid in referrals. SCREEN-8 was developed to be administered by allied health professionals (not only RDs) or community outreach workers, such as at the GCC, and was validated for older adults for in-person or telephone screening (Keller et al., 2005), the latter being important because of the COVID-19 pandemic, which reduced in-person visits with HCPs at some sites. Based on the Primary Care Nutrition Pathway for Adults Aged 65+ (Keller et al., 2022), AHS created a referral resource to assist screeners in determining appropriate referrals, resources, and/or services to recommend at each risk stratum. Screeners were trained by an AHS RD on using SCREEN-8 and the referral algorithm.

As described in detail elsewhere (Fedoruk et al., 2023), screening of community-dwelling older adults occurred between June and November 2021. The target population was older ( $\geq 65$  years of age), community-dwelling adults. The GCC screened individuals as part of their intake assessment for community resources, which included assessment of physical ability, psychosocial variables, and safety in the home, culminating in a service plan that might include social or nutrition-related supports, transportation, or home maintenance. Outreach workers conducted in-person assessments in the individuals' homes. The P2PPCN screened individuals during in-person clinic visits and included at-risk younger (age 60–64 years) adults at the screeners' judgement. Screening was conducted by a social worker and a registered nurse (RN). The RDPCN

utilized licensed practical nurses (LPNs) and RNs to conduct either in-person or telephone screening.

To measure outcomes, surveys were completed at each site from February to April 2022. In addition, the SCREEN-8 forms were collected (as described in Fedoruk *et al.*, 2023) and any notes, in particular information about referrals (declined, accepted, to what organization or service) were summarized, to understand how the referral pathway was used by the screeners and the uptake of referrals by the individuals being screened.

### Surveys

An evaluation framework was co-created with the COMRISK partners, including leadership from AHS NS, RDPCN, GCC, the client ambassador, and the evaluation team. The team met monthly from January to June 2021 during this phase of the project. A matrix was developed based on the Reach, Efficacy, Adoption, Implementation, Maintenance (RE-AIM) framework (Glasgow, McKay, Piette, & Reynolds, 2001) to outline the potential metrics in each named category, participants in the evaluation, and mechanisms for data acquisition and access that were discussed. As the project was a real-world intervention, metrics that could not easily be accessed were not included. The evaluation team developed different surveys for staff who conducted screening versus leadership and RDs, which were reviewed by the entire team, modified based on feedback, and then submitted for ethical approval. The survey content was designed to address feasibility, acceptability, and appropriateness using validated items (Weiner *et al.*, 2017) as a guide for wording survey statements. Separate surveys were developed. Face validity was verified by the organizational leadership (CBO, PCN, and AHS NS). Survey items are provided in Supplemental Table 1. The patient perspective on acceptability, value, and effectiveness of nutrition risk screening was also incorporated into the overall evaluation and is reported elsewhere (Fedoruk *et al.*, 2023).

Questions with quantitative responses were graded on a Likert scale from 1 to 7 with 1 indicating “strongly disagree” and 7 indicating “strongly agree”. For each question, if a score  $\leq 5$  was given, comments were solicited. At the end of each section, there was also an opportunity to offer open-ended comments on the feasibility, acceptability, and appropriateness of nutrition risk screening.

Anonymous responses were collected and collated in Research Electronic Data Capture (REDCap), hosted at the University of Alberta. REDCap is a secure, Web-based software platform designed to support data capture for research studies, providing (1) an intuitive interface for validated data capture, (2) audit trails for tracking data manipulation and export procedures, (3) automated export procedures for seamless data downloads to common statistical packages, and (4) procedures for data integration and interoperability with external sources (Harris *et al.*, 2009; 2019). Trained research assistants audited and cleaned the data.

### Analysis

Data were exported from REDCap to Excel. For each survey, descriptive analysis of the questions measured on the Likert scales was performed and data were expressed as mean  $\pm$  standard deviation (SD). Comments were initially transcribed and sorted by survey item. To gain a better perspective of common versus divergent opinions of the respondent groups (e.g., screeners, leadership, RDs), a synthesis of the results was performed for similar questions asked of multiple respondents. This included the

numerical results (i.e., mean  $\pm$  SD) as well as comments provided for similarly worded questions (e.g., the item “Screening for nutrition risk benefits older adults” was asked of all respondents).

## Results

### Survey Respondents

LPNs, RNs, social workers, and outreach workers completed the screener survey ( $n = 10$ , response rate 42%). One member of the leadership team from each implementing site (total  $n = 3$ ), RDs receiving referrals ( $n = 4$ ), and NS team leadership ( $n = 3$ ) were provided surveys (Supplemental tables, response rate 100%). Although a survey was developed for physicians and provided to MDs at the RDPCN, no responses were received.

### Partnership Dynamics and Communications

Team leaders from the four organizations were surveyed as to the importance of the partnerships to the outcomes of the COMRISK pilot. There was unanimous agreement that the partnership was a suitable model to reduce nutrition risk in community-dwelling older adults (Table 1). There was also general agreement that it would be feasible to continue the two- or three-way partnerships and to use the partnership structure for other initiatives. Despite this strong support, some gaps were noted. It was unclear whether the partnership increased partner organizations’ ability to identify older adults with nutrition risk, and communications around referrals appeared to be sub-optimal. Comments indicated that the process of referring to an RD was rarely utilized by the GCC, in part because clients refused the referral. Although it was initially anticipated that there would be two-way communications between RDs and the referring organization, the PCNs indicated they did not know what happened with their patient after a referral. The overall results suggest that communications between the CBO and health system partners were less optimized than those between PCNs and AHS NS.

### Screening and Referrals

Details of screening the older adults are reported elsewhere (Fedoruk *et al.*, 2023). Briefly, 276 individuals were screened, with 53 per cent identified by the screeners as being at moderate nutrition risk (SCREEN-8 score between 22 and 37) and 8 per cent identified as being at high nutrition risk. Completion of the SCREEN-8 required the screener to sum the score. Scoring errors were detected in 32 cases (11.5%). This resulted in misclassification of six people (5 to a higher risk category, 1 to a lower risk category).

Screeners were provided with site-specific algorithms (also known as “desk references”) to assist with decision making regarding referrals, resources, and/or services offered. The desk reference provided specific referral options for each level of risk and key messages for education (e.g., risk factors for and signs and consequences of poor nutrition that could be tailored to the individual). People at high nutrition risk were to be offered an RD referral and any other appropriate resources or services as per algorithm outcome. For low-risk individuals, the resources provided were pamphlets regarding healthy eating and information on virtual programming offered by the Alberta Healthy Living Program. For those at moderate nutrition risk, in addition to basic information, individuals were to be offered referral to the community organization for outreach services, their physician, home care, meal

**Table 1.** Perspectives on feasibility of the partnerships

| Survey Item                                                                 | Comments                                                                                                                                                                                                                                                                                             | Score                        |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| Overall Feasibility of Partnerships                                         |                                                                                                                                                                                                                                                                                                      | Mean $\pm$ SD<br>( $n=3-4$ ) |
| Partnerships have potential to reduce nutrition risk                        | "...SCREEN-8 needs to be implemented in all outreach assessments in community-based social services..."<br>"... It is a start by identifying issues."                                                                                                                                                | 6.4 $\pm$ 0.44               |
| Partnership between CBO and PCN is feasible                                 |                                                                                                                                                                                                                                                                                                      |                              |
| Communications between CBO and PCN worked well                              | "We had no need to speak directly to them, they could generate a referral to us if they needed."                                                                                                                                                                                                     | 4.0 $\pm$ 0                  |
| Referral process between CBO and PCN worked well                            | "...no referrals"<br>"We do not know if new frozen meal clients or grocery delivery were referred from PCN."                                                                                                                                                                                         | 5.5 $\pm$ 1.5                |
| The partnership is important to organization's work with older adults       |                                                                                                                                                                                                                                                                                                      | 7.0 $\pm$ 0                  |
| It is a priority of my organization to continue this partnership            |                                                                                                                                                                                                                                                                                                      | 6.3 $\pm$ 0.9                |
| Partnership between CBO or PCN and AHS NS is feasible                       |                                                                                                                                                                                                                                                                                                      |                              |
| Communications with AHS NS worked well                                      | "Regular team meetings were helpful in communicating with each other. This helped to answer questions and obtain feedback from each other." [with regard to implementation]<br>"I feel there is only one way communication, PCN to AHS. We don't get follow up from AHS." [with regard to referrals] | 4.3 $\pm$ 1.5                |
| Partnership increased ability to identify older adults at nutrition risk    | "...were able to identify but clients did not want to be referred."                                                                                                                                                                                                                                  | 5.7 $\pm$ 1.5                |
| Partnership(s) is/are important to my organization's work with older adults |                                                                                                                                                                                                                                                                                                      | 6.7 $\pm$ 0.6                |
| Feasible to continue the partnership with AHS NS                            | "Need to have continued updated desk references, this was so handy!.... partnership needs to continue."                                                                                                                                                                                              | 5.9 $\pm$ 1.4                |
| Three-way or two-way partnership is acceptable                              |                                                                                                                                                                                                                                                                                                      |                              |
| Partnership is a good way to support older adults living in the community   | "... there was lots of relevance in the questions asked in the SCREEN 8 to the work of the PCN and Golden Circle staff."                                                                                                                                                                             | 6.8 $\pm$ 0.4                |
| The partnership could be expanded to other initiatives                      |                                                                                                                                                                                                                                                                                                      | 6.8 $\pm$ 0.4                |

Note. AHS NS = Alberta Health Services Nutrition Services; CBO = community-based organization; GCC = Golden Circle Senior Resource Centre; PCN = primary care network. Bracketed text is added for clarification/context.

delivery programs, a dentist, pharmacist, or other community-based services. For the GCC, referral to the RDPCN was also an option. These resources and services were listed on the desk reference for easy access. A total of 51 individuals (18.5%) accepting referrals was reported on the screening form. Declined referrals were consistently documented by RDPCN, resulting in 66 (40.5%) formally declining referrals. Declined referrals for clients/patients at GCC and P2PPCN were not consistently documented (although the form was amended midway through the intervention to include a check box for declined referrals). Consent to referral stratified by nutrition risk category is reported in Table 2. Of those offered a referral, acceptance was 4.3, 35.5, and 34.8 per cent of those at low, moderate, or high risk, respectively. Referrals to an RD and the primary care clinic (which included the family nurse, chronic disease management nurse, or physician) were most common followed by the GCC, Alberta Healthy Living Program class, other HCP (included home care nurse or pharmacist), and other CBO. Whether clients/patients followed through with a referral was documented only for RDs. Only 16 out of 23 screened individuals who accepted a referral (70.4%) consulted an RD. Additionally, three people at high nutrition risk indicated that they were already served by the appropriate HCP or CBO.

### Feasibility, Acceptability, and Appropriateness

Table 3 depicts the scores for survey items that were common or very similar to those for multiple surveyed groups, in order to compare scores. Selected quotes from open-ended survey questions support the scores and also indicate challenges. Scores and comments for all survey questions are provided in Supplemental tables.

Overall, all questions had a mean score above 5 (from agree to strongly agree) indicating satisfaction with the initiative (Supplemental Table 3). Scores related to feasibility were uniformly high (range 6.1–6.7) from all respondents. However, SCREEN-8 was judged to be more user-friendly and easier to integrate into work flows when administered in person rather than virtually. Positive comments were provided by screeners, including that the SCREEN-8 was easy to use and that it was a "good tool to open the door for conversation".

Regarding acceptability, most scores ranged from 6.0 to 7.0 (Table 3). Respondents were optimistic that screening for nutrition risk benefits older adults (scores 6.5–7.0) with supporting comments that it should be implemented in more community settings. However, RDs in particular noted that screening is only part of the overall support that should be provided to older adults.

**Table 2.** Referrals made to HCPs, GCC programs, other CBOs, and Alberta Healthy Living Program class, stratified by nutrition risk and referring site

| Referral to:                                   | Nutrition Risk |                 |                 |               |                 |                  |               |                |                 | Total |
|------------------------------------------------|----------------|-----------------|-----------------|---------------|-----------------|------------------|---------------|----------------|-----------------|-------|
|                                                | Low            |                 |                 | Moderate      |                 |                  | High          |                |                 |       |
|                                                | GCC<br>n = 29  | RDPCN<br>n = 80 | P2PPCN<br>n = 6 | GCC<br>n = 47 | RDPCN<br>n = 79 | P2PPCN<br>n = 12 | GCC<br>n = 18 | RDPCN<br>n = 4 | P2PPCN<br>n = 1 |       |
| RD                                             | 0              | 1               | 0               | 1             | 16              | 1                | 2             | 2              | 0               | 23    |
| PCN HCPs (e.g., FN, CDM, MD)                   | 0              | 2               | 0               | 0             | 17              | 1                | 0             | 1              | 0               | 21    |
| GCC Programs                                   | 0              | 0               | 0               | 6             | 1               | 0                | 2             | 0              | 0               | 9     |
| Other CBO                                      | 0              | 0               | 0               | 0             | 1               | 1                | 0             | 0              | 0               | 2     |
| Other HCP <sup>a</sup>                         | 0              | 0               | 0               | 1             | 1               | 0                | 1             | 0              | 0               | 3     |
| AHLP                                           | 0              | 2               | 0               | 0             | 0               | 2                | 0             | 0              | 0               | 4     |
| Total referrals (% of people in risk category) | 5 (4.3%)       |                 |                 | 49 (35.5%)    |                 |                  | 8 (34.8%)     |                |                 |       |
| Reason for lack of referral (if given)         |                |                 |                 |               |                 |                  |               |                |                 |       |
| Client already receiving services from a CBO   | 2              | 0               | 0               | 1             | 0               | 2                | 2             | 0              | 0               | 7     |
| Client already receiving RD/other HCP services | 1              | 1               | 0               | 0             | 3               | 1                | 0             | 1              | 0               | 7     |

Note. <sup>a</sup>Pharmacist, dental care, home care

AHLP = Alberta Healthy Living Program class; CBO = community-based organization; CDM = chronic disease management; FN = family nurse; GCC = Golden Circle Senior Resource Centre; HCP = health care professional; LPN = licensed practical nurse; MD = medical doctor; P2PPCN = Peaks to Prairies Primary Care Network; RD = registered dietitian; RDPCN = Red Deer Primary Care Network; RN = registered nurse.

The lowest scores were observed for questions related to appropriateness, particularly when assessing virtual screening, for which scores were 1.2–3.0 points lower than for in-person screening. Comments supporting this cited reduced ability to assess overall wellness of individuals, and a perception of time pressure (both screening taking more time and patients not wanting to extend the call). Screeners also reported reduced opportunity to provide education.

RDs stated that a lack of family member or caregiver presence during virtual consultations could reduce compliance with nutrition recommendations. It was also more difficult to provide individuals with referrals to appropriate community resources. Screeners identified that the lack of appropriate community supports for some individuals was an issue, with “I did not identify any gaps in appropriate supports in my community” receiving a score of 5.1. Overall, there were concerns about the financial and food resources available to help older adults at nutrition risk.

## Discussion

Inadequate nutrition is a highly prevalent problem in community-dwelling older adults, making it important to identify nutrition risk early before it progresses to a clinical diagnosis of malnutrition (Ramage-Morin *et al.*, 2017). Routine nutrition risk screening in older adults is an upstream intervention that can optimize treatment through referrals and improvement of patient outcomes (Laur & Keller, 2017). Overall, all categories of survey respondent indicated that nutrition risk screening was feasible, acceptable, and appropriate in their respective settings, which are indicators of the success of the intervention and are a prerequisite to sustainability of the initiative (Proctor *et al.*, 2011). In addition, the analysis suggests that referrals were generally appropriate, and when provided to individuals at moderate risk, had the potential to prevent further decline in nutritional status. The utilization of community organizations to maximize capacity to assist community-dwelling older adults has promise, although communications between the CBO and health care organizations need further optimization. Possibly,

strategies to increase uptake of referrals by people with moderate and high nutrition risk are needed.

The main tool used for data collection was the SCREEN-8 nutrition risk screening tool (Keller *et al.*, 2022), which contributed to the overall feasibility of screening because it was simple to use. The efficiency of the SCREEN-8 form was exemplified by the lack of negative comments from screeners about the amount of time required. In addition, the tool opened a conversation that could promote a more in-depth assessment. Of an individual with weight loss, the screener noted that the “score was low but our conversation was reassuring that there weren’t any concerns”, which could be interpreted as denial of risk or that the individual’s weight loss was intentional. Following up on basic questions on weight and appetite is important to inform specific adjustments to health-promotion strategies (Harris *et al.*, 2019). The use of the SCREEN-8 in the PCN and CBO setting is practical because it can be administered by anyone with minimal training (Borkent *et al.*, 2020). This is supported by a response of “strongly agree” for the adequacy of training (data not shown). Providing the screeners with the SCREEN-8 form and the referral pathway (desk reference), training, and organizational support for the time taken to screen likely helped overcome barriers identified by others, such as lack of resources or training and lack of care pathways (Harris, Taylor, *et al.*, 2019). However, arithmetical mistakes were made in some cases, resulting in misclassification of nutrition risk. This might be obviated for busy clinicians by embedding the screening tool in an electronic medical record with the capacity to perform arithmetic as well as flag values of concern.

Ideally, public health interventions are acceptable from the perspective of both the clients and those managing and administering the intervention. From the older adult perspective and consistent with other findings (Hamirudin *et al.*, 2016), nutrition risk screening was reportedly acceptable and provided a welcome opportunity to discuss nutrition (Fedoruk *et al.*, 2023). Screeners, organizational leadership, and RDs agreed that (1) using the SCREEN-8 and a referral algorithm supported their work with older adults and (2) the intervention was beneficial for that

**Table 3.** Perceptions of screeners, organizational leaders, nutrition services leadership, and Registered dietitians regarding the feasibility, acceptability, and appropriateness of using SCREEN-8 to assess nutrition risk in community settings

| Criterion                                             | Screeners (n=10)                                                                                                                                                                                                                                                                                                        | Organizational (CBO and PCN) Leadership (n=3)                                                                                                               | Nutrition Services Leadership (n=3) and RD (n=4)                                                                                                                                                          |
|-------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Feasibility</b>                                    |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                             |                                                                                                                                                                                                           |
| User-friendly                                         | 6.3 ± 0.5 (IP)<br>6.1 ± 1.0 (V)<br>“... some patients did not have the patience to stay on the phone ...”<br>“...good tool to open the door for conversation...”<br>“...simple and easy to answer questions...”                                                                                                         | 6.7 ± 0.6 (IP, n=3)<br>4.0 (V, n=1)                                                                                                                         | n/a                                                                                                                                                                                                       |
| Implementable into workflow                           | 6.4 ± 0.8<br>“...having the resources for further referral at the bottom [of the SCREEN-8] help[s] with providing options to [the] patient...”                                                                                                                                                                          | 6.7 ± 0.6<br>“...support from the physicians was key to buy-in by the PCN...”<br>“...would like to see it a regular screening in the EMR’s...”              | 6.7 (Leaders)<br>6.5 ± 0.6 (RDs)<br>“...biggest challenge may have been the time to complete the screens in a virtual environment...”                                                                     |
| <b>Acceptability</b>                                  |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                             |                                                                                                                                                                                                           |
| Meets the needs of older adults                       | 6.4 ± 1.0<br>“My experience is that poor nutrition results from inadequate financial resources.”                                                                                                                                                                                                                        | 6.0 ± 1.0                                                                                                                                                   | 5.7 ± 0.6 (Leaders)<br>5.5 ± 1 (RDs)<br>“It is one tool that can be used to identify the needs of older adults.”                                                                                          |
| Beneficial for older adults                           | 6.7 ± 0.5<br>“An accompanying intervention to make nutritious foods more accessible [...] would address the needs of older adults with limited resources...”                                                                                                                                                            | 6.7 ± 0.6<br>“If we could educate organizations that have the opportunity to implement this tool, it would provide better outcomes for aging in community.” | 7.0 ± 0 (Leaders)<br>6.5 ± 0.6 (RDs)<br>“If the individual referred has cognitive issues, it would be ideal to involve a family member/care giver.”                                                       |
| Supports the work of the respondent                   | 6.4 ± 0.8                                                                                                                                                                                                                                                                                                               | 7.0 ± 0                                                                                                                                                     | 7.0 ± 0 (Leaders)<br>6.8 ± 0.5 (RDs)                                                                                                                                                                      |
| <b>Appropriateness</b>                                |                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                             |                                                                                                                                                                                                           |
| SCREEN-8 is a good match for assessing nutrition risk | 6.7 ± 0.5 (IP)<br>5.5 ± 2.1 (V)<br>“...questions via phone [...] didn’t allow for the visual assessment of the patient’s wellbeing...”<br>“...swallowing question is amazing to have to prevent any further problems...”                                                                                                | 7.0 ± 0 (IP)<br>4.0 ± 0 (V, n=1)<br>“The tool created a heightened awareness.”                                                                              | 6.3 ± 0.6 (Leaders, referring to both CBO and PCN settings)<br>RDs n/a<br>“In person visitation would be ideal, especially if the family member/care giver could attend with the individual.”             |
| Able to recommend community supports                  | 6.0 ± 0.9<br>“...community resources change and the tool needs to be updated to cover the changes...”<br>“I did not feel so confident about the referral to supports in the community as I did not have much opportunity to do this...”                                                                                 | n/a                                                                                                                                                         | n/a                                                                                                                                                                                                       |
| No gaps in appropriate community support              | 5.1 ± 2.0<br>“...food banks do not offer fresh or frozen fruits and veggies. The items are primarily refined carbohydrates and tinned food items, in general nutritionally less dense.”<br>“The <i>Living Healthy While You Age</i> virtually was an amazing zoom workshop/ classes, but not always accessible to all.” | n/a                                                                                                                                                         | n/a                                                                                                                                                                                                       |
| Able to identify and provide referrals                | 6.6 ± 0.5 (CR, IP)<br>6.0 ± 0.8 (CR, V)<br>5.9 ± 1.5 (MS)<br>6.5 ± 0.7 (NS)<br>“...score was low but our conversation was reassuring that there weren’t any concerns.”                                                                                                                                                  | 5.7 ± 1.5 (CR, IP)<br>5.5 ± 2.1 (CR, V)<br>5.7 ± 1.5 (MS or NS)<br>“...were able to identify but client did not want to be referred.”                       | 5.7 ± 1.5<br>4.0 ± 0 (RDs)<br>“I only had one referral, which is concerning ... They [people with nutrition risk] are out there in the community, so I had thought there would have been more referrals.” |
| Opportunity to provide education about nutrition risk | 6.7 ± 0.5 (IP)<br>6.0 ± 0.8 (V)                                                                                                                                                                                                                                                                                         | 6.7 ± 0.6 (IP)<br>4.0 (V, n=1)                                                                                                                              | 6.0 ± 1.73 (Leaders)<br>6.0 ± 1.4 (RDs)                                                                                                                                                                   |

Note. Respondents included screeners (RN, LPN, social worker, outreach worker), organizational leadership involved in developing and implementing the initiative, AHS NS leadership and RDs who saw referrals.

CBO = community-based organization; CR = community resources; IP = in-person; MS = medical services; NS = Alberta Health Services Nutrition Services; PCN = primary care network; RD = registered dietitian; V = virtual.

population. Organizational leadership perspective on the acceptability of the partnership was also generally positive, although some of the processes for training, referral, and communications need to be optimized. All leaders strongly agreed that the partnership could be extended to other initiatives.

According to Proctor *et al.*, an appropriate intervention is one that is compatible with the practice setting and for the client/patient, and is well suited to address the defined problem (Proctor *et al.*, 2011). A main issue lowering appropriateness scores in COMRISK was the lack of specific services for individuals needing financial or food-security-related support, which was more apparent in the smaller communities of Sundre and Olds (both served by the P2PPCN) than in the city of Red Deer. This points to challenges with equitable delivery of health care in rural and remote settings (College of Family Physicians of Canada, 2017) as well as the capacity of CBO to serve smaller communities. Although critically important to many community functions, establishing and maintaining organizations in smaller centres is made more difficult by small membership, uncertain funding, and government bureaucracy (Bruce, Jordan, & Halseth, 1999). Such difficulties were exacerbated during the COVID-19 pandemic, which limited CBO in-person activities. Nevertheless, the CBO involved in COMRISK was adamant that more centres serving older adults could be involved in screening for nutrition risk. A different model was used in a partnering initiative to screen older adults for frailty, in which case screening was completed by an HCP at the CBO site, and both clinical and social prescriptions were offered to the clients (Rasiah *et al.*, 2021). Offering flexible models will be essential to recruiting more sites in screening initiatives such as these.

Consistently, screeners and organizational leadership scored appropriateness of virtual screening lower than in-person screening. Screeners mostly attributed this to the inability to visually assess individuals via telephone, increased length of time needed for assessment, and reduced tolerance of patients for the virtual format. Borkent *et al.* (2020), however, refers to some of the benefits of virtual screening administration; for example, alleviating the need of patients to travel. During the COVID-19 pandemic, virtual visits were necessary to reduce risk of this highly vulnerable population acquiring an infection, and allowed the health care team to maintain contact with isolated patients. Similar virtual initiatives have been reported in other jurisdictions (Krzmaric *et al.*, 2020). Future implementation of virtual nutrition risk screening could trial videoconferencing, which would facilitate visual physical assessment and increase the interpersonal connection, although some individuals may be uncomfortable using videoconferencing and/or lack the necessary technical skills and equipment. One screener noted limited uptake of the virtual Alberta Healthy Living Program class: “The ‘Staying Strong and Health While We Age’ virtually was an amazing Zoom™ workshop/class, but not always accessible to all.”

The moderate nutrition risk group (capturing > 50% of participants) is the target for preventative care and lifestyle adjustments to prevent further decline and keep people in the community. Referrals are a critical last step of the nutrition screening process to prevent and treat malnutrition (Stratton *et al.*, 2018). A strong referral process and the creation or utilization of community resources are needed to facilitate interventions to address the specific nutrition risks identified. As discussed, more resources need to be identified or established in the community to provide appropriate support for individuals at nutrition risk, particularly to provide financial support or access to healthy foods. As these

supports are ever-changing, the desk reference tools need to be regularly updated. If community supports are not available, or screeners are unaware of the supports, the appropriateness and sustainability of implementation decreases. Another finding was that PCN screeners were more likely to refer to medical supports whereas CBO screeners favoured community supports. This may reflect the familiarity of the screeners with their own resources; for example, one screener commented that “I did not feel so confident about the referral to supports in the community as I did not have much opportunity to do this.” However, it may also indicate that older adults had different preferences depending on the setting where they were screened, as notes from screeners indicated that some clients refused referrals either to an HCP or conversely to a CBO. A study in Ontario, Canada found that community-based resources were under-utilized, even by patients who could benefit greatly, and identified a number of barriers including lack of literacy, familiarity with the language, transportation, and income (Dahrouge, James, Gauthier, & Chiocchio, 2018), but we were unable to systematically identify such barriers. However, community-based partnerships are increasingly recognized as being important to addressing numerous prevalent health conditions. In the United States, an Expanded Chronic Care Model envisions interconnected care delivery involving the health system with community-based provision of financial, healthy food, and housing resources (Plumb, Carson Weinstein, Brawer, & Scott, 2012).

Evaluation of referrals indicated that most referrals were appropriate; that is, those at high risk were most likely to be referred to an RD whereas those at moderate risk were referred to an RD when warranted (e.g., because of unintentional weight loss) and to other resources within the medical home or offered by the CBO. However, approximately 25 per cent of high and 49 per cent of moderate risk patients declined referral, which was somewhat lower than the 60 per cent refusal reported in another study (Akhtar *et al.*, 2015). On the other hand, given the overall objective to prevent escalation of nutrition risk, identifying and providing referrals to 38 per cent of those at moderate risk provides those individuals an opportunity to improve their nutrition. Nevertheless, the fact that only one third of high-risk individuals were provided and accepted referrals is concerning. The lack of referrals may be the result of patient denial, screener inexperience, virtual settings, time constraints, or inaccessibility of resources (Hamirudin, Charlton, & Walton, 2016; Reimer *et al.*, 2012). Lack of access to an RD was not mentioned as a concern; however, it could be an issue in rural settings (Hamirudin, Charlton, & Walton, 2016). In this study, access to an RD was provided through provincial NS of AHS. In another Canadian study, common reasons identified for declining a referral include “denial” and “low prioritization of nutrition” (Akhtar *et al.*, 2015). Repeated screening and support to overcome denial, training refreshers for screeners, and provision of more appropriate resources (e.g. food and income support) could increase referral uptake and make them more useful. Moreover, having screening information in the client’s file will alert the entire care team, which could facilitate closer follow-up and the opportunity to address ambivalence towards a referral. In this pilot initiative, screeners were provided with a care pathway with care options accessible to all members of the care team, such as education and monitoring weight (Keller *et al.*, 2022). Screening for access to adequate nutrition, along with other social determinants of health, is recognized as a way to increase health equity (American Academy of Family Physicians, 2019).

Additionally, the general population may not fully understand the severity of malnutrition or the necessity of preventative measures (Reimer et al., 2012). People may not believe their screening results because of optimistic bias, causing them to view their nutritional health as better than average (Murray, 2011); such bias increases with age (Chowdhury, Sharot, Wolfe, Duzel, & Dolan, 2014). Optimistic bias is a form of coping that older adults use to deal with worry and to preserve self-image, which may impede behaviour change, as they are not yet able to commit to a nutrition intervention (Reimer et al., 2012). Nutrition risk can also be relatively silent, in that the signs and symptoms may not be noticeable to a non-HCP. Patients of declared high risk for any disease may need a serious medical event to occur, such as a heart attack, to convince them of the seriousness of their conditions (Chowdhury et al., 2014).

A strength and novel aspect of this study was the involvement of both HCP and CBO staff in nutrition risk screening, which has the potential to increase reach and access. Of the three sites, GCC screeners identified the highest prevalence of high nutrition risk, potentially meaning that senior centres could be primary targets for nutrition screening to capture the most at-risk community dwellers. Feedback on feasibility, acceptability, and appropriateness was sought from screeners as well as organizational leadership, whereas the patient perspective of being screened has been examined elsewhere (Fedoruk et al., 2023). The evaluation framework was co-developed with the stakeholders; therefore, the feedback addressed issues of importance to all organizations as well as clients. A limitation of this study was that although face validity was assessed and the questions were developed using a published method for assessing feasibility, acceptability, and accessibility (Weiner et al., 2017), the surveys were not fully validated. Efficacy of screening to reduce nutrition risk and health care costs was not measured, and would require a longer-term study with follow-up screening and assessment of health care utilization. However, a systematic review indicates that screening for nutrition risk in community-dwelling older adults followed by appropriate intervention does improve nutritional status (Hamirudin, Charlton, & Walton, 2016).

## Conclusions

Study respondents agree that regular nutrition risk screening in CBOs and primary healthcare settings is feasible and acceptable, and offered suggestions to strengthen sustainability. Although screening was appropriate to identify those at risk, the process was hampered by the need for virtual screening during part of the project and a lack of community-based resources especially in smaller communities. In addition, uptake of referrals by clients/patients was sub-optimal given the level of risk, and communications among the organizations was noted as an area for improvement.

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