

*Identification of
Seniors
At
Risk*

**ISAR:
A SCREENING TOOL FOR SENIORS IN THE EMERGENCY
DEPARTMENT AT INCREASED RISK OF ADVERSE
OUTCOMES**

GUIDE TO USE AND IMPLEMENTATION

**ISAR Tool developed by St. Mary's Hospital Center in collaboration with the Sir
Mortimer B. Davis Jewish General Hospital, Maisonneuve-Rosemont Hospital,
Sacré-Coeur Hospital
and the Montreal Regional Board for Health and Social Services (Régie régionale
de la santé et des services sociaux de Montréal-Centre)**

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GLOSSARY

Clinical evaluation

This is a short evaluation carried out by a provider who is knowledgeable in the care of older patients. The evaluation will identify the main biopsychosocial needs of the patient, and identify interventions that will reduce the risk of further adverse outcomes.

False positives

Patients who screen positive on the screening tool but are not truly at risk of adverse outcomes.

False negative

Patients who screen negative on the screening tool but who are in fact at increased risk of adverse outcomes.

Screening tool

A method of rapidly distinguishing 2 groups of patients:

- ⇒ Those at risk of adverse outcomes: Positive screening
- ⇒ Those not at risk of adverse outcomes: Negative screening

IT SHOULD BE NOTED THAT A SCREENING TOOL IS NOT A DIAGNOSTIC TEST. It is therefore necessary to conduct a more detailed clinical evaluation in order to confirm the presence of conditions that may increase the risk of adverse outcomes, and to identify the patient's needs.

Adverse outcomes

The adverse outcomes considered in the development of the ISAR screening tool included the following:

- functional decline (significant reduction in independence of activities of daily living) during the 6 months after the ED visit
- admission to a nursing home or long-term care hospital or hospitalization for at least 3 months during the 6 months after the ED visit
- death during the 6 months after the ED visit
- severe disability in basic activities of daily living at the ED visit??

Please note that the last category was included as, although clients were unlikely to deteriorate further, it was felt important that ED staff evaluate their needs.

Total score

The number of points scored on the screening test.

Sensitivity

The proportion of patients who screened positive and are at increased risk of adverse outcomes (true positives) among all the patients who are at increased risk of adverse outcomes:

$$\frac{\text{True positives}}{\text{True positives} + \text{false negatives}}$$

Result of screen	Adverse outcomes		Total
	at risk	not at risk	
Positive (+)	true positive	false positive	total who screened positive true positive + false positive
Negative (-)	false negative	true negative	total who screened negative
Total	total at risk true positive + false negative	Total not at risk	total screened

Cut-off point

The cut-off point is established by the hospital involved and will be the score that distinguishes those who screened positive versus negative. For example, if the cut-off is set at 2 or more, than patients whose score on the screening tool is 2 or more will be considered to screen positive and be at increased risk of adverse outcomes.

Positive screening rate

The percentage (%) of patients with a positive screening result among all the patients screened:

$$\frac{\text{total who screened positive}}{\text{total screened}}$$

Result of screen	Adverse outcomes		Total
	at risk	not at risk	
Positive (+)	true positive	false positive	total who screened positive true positive + false positive
Negative (-)	false negative	true negative	total who screened negative
Total	total at risk true positive + false negative	Total not at risk	total screened

Predictive value of a positive result

The proportion of patients who screen positive and will develop adverse outcomes among all patients who screened positive:

$$\frac{\text{true positives}}{\text{true positives} + \text{false positives}}$$

Result of screen	Adverse outcomes		Total
	at risk	not at risk	
Positive (+)	True positive	false positive	total who screened positive true positive + false positive
Negative (-)	False negative	true negative	total who screened negative
Total	Total at risk true positive + false negative	total not at risk	total screened

True positives

Patients screen positive by the screening tool who are truly at increased risk of adverse outcomes.

True negatives

Patients who screen negative on the screening tool and are not at increased risk of adverse outcomes.

PREFACE

The ISAR screening tool was developed as the result of a project carried out by the Department of Clinical Epidemiology and Community Studies of St. Mary's Hospital in collaboration with three other hospitals (Maisonneuve-Rosemont, Sacré-Coeur, Sir Mortimer B. Davis Jewish General) and the Régie Régionale de la Santé et des Services Sociaux du Montréal-Centre (RRSSS).

The project was supported by the Quebec Ministry of Health and Social Services, the Régie Régionale de la Santé et des Services Sociaux du Montréal-Centre (RRSSS), and by St. Mary's Hospital Centre.

The initial research objectives were to develop a screening tool for use in the emergency department (ED) to identify seniors at increased risk of adverse outcomes and to determine the follow-up most appropriate for their specific needs. The significant volume of seniors in the ED and the lack of knowledge related to this population in the ED underline the importance of this research.

The research project was divided into two phases. In PHASE 1, questions were developed on the risk factors associated with functional decline in seniors. A preliminary study based on the questions was then conducted on a small group of patients. Following this phase, a questionnaire comprising of 27 questions was developed which was then used in a larger study aimed to aid in the formation of the ISAR screening tool. The sample consisted of 1885 seniors; 1708 were followed up by telephone 6 months after their visit to the ED, and 221 patients were followed up at home 21 days after their ED visit to analyze the reliability and validity of the screening tool. The tool comprised the best sub-group of six questions predicting an increased risk of adverse outcomes during the 6 months after the ED visit including: functional decline, death, and admission to a nursing home or other long-term care institution.

In addition, the ISAR tool possesses the following characteristics:

- Identifies patients in the ED with severe disability;
- Performs well in subgroups defined by age (75 years and over), disposition (admission or discharge), and language of administration (French or English);
- Predicts follow-up results in 6 months after ED visit (falls, repeated visits to the ED, and number of days in hospital);
- Reliable and valid;
- Simple and can be self-administered;
- Can be completed in the ED by a majority of patients age 65 years and over.

This research has demonstrated that the ISAR tool can be useful in allowing early identification in the ED of seniors at increased risk of adverse outcomes who could benefit from a more detailed clinical evaluation and specific intervention. Additional research is now being undertaken to determine if offering specific interventions to patients who screen positive using the ISAR tool will be effective in reducing adverse outcomes and inappropriate use of health care services.

For further details on the research protocol and the results please contact Dr. Jane McCusker in the Department of Clinical Epidemiology and Community studies at St. Mary's Hospital Center.

INTRODUCTION

The ISAR tool has been developed for use in the emergency department. It represents one of the first steps in improving health care services to be offered to seniors to better meet their needs. Without the screening tool, seniors in the ED who are at increased risk for adverse outcomes could go undetected.

The purpose of this guide is to introduce the ISAR screening tool in terms of content and methods of application in hospitals. Several healthcare professionals such as managers and other staff members collaborated with the research team in the development of this tool.

The FIRST SECTION of the document IS PARTICULARLY DIRECTED to CLINICAL HEALTH CARE PROVIDERS who will use the tool in their daily clinical activities. Information on the goal of the screening tool, characteristics of the target population and follow-up of the screening process is provided. This section may serve as a guideline for training staff members who will use the ISAR tool.

The SECOND SECTION of this document IS ADDRESSED to HEALTHCARE MANAGERS who will need to implement the screening tool in their organization. There are nine steps required to implement the screening tool. These include identification of person in charge of implementation of screening tool, development of a management process, and organization of training for staff members, etc. Each step of the process can be adapted to the particular hospital, but it is important that each hospital take into account the recommended target population, and the cut-off points in order to conserve the sensitivity and predictive value of the tool.

A copy of the ISAR tool, and statistical information for choice of the cut-off point is provided at the end of this document as well as actual case studies which serve to illustrate the screening process and may be useful for training staff.

Part 1

Description of ISAR screening tool and guide to utilization

1.1 Goal of the screening tool

The ISAR screening tool aims to identify the following groups of patients:

- ⇒ those with severe disability at the time they visit the Emergency Department (ED);
- ⇒ those at risk of developing adverse outcomes during the 6 months after the ED visit; these include death, admission to long-term care, and functional decline (decreasing independence).

The ISAR screening tool allows for the early identification in the ED of seniors at increased risk, thus allowing specific clinical services to be delivered more efficiently to deal with the particular needs of these patients.

It is important to bear in mind that the ISAR tool is NOT A DIAGNOSTIC TOOL and must be linked to process of follow-up, including a clinical evaluation. It should never replace the judgement of health care providers.

1.2 Target population

The ISAR tool was designed to screen all seniors (aged 65 and over) in the ED, including those admitted to hospital, arrived in ED by ambulance, or walk-in.¹

The ISAR tool was not designed to screen seniors referred to the ED from a nursing home or a long term care hospital. These seniors already experience functional loss and have other services available to meet their needs.

1.3 Description of the ISAR screening tool

The ISAR questionnaire consists of 6 questions. These questions cover the common and most frequently observed problems in seniors in the ED department: functional loss, cognitive impairment, polypharmacy, visual impairment and frequent hospitalizations. (see Figure 1).

Each question has 2 possible responses: “yes” or “no”. To the right of each question, space is provided to check either response. The responses are scored as “01” or “00” respectively, and is used to calculate the total score of the screening. The questions are in large print to facilitate their legibility to seniors who wish to complete the questionnaire on their own.

It is very important that the WORDING of each question IS NOT MODIFIED as it may alter the results of the screening and the sensitivity and predictive value.

¹ When implementing the tool, the organization can modify the target population for diverse reasons. We suggest that you consult section 2.4 of this document for further information.

**Figure 1
ISAR Questionnaire**

<p>1. Before the illness or injury that brought you to the Emergency, did you need someone to help you on a regular basis ?</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>01 00</p>
<p>2. Since the illness or injury that brought you to the Emergency, have you needed more help than usual to take care of yourself?</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>01 00</p>
<p>3. Have you been hospitalized for one or more nights during the past 6 months (excluding a stay in the Emergency Department)</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>01 00</p>
<p>4. In general, do you see well ?</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>00 01</p>
<p>5. In general, do you have serious problems with your memory ?</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>01 00</p>
<p>6. Do you take more than three different medication everyday ?</p>	<p><input type="checkbox"/> YES <input type="checkbox"/> NO</p>	<p>01 00</p>

There are three sections on the back of the ISAR questionnaire which should be completed by the staff member who administers the questionnaire (see figure 2):

- ⇒ SECTION 1 identifies the source of information for the screening or the reason for non-screening. It is first necessary to check the patient's orientation in time and place as well as the patient's physical status.
- ⇒ SECTION 2 indicates the total screening score.
- ⇒ SECTION 3 is reserved for recording the names and contact information of key staff members (who will be responsible for follow-up, if appropriate).
Please note that this section could be modified according to the needs of the organization and the resources available.

Other sections may be added to meet the needs of specific organizations.

1.4 Use of the ISAR screening tool for emergency department staff

This section describes the sequential steps that need to be followed by the Emergency staff to implement the ISAR screening tool.

Step 1 - Determine information source (section 1 in back of ISAR)

- ⇒ Check the case which best represents the patient's situation
- ⇒ Follow the instruction associated with that situation

If necessary, evaluate the patient's ability to complete the ISAR by confirming whether the patient is oriented to time and place:

- ⇒ *What is the day of the week today?*
- ⇒ *Where are you?*

Step 2 - Administer screening questions

Make sure that ISAR is completed following the instructions provided in the previous step.

If ISAR is completed by patient or family member...

- ⇒ Check that each question is answered and only one answer is checked.

If ISAR is administered by a staff member...

- ⇒ Read the questions clearly without interpretation

If ISAR is not completed because patient is medically unstable...

- ⇒ Consider carrying out screening later on after the patient's medical condition is stable.

Figure 2

Section 1 – Information source (Check one box and make appropriate follow-up)	
<input type="checkbox"/> Patient oriented to time and place	Patient completes ISAR
<input type="checkbox"/> Patient oriented to time and place, but unable to complete ISAR for various reasons (can't read, physical deficiency...)	Patient completes ISAR with the help of the intervenant of the informant
<input type="checkbox"/> Patient disoriented to time and space, informant available	Informant Complets ISAR
<input type="checkbox"/> Patient disoriented to time and place, informant not available	Positive screening
<input type="checkbox"/> Patient medically unstable	Impossible screening, postponed
Name of the informant: _____ Tel: _____	

Section 2 – Score
<p>Compile the answers (0 or 1 point)</p> <p>If the patient obtained 2 points or more, it is a positive screening</p> <p>Results : _____ / 6 points</p> <p>Positive screening <input type="checkbox"/> Negative screening <input type="checkbox"/></p>

Section 3 – If positive, inform as needed
<input type="checkbox"/> Liaison nurse: _____
<input type="checkbox"/> Social worker: _____
<input type="checkbox"/> Other: _____

The screening should be carried out quickly. In depth questioning of those at risk will be done later.

Step 3 - Score the questionnaire (section 2 on the back of the ISAR)

- ⇒ Each question is scored as 0 or 1. Add up all the responses.
- ⇒ Write in the total score: 0 to 6 points, out of 6 points.
- ⇒ Follow the instructions to check if the screening result is positive or negative.²

Step 4 - Identify staff members responsible for follow-up (section 3 on the back of the ISAR)

If the result of the screening is positive, inform key staff members who are responsible for follow-up. This could be:

- ⇒ Liaison nurse in ED or geriatric nurse
- ⇒ Social worker
- ⇒ CLSC case manager
- ⇒ Attending physician
- ⇒ Other...

Step 5 - Sign the document

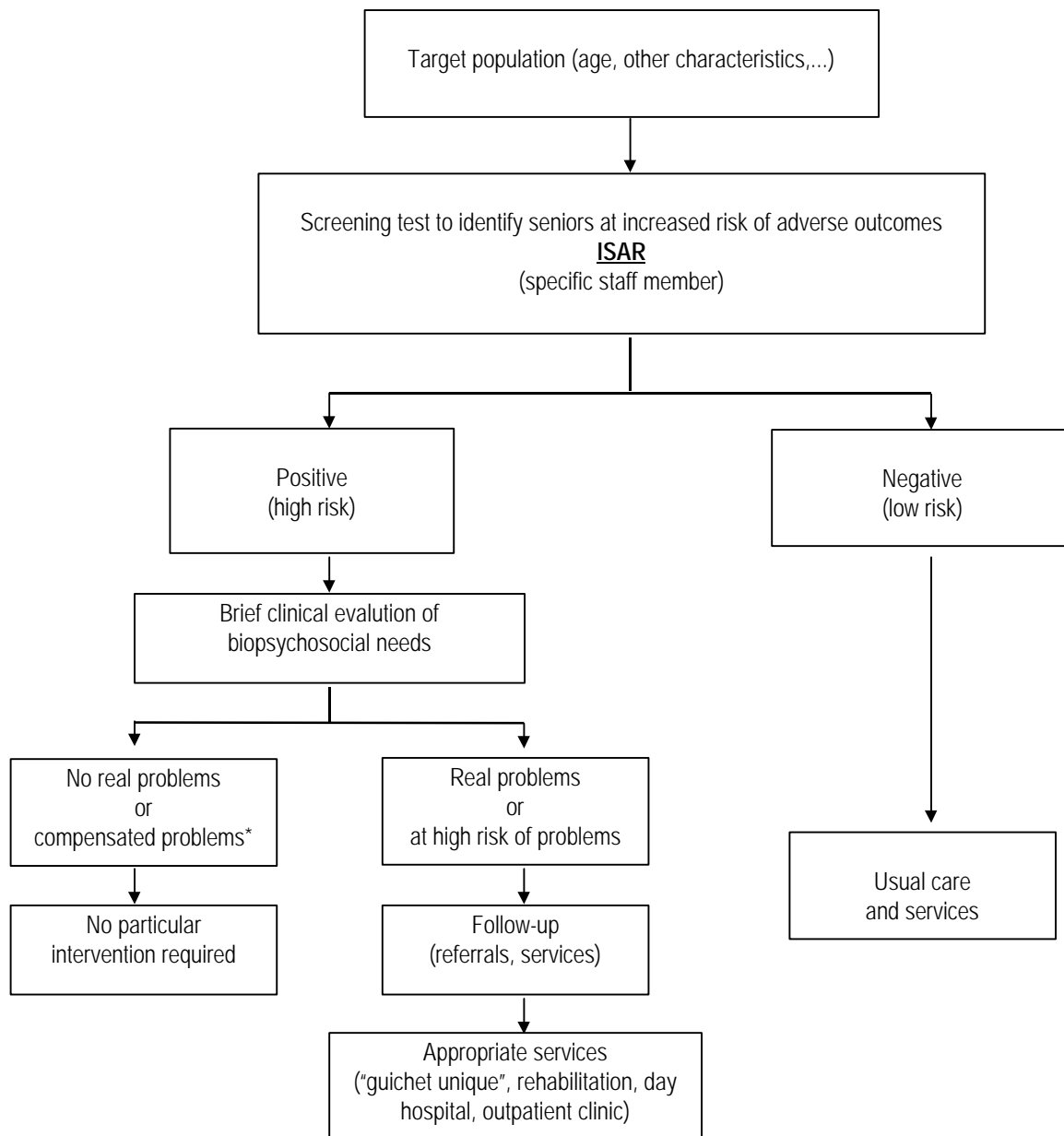
The signature of the person responsible for the screening is required as the questionnaire is an official document to be included in the medical record of the patient.

1.5 Follow-up post screening

For patients who screen positive, the staff person in the ER must ensure that the patient receives follow-up according to the management process planned by the organization (see Figure 3). This will involve a brief clinical evaluation of the biopsychosocial needs of the patient in order to document problems and determine the appropriate follow-up.

² The cut-off point (a score of 3+ or 2+) can be modified by the organization, but this will change the performance of the tool. Please review section 2.5 for further information.

Figure 3
General process of management of patients



* The elderly patient presenting with real but compensated problems is a patient who is at risk of adverse outcomes, but who has all the resources (individual, social, or material) necessary to meet his/her needs.

Part 2

Implementation of screening program

The implementation of a screening program using the ISAR tool requires careful planning following a carefully structured sequence of steps taken in collaboration with various clinical staff and different hospital sectors. The following stages illustrate this process that need to be followed in order to have a well-functioning screening program undertaken by the responsible team. In addition, Figure 5 on page 20 illustrates the steps taken.

2.1 Appoint a staff member responsible for implementation and follow-up

The STAFF MEMBER has a clear mandate and decision making authority. Ideally, this person is not associated with a specific service or professional group, but to a PROJECT IN AN INSTITUTION.

The main responsibilities of the staff member is to plan, organize and coordinate the project in collaboration with an internal interdisciplinary working committee which is described in the following section.

2.2 Strike an interdisciplinary working committee

This committee consists of director generals, heads of medical services in emergency and geriatrics, head nurses, liaison nurse, social workers, and rehabilitation professionals (occupational therapist, physiotherapist).

The role of the committee is to develop general methods of implementation of the project. These methods include defining the target population, the cut-off point, the required resources, general management process, evaluation and follow-up which are discussed below.

2.3 Define the target population

You must define the target population to whom ISAR will be administered. Ideally the screening program should include all ED patients aged 65 and over but it is also valid among sub-groups of this population. For example, the ISAR tool could screen the following subgroups of seniors:

- ⇒ those aged 75 and over,....;
- ⇒ stretcher patients;
- ⇒ those discharged home.

This decision affects the number of patients to be screened and the number that will screen positive. HOWEVER, THE TARGETING OF A PARTICULAR SUBGROUP OF SENIORS MEANS THAT THOSE WHO ARE AT RISK BUT NOT MEMBERS OF THIS SUBGROUP WILL NOT BE DETECTED.

Appendix 2 provides data on the sensitivity and predictive value of the ISAR in subgroups of seniors.

2.4 Determine the cut-off score

You must decide what cut-off point is to be used to define patients at increased risk. A cut-off of 2 or more on the ISAR tool is recommended for optimal identification of high-risk seniors. However, the ISAR tool is also valid with cut-off scores of 3 or 4.

If a higher cut-off is used, you can expect the following:

- ⇒ fewer patients will screen positive;
- ⇒ a higher percentage of those who screen positive will be TRULY at increased risk

The choice of a higher cut off point reduces the workload of the staff since a higher cut off point lowers the number of patients who screen positive. NOTE THAT IF A HIGHER CUT OFF SCORE IS USED, PATIENTS WITH A LOWER SCORE BUT WHO ARE TRULY AT RISK MAY BE MISSED BY THE SCREENING.

Appendix 2 provides data on the sensitivity and predictive value of the ISAR tool using different cut off points.

2.5 Coordination with CLSC and other community resources

Meeting with the CLSC and other community resources must be planned in order to:

- ⇒ identify community services that are available and accessible;
- ⇒ develop referral methods and intervention protocols.

2.6 Management process

The screening program involves both screening in the ED with the ISAR tool and follow-up in and/or outside the hospital of patients with a positive screening result. The three steps to consider in this process are:

- ⇒ the screening;
- ⇒ clinical evaluation of the biopsychosocial needs of the patient;
- ⇒ referrals and follow-up.

For each step of the process, it is important to identify the timing of activities / interventions (day, evening, night, weekend, holidays,...), resources used and/or staff members involved and their roles and responsibilities.

Please consult section 1.5 in figure 2 of this document for further details on the management process (or follow-up process) suggested.

2.7 Resources needed

Staff members and their specific roles must be identified. It is necessary to plan resources needed for:

- ⇒ administration of the ISAR questionnaire (staff nurse, triage nurse,...);
- ⇒ brief clinical evaluation of the biopsychosocial needs of the patient (liaison nurse, member of the geriatric team, social worker in ED,...);
- ⇒ liaison with other establishments and organizations in the community (liaison nurse, members of geriatric team,...).

2.8 Training and support for staff members

Staff members must be trained to administer the ISAR according to the instructions previously mentioned (see section 1). To reach this objective you must:

- ⇒ designate a person responsible for training and support;
- ⇒ identify staff members involved (including substitute staff members);
- ⇒ organize training sessions (approx. 2 hours);
- ⇒ establish a support system for staff during implementation.

2.9 Evaluation and follow-up

Lastly, the staff member responsible of the project in collaboration with the internal interdisciplinary working committee must examine the tools or methods of evaluation for the screening program and make the needed changes. To complete this task, follow-up indicators are suggested in Figure 4.

Such a follow-up would allow resources to be adapted to the number of patients involved in the screening process. In this respect, it is desirable that the follow-up is more intense during the first months of implementation.

Figure 4
Indicators for evaluation of screening process and follow-up

For target population Number of visits to the ED by target population Reasons why screening process not completed Number of patients screened Number of positive results
For patients who screened positive Number of patients who received a brief clinical evaluation of their biopsychosocial needs Reasons why evaluation was not completed
For patients who received a brief clinical evaluation of their biopsychosocial needs Specific problems identified Specific referrals made
For patients who received specific referrals Type of evaluation and services received from referral

Figure 5
Specific action plan

General objective: Implementation of a emergency department screening program for seniors at risk of functional decline.

<i>Specific objectives</i>	<i>Activities</i>	<i>Staff member responsible</i>
Appoint a staff member responsible for implementation and follow-up	<ul style="list-style-type: none"> ⇒ Define a clear mandate ⇒ Designate an experienced staff member 	
Strike an interdisciplinary working committee	<ul style="list-style-type: none"> ⇒ Identify members of the working committees ⇒ Establish an action plan to integrate the suggested steps of implementation 	
Define the target population	<ul style="list-style-type: none"> ⇒ Consult appendix 2 of this document ⇒ Establish a link between the task and available resources ⇒ Specify which group or subgroup of patients will be screened with ISAR 	
Determine the cut-off score	<ul style="list-style-type: none"> ⇒ Consult appendix 2 of this document ⇒ Establish a link between the task and available resources ⇒ Specify which cut-off point will be used during administration of ISAR 	
Coordination with CLSC and other community resources	<ul style="list-style-type: none"> ⇒ Identify services offered ⇒ Develop referral methods and intervention protocols 	
Management process	Identify for each step: <ul style="list-style-type: none"> ⇒ Timing of activities/intervention ⇒ Staff members involved. ⇒ Roles and responsibilities of each staff member involved. 	

Appendix 1

ISAR tool

ISAR Questionnaire (front)

LOGO

A D D R E S S O G R A P H

Please answer yes or no to each of these questions

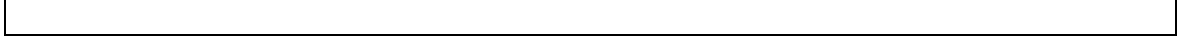
			Hospital use only
1. Before the illness or injury that brought you to the Emergency, did you need someone to help you on a regular basis?	<input type="checkbox"/>	YES	01
	<input type="checkbox"/>	NO	00
2. Since the illness or injury that brought you to the Emergency, have you needed more help than usual to take care of yourself?	<input type="checkbox"/>	YES	01
	<input type="checkbox"/>	NO	00
3. Have you been hospitalized for one or more nights during the past 6 months (excluding a stay in the Emergency Department)?	<input type="checkbox"/>	YES	01
	<input type="checkbox"/>	NO	00
4. In general, do you see well?	<input type="checkbox"/>	YES	00
	<input type="checkbox"/>	NO	01
5. In general, do you have serious problems with your memory?	<input type="checkbox"/>	YES	01
	<input type="checkbox"/>	NO	00
6. Do you take more than three different medications every day?	<input type="checkbox"/>	YES	01
	<input type="checkbox"/>	NO	00

ISAR Questionnaire (back)

Section 1 – Information source (Check one box and make appropriate follow-up)	
<input type="checkbox"/> Patient oriented to time and place	Patient completes ISAR
<input type="checkbox"/> Patient oriented to time and place, but unable to complete ISAR for various reasons (can't read, physical deficiency...)	Patient completes ISAR with the help of the intervenant of the informant
<input type="checkbox"/> Patient disoriented to time and space, informant available	Informant complete ISAR
<input type="checkbox"/> Patient disoriented to time and place, informant not available	Positive screening
<input type="checkbox"/> Patient medically unstable	Impossible screening, postponed
Name of the informant: _____ Tel: _____	

Section 2 – Score
Total the scores (0 or 1 point)
If the patient has a score of 2 points or more, the screen is positive
Results : _____ / 6 points
Positive screen <input type="checkbox"/> Negative screen <input type="checkbox"/>

Section 3 – Persons informed of positive result
<input type="checkbox"/> Liaison nurse: _____
<input type="checkbox"/> Social worker: _____
<input type="checkbox"/> Other: _____



Appendix 2

Choice of a cut-off point

CUT-OFF POINT

The choice of the cut-off point of the **ISAR** score should take into account the following criteria:

- ⇒ **the percentage of patients who screened positive**
- ⇒ **the sensitivity of the tool**
- ⇒ **the predictive value of the tool**

These criteria allow us to estimate approximately:

- ⇒ **the workload associated with the screening**
- ⇒ **the resources required to undertake screening**

The following table presents the percentage of patients who screen positive, and the sensitivity and the predictive value of the **ISAR** screening tool for 3 different cut-off points for patients aged 65 and over. This table should be useful in choosing the cut-off point that is the most convenient for your institution and that corresponds to the availability of the resources, the target population, as well as the type of screening you wish to perform.

PERCENT THAT SCREEN POSITIVE

Cut-off	Positive screen (%)	Sensitivity (%)	Predictive value (%)
2 points or more	51	75	51
3 points or more	27	48	60
4 points or more	12	25	70

⇒ What is a positive screen?

It is the proportion (%) of patients who score at or above the cut-off point, divided by the total number of patients aged 65 and over in the ED who receive the **ISAR** screening tool.

Among patients aged 65 and over presenting to the ED of your hospital every day, the cut-off could be set at 2 points or more, meaning that 51% of patients would have a positive screen, i.e. a score of 2 points or more.

Thus, if 100 patients aged 65 years and over come to the ED of your hospital every day and receive the **ISAR** screening tool, 51 patients would have a positive score for **ISAR**, i.e. a score of 2 points or more.

If the cut-off was set at 3 points or more, then among 100 patients who come to the ED of your hospital center every day and receive the **ISAR** screening tool, 27 patients would have a positive screen.

The percent that screen positive will decrease as the cut-off score increases.

SENSITIVITY

Cut-off point	Positive screen (%)	Sensitivity (%)	Predictive value (%)
2 points or more	51	75	51
3 points or more	27	48	60
4 points or more	12	25	70

⇒ What is the sensitivity?

The proportion (%) of patients who screen positive and will develop an adverse outcome (true positives) among all the patients who develop an adverse outcome, and complete the screening tool.

For a cut-off point of 2 points or more in patients aged 65 and over, 75% of patients who developed an adverse outcome presenting to the ED of your hospital would have screened positive (true positive). However, 25% patients presenting to the ED who developed an adverse outcome would not have been identified (false negative).

Increases in the cut-off score (3, 4, points,..) will decrease the sensitivity of the tool , i.e. the number of false negatives (patients at risk, but not identified by the tool because of a high cut-off score) will be greater. At the same time, the number of true positives (patients screened positive and who are truly at risk) will be lower.

PREDICTIVE VALUE

Cut-off point	Positive screen (%)	Sensitivity (%)	Predictive value (%)
2 points or more	51	75	51
3 points or more	27	48	60
4 points or more	12	25	70

⇒ What is the predictive value?

The proportion (%) of patients who screened positive and will develop an adverse outcome (true positive) among all patients who screened positive.

For a cut-off of 2 points or more in patients aged 65 and over, 51% of the patients who screened positive at the ED of your hospital would truly be at risk of adverse outcomes (true positives). 49% of patients who screened positive would not be at risk of adverse outcomes (false positive).

Increases in the cut-off score (3, 4, points,..) will increase the predictive value , i.e. the number of true positives (patients screened positive and who are truly at risk) will be greater. At the same time, the number of false positives (patients screened positive, but not at risk) will be lower.

IN SUMMARY:

The choice of a cut-off point is clearly an important decision. A high cut-off point for the screening of seniors means that the number of individuals who screen positive will be less, that a greater percentage of them will truly have adverse outcomes, but that more seniors at high risk will not be identified.

The following tables display the same statistical information on the performance of the ISAR screening tool according to selected characteristics of the population screened.

AGE 75 YEARS AND OVER

ISAR cut-off	Positive screen (%)	Sensitivity (%)	Predictive value (%)
2 points or more	59	78	56
3 points or more	33	51	64
4 points or more	16	27	74

AGE 65 YEARS AND OVER, DISCHARGED

ISAR cut-off	Positive screen (%)	Sensitivity (%)	Predictive value (%)
2 points or more	46	74	43
3 points or more	22	44	53
4 points or more	10	24	66

AGE 65 AND OVER, ADMITTED TO HOSPITAL

ISAR cut-off	Positive screen (%)	Sensitivity (%)	Predictive value(%)
2 points or more	63	77	62
3 points or more	39	53	69
4 points or more	18	27	74

AGE 65 YEARS AND OVER, ARRIVED BY AMBULANCE

ISAR cut-off	Positive screen (%)	Sensitivity (%)	Predictive value (%)
2 points or more	69	83	66
3 points or more	41	59	78
4 points or more	22	35	86

AGE 65 YEARS AND OVER, WALK-INS

ISAR cut-off	Positive screen (%)	Sensitivity (%)	Predictive value (%)
2 points or more	46	70	42
3 points or more	24	41	50
4 points or more	10	20	57

Appendix 3
Case studies

CASE STUDIES

These case studies have been designed to illustrate the screening process. They may be useful for training staff. These cases assume that the cut-off is 2+.

Case study 1

Miss Young, aged 67, arrived in the Emergency by ambulance after a fall.

Screening

Miss Young is oriented in time and place and is able to complete the screening questionnaire herself. The screening score is 3 based on the following questions: 1 (need for assistance), 2 (decline in function), and 4 (poor vision). Miss Young is, therefore, screened positively and is possibly at risk for adverse outcomes.

Clinical evaluation:

Miss Young was found by a neighbor after she cried for help. She had fallen and slipped on the floor where she remained for several days, unable to move. Miss Young had lived with a friend until recently when her friend had to be hospitalized. Since this time she has had a great deal of difficulty managing on her own because it was her friend who took care of various household tasks (cooking, shopping, etc.).

At the physical exam, Miss Young is found to have severe cataracts in both eyes and is clinically blind. She needs eye surgery for her cataracts but there is a long waiting list. In addition, her personal hygiene is very poor, and she has a large pressure ulcer on her buttock and left thigh as a result of prolonged immobilization on the floor following her fall. The Emergency staff decides to admit her because of her unstable medical condition.

Discussion:

Miss Young is not currently capable of taking care of herself. Also, her pressure sores will require medical and nursing follow-up. Some form of temporary placement, for example, to a nursing home is required until her medical condition stabilizes. Follow-up by a CLSC could also be helpful. She would appear appropriate for the "Guichet unique" programme where she would be more fully evaluated and a plan of care implemented.

Case study 2:

Mr. Lanctot, aged 69, was brought to the ED by his wife with a persistent cough.

Screening

The ISAR score, self-completed by Mr. Lanctot, is 3 with positive responses with questions 2 (decline in function), 3 (hospitalization of more than 1 night during the past 6 months), and 6 (taking

more than 3 medications). Mr. Lanctot is screened positively and may be at risk of adverse outcomes.

Clinical evaluation:

Mr. Lanctot has angina but his medical treatment is good, and his angina is stable. He was hospitalized for 2 days, 4 months ago, for a respiratory tract infection with deterioration in his general status, and now presents with the same symptoms which he has had for about a week. The ED diagnosis is pharangitis and sinusitis. The patient is being discharged with antibiotics. Although Mr. Lanctot is clearly at risk because of his deteriorated functional status and other risk factors, he lives with his wife who is completely independent, and is also under follow-up by his family doctor.

Discussion

Mr. Lanctot therefore has adequate resources to deal with his increased risk. Follow-up by his family doctor seems appropriate: a visit within 48 hours could be arranged to re-evaluate the situation.

Case study 3:

Mrs. Bellevue, aged 78, arrives in the Emergency with mild back pain.

Screening

The ISAR score, self-completed by Mrs. Bellevue, is 3 with positive responses to questions 2 (decline in function), 4 (poor vision) and 5 (memory problems). Mrs. Bellevue is screened positively and may be at risk of adverse outcomes.

Clinical Evaluation

Mrs. Bellevue experiences great difficulty in walking and has poor balance. In addition, she has a limited family support system. A fracture of the L4 (4th lumbar vertebra) was found following a physical and radiological evaluation of Mrs. Bellevue in the Emergency department. Mrs. Bellevue was prescribed pain medications and was given recommendations regarding activities that are permissible.

Discussion

The liaison service of the hospital organized the discharge planning. The liaison nurse contacted the CLSC in order to organize a more in-depth evaluation of Mrs. Bellevue's needs. Also, an admission to a rehabilitation center was considered.