

**NATIONAL SURVEY OF PHYSICIANS ON THE NEED FOR AND REQUIRED
SENSITIVITY OF A CLINICAL DECISION RULE TO IDENTIFY ELDERLY PATIENTS AT
HIGH RISK OF FUNCTIONAL DECLINE FOLLOWING A MINOR INJURY**

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BRIEF ABSTRACT

Many elderly patients visiting the emergency department for minor injuries are not assessed for functional status and experience functional decline 6 months post injury. Identifying such high-risk patients can allow for interventions to prevent or minimize adverse health outcomes including loss of independence.

For the purpose of a planned clinical decision rule to identify elderly patients at high risk of functional decline a survey of physicians was conducted. A random sample of 534 Canadian geriatricians, emergency and family physicians was selected with half randomly selected to receive an incentive.

A response rate of 57.0% was obtained with 90% of physicians considering a drop in function of at least 2 points on the 28-point OARS ADL scale as clinically significant. A sensitivity of 90% would meet or exceed 90% of physicians' requirements for a clinical decision rule to identify injured seniors at high risk of functional decline 6 months post injury.

FULL ABSTRACT

Introduction: Elderly patients (65 years of age and older) frequently visit the emergency department for minor injuries. A large proportion of these patients are not assessed for functional status (i.e. ability to walk independently and care for themselves) prior to discharge. Many patients experience persistent functional decline 6 months or more post injury. For the purposes of a planned clinical decision rule our objectives were to conduct a mail survey of Canadian physicians to determine: 1) the required sensitivity for a clinical decision rule to screen for functional decline at 6 months post injury; and 2) a clinically significant point drop in basic activities of daily living (basic ADL) and instrumental activities of daily living (IADL) scores to define functional decline.

Methods: Following 13 key informant interviews and 8 cognitive interviews, a survey questionnaire was developed. A random sample of 534 emergency physicians, geriatricians, and family physicians (178 from each group) was selected from those registered in the Canadian Medical Directory. Half of the physicians from each group were randomly selected to receive a monetary token of appreciation with the first survey. In a modified Dillman technique, we distributed a pre-notification letter, the survey questionnaire, and up to 4 follow-up contacts including a final special contact using Xpresspost to non-responders.

Results: 265 (57.0%) physicians completed the survey. For geriatricians and family physicians the 90th percentile of the required sensitivity reported for a clinical decision rule to identify injured seniors at high risk of functional decline 6 months post injury is 90%. For emergency physicians, the 90th percentile was 93% sensitivity. Considering all 14 basic ADL/IADL items, 90% of physicians would consider a drop in function of at least 2 points on the 28-point OARS ADL scale as clinically significant. If only basic ADL items were considered, 90% of physicians would consider a drop in function of at least 1 point as clinically significant. The response rate (62.7%) was significantly higher ($p = 0.0133$) among

the group of physicians who received an incentive versus those who did not receive an incentive (51.3%).

Conclusion: Our results indicate that 90% of physicians would consider a drop in function of at least 2 points in the basic ADL/IADL as clinically significant. They also show that a tool, with a sensitivity of 90% to detect patients at risk of a functional decline 6 months post injury, would meet or exceed the sensitivity required by 90% of physicians. These results will be used as clinically important outcomes for a future planned clinical decision rule to identify elderly patients at high risk of functional decline 6 months after sustaining a minor injury. Our results indicate that unconditional incentives help improve response rates significantly.

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1. BACKGROUND AND REVIEW OF THE LITERATURE

The fast paced and frequently overcrowded emergency department (ED) environment often prevents physicians from adequately assessing patients for functional independence or identifying patients at high risk of losing independence, which can have significant post discharge consequences for elderly patients.¹⁻⁵ One such consequence maybe a loss of independence or further loss of independence in performing some activities of daily living (such as walking or taking medications) which could lead to clinically significant outcomes such as reduced quality of life. With the geriatric population placing an ever increasing burden on emergency departments, it is essential to develop a clinically useful tool that identifies elderly patients at high risk of losing independence following a minor injury not requiring hospital admission for treatment. The goal of this thesis was to lay the groundwork such as identifying outcome measures for a future planned clinical decision rule to identify elderly patients at high risk of losing independence 6 months after sustaining a minor trauma. Identifying patients at high risk of losing independence as previous studies have demonstrated that appropriate treatment, referral and follow-up can prevent adverse outcomes and loss of independence.^{6,7}

1.1 Aging Population and Emergency Department Utilization

In 1981, only 9.6% of the Canadian population was 65 years of age or older.⁸ In 2011, 14.4% of the Canadian population was elderly (65 years of age or older).⁹ The proportion of individuals 65 years of age or over is expected to increase to 25% by 2051.^{8,9} According to Human Resources and Skills Development Canada elderly individuals 65 years of age and older make up the fastest-growing age group with the trend expected to continue for the next few decades.^{8,10} Such a trend is mainly due to an increased life expectancy, aging of the population and low birth rate.⁸

Emergency departments are faced with continuous increases in visits in part due to increased proportion of elderly patients and frequent use for non-urgent problems.^{2,11} Currently 18-40% of patients treated in emergency department are 65 years of age or older.^{2,6,7,11-13} As the proportion of the Canadian population 65 years of age or older is expected to increase in the next few decades, the number of elderly patients presenting to emergency department is expected to increase.^{2,8}

Elderly patients are at higher risk of negative health outcomes compared to the general population. Injuries are one of the leading reasons elderly patients visit the emergency department¹ and the seventh leading cause of death of elderly patients¹⁴. Compared to similar injuries in younger individuals, an injury to an elderly patient can be more serious and require more time and resources to manage.^{2,15-21} It has been shown that trauma in elderly patients often requires prolonged hospitalization and rehabilitation.^{22,23} Previous studies have shown that elderly patients are five times more likely to be admitted to hospital than non-elderly patients.^{7,16-19,24,25} One study reported that as many as 25% of the elderly patients will be hospitalized and as many as 24% will return to the emergency department within three months of discharge.²⁶ Another reported as many as 44% of elderly patients discharged from the emergency department return for a repeat visit within six months of their initial visit.²⁷

1.2 Functional Decline and Activities of Daily Living

Functional decline of an individual is often defined and measured by the reduction in ability to perform self-care activities or activities of daily living (ADL) because of a decrement in physical functioning.^{10,13,28,29} In the literature a number of terms are used to describe functional decline, including functional status, loss of function, ADL decline, ADL status decline, status decline, declining function, functional ability, functional impairment and functional decline. ADL tasks have been classified into basic activities of daily living (basic

ADL), also referred to as physical activities of daily living and instrumental activities of daily living (IADL).³⁰⁻³² The basic ADL tasks are activities that a person normally performs on a daily basis and are fundamental for self care (eating, bathing, dressing, grooming, walking, transferring from bed, and continence). The IADL tasks are activities that allow an individual to live independently in a community and are not necessary for fundamental functioning (using telephone, taking transportation, shopping, housekeeping, preparing meals, taking medications, handling finances).

Functional decline is one of the most common and serious clinical problems in elderly patients.^{10,29} Functional decline may be acute, occurring within a week, or sub-acute, developing over many weeks or months.¹⁰ Functional decline is associated with reduced functioning as well as social isolation and reduced quality of life.^{13,33-36} Two thirds of patients with IADL decline and three quarters of patients with basic ADL decline will visit the emergency department for their functional decline.³² Previous studies have shown that functional decline is an important predictor of mortality³⁷, hospitalization, prolonged hospital stay, repeat emergency department visits, institutionalization and need for home care.^{4,5,24,26,29,34,35,38-54} Previous research has shown that functional decline is the most important predictor of admissions to institutions and of disproportionate use of health services³⁷ (more than 40% of public health care expenses) by the elderly population.^{6,10,26,29} It has been reported that identification of functional decline in elderly patients is more predictive of mortality than organ damage or severity of illness.^{15,55}

Elderly patients are often discharged home from an emergency department without a full functional assessment. Currently, 75% of elderly patients with injuries are discharged home after their emergency department visit.¹ Of the elderly patients discharged home, 10-45% will develop functional decline up to 7 months post injury.^{1-3,5,14,42,56-58} One study reported that 20% of patients who said they could not take care of themselves if discharged were discharged nonetheless.³² A study done in an emergency department in Australia

found that of elderly patients discharged home, 81% were dependent in at least one ADL and 71% warranted some type of geriatric referral.⁵⁹ Another study showed that eight weeks after a fall, 43% of patients still had pain or functional decline.⁵⁶ It was also reported that 41% of the patients had pain or functional decline 7 months after the injury. In a recent Canadian emergency department study by Sirois and colleagues it was reported that 17% of elderly patients had a functional decline at 6 months post minor injury.^{60,61} Despite this high rate of functional decline in the elderly patients, assessment of functioning is not performed in 75% of the cases during an emergency department clinical assessment.^{2,15,18,32,62} Many of the elderly patients discharged home will continue to have a decline in their mobility or will require help with their activities of daily living even 6 or 7 months post injury.¹⁻⁵

Functional decline is often experienced after a major trauma, but may also follow minor injuries (i.e. not requiring hospital admission for treatment). The effect of minor injuries on functional decline, in terms of basic ADL and IADL items, has been reported in the literature. Shapiro and colleagues were the first to report the effect of minor injuries on functional decline in elderly patients presenting to the emergency department and to show that such population is different from previous studied injured elders with major trauma or falls.¹⁴ They reported that more than 90% of the minor injuries observed in the elderly patients were contusions, fractures, lacerations and sprains. Patients with contusions were found to have the highest rate (33%) of functional decline compared to other minor injuries. It was reported that 3 months after an emergency department visit for minor trauma 7% of patients had a decline in basic ADL, and 23% had a decline in IADL. Ferrera and colleagues reported that 12% of elderly patients discharged home from emergency departments experienced a decline in their basic ADL scores at 1-month follow-up.⁵⁷ Another study indicated that 40% of older emergency department patients with blunt injuries not requiring hospital admission had functional decline within the first week of injury.¹ Four weeks after the injury 35% of the patients had functional decline. In the study by Shapiro

and colleagues it was reported that decline in the basic ADL score was most likely due to decline in the ability to toilet, bath and dress while decline in IADL score was most likely a result of decline in the ability to do housework, shopping, and laundering. According to Wilber and colleagues, however, the decline in basic ADL mainly (88%) involved dressing, transferring or walking and the decline in IADL mainly (98%) involved transportation, shopping, meals or housework.³² It has been reported that decline in the basic ADL score is correlated with injury type while decline in IADL score is correlated with anatomic location of the minor injury.¹⁴ The most common anatomic sites of injury were found to be face, upper extremity, hand/wrist, and head, while the less common injuries were lower extremities.

Emergency medical staff typically do not meet all the medical needs of the elderly population.^{25,26,63,64} Previous research has acknowledged that time is a constraining factor for emergency medical staff where they direct their efforts at the presenting medical complaint and focus on the treatment of acute illness and injury rather than at the functional needs.^{1,63,64} Some studies have shown that there is hardly any information on functional status in the emergency department medical records and that there is lack of this knowledge among emergency physicians.^{3,15,65} According to Pinholt *et al.*, emergency staff rely heavily on clinical judgment rather than using a comprehensive geriatric assessment and as such overlook functional impairments.^{66,67} There is limited research into the reliability and validity of emergency department physicians' judgments on assessing elderly patients for functional decline.¹⁵

These findings highlight the importance of specialized assessment and screening programs for elderly patients during an emergency department visit. To help the emergency medical staff when it comes to elderly patients some hospitals in Canada and other countries have introduced geriatric evaluation and management (GEM) nurse practitioners in the emergency department to assess discharged elderly patients and to refer patients needing support to community based services.^{6,7} A number of researchers have

recommended the use of such multidisciplinary team approach, to deal with such a gap by helping meet the medical needs of the elderly population.⁶⁸⁻⁷² However, such geriatric assessment act at a tertiary level by reducing the consequences or outcomes of functional decline.¹⁰ Geriatric services focus on fixing the impairments and arranging appropriate resources when functional decline has started, or even ended, rather than preventing the functional decline in the first place.^{1,10}

To prevent functional decline primary and secondary preventions must be undertaken. Primary prevention is meant to focus on the individual, such as nutrition and physical activities to prevent or minimize vulnerability whereas secondary prevention involves identifying high-risk patients to allow early intervention and resource allocation before the onset or during the early stages of functional decline.¹⁰ An article by Pathy and colleagues indicated that a two stage process of screening for high-risk patients then intervening is more effective and efficient than applying interventions on all the elderly patients.⁷³ Such a screening process could be universal through a public health approach (e.g., mailed questionnaire to all geriatric patients in a community) or it could be opportunistic (e.g., when an elderly individual visits a physician, emergency department, or receives home care services).¹⁰ It has been suggested that the emergency department is a potential important site for the identification of high-risk elderly patients.⁷⁴

1.3 Measuring Functional Decline

For clinical or research purposes it is necessary to measure functional decline with an appropriate, valid, reliable and sensitive measurement tool to ensure proper or true functional decline measurement with accuracy and consistency.⁷⁵⁻⁷⁷ In the past, functional decline has been measured in different ways with various instruments.^{29,78} The number of basic ADL/IADL items included as well as the mode of administration and definition of functional decline in each instrument varies.⁷⁹ To the best of our knowledge there is no gold

standard tool to measure functional decline. The existing assessment tools have their own advantages and limitations.

The concept of standardized tests for measuring functional decline came about in the 1960s when Katz and colleagues brought forth the hierarchical nature or rank ordering of activities of daily living based on difficulty of performing the tasks. Katz and colleagues introduced one of the first functional assessment tools to assess the ability of an individual to perform 6 basic ADL items (feeding, continence, transferring, toileting, dressing, and bathing).⁸⁰ Mobility or walking, an important basic ADL, and the more complex and sensitive tasks, the IADL tasks, were introduced by other assessment tools. Other common basic ADL assessment tools used are the Barthel Index (BI) and the Functional Independence Measure (FIM) that introduced other basic ADL. The Barthel Index is one of the well known and most frequently cited ADL assessment tool.⁸¹ The original Barthel Index (OBI) was proposed by Mahoney and Barthel in 1965 to assess for feeding, bathing, dressing, grooming, toilet transfer, wheelchair/bed transfer, walking, stair climbing, and bladder and bowel control with a weighted index toward more important tasks such as walking.⁸² To increase the sensitivity of the original Barthel Index Shah and colleagues proposed the modified Barthel Index (MBI) in 1989 to detect changes in scoring individuals who require some assistance.⁸³ Another commonly used functional assessment tool used for measuring basic ADL tasks is the Functional Independence Measure tool. The Functional Independence Measure was proposed by Granger and colleagues in 1990 contains sections (self-care, sphincter control, mobility and locomotion) for functional assessment.⁸⁴

Although the modified Barthel Index and the Functional Independence Measure tools are valid, reliable and sensitive (or precise due to greater range of possible scores) they do not measure IADL items. Review of the literature show that functional measures that focus on the basic ADL items show a ceiling effect during recovery despite the individual not becoming fully independent in the areas of IADL.^{85,86} The limitation was addressed by

adding IADL items to the basic ADL items when measuring functional decline.^{87,88} The definition of IADL items started in late 1960s when Lawton and Brody identified different degrees of complexities in performing functional tasks.^{88,89} Lawton and Brody have proposed a scale (Lawton IADL Scale) that assess the ability of an elderly person to perform 8 IADL tasks (housekeeping, cooking, laundry, using the telephone, taking medication, using transportation, shopping and handling finances).⁸⁸ Lawton and Brody had suggested that women be scored on all 8 items whereas men not to be scored on housekeeping, laundering and cooking because of traditional sex-related roles. Although it was originally suggested that men and women be scored differently, the current practice is to include all 8 domains for both sexes. Other researchers have indicated that no IADL scale is right for every person and that “individualizing measures to only those activities which a person needs and wants to perform is a way of ensuring clinical relevance for individuals.”^{88,89}

There have been a number of efforts to measure both basic ADL and IADL within a single scale. The Barthel Index and the Lawton IADL Scale are useful tools but they measure only one domain, either the ADL tasks or the IADL tasks. One of the more comprehensive tools proposed by Hebert and colleagues is the Functional Autonomy Measurement System (or *Système de Mesure de l'Autonomie Fonctionnelle* [SMAF]) which is a 29-item measuring functional ability in 5 areas including basic ADL tasks (eating, washing, dressing, grooming, using the toilet, urinary and bowel function) and IADL tasks (housekeeping, meal preparation, shopping, laundry, telephone, transportation, medication use, handling finances).^{10,90} Another assessment tool is the Functional Status Questionnaire (FSQ) developed by Jette and colleagues in 1986 is a 34 item questionnaire covering some basic ADL and some IADL items as well as mental health, work performance and other domains.⁹¹ The Functional Status Questionnaire is not as specific as the Functional Autonomy Measurement System as the Functional Status Questionnaire combines some activities into one question and measures it as a whole such as the following: “During the

past month have you had difficulty with (1) Taking care of yourself, that is, eating, dressing or bathing?”.

Another comprehensive tool used for assessing functional decline is the Older Americans Resources and Services (OARS) ADL scale. The tool enables us to use the functional assessment section on its own and is simple to use. The scale is a 14-item questionnaire involving seven basic ADL items and seven IADL items.^{30-32,92} Each of the 14 items rates the patients on their ability to perform the activities independently. The items in the OARS ADL scale are graded on a 3-point scale as follows: 0 (completely unable to perform the activity), 1 (can perform the activity but with some help), and 2 (can perform the activity without any help). A person's score can range from 0 to 28 with the highest score indicating complete independence in performing the activities of daily living and the lowest score indicating that the patient is unable to perform the activities at all.^{30,93} The OARS ADL scale has been validated on assessing patients in the emergency department and has been successfully used for both in-person and over the telephone interviews in emergency department studies.^{31,74} The OARS ADL scale administration has also been validated in the emergency department against a nurse's assessment of function using the Functional Autonomy Measurement System in the patient's home after an emergency department visit.^{74,90} The Spearman correlation coefficient between the OARS and the Functional Autonomy Measurement System score was reported to be 0.80.³¹

The inability to perform all of the basic ADL and IADL items because of a decrement in physical function implies a point drop in the OARS ADL scores indicating functional decline. However, it is not clear what point drop in the OARS ADL score implies a clinically significant functional decline. To be used in a clinical setting this clinically significant point drop must be clearly defined.

In 1999, McCusker and colleagues used a 3-point or greater decline on the 28-point OARS ADL scale, within 6-months follow-up, to define a functional decline.⁷⁴ They defined

this based on feedback from an expert panel. However, details of the composition of the expert panel were not provided. More recently, another study also used a 3-point drop to define functional decline but it was relying on the article published by McCusker in 1999. Another study defined functional decline as “inability to perform, without personal assistance, one or more basic ADL and one or more IADL tasks that participant had been able to perform”.⁹⁴ Hustey and colleagues definition was based on ADL and IADL tasks in general and were not based on the 28-point OARS ADL scale. If we were to interpret this on the 28-point OARS ADL scale it would imply approximately a 4-point (2 point drop for the ADL task and 2 point drop for the IADL task) or greater decline. Such limited information on a clinically significant point drop on the 28-point OARS ADL scale led us to investigate further to determine a clinically significant point drop in the OARS ADL scale.

There have been different approaches to the basic ADL and instrumental ADL measures leading to controversies on the dimensionality of the basic ADL/IADL. Such differences give rise to three different approaches to the basic ADL and IADL measures: i) treating basic ADL and IADL as distinct concepts that are measured separately, since the IADL tasks involve much greater complexity to perform due to cultural and environmental^{93,95}, ii) including measures on the more complex IADL only for those fully independent on the more basic ADL^{96,97}, iii) combining basic ADL and IADL items into a single measure.^{98,99}

Given such controversies in basic ADL/IADL measures we thought it was necessary to try to obtain physician opinions on which basic ADL/IADL items they think are more important in terms of performance by elderly patients who were completely independent prior to injury. We also wanted to determine the physicians’ views on basic ADL and IADL measures in terms of a point drop difference between the basic ADL and IADL items.

1.4 Screening Tools and Clinical Decision Rules

The OARS ADL scale and the other tools mentioned above are functional assessment tools used in measuring functional decline in elderly patients. A screening tool, on the other hand, is a case-finding tool used to identify patients at risk of an outcome.¹⁰⁰ Screening tools help stakeholders be more effective and efficient by targeting high-risk patients and avoiding unnecessary assessment of many healthy subjects.^{101,102} Screening elderly patients at high risk of functional decline is essential to helping clinicians, health services administrators and health policy makers with the targeting of interventions and resource allocation to patients at high risk of functional decline.^{10,78,102}

A systematic review of screening tools to identify elderly patients at risk of functional decline done by Sutton and colleagues in 2008 identified five screening tools to identify elderly patients at risk of functional decline in the emergency department.¹³ The five tools identified are the Hospital Admission Risk Profile (HARP)¹⁰³, Identification of Seniors at Risk (ISAR)⁷⁴, Triage Risk Screening Tool (TRST)^{94,104}, Score Hospitalier d'Evaluation du Risque de Perte d'Autonomie (SHERPA)¹⁰⁵, and an index¹⁰⁶ for identifying elderly patients at risk of functional decline developed by Inouye and colleagues in 1993. Although the five screening tools, and specifically the Identification of Seniors at Risk and the Triage Risk Screening Tool, help identify elderly patients at risk of functional decline they are developed for the general elderly population and not specifically for elderly patients with minor trauma. Also, these tools are not developed specifically to identify patients at high risk of functional decline but rather to identify patients at risk of adverse events including functional decline and cognitive impairment. A tool that is developed specifically to identify elderly patients at high risk of functional decline after a minor injury would be more appropriate, reliable and sensitive for such elderly population.

Although screening tools can be very useful in identifying patients at risk of an outcome they do not have a decision making component as part of the tool as with clinical

decision rules. Screening tools help identifying certain patients but leave the decision making to the medical staff. Clinical decision rules are screening tools in that they identify patients of interest but also help clinicians make diagnostic and therapeutic decisions at the bedside. In other words, a clinical decision rule not only helps identify patients at risk but also recommends decisions as part of the tool.¹⁰⁷ Clinical decision rules are derived from original research and incorporate three or more variables from clinical findings (history, examinations, and test results).¹⁰⁸⁻¹¹¹ A clinical decision rule is developed and tested through a derivation study (creation of the rule), a validation study (assessment for accuracy, reliability and impact), and an implementation study (assessment of the rules effect on patient care).¹¹¹⁻¹¹³ As with assessment tools the validity, reliability and sensitivity of a clinical decision rule must be reasonably high to be accepted by clinicians.

One of the requirements of a clinical decision rule is a clearly defined outcome measure. For functional decline the outcome measure can be defined as a point drop on the 28-point OARS ADL scale. Although any one point drop is an indication of decline in function, it is a clinically significant point drop that is more relevant for use in a clinical setting and that needs to be identified. Once a clearly defined outcome measure is chosen, the required sensitivity of the clinical decision rule to identify patients who go on to have the outcome needs to be assessed. So in the proposed clinical decision rule study, the clinically significant point drop and the required sensitivity for such a point drop will be used to identify elderly patients at high risk of functional decline 6 months after sustaining a minor injury.

1.5 Study Rationale

A future planned clinical decision rule is to be developed to identify elderly patients at high risk of functional decline 6 months after sustaining a minor injury. However, it is not clear what point drop on the 28-point OARS ADL scale is clinically significant to define functional decline, which is to be used as the outcome measure for the clinical decision rule.

It is also necessary to define what sensitivity would be acceptable for the clinical decision rule. This study was designed and conducted to determine physicians' views on what constitutes a clinically significant point drop to define functional decline as well as the required sensitivity for a clinical decision rule to identify elderly patients at high risk of functional decline 6 months after sustaining a minor injury.

2. GOALS AND OBJECTIVES

The goal of this study was to lay the groundwork for a clinical decision rule to identify elderly patients (65 years of age or older) at high risk of functional decline following a minor injury.

The **specific objectives** were:

1. To obtain key informants' subjective views on minor injuries, functional decline assessment and measurement with respect to basic ADL/IADL scores;
2. To determine physicians' subjective views on functional decline assessment and the importance of the basic ADL/IADL items to functional decline;
3. To determine physicians' subjective views on what constitutes a significant point drop in OARS ADL score to define functional decline;
4. To identify the required sensitivity that the physicians would be satisfied with to use a clinical decision rule to identify elderly patients at high risk of functional decline at 6 months following a minor injury;
5. To understand the differences among the three physician groups on the required sensitivity and the significant point drop in OARS ADL scales;
6. To understand whether incentives and Xpresspost make a significance difference in improving physician survey response rates.

3. METHODS

This study involved the development and conduct of a national survey of geriatricians, emergency physicians and family physicians. The geriatricians, emergency physicians and family physicians were targeted as they are the physicians that see elderly patients the most and a clinical decision rule would benefit them the most. Prior to developing the survey we conducted exploratory in-depth or key informant interviews of physicians to aid the development of the survey. From the key informant interviews we collected a range of physician responses with information about physicians' current knowledge of functional ability and how it is measured. The interviews enabled us to gather information on the perceived need for a clinical decision rule and whether such a prediction rule was possible and worthwhile. From the physicians' responses in the key informant interviews we tailored our survey questions in a better and more effective way that enabled us to obtain high quality data.

3.1 Study Stages

To promote collection of high quality data, we conducted the study in four stages: 1) in-depth, key informant, in-person interviews (pre-survey), 2) cognitive interviews (draft survey), 3) pilot testing (final draft survey), and 4) final survey. Survey administration was informed by Dillman's Tailored Design technique.¹¹⁴ An overview of the steps followed for conducting the survey is outlined in Figure 1.

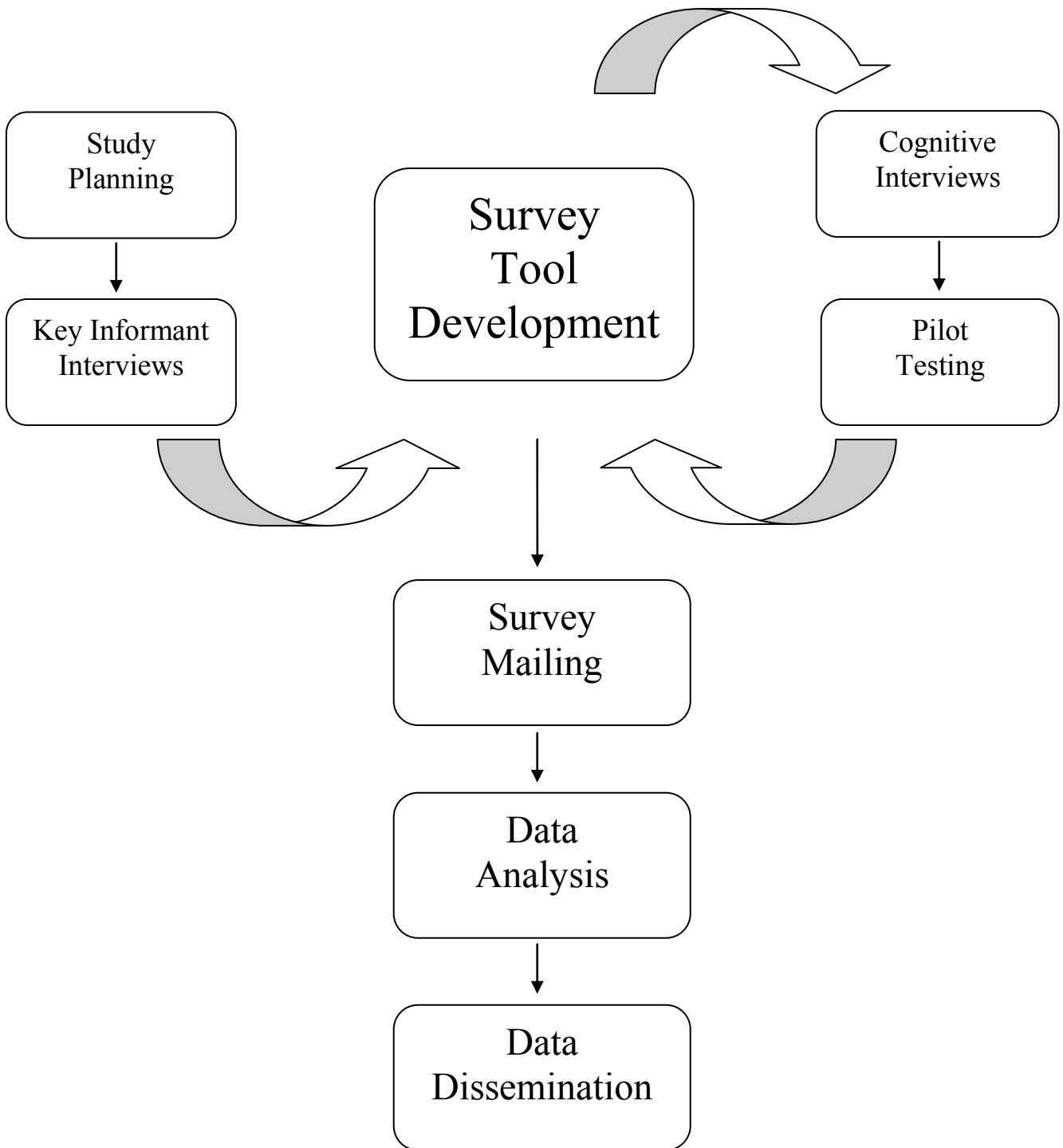


Figure 1. Summary and flow of methods

3.2 OARS Score

The survey questionnaire was developed with a focus mainly on the 14 OARS ADL scale items, presented in Appendix H, and how they relate to functional decline. The items are divided into seven basic ADL and seven IADL items. The seven basic ADL items include eating, dressing, grooming, walking, getting in and out of bed, bathing, and continence or voluntarily controlling urinary and fecal discharge. The seven IADL items include telephone use, transportation (getting to places out of walking distance), shopping, meal preparation, housework, taking medications, and money management. The 14 OARS ADL scale items are graded on a 3-point scale that are defined as follows: (2) indicates that the individual can carry out the activity without any help, (1) indicates that the patient can perform the activity but with some help, and (0) indicates that the patient is unable to perform the activity at all.⁹³

3.3 Questionnaire Development

3.3.1 Key Informant Interviews

Prior to conducting key informant or exploratory in-depth interviews,¹¹⁵ an interview guide was developed, as presented in Appendix A. The interview protocol was developed and reviewed by members of the study team and is comprised of five main questions. The interviews were semi-structured, involving open-ended questions with prompts. These key informant interviews were designed to gather information on the common types of minor injuries they have encountered in their practice that lead to functional decline, how they typically assess functional status in elderly patients, what tools the physicians use to measure functional decline and their knowledge of the OARS ADL scale and what they think of this tool for measuring functional decline. We also wanted to discover what physicians thought was a clinically significant point drop in basic ADL/IADL scores to imply functional decline. These key informant interviews were used to 1) establish feasibility of a survey of

this kind, 2) establish physicians' knowledge of the OARS ADL scale and how they assess for functional decline, and 3) identify whether to use open-ended or closed-ended questions for sensitivity and point drop. The interviews were face-to-face interviews and were conducted at the physicians' offices during regular working hours. The interviews were tape recorded with permission of the physicians.

A convenience sample¹¹⁶ of thirteen physicians was selected for the key informant interviews. Of the thirteen key informant interviews, four were conducted with geriatricians, four with emergency physicians and five with family physicians. The physicians were selected from the three different specialties as all three would be targeted for the larger survey. The physicians interviewed were from The Ottawa Hospital. The information gathered was used to develop a more targeted questionnaire with more sensible questions that were relevant to the survey population and tailored around functional decline in elderly patients.

3.3.2 Cognitive Interviews

Based on the information collected from the key informants, a preliminary survey questionnaire was developed, as presented in Appendix C. The information provided by the key informant interviews suggested that an important factor to consider was whether patients had support at home, so we built that into the subsequent survey.

We conducted cognitive interviews on a group of expert physicians to evaluate the clarity, comprehensibility and face validity of each question in the draft survey. Eight physicians were selected (one geriatrician, five emergency physicians and two family physicians). The surveys were given to the physicians in a format that would be the same as if they were mailed the survey. The surveys included a cover letter, survey questionnaire and a return enveloped packaged in a size 10 envelope. These surveys were given to the physicians by hand and were asked to complete the survey as if they were completing a final

survey on their own. The physicians were asked to read aloud and express their thoughts regarding each question and they were observed on how they completed the questionnaires. This enabled us to determine if the physicians understood the questions in a consistent way and with an understanding we intended.¹¹⁷ Whenever there was a misunderstanding of a question or a long pause on a question it was noted as a question with a potential problem and it was investigated to determine the root of the issue. The physicians were also observed how they referred to previous questions on the survey and how that affected their responses to subsequent questions. Such issues were taken note of and necessary changes made prior to piloting the surveys.

3.3.3 Pilot-testing

The key informant and the cognitive interviews enabled us optimize the survey instrument, Appendix D, to be mailed to physicians. Prior to mass mailing we conducted a pilot survey to identify and fix any problems with our survey implementation procedure. Of the 534 physicians randomly selected for the survey, sixteen were located in the Ottawa region and so we selected these physicians for the pilot survey. Of the sixteen physicians selected for the pilot six were geriatricians, six were emergency physicians and four were family physicians. All but one physician returned completed surveys. The returned surveys provided good quality data and enabled us to see what needed to be changed. We noticed that two of the physicians in the pilot survey had possibly misunderstood what we were asking for when we indicated “total point drop (from initial score of 28)” as it seemed they were providing the final calculated score and not the point drop. Minor modifications were made to the wording of the questions relating to the point drop in basic ADL/IADL tasks by re-phrasing the question and indicating that we wanted the “point drop (points lost from initial score of 28)”. With these modifications we were ready to start mailing out the full survey.

3.3.4 Final Questionnaire

The final questionnaire, Appendix G, consists of 12 questions separated into five sections and was printed on two separate pages. The final English questionnaires as well as the pre-notification letters and cover letters were translated into French for the physicians who had indicated French for their language of correspondence in the Canadian Medical Directory. The letters and surveys were translated using online translation tools, edited by friends, and finally sent to The Ottawa Hospital Research Ethics Board's Translation Services for the final edits and approval. The questionnaire consists of the following sections: whether the physician is currently practicing in their field and seeing elderly patients, demographic and practice settings, assessment and measurement of functional decline, relevance of activities of daily living to functional decline, and required sensitivity. The assessment and measurement of functional decline as well as relevance of activities of daily living to functional decline information was gathered from the physicians by using the 14 OARS ADL scale items.

3.4 Study Setting

This study was conducted in Canada. At the time of the study there were about 2,450 emergency physicians, 235 geriatricians and 33,700 family physicians registered in the Canada Medical Directory. The researchers conducting this study were located at the Ottawa Hospital Research Institute at The Ottawa Hospital in Ottawa Ontario, Canada.

3.5 Study Design

For this study we were interested in acquiring answers to our research questions at a single point in time from clinicians in Canada. As a result, a cross-sectional survey design was used.

3.6 Study Population

The study population for the survey included geriatricians, emergency physicians, and family physicians practicing in Canada and registered in the Canadian Medical Directory provided by the Scott's Directories as of August 23, 2011. To meet budgetary and logistical constraints a reasonable sample size was selected for each specialty. The sample size for each population (family physicians, geriatricians, and emergency physicians) was determined to yield desired precision around the estimated mean required sensitivity using a two-sided 95% confidence interval, as outlined in Appendix I.¹¹⁸ As we had no previous information to estimate the standard deviation of responses, we estimated it as the range divided by four. This is based on the well-known property of the normal distribution that approximately 95% of responses are within plus or minus two standard deviations of the mean. The anticipated range of responses was between 60% and 100%, giving an approximate standard deviation of 10%. Using a desired margin of error of $\pm 2\%$, an anticipated response rate of 55%, and applying the finite population correction factor, yields required sample sizes for the emergency physicians, family physicians and geriatricians as 177, 177 and 126, respectively. For simplicity, the sample size for all three groups was set at 177. Since we wanted to give an incentive to half of the physicians in each stratum the sample size was set to an even number of 178 for each stratum. A random sample of 178 emergency physicians who were specializing in emergency and emergency family medicine, 178 geriatricians, and 178 family physicians who were specializing in family medicine were selected for the survey. Computer-generated random numbers, using Microsoft Excel, were used to select the physicians in each group. This study surveyed a total of 534 physicians. Of the 534 physicians randomly selected, 101 (23 emergency physicians, 36 geriatricians, and 42 family physicians) were French-speaking as indicated by a flag on the language of correspondence in the Canadian Medical Directory and as such were sent French-translated surveys. To be included in the study the physicians must have been practicing Medicine in

Canada in their respective disciplines and be treating patients 65 years of age and older at the time of the study. To determine if the physicians were practicing medicine and treating patients 65 years of age and older we asked a screening question at the beginning of the survey. These three physician groups were chosen to be surveyed as they were the most appropriate group of physicians that treated elderly patients and would potentially be using a clinical decision rule to identify elderly patients at a high risk for functional decline. The cognitive interviews and the pilot study were conducted with physicians located in Ottawa.

3.7 Survey Administration

There has been a great deal of research on improving survey response rates but most of the research is targeted at the general public surveys. Studies on improving response rates of physicians were reviewed to help guide the development of the survey instrument and gear it towards achieving reasonably high response rates.¹¹⁹⁻¹²⁷ The majority of these studies on improving response rates use the Tailored Design Method¹¹⁴, explained later in this section, and present their quantitative findings based on the techniques. Reviews of the methodologies of improving response rates of physicians have been conducted¹²³⁻¹²⁷ and the most effective methods to increasing response rates of physicians were shown to be interesting, short questionnaires, recorded delivery/registered mail, and unconditional monetary incentives. For the most part, these were some of the techniques we followed for this survey with details in the following paragraphs.

3.7.1 Tailored Design Method

To achieve reasonably high response rates Tailored Design Method with some minor modifications was followed. The most important concept of these procedures is the application of social exchange theory that Dillman applies to understand why respondents do or do not respond to questionnaires.¹¹⁴ The social exchange theory indicates that reward, cost and trust are essential in influencing the outcome of any request which in our

case was response to questionnaire. According to social exchange theory an individual will exchange knowledge or expertise with others when he or she thinks that the reward for the exchange is equal to or greater than the cost and trusts or expects that the rewards will outweigh the costs in the long run. A summary of the social exchange elements that are explained by Dillman are shown in Table 1.

Table 1. Social exchange elements: rewards, costs, and trust*.

Ways to establish trust

- Provide a token of appreciation in advance
- Sponsorship by a legitimate authority
- Make the task appear to be important
- Invoke other exchange relationships

Ways to provide reward

- Show positive regard
- Thank the person
- Ask for advice
- Support group values
- Give tangible rewards
- Make the questionnaire interesting
- Give social validation
- Inform respondents that opportunities to respond are scarce

Ways to reduce social costs

- Avoid subordinating language
 - Avoid embarrassment
 - Avoid inconvenience
 - Make the questionnaire appear short and easy
 - Minimize requests to obtain personal information
 - Keep requests similar to other requests to which a person has already responded
-

* Dillman, 2007¹¹⁴

A tangible token of appreciation in the form of a \$10 Tim Hortons gift card was chosen to be sent to physicians. The gift cards were sent in advance together with the first survey that included personalized cover letters with the physicians' names. The physicians

were also addressed by their area of practice (i.e. geriatrician, emergency physician, family physician) to ensure the included cover letters were more personalized. The covers letters included the Ottawa Hospital Research Institute, The Ottawa Hospital, and the University of Ottawa logos to emphasize sponsorship by legitimate authority. The cover letters introduced the subject, provided instructions and addressed privacy and confidentiality concerns. The questionnaires were kept short to fit two pages with one-sided printing. As the style, such as bolding, shading and spatial arrangement, and type of fonts used help increase the response rates^{114,120,127} the questionnaire was designed with sections and section headings using bold and italics with spatial arrangement and consistency to enhance the visual appeal to make the questionnaire as readable as possible.

3.7.2 Modifications to the Tailored Design Method

Although the Tailored Design Method was followed, a few modifications were made to meet our needs. One week prior to mailing the first survey a personalized pre-notification letter, Appendix E, was sent to each physician. Instead of providing a token of appreciation to every physician in the sample half of the physicians within each specialty were randomly selected, using computer-generated random numbers, to receive the token of appreciation. We were blinded from knowing who was to receive the incentives as physicians' identifiable information was not on the file used in randomization. The incentives were provided to optimize the response rate and to assess the impact of incentives. Although it is usually recommended to present demographic questions at the end of a questionnaire if the questions posed are sensitive we presented the simple and demographic questions first as they were none sensitive and simple questions to ease respondents into questionnaire completion, as suggested by Burns and colleagues.¹²⁰ The Ottawa Hospital size 10 envelopes with windows, that bared The Ottawa Hospital logo, were used to indicate a legitimate source and to help distinguish from spam mail. The return envelopes were

addressed with Dr. Jeff Perry's name, the name of the study and the precise address at the Civic campus. The physicians who did not respond were reminded with up to four reminders including a special contact using Canada Post's Xpresspost. A questionnaire was included with each reminder letter sent to the physicians who did not respond to previous mail requests.

3.7.3 Questionnaire Mailings

Once the questionnaire was finalized we started mailing the surveys to the remaining 518 English and French-speaking physicians in our sample after conducting the pilot survey on sixteen local physicians. Each survey package included a cover letter, a questionnaire, and a prepaid business reply mail envelope. A week after the pre-notification letter the first survey questionnaire, with the token of appreciation, if applicable, was mailed. In order to give enough time for delivery of the questionnaires to and from the physicians we decided to send a reminder every third week. We kept track of returned questionnaires to avoid resending a questionnaire to the physicians that responded to the survey or those that were returned by Canada Post due to change of address. The final reminder survey was a special contact survey that was sent through Canada Post's Xpresspost. Compared to the regular mail, the Xpresspost is delivered Nationally within two business days in a specialized envelope with dimensions of 15.2 cm by 26.0 cm, with the wording "Xpresspost" plus the ability to track and confirm the delivery of the mail. The regular mail is a plain envelope with dimensions 10.5 cm by 24.1 cm that gets delivered within four business days with no tracking and no confirmation of delivery.

3.8 Data Collection and Data Entry

To capture the data in a consistent way a data entry template was developed with a data dictionary that explained the values each variable would hold. The data were manually entered into the Microsoft Excel workbook template where each variable was listed as a

column including the questionnaire ID plus a column for data entry comments. The comments field was used to document any issues with the data to avoid overlooking the issue when all the data were entered. The data were double entered by a second data entry person and minor corrections were made.

3.9 Data Cleaning and Linkage

Upon data collection and entry data cleaning techniques were performed. The data were visually checked for obvious mistakes prior to importing into SAS 9.2 for further checking and analyses. Descriptive statistics such as frequencies of each variable were produced to check for outliers and unusual values. Unusual values were compared with the original answers on the paper and corrections were made. Once the data were cleaned it was linked with the sampling frame to obtain the remaining variables including province of residence, sex, and language of correspondence. Further data checking was performed by comparing the sex variable on the sampling frame against the physician answer to check the accuracy of the sex variable on the sampling frame. It was found that the sex variable on the sampling frame was not accurate as the gender did not match what was reported by some of the physician on the survey. Although we wanted to use the gender variable in nonresponse analysis it was dropped from the sampling frame due to its data quality. Once the data were cleaned and the final dataset created data analyses were performed using SAS 9.2.

3.10 Data Analysis

The analyses included descriptive statistics to characterize key informants' subjective views on functional decline and to characterize the three physician groups in terms of demographic information. Physician assessment of functional decline and their views on the importance of the basic ADL/IADL items in terms of functional decline are presented using bar graphs and line graphs. The distribution for the reported clinical significant changes in

basic ADL and IADL and the reported sensitivities were described for the overall physician population as well as by physician group using 25th, 50th, 75th, and 90th percentiles. We initially planned to consider only the mean sensitivity but later observed that the reported sensitivities were skewed and so decided to consider the median sensitivity and point drop instead. However, we realized that we would want the majority of physicians to be satisfied with the point drop to define functional decline and the sensitivity of a future planned clinical decision rule and as such included other percentiles, such as the 90th percentile, in the analyses. The clinically significant point drop in basic ADL and IADL items and the sensitivities reported by the physician groups were compared to determine if the medians were significantly different using Kruskal-Wallis and Wilcoxon tests of significance. The overall and group specific response rates were compared among the three physician groups using Chi-squared tests. We also compared response rates of physicians that received the incentives versus those that did not receive the incentives. Two sided significance tests were set at an alpha level of 0.05.

Although previous research has shown that nonresponse bias is less of a concern for physician surveys compared to general population surveys,¹²⁸⁻¹³² Chi-squared tests were performed to compare characteristics of respondents and non-respondents in our survey.

3.11 Ethical Concerns

This project was provided expedited review and approval by The Ottawa Hospital Research Ethics Board (OHREB).

4. RESULTS

4.1 Results from Key Informant and Cognitive Interviews

From the key informant interviews we determined the physicians' opinions on what they thought were some common types of minor injuries that lead to functional decline. A summary of the responses and the number of physicians with the same or similar answer are provided in Table 2. In general, the physicians thought any injury that limits the mobility of the limbs could lead to functional decline. When asked to elaborate, the majority of the physicians indicated head injuries followed by soft tissue and fracture injuries that commonly lead to functional decline. Other injuries mentioned by the physicians are listed in Table 2. Three physicians indicated that shoulder injuries were more likely to lead to functional decline than other minor injuries.

Table 2. Key informant responses on the type of minor injuries that are most likely to lead to functional decline in elderly patients who were previously living independently.

Injury	Number of physicians (N=13)
Lower extremity injuries affecting ambulation	9
Upper extremity injuries affecting motion function	9
Head injuries affecting cognition	8
Sprains	6
Bruises/Contusions	6
Minor fractures	6
Lacerations	5
Injuries to wrist/hand	5
Minor foot injuries	4
Abrasion	3
Shoulder injuries	3
Back injuries	2
Leg injuries	2
Burns of 2 nd degree and up	2
Anything that affects balance or falls risk	2
Chest pain or rib injuries	2
Pelvic fracture	1
Vertebral compression fracture	1
Falls	1
minor car accidents leading to being afraid to drive again	1
Vision and hearing	1
Soft tissue injuries	1
Injuries to the knee	1
Thoracic and lumbar injuries	1

Having gathered such information on common minor injuries from the key informants and comparing it with previous research we did not think it was necessary to ask the questions on minor injuries on the survey. Moreover, we noticed that asking physicians such questions on minor injuries that lead to functional decline took physician a substantially longer time to respond compared to other interview questions. As Dillman techniques suggest keeping the questionnaire short and simple to achieve reasonably high response rates we decided to exclude questions on minor injuries that lead to functional decline especially that we had gathered the information we needed from the key informant interviews.

Respondents demonstrated a varying degree of functional decline assessment of elderly patients and knowledge on the tools available for assessment of functional decline. A summary of the key informant responses on assessment of functional decline are presented in Table 3. The most common answer was that the respondents ask a limited number of basic ADL/IADL items without following any standard. Some physicians had good knowledge of the tools available to them and used them for assessing functional decline. Some physicians knew about some tools but did not use them due to time constraints, while others did not mention any tools and assessed for some basic ADL/IADL items without following any standards. Some physicians assess for most of the basic ADL and IADL items while others assess for a subset of the basic ADL/IADL items. For example, some physicians indicated that “if a patient is able to eat and walk they often go home.” Some physicians that did not perform the full functional assessment referred the patients to a geriatric evaluation and management unit when they felt the patient was not ready to go home. The geriatric evaluation and management units are specialized for elderly patients that assess and determine the cause of problem and provide the necessary services for elderly patients. The physicians that followed a standard way of assessing for functional decline used some other tools such as the Functional Status Questionnaire⁹¹, Barthel

Index⁸², modified Barthel Index⁸³, Katz Index of ADL¹³³, or the Lawton IADL Scale⁸⁸. Some of the physicians interviewed did not use the OARS ADL scale but rather asked patients what they felt were important items and relevant to the patient and they did not use the scoring system that the OARS ADL scale³⁰ provides. Based on the knowledge and information the key informants provided we noticed there was a need to provide a more detailed information such as listing the 14 basic ADL/IADL items and the definition of the OARS ADL scoring system on the questionnaire to ensure it was clear to the physicians what we meant by the OARS ADL scale items and the scoring system.

Table 3. Key informant responses on their assessment of functional status in elderly patients.

How functional status is assessed	Number of physicians (N=13)
Ask a limited number of basic ADL/IADL items without following any standards	5
Ask third party (e.g. family members) as the patients do not always fully report their functional status	4
Assess ambulation only	3
Refer to geriatric evaluation and management service	3
Rely on social worker to evaluate for functional decline but realize they are not always qualified	3
Assess what the patients were able to do in the past versus now	3
Assess what support the patients have at home	3
Assess using Lawton IADL scale	2
Knows about Barthel Index (BI), Modified BI (MBI) and Katz index but do not use it	2
Refer patient to home care if notice functional decline	2
Mostly assess for balance using Timed Up and Go test (TUG)	2
Don't ask questions in a standard way but rely on geriatric evaluation and management nurses	2
Assess if patient can get out of bed	1
Assess if patient can manage at home or needs a walking aid or increased supervision	1
Always ask for basic ADL tasks (dressing, bathing, ambulation)	1
Ask if living alone or getting some assistance	1
"if a patient is able to eat and can walk they often go home"	1
Don't recall if ever asking if can do "finances, meals"	1
- Assess for Shopping, Housekeeping, Accounting and Finances (banking), Food preparation, Telephone (Tools, Transportation) and use SHAFT as an acronym to remember what to ask	1
- For basic ADL tasks assess for Dressing, Eating, Ambulation, Hygiene, and Toileting and use the acronym DEATH to remember	
Functional Status Questionnaire	1
Ask all ADL and IADL and use a template in their EMR (electronic medical records) system	1
Ask if they are able to dress themselves, feed themselves, personal grooming, how are they getting around the house, how are they maintaining the house	1
Ask basic ADL/IADL but also ask about weight loss (implying likely not eating) and cognition as they are predictor of functional decline	1
Ask open-ended questions about functional abilities	1
Do not ask about basic ADL/IADL but just observe the patient when ambulating	1
Test their mental capabilities	1

Key informant opinions on the OARS ADL scale are presented in Table 4. All the key informants agreed that the OARS ADL scale was relevant in measuring functional decline in elderly patients with minor injuries when the assessment tool was introduced to

the key informants. The majority of the physicians, however, indicated that not all the items were equally relevant. They thought the items needed different weights. The physicians' opinions were that some tasks, either ADL or IADL, such as shopping for groceries or clothing or getting to places out of walking distance can easily be accomplished by getting assistance from someone. For other items, such as eating, the physicians indicated that it would be hard to get assistance so often. A good number of the physicians thought using the telephone and handling their own money were also essential and should be weighted more than indicated by the OARS ADL scale. Although the majority of the key informants thought basic ADL tasks were more relevant in general, some indicated that some IADL tasks such as handling their own money were also very relevant and needed more weight.

Table 4. Key informant opinions on the OARS ADL scale.

Opinion on the OARS ADL scale	Number of physicians (N=13)
The OARS ADL scale is a comprehensive scale	13
Relevant tool overall	13
Some items are more relevant and should be weighted more	9
The OARS ADL scale is too long	3
Consider only basic ADL items to be relevant and IADL items are not relevant	1

When the key informants were asked about their opinions on what constitutes a clinically significant point drop in OARS ADL scale the majority responded that it depended on whether the elderly patients have family members to help or not and if they were capable to help. This opinion of the key informants on whether a patient had support at home or not was a major point to consider as we initially did not consider such a distinction between those patients that had support versus those that did not have support at home. Based on those opinions we modified our questionnaire and split the question on point drop in basic ADL/IADL into two parts, one for patients that had support at home and one for patients that did not have support at home. The key informants thought that the basic ADL tasks, in general, were more relevant than the IADL tasks but at times considered some of the IADL

tasks as important as the basic ADL tasks. For example, some key informants thought using the telephone was an essential task and should have the same weight as the basic ADL items. Some other tasks were thought to be less important, especially if the patient had some support at home. One key informant said that “as long as the patient has support once every week or two with the less essential tasks, such as doing housework, then they would be okay.” In general, the key informants thought if the patients live alone a lower point drop (such as 1 point in basic ADL or 2 points in IADL items) is significant whereas if they have support at home the patients can manage with a higher point drop (such as 2 points in basic ADL and 4 points in IADL items). Such key informant information on the relevance of basic ADL and IADL tasks led us to add another separate question to capture the physician opinions on what constituted a clinically significant point drop in the 7 ADL items only.

Overall, the key informants thought it was important to separate the basic ADL and IADL items and to weight the items differently. The key informants had no agreement on which items should be weighted more than other items but the majority of the key informants expressed that being able to walk, eat and take their own medications should be weighted more. They also thought it was important to distinguish between patients that had substantial support versus those that did not have any support at home. These key informant information led us to update the questionnaire as stated above. The frequencies of physician responses on a point drop are presented in Table 5.

Table 5. Key informant opinions on what constitutes a significant point drop in the OARS ADL scale.

Significant point drop to define functional decline	Number of physicians (N=13)
Depends if live alone or with someone who is capable to help	7
Basic ADL: 2 points IADL: 2 points	2
Basic ADL: 2 point drop IADL: 4 point drop	2
Basic ADL: 2 point drop IADL: 14 point drop (i.e. IADL tasks are not relevant at all)	1
Basic ADL and IADL tasks are equivalent: 2 point drop in either basic ADL or IADL	1
Basic ADL and IADL tasks are equivalent: 1 point drop in either basic ADL or IADL	1
Basic ADL: 1 point IADL: 2 points	1
If live alone then 1 point drop If live with someone (who is physically capable to help) 2 point drop	1
Depends on season	1
If have support then 28 point drop If have no support then 1 point drop	1
Basic ADL: 2 point drop IADL: 8 point drop	1
If has no support Basic ADL: 1 point IADL: 2 points If has support Basic ADL: 2 point IADL: 4 points	1
1 point drop in basic ADL in somebody without support is significant 3 point drop in basic ADL in somebody with support is significant 1 point drop in IADL in somebody without support is significant 7 point drop in IADL in somebody with support is significant. They can get help for the item	1

The cognitive interviews enabled us to observe a few shortcomings in the questionnaire and to alter the questionnaire further. We obtained feedback that it would be clearer to put a statement at the beginning of the questionnaire to instruct respondents to complete and return the questionnaire in the postage paid envelope. We also noticed that some physicians were putting ranges for the questions requiring a continuous numeric response such as the percent required sensitivity and the clinically significant point drop in the OARS ADL scores. To enforce a single number for such questions we used form boxes with predefined field length. Observing the physicians completing the questionnaire we also

noticed some of the question wording were a bit too long and caused some difficulty for the physicians answering the questions. To make such questions easier to read and understand we modified the question wordings and format on the questionnaire. These changes helped in having a more clear and easy to understand questionnaire.

4.2 Results from Survey

4.2.1 Response Rate

Of the 534 physicians surveyed, 27 were non-contactable because they had moved from their address we had on file and 42 were ineligible as they were not practicing anymore or were not seeing elderly patients. Of the 465 eligible surveys 265 (57.0%) completed and returned the survey (including the 15 physicians from the pilot survey). Response rate was 51.9% among emergency physicians (81/156), 70.5% among geriatricians (117/166), and 46.9% among family physicians (67/143). The overall and group cumulative response rates are shown in Figure 2. The response rates among the three physician groups were significantly different ($p < 0.0001$). The geriatrician response rate was significantly higher than the response rate of the emergency physicians ($p = 0.0006$) and family physicians ($p < 0.0001$). The response rates of the emergency and family physicians were not significantly different from one another ($p = 0.3811$).

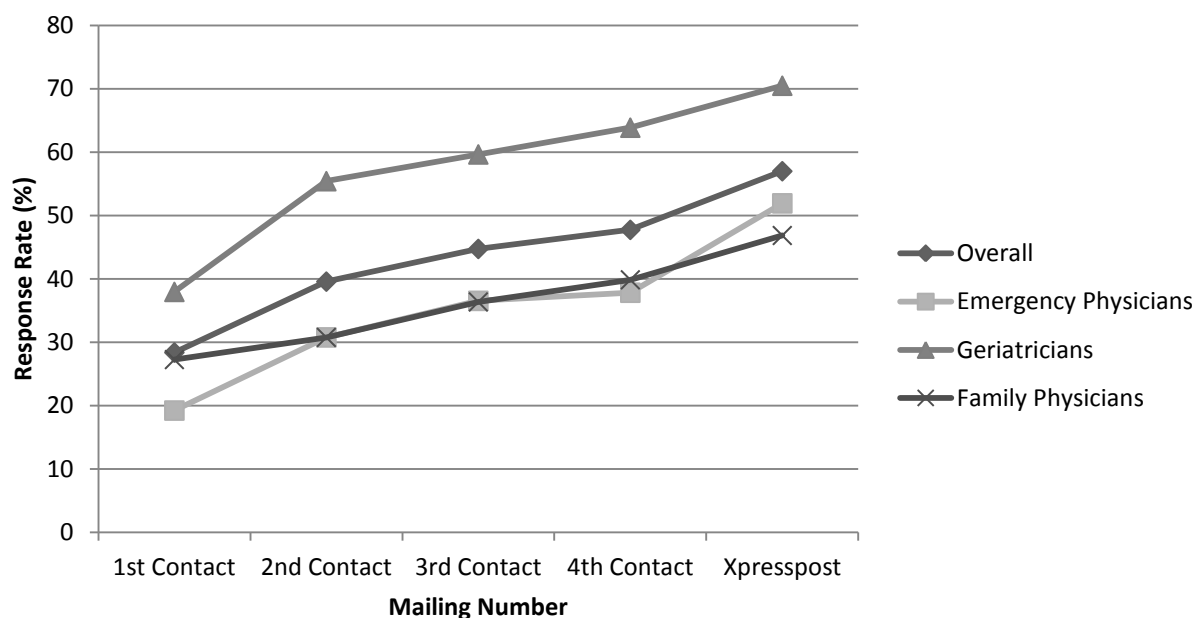


Figure 2. Overall and physician group cumulative response rates.

In general the conditional response rates were declining with each contact except for the Xpresspost which had an increased conditional response rate. This information is presented in Table 6 but also can be seen by the slopes of the response rates in Figure 2.

Table 6. Response rates among remaining non-responders.

	1 st Contact	2 nd Contact	3 rd Contact	4 th Contact	Xpresspost
Overall	28.4	15.6	8.5	5.5	17.7
Emergency Physicians	19.2	14.3	8.3	2.0	22.7
Geriatricians	38.0	28.2	9.5	10.5	18.3
Family Physicians	27.3	4.8	8.1	5.5	11.6

Figure 3 shows the comparisons of response rates among physicians who received the incentives versus those that did not receive the incentives. At an alpha level of 0.05, the overall response rate of the physicians who received a \$10 Tim Hortons gift card (62.7%) was significantly higher ($p = 0.0133$) than the response rate of the physicians who did not receive an incentive (51.3%). The response rates for emergency physicians and family physicians with incentives (56.8% and 52.1%, respectively) were higher than for those who

did not receive incentives (46.7% and 41.7%, respectively) but differences were not statistically significant ($p = 0.2061$ and $p = 0.2107$, respectively). The response rate of the geriatricians who received an incentive (77.8%) were significantly higher ($p = 0.0442$) than the response rate of the geriatricians who did not receive an incentive (63.5%). From the numbers we notice that the incentives had an effect but we did not have enough power to detect a significant difference among the emergency and family physicians.

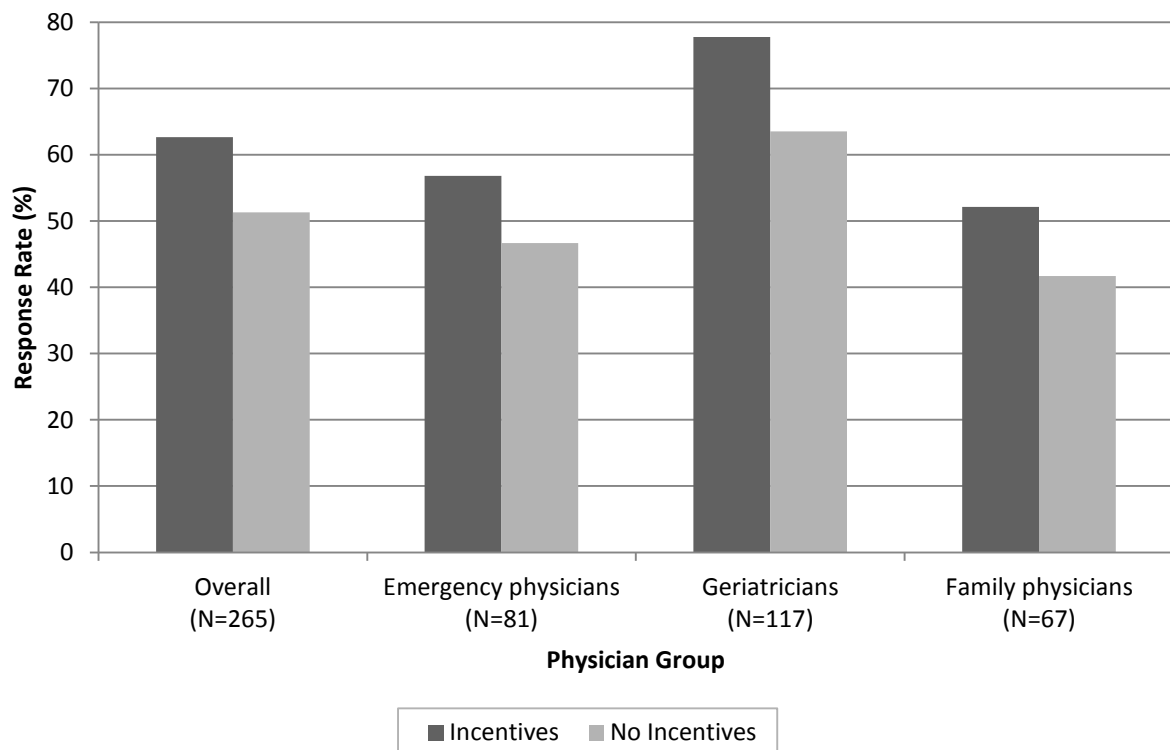


Figure 3. Final response rates for the overall and physician groups with and without incentives.

4.2.2 Assessment for and Relevance of Activities of Daily Living to Functional Decline

Tables 7 through 10 present the distribution of physician responses on how often they asked patients if they had difficulty performing the 14 basic ADL/IADL tasks. Walking, taking own medications, and driving/taking transportation were reported to be most frequently asked overall and by emergency and family physicians. Using telephone, handling finances, and taking care of own appearance were least frequently asked overall by

emergency and family physicians. More than 88.8% of the geriatricians reported that they routinely ask patients about all of the 14 basic ADL/IADL items. Information from these tables is summarized graphically in Figures 4 through 7.

Table 7. Emergency physician answers on whether they ask patients if they have difficulty performing the 14 basic ADL/IADL items.

		Emergency Physician Response (N=81)			
		Always n (%)	Often n (%)	Rarely n (%)	Never n (%)
a.	Eating	7 (8.6)	32 (39.5)	38 (46.9)	4 (4.9)
b.	Dressing and undressing	3 (3.7)	27 (33.3)	46 (56.8)	5 (6.2)
c.	Getting in and out of bed	6 (7.4)	31 (38.3)	41 (50.6)	2 (2.5)
d.	Walking	30 (37.0)	43 (53.1)	8 (9.9)	0 (0.0)
e.	Using telephone	1 (1.2)	0 (0.0)	42 (51.9)	38 (46.9)
f.	Preparing meals	5 (6.2)	34 (42)	33 (40.7)	9 (11.1)
g.	Taking own medications	10 (12.3)	48 (59.3)	21 (25.9)	1 (1.2)
h.	Taking care of own appearance	3 (3.7)	15 (18.5)	46 (56.8)	17 (21.0)
i.	Bathing/showering	3 (3.7)	41 (50.6)	33 (40.7)	4 (4.9)
j.	Getting to bathroom on time	2 (2.5)	27 (33.3)	46 (56.8)	6 (7.4)
k.	Driving or taking transportation	9 (11.1)	37 (45.7)	28 (34.6)	7 (8.6)
l.	Shopping for groceries	3 (3.7)	27 (33.3)	39 (48.1)	12 (14.8)
m.	Handling finances	1 (1.2)	10 (12.3)	49 (60.5)	21 (25.9)
n.	Doing housework	3 (3.7)	30 (37.0)	39 (48.1)	9 (11.1)

Table 8. Family physician answers on whether they ask patients if they have difficulty performing the 14 basic ADL/IADL items.

		Family Physician Response (N=67)			
		Always n (%)	Often n (%)	Rarely n (%)	Never n (%)
a.	Eating	5 (7.5)	28 (41.8)	32 (47.8)	2 (3.0)
b.	Dressing and undressing	2 (3.0)	35 (52.2)	29 (43.3)	1 (1.5)
c.	Getting in and out of bed	3 (4.5)	28 (41.8)	33 (49.3)	3 (4.5)
d.	Walking	18 (26.9)	38 (56.7)	9 (13.4)	1 (1.5)
e.	Using telephone	1 (1.5)	7 (10.4)	42 (62.7)	17 (25.4)
f.	Preparing meals	4 (6.0)	34 (50.7)	28 (41.8)	1 (1.5)
g.	Taking own medications	20 (29.9)	38 (56.7)	8 (11.9)	1 (1.5)
h.	Taking care of own appearance	2 (3.0)	22 (32.8)	35 (52.2)	8 (11.9)
i.	Bathing/showering	5 (7.5)	38 (56.7)	23 (34.3)	1 (1.5)
j.	Getting to bathroom on time	5 (7.5)	35 (52.2)	23 (34.3)	4 (6.0)
k.	Driving or taking transportation	4 (6.0)	44 (65.7)	17 (25.4)	2 (3.0)
l.	Shopping for groceries	2 (3.0)	34 (50.7)	27 (40.3)	4 (6.0)
m.	Handling finances	1 (1.5)	28 (41.8)	36 (53.7)	2 (3.0)
n.	Doing housework	4 (6.0)	40 (59.7)	22 (32.8)	1 (1.5)

Table 9. Geriatrician answers on whether they ask patients if they have difficulty performing the 14 basic ADL/IADL items.

		Geriatrician Response (N=117)			
		Always n (%)	Often n (%)	Rarely n (%)	Never n (%)
a.	Eating	79 (67.5)	31 (26.5)	7 (6.0)	0 (0.0)
b.	Dressing and undressing	91 (77.8)	22 (18.8)	3 (2.6)	1 (0.9)
c.	Getting in and out of bed	81 (69.2)	29 (24.8)	6 (5.1)	1 (0.9)
d.	Walking	104 (88.9)	12 (10.3)	1 (0.9)	0 (0.0)
e.	Using telephone	59 (50.4)	45 (38.5)	13 (11.1)	0 (0.0)
f.	Preparing meals	91 (77.8)	25 (21.4)	1 (0.9)	0 (0.0)
g.	Taking own medications	98 (83.8)	18 (15.4)	1 (0.9)	0 (0.0)
h.	Taking care of own appearance	79 (67.5)	31 (26.5)	5 (4.3)	2 (1.7)
i.	Bathing/showering	97 (82.9)	18 (15.4)	2 (1.7)	0 (0.0)
j.	Getting to bathroom on time	90 (76.9)	25 (21.4)	2 (1.7)	0 (0.0)
k.	Driving or taking transportation	81 (69.2)	30 (25.6)	5 (4.3)	1 (0.9)
l.	Shopping for groceries	80 (68.4)	33 (28.2)	4 (3.4)	0 (0.0)
m.	Handling finances	88 (75.2)	26 (22.2)	3 (2.6)	0 (0.0)
n.	Doing housework	85 (72.6)	28 (23.9)	4 (3.4)	0 (0.0)

Table 10. Distribution of the overall physician answers on whether they ask patients if they have difficulty performing the 14 basic ADL/IADL items.

		Overall Physician Response (N=265)			
		Always n (%)	Often n (%)	Rarely n (%)	Never n (%)
a.	Eating	91 (34.3)	91 (34.3)	77 (29.1)	6 (2.3)
b.	Dressing and undressing	96 (36.2)	84 (31.7)	78 (29.4)	7 (2.6)
c.	Getting in and out of bed	90 (34.0)	88 (33.2)	80 (30.2)	6 (2.3)
d.	Walking	152 (57.4)	93 (35.1)	18 (6.8)	1 (0.4)
e.	Using telephone	61 (23.0)	52 (19.6)	97 (36.6)	55 (20.8)
f.	Preparing meals	100 (37.7)	93 (35.1)	62 (23.4)	10 (3.8)
g.	Taking own medications	128 (48.3)	104 (39.2)	30 (11.3)	2 (0.8)
h.	Taking care of own appearance	84 (31.7)	68 (25.7)	86 (32.5)	27 (10.2)
i.	Bathing/showering	105 (39.6)	97 (36.6)	58 (21.9)	5 (1.9)
j.	Getting to bathroom on time	97 (36.6)	87 (32.8)	71 (26.8)	10 (3.8)
k.	Driving or taking transportation	94 (35.5)	111 (41.9)	50 (18.9)	10 (3.8)
l.	Shopping for groceries	85 (32.1)	94 (35.5)	70 (26.4)	16 (6.0)
m.	Handling finances	90 (34.0)	64 (24.2)	88 (33.2)	23 (8.7)
n.	Doing housework	92 (34.7)	98 (37.0)	65 (24.5)	10 (3.8)

Table 11. Percent of physicians always or often asking if patients have difficulty performing activity of daily living and Chi-squared test of significance differences among the physician groups.

		Emergency Physicians (N=81), %	Geriatricians (N=117), %	Family Physicians (N=67), %	p-value
a.	Eating	48.2	94.0	49.2	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.8934 ^D
b.	Dressing and undressing	37.0	96.6	55.2	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.0269 ^D
c.	Getting in and out of bed	45.7	94.0	46.3	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.9429 ^D
d.	Walking	90.1	99.2	83.6	0.0004 ^A 0.0027 ^B <0.0001 ^C 0.2364 ^D
e.	Using telephone	1.2	88.9	11.9	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.0067 ^D

	Emergency Physicians (N=81), %	Geriatricians (N=117), %	Family Physicians (N=67), %	p-value
f. Preparing meals	48.2	99.2	56.7	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.2990 ^D
g. Taking own medications	71.6	99.2	86.6	<0.0001 ^A <0.0001 ^B 0.0003 ^C 0.0277 ^D
h. Taking care of own appearance	22.2	94.0	35.8	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.0678 ^D
i. Bathing/showering	54.3	98.3	64.2	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.2252 ^D
j. Getting to bathroom on time	35.8	98.3	59.7	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.0037 ^D
k. Driving or taking transportation	56.8	94.9	71.6	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.0617 ^D
l. Shopping for groceries	37.0	96.6	53.7	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.0420 ^D
m. Handling finances	13.6	97.4	43.3	<0.0001 ^A <0.0001 ^B <0.0001 ^C <0.0001 ^D
n. Doing housework	40.7	96.6	65.7	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.0025 ^D

A = Overall comparison

B = Geriatricians compared with Emergency Physicians

C = Geriatricians compared with Family Physicians

D = Emergency Physicians compared with Family Physicians

Tables 12 through 15 present the distribution of physician responses on their views on the importance of the 14 basic ADL/IADL items in terms of performance by elderly patients who were completely independent prior to a minor injury and who have no support at home. Being able to get in and out of bed, walking, and being able to get to bathroom were thought to be the most important items in terms of performance overall and by each

physician group. The three items that were thought to be less important than others in terms of performance by elderly patients were ability to do housework, shopping for groceries, and driving or taking transportation by all the physician groups. Information from these tables is summarized graphically in Figures 4 through 7.

Table 12. Distribution of emergency physician answers on the importance of the 14 basic ADL/IADL items in terms of performance by an elderly patient who was completely independent prior to the injury and the patient has NO support at home.

		Emergency Physician Response (N=81)			
		Very Important n (%)	Somewhat Important n (%)	Less Important n (%)	Not Important n (%)
a.	Eating	75 (92.6)	4 (4.9)	2 (2.5)	0 (0.0)
b.	Dressing and undressing	46 (56.8)	32 (39.5)	3 (3.7)	0 (0.0)
c.	Getting in and out of bed	69 (85.2)	12 (14.8)	0 (0.0)	0 (0.0)
d.	Walking	66 (81.5)	13 (16.0)	2 (2.5)	0 (0.0)
e.	Using telephone	31 (38.3)	34 (42.0)	15 (18.5)	1 (1.2)
f.	Preparing meals	29 (35.8)	38 (46.9)	13 (16.0)	0 (0.0)
g.	Taking own medications	55 (67.9)	22 (27.2)	3 (3.7)	0 (0.0)
h.	Taking care of own appearance	15 (18.5)	37 (45.7)	29 (35.8)	0 (0.0)
i.	Bathing/showering	40 (49.4)	34 (42.0)	7 (8.6)	0 (0.0)
j.	Getting to bathroom on time	49 (60.5)	31 (38.3)	1 (1.2)	0 (0.0)
k.	Driving or taking transportation	18 (22.2)	30 (37.0)	30 (37.0)	3 (3.7)
l.	Shopping for groceries	23 (28.4)	29 (35.8)	28 (34.6)	1 (1.2)
m.	Handling finances	27 (33.3)	35 (43.2)	18 (22.2)	1 (1.2)
n.	Doing housework	14 (17.3)	28 (34.6)	37 (45.7)	2 (2.5)

Table 13. Distribution of family physician answers on the importance of the 14 basic ADL/IADL items in terms of performance by an elderly patient who was completely independent prior to the injury and the patient has NO support at home.

		Family Physician Response (N=67)			
		Very Important n (%)	Somewhat Important n (%)	Less Important n (%)	Not Important n (%)
a.	Eating	60 (89.6)	6 (9.0)	1 (1.5)	0 (0.0)
b.	Dressing and undressing	46 (68.7)	20 (29.9)	0 (0.0)	0 (0.0)
c.	Getting in and out of bed	62 (92.5)	4 (6.0)	1 (1.5)	0 (0.0)
d.	Walking	57 (85.1)	9 (13.4)	0 (0.0)	0 (0.0)
e.	Using telephone	23 (34.3)	33 (49.3)	11 (16.4)	0 (0.0)
f.	Preparing meals	29 (43.3)	31 (46.3)	7 (10.4)	0 (0.0)
g.	Taking own medications	54 (80.6)	12 (17.9)	1 (1.5)	0 (0.0)
h.	Taking care of own appearance	16 (23.9)	34 (50.7)	17 (25.4)	0 (0.0)
i.	Bathing/showering	33 (49.3)	32 (47.8)	2 (3.0)	0 (0.0)
j.	Getting to bathroom on time	41 (61.2)	23 (34.3)	2 (3.0)	1 (1.5)
k.	Driving or taking transportation	25 (37.3)	25 (37.3)	16 (23.9)	1 (1.5)
l.	Shopping for groceries	19 (28.4)	32 (47.8)	14 (20.9)	2 (3.0)
m.	Handling finances	27 (40.3)	28 (41.8)	11 (16.4)	0 (0.0)
n.	Doing housework	11 (16.4)	31 (46.3)	22 (32.8)	3 (4.5)

Table 14. Distribution of geriatrician answers on the importance of the 14 basic ADL/IADL items in terms of performance by an elderly patient who was completely independent prior to the injury and the patient has NO support at home.

		Geriatrician Response (N=117)			
		Very Important n (%)	Somewhat Important n (%)	Less Important n (%)	Not Important n (%)
a.	Eating	105 (89.7)	7 (6.0)	4 (3.4)	1 (0.9)
b.	Dressing and undressing	93 (79.5)	23 (19.7)	0 (0.0)	0 (0.0)
c.	Getting in and out of bed	114 (97.4)	3 (2.6)	0 (0.0)	0 (0.0)
d.	Walking	111 (94.9)	6 (5.1)	0 (0.0)	0 (0.0)
e.	Using telephone	46 (39.3)	57 (48.7)	13 (11.1)	1 (0.9)
f.	Preparing meals	52 (44.4)	55 (47.0)	10 (8.5)	0 (0.0)
g.	Taking own medications	89 (76.1)	25 (21.4)	3 (2.6)	0 (0.0)
h.	Taking care of own appearance	50 (42.7)	54 (46.2)	11 (9.4)	2 (1.7)
i.	Bathing/showering	71 (60.7)	40 (34.2)	5 (4.3)	0 (0.0)
j.	Getting to bathroom on time	88 (75.2)	27 (23.1)	2 (1.7)	0 (0.0)
k.	Driving or taking transportation	35 (29.9)	56 (47.9)	21 (17.9)	4 (3.4)
l.	Shopping for groceries	42 (35.9)	46 (39.3)	28 (23.9)	1 (0.9)
m.	Handling finances	37 (31.6)	62 (53.0)	16 (13.7)	2 (1.7)
n.	Doing housework	24 (20.5)	50 (42.7)	41 (35.0)	2 (1.7)

Table 15. Distribution of the overall physician answers on the importance of the 14 basic ADL/IADL items in terms of performance by an elderly patient who was completely independent prior to the injury and the patient has NO support at home.

		Overall Physician Response (N=265)			
		Very Important n (%)	Somewhat Important n (%)	Less Important n (%)	Not Important n (%)
a.	Eating	240 (90.6)	17 (6.4)	7 (2.6)	1 (0.4)
b.	Dressing and undressing	185 (69.8)	75 (28.3)	3 (1.1)	0 (0.0)
c.	Getting in and out of bed	245 (92.5)	19 (7.2)	1 (0.4)	0 (0.0)
d.	Walking	234 (88.3)	28 (10.6)	2 (0.8)	0 (0.0)
e.	Using telephone	100 (37.7)	124 (46.8)	39 (14.7)	2 (0.8)
f.	Preparing meals	110 (41.5)	124 (46.8)	30 (11.3)	0 (0.0)
g.	Taking own medications	198 (74.7)	59 (22.3)	7 (2.6)	0 (0.0)
h.	Taking care of own appearance	81 (30.6)	125 (47.2)	57 (21.5)	2 (0.8)
i.	Bathing/showering	144 (54.3)	106 (40.0)	14 (5.3)	0 (0.0)
j.	Getting to bathroom on time	178 (67.2)	81 (30.6)	5 (1.9)	1 (0.4)
k.	Driving or taking transportation	78 (29.4)	111 (41.9)	67 (25.3)	8 (3)
l.	Shopping for groceries	84 (31.7)	107 (40.4)	70 (26.4)	4 (1.5)
m.	Handling finances	91 (34.3)	125 (47.2)	45 (17.0)	3 (1.1)
n.	Doing housework	49 (18.5)	109 (41.1)	100 (37.7)	7 (2.6)

Table 16. Percent of physicians that perceive activity of daily living to be very or somewhat important in terms of performance by patients and Chi-squared test of significance differences among the physician groups.

		Emergency Physicians (N=81), %	Geriatricians (N=117), %	Family Physicians (N=67), %	p-value
a.	Eating	97.5	95.7	98.5	0.5364
b.	Dressing and undressing	96.3	99.2	98.5	0.3372
c.	Getting in and out of bed	100.0	100.0	98.5	0.2269
d.	Walking	97.5	100.0	98.5	0.2578
e.	Using telephone	80.3	88.0	83.6	0.3197
f.	Preparing meals	82.7	91.5	89.6	0.1594
g.	Taking own medications	95.1	97.4	98.5	0.4415
h.	Taking care of own appearance	64.2	88.9	74.6	0.0002
i.	Bathing/showering	91.4	94.9	97.0	0.3153
j.	Getting to bathroom on time	98.8	98.3	95.5	0.3617
k.	Driving or taking transportation	59.3	77.8	74.6	0.0142
l.	Shopping for groceries	64.2	75.2	76.1	0.1641
m.	Handling finances	76.5	84.6	82.1	0.3518
n.	Doing housework	51.9	63.3	62.7	0.2309

Figures 4 through 7 present graphical and aggregate summary of the information presented in Tables 7 through 10 and Tables 12 through 15. The bars in these figures indicate the percent of physicians that always or often ask their patients if they had difficulty performing the activity of daily living. The dashed lines indicate the percent of physicians that thought the activity of daily living was very or somewhat important in terms of performance by elderly patients who were completely independent prior to the injury and who had no support at home.

Overall, there was higher proportion of physicians that thought all the basic ADL/IADL items, except for doing housework and driving/taking transportation, were somehow or very important than the proportion of physicians that assess for the same tasks. Those two IADL tasks were thought to be less important but were asked none the less. These overall statistics are presented in Figure 4. Drilling down to the physician level we observe a difference in opinions between the physician groups, especially when it comes to the geriatricians. Emergency and family physicians had a similar pattern of responses and for most of the basic ADL/IADL items they often indicated a high importance of the task but yet did not assess for the task. Geriatricians on the other hand assessed the patients for all tasks even when they thought some tasks were not as important. About 80% of the emergency physicians thought that using the telephone is very or somewhat important in terms of functional decline but yet only about 1% assessed for this task. This pattern of indicating high importance but assessing much less is common among the emergency physicians. It is mainly the walking and taking own medications that emergency physicians always or often assess which was close to their opinion of having these items being of high importance to functional decline. Although the family physicians have a similar pattern of response the proportion of the family physicians assessing for the tasks that they thought are important to functional decline was a bit higher compared to emergency physicians.

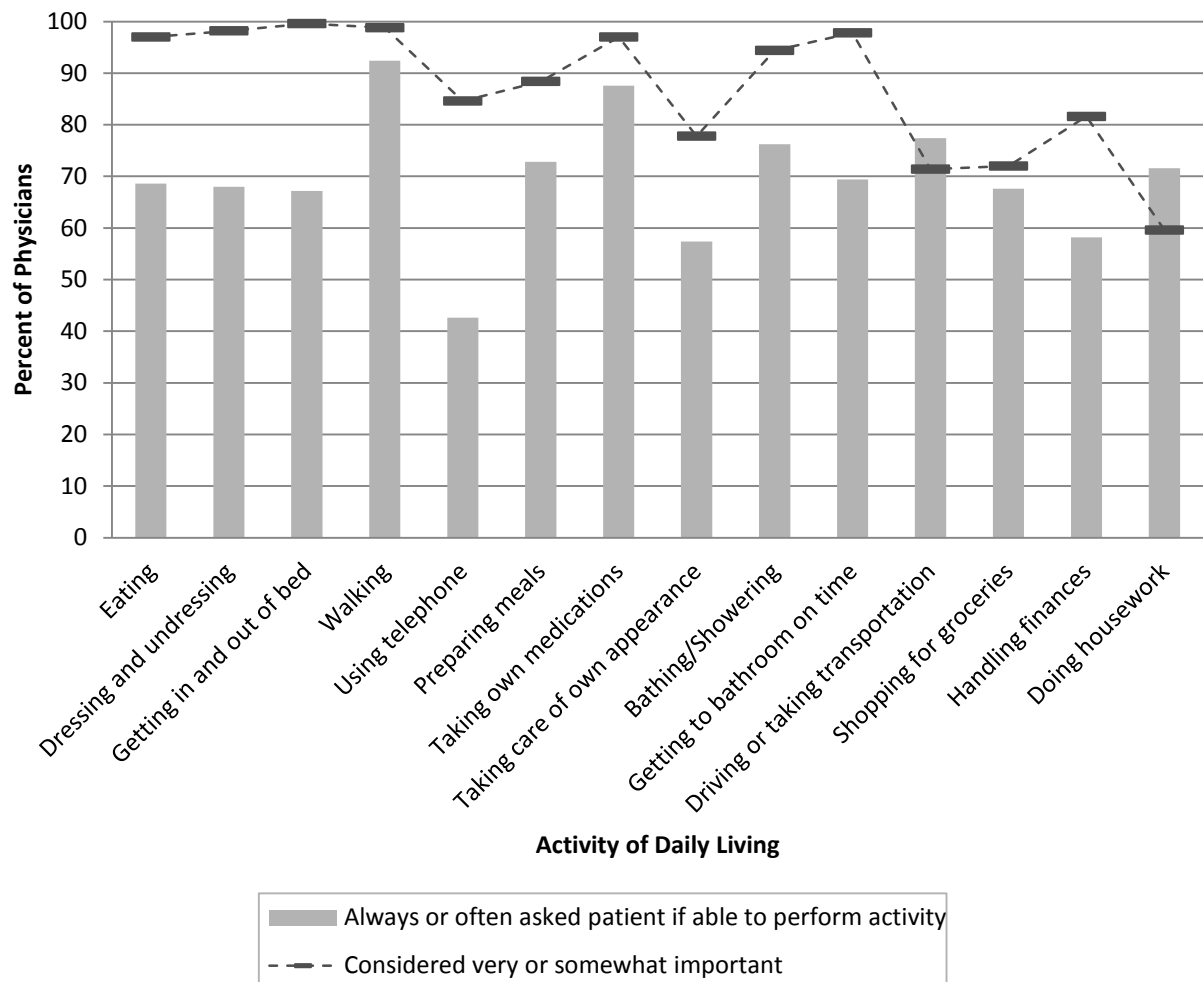


Figure 4. Overall percent of physicians that perceive activity of daily to be very or somewhat important in terms of performance by patients (dashed lines) and percent of physicians always or often asking if patients have difficulty performing activity of daily living (solid bars).

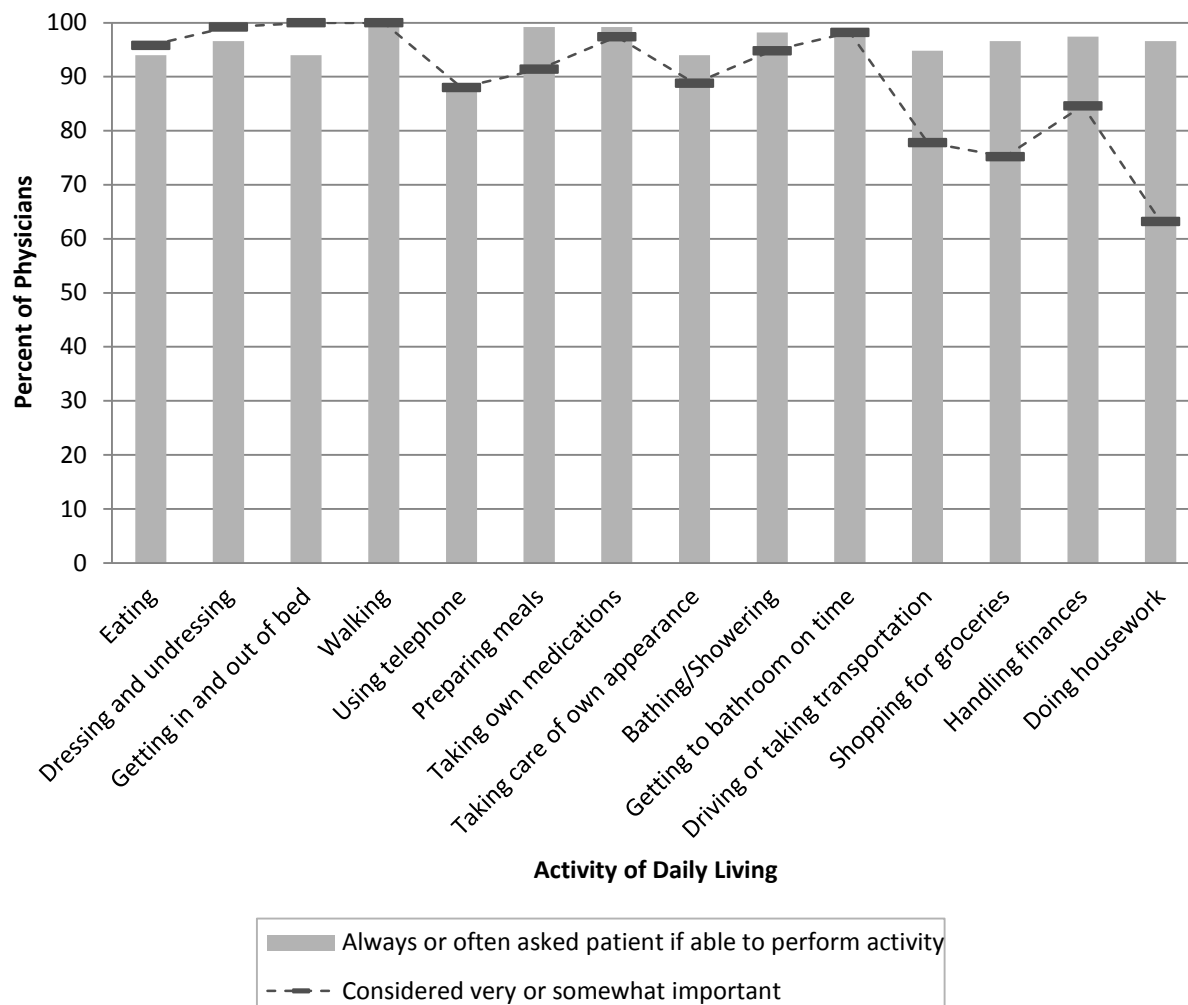


Figure 5. Percent of geriatricians that perceive activity of daily to be very or somewhat important in terms of performance by patients (dashed lines) and percent of geriatricians always or often asking if patients have difficulty performing activity of daily living (solid bars).

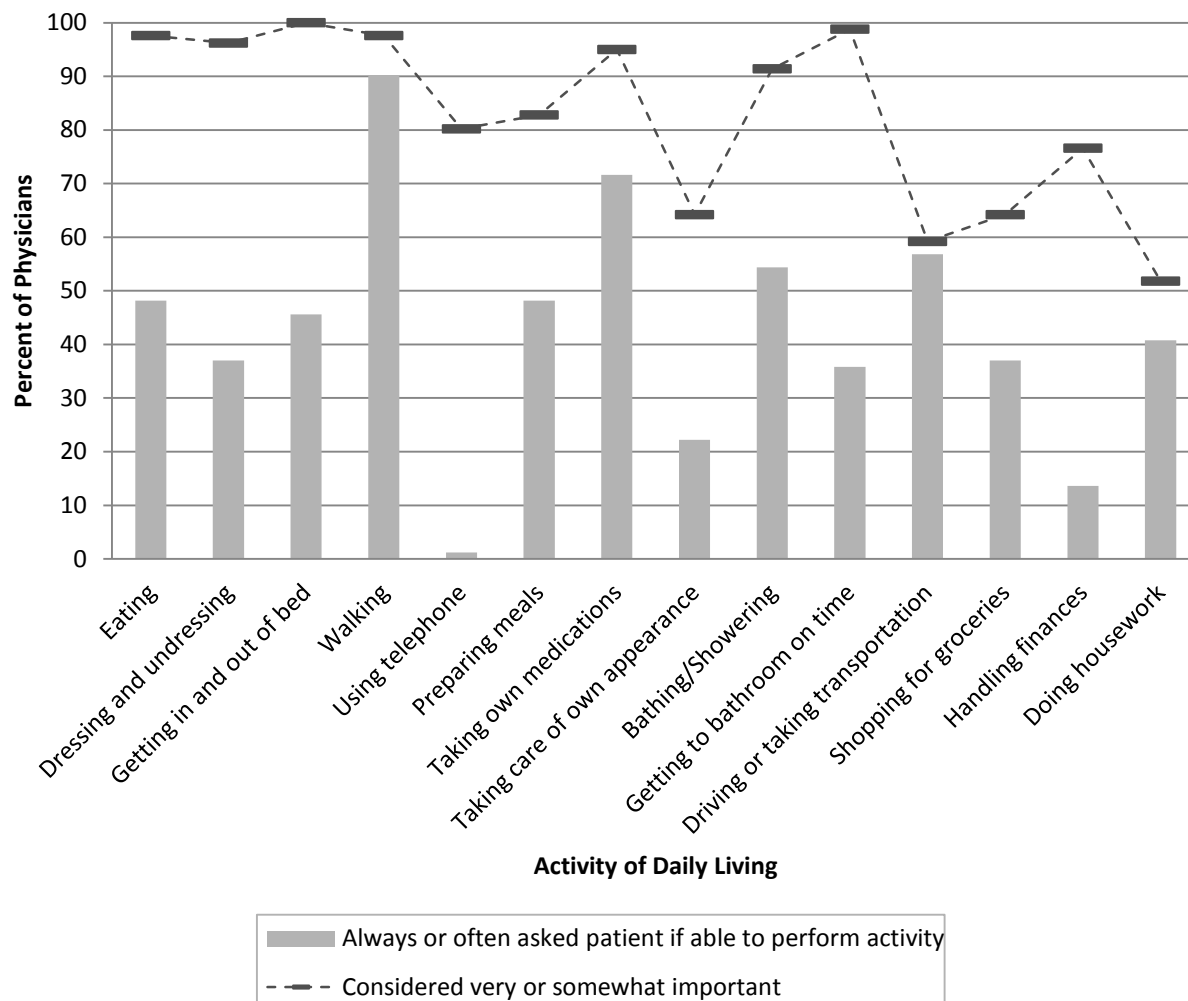


Figure 6. Percent of emergency physicians that perceive activity of daily to be very or somewhat important in terms of performance by patients (dashed lines) and percent of emergency physicians always or often asking if patients have difficulty performing activity of daily living (solid bars).

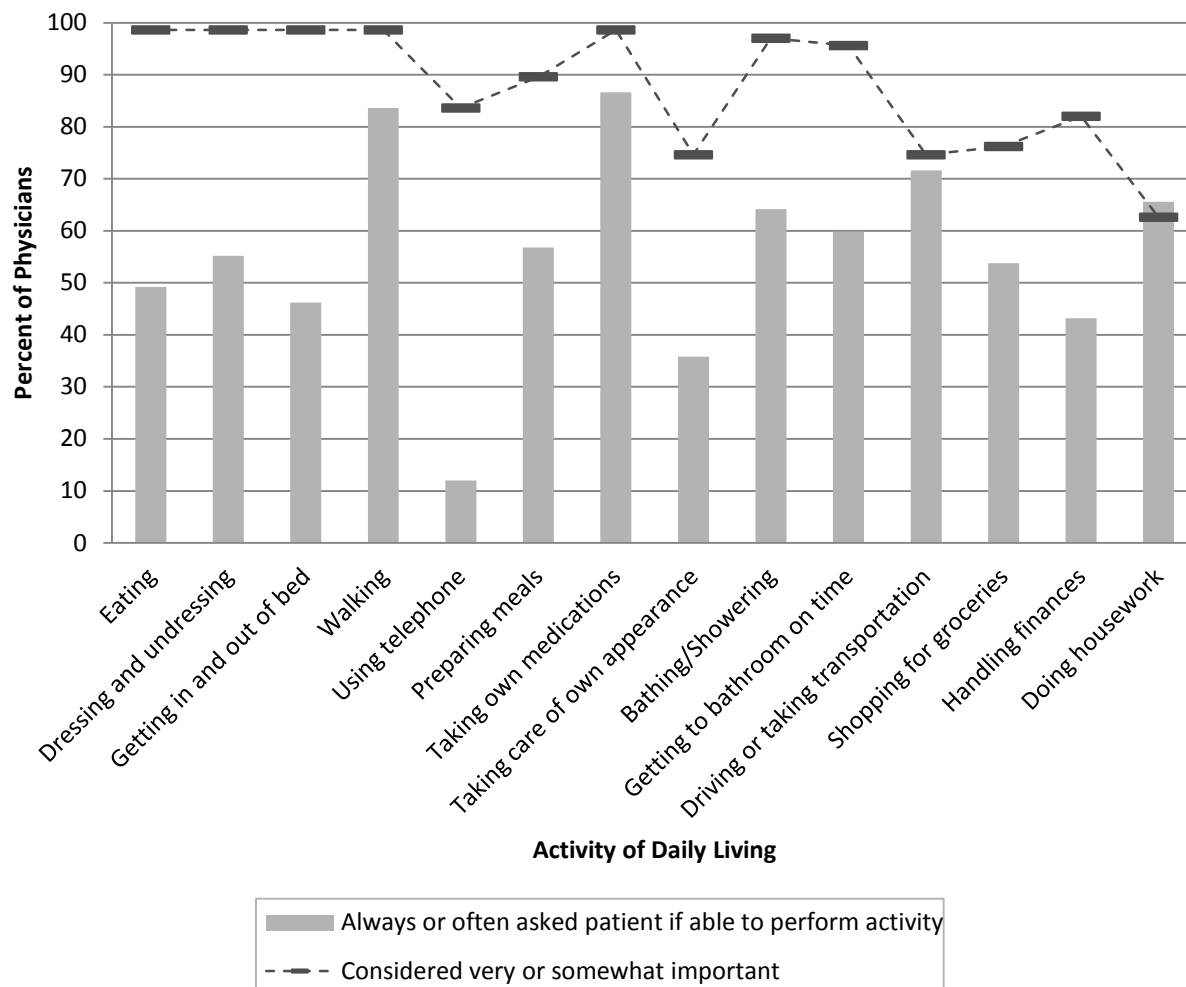


Figure 7. Percent of family physicians that perceive activity of daily to be very or somewhat important in terms of performance by patients (dashed lines) and percent of family physicians always or often asking if patients have difficulty performing activity of daily living (solid bars)

4.2.3 Point Drop and Required Sensitivity

The physicians' perception of a significant point drop to imply functional decline and the required sensitivity to identify elderly patients at high risk of functional decline are presented in Tables 17 and 18.

Table 17 presents the median point drop and the median required sensitivity for a clinical decision rule. The overall median response was a 5 (interquartile range (IQR) 4 - 7) point drop in all the 14 basic ADL/IADL items for patients that have no support at home and

a median response of 8 (IQR 5 - 12) point drop for patients that have extensive support at home to indicate a clinically significant point drop to imply functional decline. When considering the 7 basic ADL items only the median response was a 2 (IQR 2 - 4) point drop in the 7 basic ADL items for patients that have no support at home and a median response of 4 (IQR 2 - 6) point drop for patients that have extensive support at home to imply a clinically significant change, indicative of functional decline. Emergency and family physicians' perception of a point drop were very similar to the overall responses in terms of their opinion of a clinically significant point drop in all the 14 basic ADL/IADL items. The geriatricians' median response was 4 (IQR 3 - 6) point drop in the basic ADL/IADL items for patients that have no support at home and a median response of 6 (4 - 10) point drop for patients that have extensive support at home. The physician responses varied when looking at the 7 ADL items only. There were significant differences among the physician opinions on what constitutes a clinically significant point drop in the OARS ADL score. Whether it was the 14 basic ADL/IADL items or just the 7 ADL items and whether the patients had support at home or not the geriatricians opinions on what constitutes a clinically significant point drop were always significantly different from the median responses of the emergency and family physicians whereas the median responses of the emergency and family physicians were not significantly different. P-values on the tests of significance are also presented in Table 17.

The overall, emergency physician, family physician, and geriatrician median required sensitivity, percent (IQR), for a clinical decision rule to identify injured seniors at high risk for a functional decline 6 months post injury was 80% (80 - 90%), 90% (80 - 90%), 80% (75 - 88%), and 85% (80 - 90%), respectively. The median sensitivity required by family physicians was significantly lower than that required by emergency physicians ($p=0.0002$) and geriatricians ($p=0.0008$). The median sensitivity required by geriatricians and emergency physicians were not significantly different ($p=0.3021$). The details of the physician responses are summarized in Table 17.

Table 17. Physicians' perception of a significant point drop to imply functional decline and the required sensitivity to identify elderly patients at high risk of functional decline.

	Emergency Physicians (N=81)	Family Physicians (N=67)	Geriatricians (N=117)	Overall (N=265)	P-value
Median point drop (IQR) in all 14 basic ADL/IADL items					
If patient has NO support at home	6 (4-7)	6 (4-8)	4 (3-6)	5 (4-7)	0.0003 ^A 0.0073 ^B 0.0003 ^C 0.1148 ^D
If patient has support at home	10 (6.5-12)	10 (6-14)	6 (4-10)	8 (5-12)	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.2912 ^D
Median point drop (IQR) in the 7 ADL items only					
If patient has NO support at home	2 (2-4)	3 (2-4)	2 (1-4)	2 (2-4)	0.0002 ^A 0.0081 ^B <0.0001 ^C 0.1563 ^D
If patient has support at home	5 (4-7)	4 (3-7)	2 (2-5)	4 (2-6)	<0.0001 ^A <0.0001 ^B <0.0001 ^C 0.7739 ^D
Required sensitivity					
Median required sensitivity (IQR), %	90 (80-90)	80 (75-88)	85 (80-90)	80 (80-90)	0.0003 ^A 0.3021 ^B 0.0008 ^C 0.0002 ^D
Mean required sensitivity (SD), %	84.2 (9.1)	76.6 (15.1)	83.6 (7.9)	82.0 (10.9)	
95% CI of the mean	(82.2, 86.2)	(72.9, 80.3)	(82.2, 85.1)	(80.7, 83.4)	

IQR = Interquartile Range; SD = Standard Deviation; CI = Confidence Interval

A = Overall comparison

B = Geriatricians compared with Emergency Physicians

C = Geriatricians compared with Family Physicians

D = Emergency Physicians compared with Family Physicians

Our analysis to determine the point drop to imply functional decline that would meet or exceed the requirements for 90% of responders (i.e., the 10th percentile) and the analysis to determine the sensitivity that would meet or exceed the requirements for 90% of responders (i.e., the 90th percentile) for a clinical decision rule to identify elderly patients at high risk of functional decline are presented in Table 18. Ninety percent (90%) of geriatricians would be satisfied with a point drop of 2 or more in functional decline when considering all the 14 basic ADL/IADL items. The results indicate that 90% of geriatricians did not distinguish between patients who do not have support at home versus those that have support at home when it comes to a clinically significant point drop. Emergency and

family physicians accept a higher point drop to consider a clinically significant functional decline. It is also shown that 90% of physicians within each group require a smaller point drop when only basic ADL items are considered compared to when looking at all the 14 basic ADL/IADL items. Based on the distribution of required sensitivities, 90% of geriatricians and family physicians would be satisfied with a sensitivity of 90%, while 90% of emergency physicians would be satisfied with a sensitivity of 93% for a clinical decision rule to identify elderly patients at high risk of functional decline. Overall, 90% of physicians would consider a drop in function of at least 2 points in the basic ADL/IADL items as clinically significant, and 90% of physicians would require a tool with sensitivity of 90% to detect patients at risk of a functional decline at 6 months post injury.

Table 18. Required point drop to imply functional decline and required sensitivity for a clinical decision rule that would meet or exceed expectations for 90% of responders.

	Emergency Physicians	Family Physicians	Geriatricians	Overall
Minimum point drop in all 14 basic ADL/IADL items*				
If patient has NO support at home	3	3	2	2
If patient has support at home	5	4	2	3
Minimum point drop in the 7 ADL items*				
If patient has NO support at home	1	1	1	1
If patient has support at home	2	2	1	2
Sensitivity*, %	93	90	90	90

* Meet or exceed expectations for 90% of respondents

The distribution of physician responses in terms of a clinically significant point drop in the OARS ADL scores to define functional decline and the required sensitivity for a clinical decision rule is presented in Figures 8 through 12.

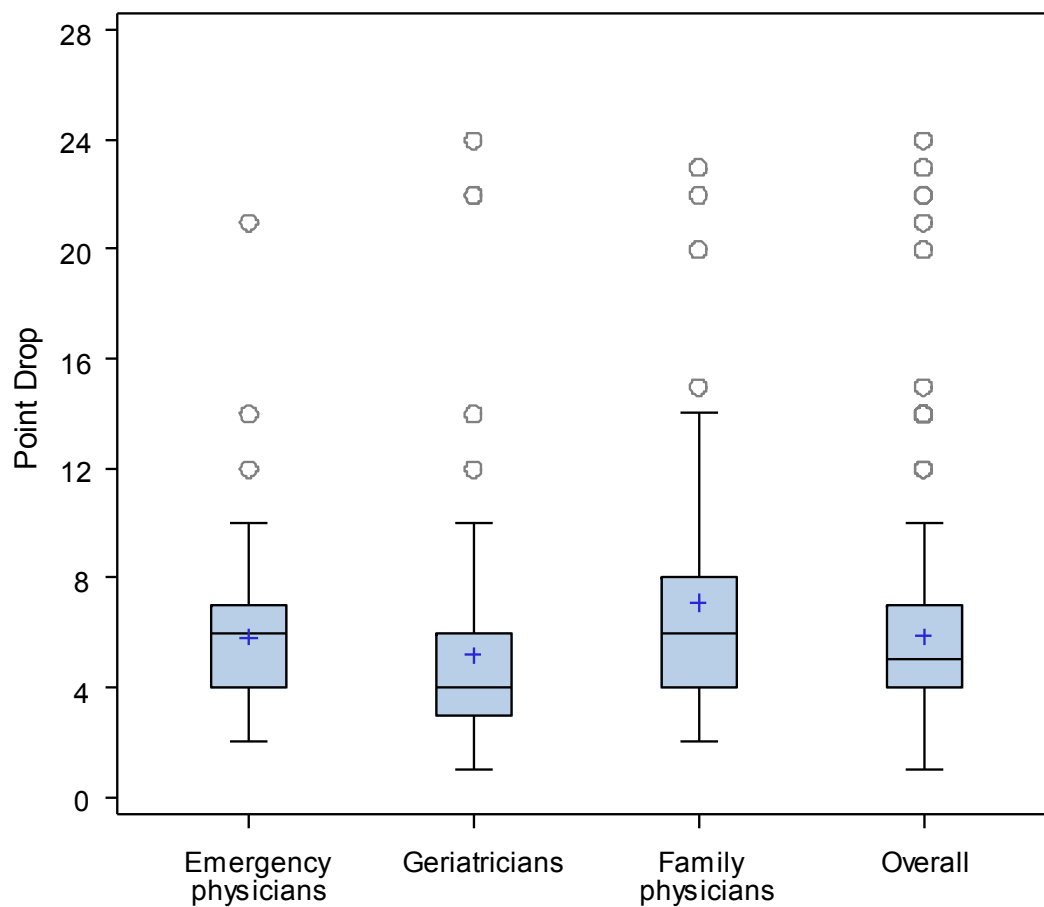


Figure 8. Boxplot showing the physician responses on the point drop – all 14 items and no support.

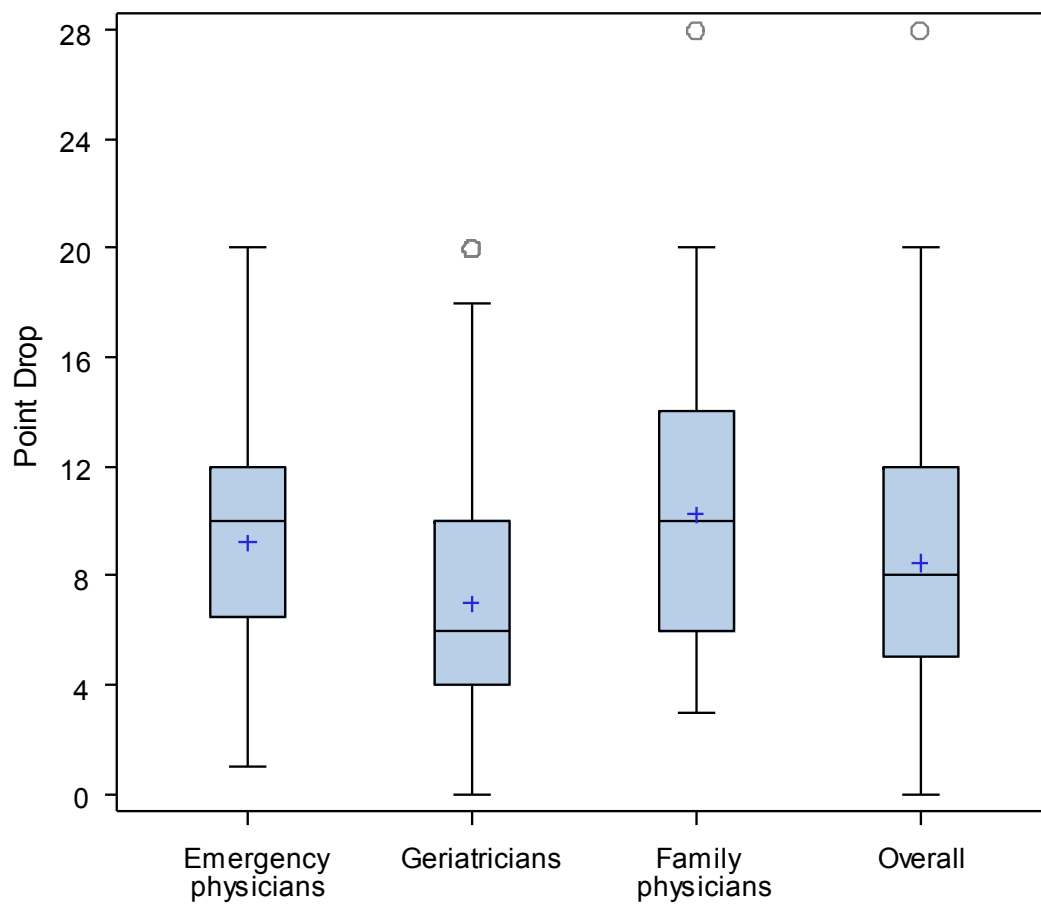


Figure 9. Boxplot showing the physician responses on the point drop – all 14 items but has support at home.

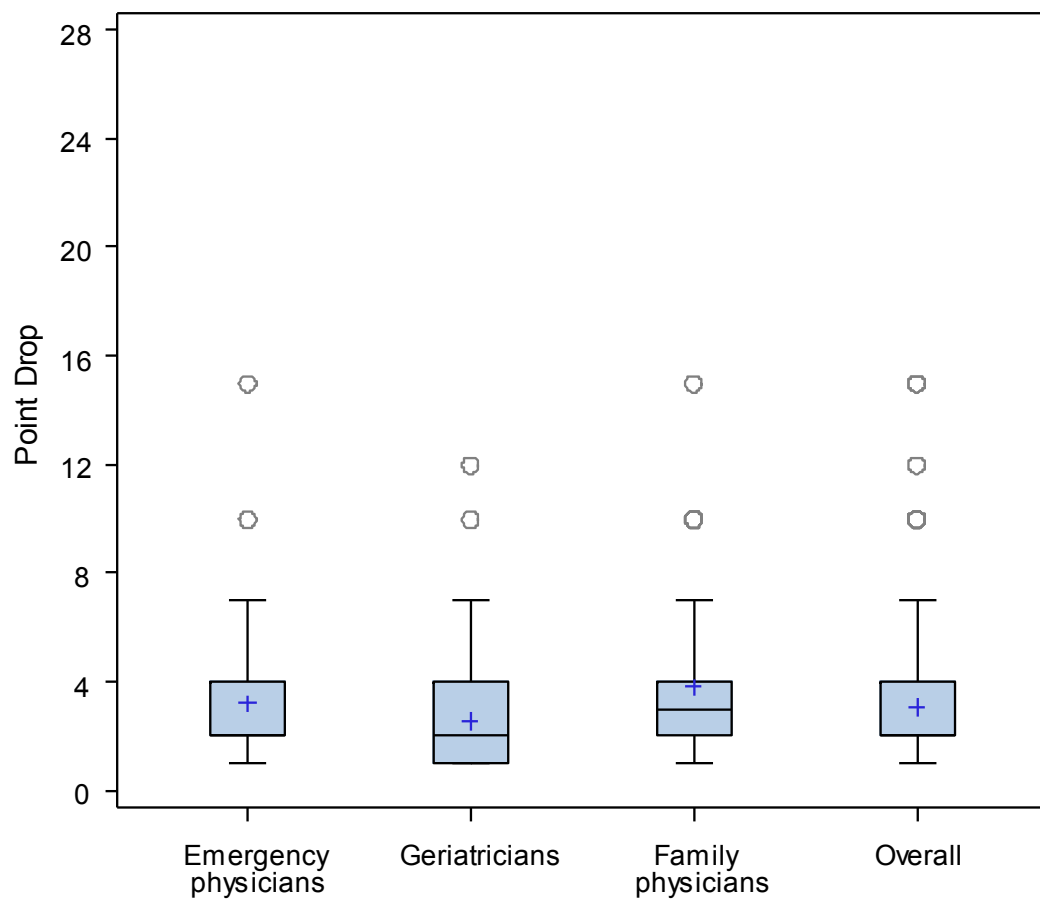


Figure 10. Boxplot showing the physician responses on the point drop – only 7 ADL items and no support.

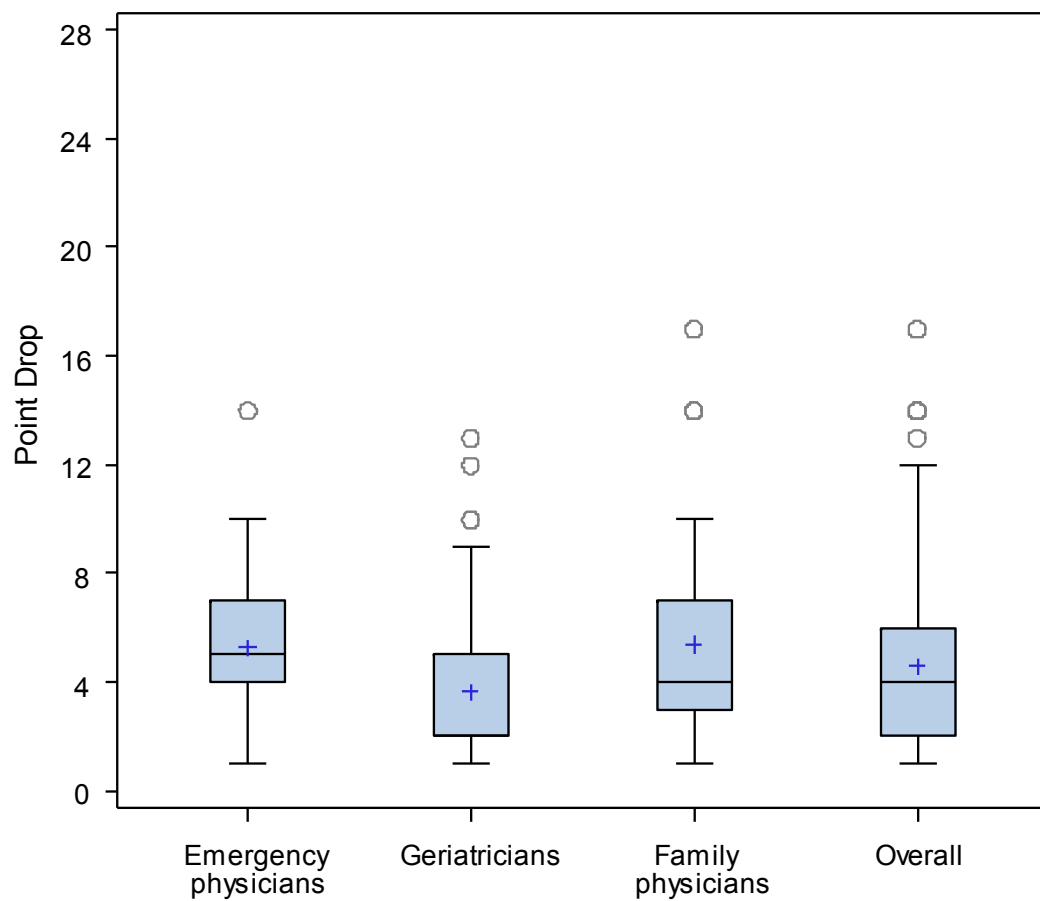


Figure 11. Boxplot showing the physician responses on the point drop – only 7 ADL items but has support at home.

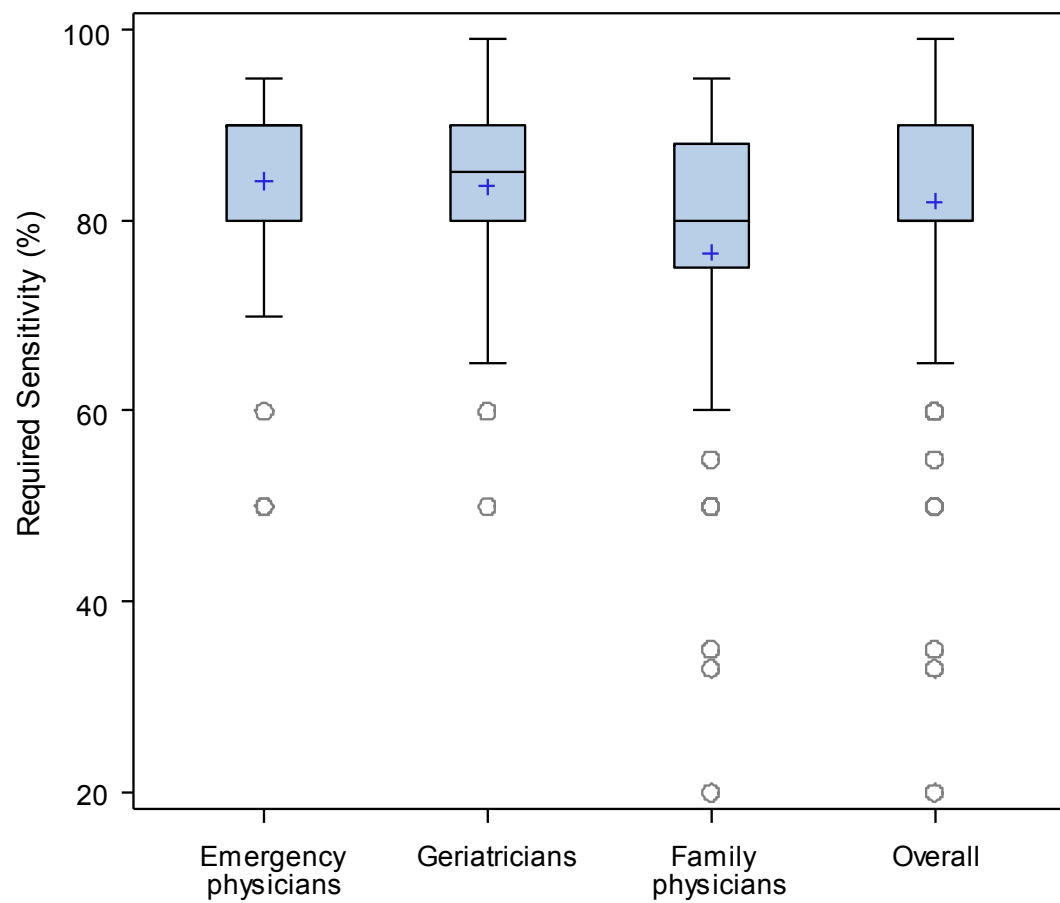


Figure 12. Boxplot showing the physician responses on the required sensitivity.

4.2.4 Respondent Characteristics

Physician demographic information was collected to observe the distribution of the respondent characteristics and compare among the physician groups. Such respondent characteristics are displayed in Table 19. Overall, there was a slightly higher proportion (55.1%) of males than females in our survey. Looking within the different physician groups we noticed the majority (75.3%) of the emergency physician respondents were male. Among the family physician respondents, there were similar proportions of male and female respondents. There were slightly more (55.6%) female geriatrician respondents. Looking at the overall age distribution, the majority of the physicians responding were 35 years of age and older. Overall, a high proportion of physicians were in practice for 20 or more years. The majority of emergency physicians (44.4%) were practicing in a teaching hospital. The majority family physicians (58.2%) were practicing in a group practice setting. Most of the geriatricians (79.5%) were practicing in a hospital. The number of patients, of all ages, and number of elderly patients seen per week were equally distributed when we looked at the overall values. No tests for significance difference in demographic characteristics among the physician groups are done as the three physician groups are expected to be different in these characteristics.

Table 19. Respondent demographics.

	Overall (N=265), n (%)	Emergency Physicians (N=81), n (%)	Family Physicians (N=67), n (%)	Geriatricians (N=117), n (%)
Gender				
Male	146 (55.1)	61 (75.3)	33 (49.3)	52 (44.4)
Female	119 (44.9)	20 (24.7)	34 (50.7)	65 (55.6)
Age				
< 35	20 (7.5)	11 (13.6)	3 (4.5)	6 (5.1)
35-44	88 (33.2)	12 (14.8)	29 (43.3)	37 (31.6)
45-54	76 (28.7)	36 (44.4)	19 (28.4)	33 (28.2)
≥ 55	78 (29.4)	21 (25.9)	16 (23.9)	39 (33.3)
Years in Practice				
< 10	58 (21.9)	25 (30.9)	16 (23.9)	17 (14.5)
10-19	95 (35.8)	33 (40.7)	14 (20.9)	48 (41.0)
≥ 20	109 (41.1)	23 (28.4)	35 (52.2)	51 (43.6)
Years residency training				
< 3	66 (24.9)	17 (21.0)	48 (71.6)	1 (0.9)
3-5	137 (51.7)	60 (74.1)	12 (17.9)	65 (55.6)
5.5-9	51 (19.2)	3 (3.7)	3 (4.5)	45 (38.5)
≥ 10	4 (1.5)	0 (0.0)	1 (1.5)	3 (2.6)
Practice setting				
Teaching Hospital	--	36 (44.4)	--	--
CDGH*: Teaching	--	31 (38.3)	--	--
CDGH: Non-Teaching	--	13 (16.0)	--	--
Solo practice	--	--	19 (28.4)	9 (7.7)
Group practice	--	--	39 (58.2)	10 (8.5)
Hospital	--	--	6 (9.0)	93 (79.5)
Other	--	1 (1.2)	3 (4.5)	5 (4.3)
Number of patients seen / week				
≤ 28	67 (25.3)	3 (3.7)	1 (1.5)	63 (53.8)
29-60	71 (26.8)	19 (23.5)	12 (17.9)	40 (34.2)
61-100	65 (24.5)	36 (44.4)	18 (26.9)	11 (9.4)
> 100	57 (21.5)	23 (28.4)	34 (50.7)	0 (0.0)
Number of elderly patients seen / week				
≤ 20	79 (29.8)	16 (19.8)	18 (26.9)	45 (38.5)
21-30	59 (22.3)	18 (22.2)	10 (14.9)	31 (26.5)
31-50	69 (26)	31 (38.3)	15 (22.4)	23 (19.7)
> 50	46 (17.4)	15 (18.5)	18 (26.9)	13 (11.1)

* CDGH = Community / District General Hospital

* Teaching Hospital, Community / District General Hospital (teaching and non-teaching) are applicable to emergency physicians only

Two demographic variables (language of correspondence and province of residence) were available on the sampling frame and were used for tests of nonresponse bias. Gender of the physicians was also available on the sampling frame but we detected a high prevalence of inaccuracies recorded in the Canadian Medical Directory and as such was not used. The number of physicians in some provinces was very low so data were combined into regions (Western Canada, Ontario, Quebec, Eastern Canada) for nonresponse bias tests as in Table 20.

Table 20. Chi-squared tests of nonresponse bias.

	Respondents % (n)	Nonrespondents % (n)	P-value
Language of the questionnaire			0.5871
English	81.5 (216)	79.5 (159)	
French	18.5 (49)	20.5 (41)	
Region			0.2915
Western Canada*	28.3 (75)	33.5 (67)	
Ontario	41.5 (110)	38.0 (76)	
Quebec	21.5 (57)	23.5 (47)	
Eastern Canada**	8.7 (23)	5.0 (10)	

* British Columbia, Alberta, Saskatchewan, Manitoba, Yukon Territory

** New Brunswick, Nova Scotia, Newfoundland

Chi-squared analyses showed no significant differences in response rates among the English and French-speaking physicians (p-value: 0.5871) implying that there was no indication of nonresponse bias in terms of the language of the questionnaire. Similarly, there was no indication of nonresponse bias when looking at the regions. Nonresponse bias, however, was present when considering physician specialty as indicated by a significantly higher ($p < 0.0001$) response rate among the geriatricians compared to the other specialties.

5. DISCUSSION

Based on 265 completed surveys our results indicate that 90% of physicians would consider a drop in function of at least 2 points if a patient does not have support at home and at least 3 points if a patient has support at home, on the 28-point OARS ADL scale as clinically significant to imply functional decline. Only 10% of physicians would consider a drop smaller than this, as clinically important. We found that for a tool to detect patients at risk of a functional decline at 6 months post injury, sensitivity of 90% would meet or exceed requirements for 90% of physicians. Only 10% of physicians would require sensitivity higher than 90%. These results will be used as clinically important outcomes for a future planned clinical decision rule to identify elderly patients at high risk of functional decline 6 months after sustaining a minor injury. Identifying previously independent elderly patients at high risk of functional decline following a minor injury can allow for effective treatments, referral and follow-up to prevent or minimize adverse health outcomes such as death, admission into hospital, repeat emergency department visit and loss of independence.^{6,7,10,13,134} Although it is difficult to quantify mortality and hospital admission preventions as many as 44% repeat emergency department visits²⁷ and up to 45% functional declines^{1-3,5,14,42,56-58} within six months post discharge can be prevented.

5.1 Key Informant and Cognitive Interviews

From the key informant interviews we gathered substantial qualitative information that helped guide the development of the survey instrument. Initially we planned to include questions on physicians' opinions on what constitutes some common minor injuries that lead to functional decline in the survey instrument. However, the information on minor injuries obtained from the key informant interviews was sufficient for our purposes (i.e. no new information obtained) and so there was no need to include such questions on the survey instrument. The key informants indicated that minor injuries such as contusion, fracture,

laceration, and sprain commonly lead to functional decline. Contusions and sprains were reported by the majority of the key informants to be injuries that commonly lead to functional decline. This finding might suggest that soft tissue injuries get less attention from clinicians than injuries that are more identifiable such as lacerations.

The information provided by the key informants on minor injuries that commonly lead to functional decline was very similar and was in agreement with the information provided in the literature. One study¹⁴ showed patients were more likely to experience functional decline when they had a contusion, fracture, laceration, sprain, abrasion, amputation, burn, or dislocation.¹⁴

The key informants also provided valuable information to help us structure the questions around the clinically significant point drop to define functional decline. The majority of the key informants suggested that the ADL and IADL items be measured separately as they pointed out that the majority of the basic ADL items should be weighted more than the IADL items. Such information was in agreement with some of the previous research that suggested having separate measures for basic ADL and IADL items. The key informants also raised an interesting point on having the point drop based on whether the elderly patients have support at home or not. This information raised an interesting point of view on the definition of functional decline. Such definition not only considers what the patient himself or herself can or cannot do but what kind of help is available to him or her. The survey instrument was developed with these points in mind.

5.2 Survey Findings

5.2.1 Response Rate

We achieved a satisfactory overall response rate of 57.0% which was close to our expectation of 55%. Our response rate compares favourably with two systematic reviews of physician postal surveys that have reported mean response rates of 54%¹²¹ and 61%¹²².

Other research shows that response rates vary between 34% and 70% among physician surveys.^{119,120,126} The geriatricians had the highest response rate of 70.5% compared to emergency physicians', 51.9%, and family physicians', 46.9%. Although we were expecting a slightly higher response rate than 55% from geriatricians we were not expecting it to be as high as 70.5%. Such a high response rate from geriatricians is an indication of the relevance of the study to the geriatricians.

Overall, there was a significantly higher response rate among physicians that received the incentives compared to those that did not receive an incentive. Within each physician group the response rates were slightly higher for physicians that received the incentives versus those that did not receive the incentives but the differences were not statistically significant except for geriatricians. The inability to detect a significant difference among the individual physician specialty groups that received an incentive versus those that did not receive an incentive was likely due to an inadequate power. The sample size was big enough to test for significant differences among the specialties but not powerful enough to detect differences within specialties. We originally did not anticipate hypothesis testing within a specialty but rather to test for differences between the specialties. The fact that the overall response rate of the physicians that received the incentives was significantly higher than those that did not receive an incentive is an indication that we had a power issue for comparisons within the specialties.

From this survey it became clear how the response rates differ among physician specialties. There are deficiencies in previous research on response rates of physicians. Some articles would indicate low response rates of physicians while others have achieved higher response rates and then generalize to the overall physician population. This study had the advantage of using the same exact survey on three different specialties and receiving significantly different response rates. This showed the importance of the relevance of the topic to the physicians being surveyed.

5.2.2 Assessment and Relevance of Activities of Daily Living to Functional Decline

Overall, the results indicated that a lower proportion of physicians ask patients whether they are able to perform the basic ADL/IADL items than the proportion that think the same basic ADL/IADL items are relevant to functional decline. There could be a number of reasons, some of which are mentioned in the following paragraph, for such unusual proportions of not assessing when the items are considered important and relevant to functional decline.

It is mainly the emergency and family physicians that do not assess the patients on all the basic ADL/IADL items despite their opinions on high importance of the tasks to functional decline whereas geriatricians generally ask patients on all the items. Geriatricians are specialized to deal with elderly patients and generally assess the elderly patients more thoroughly than other physician groups. The geriatricians have more training and information on what is available to intervene when a deficit is present and prevent further functional decline as well as how to assess for the presence of an early decline. From the key informant interviews it was the geriatricians that seemed to have more information on the tools for assessing functional decline and given such knowledge there is a higher chance that they would use such knowledge to assess for functional decline. The geriatricians also have standards on assessing patients for functional decline and follow it. This is shown by the fact that a high proportion of geriatricians ask the patients on all the basic ADL/IADL items even when they thought the tasks were not important to functional decline.

Geriatricians are more likely to follow-up with their patients and ask them about the different tasks even if all the tasks were not assessed on their first visit. On the other hand, emergency and family physicians are trained for treating the general population and may not have such detailed training on elderly patients and the tools used for detecting functional decline in elderly patients. Emergency physicians are usually in a rush to treat the patients and move on to the next urgent patient. These findings are in agreement with previous

studies that indicate emergency physicians do not have the time to assess for functional decline.^{1,63,64} This is especially true when the injuries of the elderly patients are not apparent at the time of emergency department visit, which lead to functional decline weeks and months later. As discussed earlier, soft tissue injuries such as sprains and contusions are less apparent and as such get overlooked by emergency and family physicians when it comes to functional decline. Family physicians likewise have less time to assess for functional status completely, especially when it comes to less apparent items such as using the telephone. These findings indicate that emergency and family physicians are aware on the importance of the basic ADL/IADL items in terms of performance by elderly patients but do not routinely assess them.

5.2.3 Point Drop and Sensitivity

Our results indicate that 90% of physicians would consider a drop in function of at least 2 points on the 28-point OARS ADL scale as clinically significant when the patient has no support at home. When the patient has support at home, the physicians would consider a minimum of 3 points decline on the same items. Except for geriatricians, the physicians within each specialty required a greater point drop to consider clinically significant to define functional decline when the patient has support at home compared to not having support at home. In general, the geriatricians required a smaller point drop than the other two specialties when considering all the 14 basic ADL/IADL items. When we considered the 7 basic ADL items only, 90% of physicians would consider a one point drop or more as clinically significant to define functional decline. This was the case for the overall and specialty specific responses. These findings need to be considered for the outcome measure of a clinical decision rule for identifying elderly patients at high risk of functional decline after a minor injury.

Having measured the basic ADL separately, as suggested by some researchers, helped us identify further the weight of the basic ADL over the IADL items. In other words, a smaller clinically significant point drop in the basic ADL compared to the combined basic ADL/IADL items indicates the importance of the basic ADL over the IADL items in general. This further, shows that one needs to be cautious when using the overall OARS ADL scale as the basic ADL items and IADL items are not weighted.

The lower clinically significant point drop reported by geriatricians aligns with the geriatricians' perception of the importance of the basic ADL/IADL items in terms of relevance to functional decline. As reported earlier, a high proportion of geriatricians thought most of the basic ADL/IADL items were important in terms of performance by an elderly patient and as such any small point drop is perceived to be clinically significant by the geriatricians. The geriatricians not only perceive most of the basic ADL/IADL items to be important but actually assess the patients on their ability to perform such tasks and so are more prone to count such items in the point drop whereas emergency and family physicians assess less often and as such are less likely to count such items as important in the calculations of the point drop. The lower point drop indicated by the geriatricians compared to emergency and family physicians might be closer to the reality in some cases than what is reported by the emergency and family physicians as the geriatricians have more experience with the elderly patients and also have more chance to see the same patient to know when they become less independent. Another reason that the geriatricians perceive a lower point drop is significant is that they might be seeing more severely ill patients that have been referred to them by the emergency and family physicians. The less severely injured elderly patients are probably not referred to the geriatricians and it is these patients that emergency and family physicians are considering in their opinions of a clinically significant point drop. To avoid having a separate clinical decision rule for geriatricians the clinical decision rule needs to

consider these findings and be able to distinguish between different patients with different injury severity.

The results indicated that 90% of geriatricians and family physicians would accept a tool with sensitivity of 90% to detect patients at high risk of functional decline 6 months post injury. The sensitivity required by 90% of emergency physicians was slightly higher at 93%. This indicates that in order for emergency physicians to use the clinical decision rule they want the tool to be up to 93% accurate in detecting elderly patients who will truly have a functional decline 6 months post injury. Emergency physicians are trained to detect conditions associated with mortality and morbidity and therefore will choose to investigate, treat or refer more patients if it leads to fewer patients resulting in a poor prognosis. Some Geriatricians and family physicians, however, might be more pragmatic, recognizing that some patients will have a poor outcome despite our best intentions and as such accept a slightly lower sensitivity for clinical decision rules.

Although our results indicated that 90% of physicians would require a clinical decision rule with a sensitivity of up to 90% before using it the results might indicate physicians' previous habits of using highly sensitive tools and as such asked for such high sensitivities. In our study only 25% of the physicians had indicated that they would accept a clinical decision rule with a sensitivity of up to 80%. The sensitivity of the commonly used screening tool Identification of Seniors at Risk or ISAR is 81%. If indeed the majority of the physicians require a clinical decision rule with a sensitivity of up to 90% it might explain why so many physicians do not assess for functional decline using existing screening tools. Having a clinical decision rule with a sensitivity of 90% might be very welcomed by physicians and a major step to having the physicians start using it.

We opted to consider the 90th percentile more important than the initially planned mean and later 50th percentile or median because the means were skewed and we later realized that we would want the majority or 90% of physicians to be satisfied with the

clinically significant point drop to define functional decline as well as the sensitivity of a future planned clinical decision rule. In other words, we need a large majority (i.e. 90%) of physicians to be comfortable with the sensitivity so that they will use the clinical decision rule. The medians would satisfy only half of the physicians.

5.2.4 Respondent Characteristics

The distribution of the respondent characteristics was in alignment with the sampling frame. There was a higher proportion of male emergency physicians than female physicians responding but such a gender proportion are due to the fact that such proportion of physicians are actually practicing in Canada as published by the Canadian Medical Association (CMA). For example, 75.4% of emergency physicians practicing in Canada were males.¹³⁵ When considering region and language of the questionnaire there were no indication of nonresponse bias as Chi-squared tests showed. Nonresponse bias, however, was present when considering physician specialty as the response rate was higher among the geriatricians compared to the other specialties. Such a difference in responders and non-responders when it came to the specialty was expected as the survey was more relevant to geriatricians in that the survey topic was on geriatric patients. Although emergency and family physicians also see geriatric patients the proportion of elderly patients seen is much lower compared to what geriatricians see making the topic a bit less relevant to the emergency and family physicians. Family physician non-responders could also be physicians that do not see geriatric patients regularly and as such consider themselves as physicians that do not treat elderly patients 65 years of age and older and so do not bother to respond to indicate that they do not see elderly patients. Hence, in general there was no indication of nonresponse bias except for specialty which was expected. Most of the findings from the literature on nonresponse bias were targeted at specific specialties and so failed to show nonresponse bias across specialties. In conclusion, it is unlikely that we had

significant nonresponse bias or that responses from the non-responders would have been vastly different. However, we did not have a lot of information on the non-responders to test for non-response bias fully and to rule out non-response bias fully. We do not know if the non-responders are less qualified, have less experience, see fewer patients, are less likely to use the planned clinical decision rule or any clinical decision rule beside other factors.

5.3 Clinical and Research Implications

There are a few potential clinical implications of this survey. The results indicate that although the majority of the physicians consider most of the basic ADL/IADL tasks to be important they do not assess for such tasks. From the key informant and cognitive interviews it became apparent that the majority of the physicians do not use any functional assessment tools. Prior to having a clinical decision rule developed for the physicians to use it is important that the physicians assess for functional decline. One way is to provide a list of the basic ADL/IADL items to physicians and remind them of the items every year or so. Another way is to have the list of the basic ADL/IADL items on the patient's chart or integrated into an Electronic Medical Record (EMR). The elderly patients might benefit from a simple tool with the list of the basic ADL/IADL items with indications to which items the patient is unable to perform due to an injury or illness and to identify if the patient can get support at home on such items that they cannot perform. Such a tool can be filled in by the physician, patient, family member, or registered nurse and the physician alerted on deficiencies in performance of the tasks.

The results of this study are ideal for a clinical decision rule to identify elderly patients at high risk of functional decline following a minor injury. The results indicate how the majority of the physicians would define functional decline in terms of the basic ADL/IADL items and what sensitivity they would accept for a clinical decision rule. This study also clarified the distinction between the basic ADL and the IADL items in terms of importance to

functional decline. Finally, the results indicate how the clinical decision rule would need to distinguish between patients that have support at home versus those that do not have any support at home. These findings highlight the importance of performing research, especially on content experts, prior to developing a clinical decision rule as the outcome measures for the clinical decision rule might need to be adjusted.

The methods and results of this study show how different methodological approaches optimize responses. This study was special in that the same survey was conducted on three different physician groups during the same time period and obtained different response rates. Given that the response rates were much higher among the geriatricians it is very important to ensure the topic of the questionnaire is relevant to the population being surveyed. In order to come up with appropriate questions and more relevant ways to ask questions on a survey it is important to conduct key informant and cognitive interviews. It is also important to pilot the survey prior to mass mail out to test the process and confirm result formats. Although the amount of an incentive might make a difference it is important to provide unconditional incentives which acts as goodwill gesture and help improve the response rates significantly. A special contact, such as Xpresspost, also helps increase the response rates among medical professionals. A special contact can reinforce an image of professionalism and project importance. In addition, the special contact provides a unique method of contact by helping distinguish the survey from other mail and general surveys. Future survey research should consider these methodological approaches that will potentially optimize responses.

5.4 Study Strengths

The survey was designed and conducted using a modified Tailored Design Method to optimize responses and data quality. The techniques used included key informant and cognitive interviews, pilot testing, use of simple and concise words, short and easy

questionnaire, inclusion of a tangible token of appreciation provided in advance, personalized pre-notification and cover letters, indication of a legitimate authority source, enhanced questionnaire arrangements and visual appeal, inclusion of a postage paid return envelope, up to four reminders with a blank questionnaire and a special contact using Xpresspost. With these techniques we were able to obtain reasonably high response rates with the majority of the questions completely filled in with very few missing answers resulting in high quality data.

The survey was implemented in ways to avoid or minimize the four common survey errors. We have put effort to eliminate or minimize sampling error (errors due to surveying only some individuals in the survey population), coverage error (the list from which the sample is drawn is not comprehensive of the population), measurement error (inaccurate or imprecise answers mostly due to poor question or design) and nonresponse errors (responders and non-responders differ).¹¹⁴ Appropriate sample size calculations for each specialty using a very narrow margin of error were determined to minimize sampling error. Such samples were randomly selected from each of the three physician populations. Coverage error was minimized as the samples were selected from the Canadian Medical Directory which contains practicing physicians in Canada and is an optimal source compared to other sources such as the Canadian Association of Emergency Physicians that contains only members who consented to be contacted which is biased towards tertiary care emergency physicians. The questionnaire was reviewed and tested thoroughly by conducting cognitive interviews and pilot testing to avoid measurement error. Although it is difficult to avoid nonresponse bias a lot of effort was put to minimize nonresponse bias. The high response rate was in itself an indication of low nonresponse error. Based on the demographic variables available on the sampling frame we further analyzed and verified that there were no obvious indications of nonresponse bias. These efforts optimized the data quality for more accurate results.

5.5 Study Limitations

This study has a few limitations that need to be addressed. The physicians selected were based on what was available in the Canadian Medical Directory provided by the Scott's Directories as of August 23, 2011. Although the Canadian Medical Directory was thought to be up-to-date we found a small number of physicians that had retired or moved still in the directory. There is also a possibility that certain physicians were not included in the directory which could lead to possible biased samples for our study. However, these limitations are minimal as the Canadian Medical Directory is claimed to be Canada's #1 source for contact information on doctors with accuracy of 97.2% or better. One of the potential limitations of this study is that we included data from the pilot surveys in the final analyses. The rationale behind this was that we only made minor changes to the wording of a question on the questionnaire and the answers were still interpreted as for the modified question. Including the data from the pilot surveys provided more power to this study but the responses to the point drop questions might be slightly different compared to the final survey responses with an adjusted wording of the questions. Although we had enough power to test for significant differences among the different physician specialties we did not have enough power to test for significant differences within a physician group. In other words, we did not have enough power to confirm that the incentives provided to the emergency and family physicians significantly increased the response rate compared to those that did not receive the incentives. Although we have tried our best to avoid any confusion there is still a possibility of misunderstanding or misinterpretation of what we meant by a point drop in the basic ADL/IADL items to imply functional decline. There is also a possibility of misinterpretation when it comes to the questions on the importance of the basic ADL/IADL items with respect to functional decline. Some physicians provided comments on the returned questionnaires mainly indicating that the point drop depended on what injury it was but we have ignored such comments. There is a possibility that physicians assumed different injuries when

providing their opinions on the point drops. The physicians' responses might indicate what the physicians would do in terms of patient assessment but in reality might not do such assessments. Although we have tried our best to avoid any type of bias it is possible that there might be some nonresponse bias that we were not able to identify.

5.6 Conclusion

Our results indicate that 90% of physicians would consider a drop in function of at least 2 points in the basic ADL/IADL as clinically significant. They also indicate that a tool, with a sensitivity of 90% to detect patients at risk of a functional decline 6 months post injury, would meet or exceed the sensitivity required by 90% of physicians. The majority of the physicians indicated that a lower point drop is required to define functional decline when only the 7 basic ADL items are considered. The physicians also reported that a lower point drop was required to define functional decline when the patient did not have support at home. These results will be used as clinically important outcomes for a future planned clinical decision rule to identify elderly patients at high risk of functional decline 6 months after sustaining a minor injury.

The overall response rate was 57.0% with geriatricians having the highest response rate of 70.5%. The response rate was significantly higher among geriatricians that received the incentives versus those that did not receive incentives. The response rate slightly increased with the final Xpresspost contact. These findings indicate the importance of a tangible reward that is provided in advance as well as a final reminder through a special express contact. The high response rates and good quality data we obtained emphasizes the importance of all the methodological approaches we undertook for this study.

5.7 Future Work

This study concentrated on answering a few questions based on the views of three physician groups. Future work could take these results and especially the clinically significant point drop and the required sensitivity to help plan a clinical decision rule study. The clinical decision rule will be used to identify elderly patients at high risk of functional decline after sustaining a minor injury. Other studies could include implementations studies on the clinical decision rule. Future work could also look into determining the required sensitivity and point drop for specific injuries and especially the injuries that commonly lead to functional decline. Some future work could also look at developing a weighted comprehensive assessment tool or modifying the OARS ADL scale and giving different weights to the OARS ADL scale items based on their relevance to functional decline.

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7. APPENDICES

Appendix A – Key Informant Interview Guide

Thank you for participating in this interview. We are working on developing a national survey of physicians to find out if there is a need for a clinical decision rule to identify elderly patients at high risk of functional decline following a minor injury. Functional decline is the loss of independence in performing certain activities of daily living and leads to lower quality of life and health status. A better understanding of which patients are at high-risk of functional decline can lead to effective treatment, referral and follow-up to prevent adverse outcomes and loss of independence.

We would like to get your advice so that we can ask sensible questions in the survey. The main objective of the survey will be to get feedback from family physicians, emergency physicians and geriatricians on

- 1) the need for such a rule,
- 2) how sensitive such a rule would have to be for it to be acceptable to clinicians,
- 3) to learn how clinicians think about and define functional decline, and
- 4) to understand how functional decline is assessed and managed.

We would like to get ideas from you based on your clinical expertise and your current practices such as assessment of functional decline.

The following series of questions should take about 10-15 minutes to complete. Although we are asking these selected questions please note that we would really appreciate if you provide your feedback on anything else that comes to mind.

Thank you again for your participation in this interview and for your feedback.

1. Which type of minor injuries do you think are most likely to lead to functional decline in elderly patients? (prompt: soft tissue injury, minor fracture)

2. What can you tell me about how you assess functional ability in the elderly? (prompt: are you familiar with the OARS ADL scale or any similar tools?)

ACTION: Present OARS scale to participant

3. We are thinking of using this 14 item OARS ADL scale to identify patients at risk of functional decline. What do you think of this scale? Does it seem to be relevant in measuring functional decline? (prompt: even if you are not familiar with the scale, do the items seem to address the key components of functional decline as you see it?)

4. If we were to use the OARS ADL scale what level of change would you say is clinically significant to imply functional decline? In other words, what drop in scores in ADL and IADL is considered functional decline? Does the level of change matter between ADLs and IADLs? (prompt: for example if a person scored a 0 in just one of the items would that be enough to imply functional decline? Now imagine there are *two* items and a person scored a 1 in each of the two items (i.e. he/she needed some help to complete the two items), would that be enough to imply functional decline? Do the ADL and IADLs have the same weight in terms of scores and functional decline?)

5. Thank you for all that valuable information, is there anything else you would like to add that was not covered in these questions?

Appendix B – Cognitive Interview Draft Cover Letter

Dr. FirstName LastName
Organization Name
Address 1
Address 2
City, PROV Postal Code

Dear Dr. Last Name,

We are writing to ask for your help in a research project conducted by the Ottawa Hospital Research Institute and the University of Ottawa **to develop a sensitive clinical decision rule to identify elderly patients at high-risk of functional decline** 6 months after sustaining a minor injury.

As a <physician group> you have been selected for this project as you have been identified as a physician with expertise in providing patient care to elderly individuals and hence a valuable source to receive good feedback from through a brief questionnaire.

Your responses will lead to the development of a sensitive clinical decision rule to help physicians, including yourself, in identifying elderly patients at high-risk of functional decline 6 months after sustaining a minor injury. **Identifying patients at high-risk of functional decline can lead to effective interventions, referral and follow-up to prevent or minimize poor outcomes and/or loss of independence.**

All data collected will be kept confidential unless release is required by law. We have written an identification number on each questionnaire so that we do not mail you reminders once you return your completed survey. Once we receive your completed survey your name will be deleted from the mailing list and will not be connected to your answers. Participants will not be identified in any publications or presentations resulting from this study. All information that leaves the hospital will be coded with a unique identification number and participants will not be identifiable.

Enclosed is a small token of appreciation for helping us with this important project as well as a **brief questionnaire that will take about five minutes to complete**. We would appreciate if you could complete the questionnaire and return it in the enclosed postage-paid envelope within the next few days. **Your feedback is very important and critical** in the process of coming up with a clinical decision rule to identify elderly patients at high-risk of functional decline.

If you have any questions please do not hesitate to contact us at (613) 798-5555 ext. ### or by sending us an e-mail at ###@ohri.ca.

Thank you for your time. We look forward to receiving your completed survey.

Sincerely,

Kasim Abdulaziz, MSc Candidate
University of Ottawa
Methodologist, Ottawa Hospital Research Institute
(613) 798-5555 ext ###
###@ohri.ca

Dr. Jeffrey Perry, MD, MSc, CCFP-EM
Emergency Physician, The Ottawa Hospital
Associate Professor, Department of Emergency Medicine
Senior Scientist, Ottawa Hospital Research Institute
New Investigator, Canadian Institutes for Health Research

Appendix C – Cognitive Interview Draft Questionnaire

Questionnaire ID [_____]

Are you currently practicing emergency medicine AND treating patients 65 years of age and older?

☐ Yes ☐ No

If No, please return the survey in the postage paid envelope.

A. Assessment for Functional Decline

1. Do you routinely ask your elderly patients whether they have difficulty performing the following activities of daily living?

- | | | | |
|---------------------------------------|------------------------------|-----------------------------|------------------------------------|
| a. Eating | ☐ Yes | ☐ No | ☐ Sometimes |
| b. Dressing and undressing | ☐ Yes | ☐ No | ☐ Sometimes |
| c. Getting in and out of bed | ☐ Yes | ☐ No | ☐ Sometimes |
| d. Walking | ☐ Yes | ☐ No | ☐ Sometimes |
| e. Using telephone | ☐ Yes | ☐ No | ☐ Sometimes |
| f. Preparing meals | ☐ Yes | ☐ No | ☐ Sometimes |
| g. Taking own medications | ☐ Yes | ☐ No | ☐ Sometimes |
| h. Taking care of own appearance | ☐ Yes | ☐ No | ☐ Sometimes |
| i. Bathing/Showering | ☐ Yes | ☐ No | ☐ Sometimes |
| j. Getting to bathroom on time | ☐ Yes | ☐ No | ☐ Sometimes |
| k. Driving or taking a transportation | ☐ Yes | ☐ No | ☐ Sometimes |
| l. Shopping for groceries | ☐ Yes | ☐ No | ☐ Sometimes |
| m. Handling finances | ☐ Yes | ☐ No | ☐ Sometimes |
| n. Doing housework | ☐ Yes | ☐ No | ☐ Sometimes |

B. Relevance of Activities of Daily Living to Functional Decline

2. At 6 months after sustaining a minor injury (that is, an injury that is treated on an outpatient basis without being admitted), how important do you consider each of the following items in terms of being performed by an elderly patient who was completely independent prior to sustaining the injury? Assume the patient has NO support at home.

- | | Very
Important | Somewhat
Important | Less
Important | Not
Important |
|---------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Eating | ☐ | ☐ | ☐ | ☐ |
| b. Dressing and undressing | ☐ | ☐ | ☐ | ☐ |
| c. Getting in and out of bed | ☐ | ☐ | ☐ | ☐ |
| d. Walking | ☐ | ☐ | ☐ | ☐ |
| e. Using telephone | ☐ | ☐ | ☐ | ☐ |
| f. Preparing meals | ☐ | ☐ | ☐ | ☐ |
| g. Taking own medications | ☐ | ☐ | ☐ | ☐ |
| h. Taking care of own appearance | ☐ | ☐ | ☐ | ☐ |
| i. Bathing/Showering | ☐ | ☐ | ☐ | ☐ |
| j. Getting to bathroom on time | ☐ | ☐ | ☐ | ☐ |
| k. Driving or taking a transportation | ☐ | ☐ | ☐ | ☐ |
| l. Shopping for groceries | ☐ | ☐ | ☐ | ☐ |
| m. Handling finances | ☐ | ☐ | ☐ | ☐ |
| n. Doing housework | ☐ | ☐ | ☐ | ☐ |

C. Measuring Functional Decline

Each of the items in question 2 above is given a point value of 0, 1 or 2 based on the patient's ability to perform the activity as follows:

- **2 points:** patient can perform the activity **without help**.
- **1 point:** patient can perform the activity but **with some help**.
- **0 points:** patient **completely unable to perform the activity**.

3. Assuming all 14 items in question 2 are used in determining functional decline and each is given a point value of 0, 1, or 2, what point drop from a baseline of being completely independent (i.e. from 28 points = 14 items x 2 points) would you say is clinically significant to imply functional decline 6 months after sustaining a minor injury?

- a) Total point drop if the patient has **NO support** at home: _____ total point drop.
- b) Total point drop if the patient **has support** at home: _____ total point drop.

4. Now, if we were to only look at the basic activities of daily living (ADL) items (i.e. the following 7 items) what point drop from a baseline of being completely independent (i.e. from 14 points = 7 items x 2 points) would you say is clinically significant to imply functional decline 6 months after sustaining a minor injury?

- | | | | |
|-----------------------------|---------------------------|---------------------------------|-----------|
| ✓ Eating | ✓ Dressing and undressing | ✓ Taking care of own appearance | ✓ Walking |
| ✓ Getting in and out of bed | ✓ Bathing/Showering | ✓ Getting to bathroom on time | |

- a) Total point drop **in ADLs** if the patient has **NO support** at home: _____ total point drop.
- b) Total point drop **in ADLs** if the patient **has support** at home: _____ total point drop.

D. Required Sensitivity

5. How sensitive would you require a clinical decision rule, which identifies elderly patient at high-risk of functional decline 6 months after sustaining a minor injury, to be to use? _____%

E. Professional Status and Practice Settings

1. Are you: ☐ Male ☐ Female

2. Year of Birth: 19_____

3. How many years have you been practicing medicine? _____ years

4. Please indicate all the credentials you have.

☐ CCFP ☐ CCFP (EM) ☐ FRCPC

☐ Other (specify): _____

5. In what setting do you perform MOST of your emergency medicine clinical activity?

☐ Teaching Hospital

☐ Community / District General Hospital: Teaching

☐ Community / District General Hospital: Non-Teaching

☐ Other (specify): _____

6. On average how many patients do you see per week? _____ # patients /week

7. On average how many patients that are over the age of 65 do you see per week? _____ # elderly patients /week

Appendix D – Pilot-testing Questionnaire

Questionnaire ID _____

FUNCTIONAL DECLINE IN ELDERLY PATIENTS - FOR DR. JEFF PERRY, UNIVERSITY OF OTTAWA

Are you currently practicing emergency medicine AND treating patients 65 years of age and older?

☐ Yes ☐ No

If No, please return the questionnaire in the postage paid envelope

If Yes, please complete and return the questionnaire in the postage paid envelope

A. Professional Status and Practice Settings

1. Are you: ☐ Male ☐ Female

2. Year of Birth: 19 _____

3. How many years have you been practicing medicine? _____ years

4. How many years of residency training have you had in total? _____ years

5. In what setting do you perform MOST of your emergency medicine clinical activity?

☐ Teaching Hospital

☐ Community / District General Hospital: Teaching

☐ Community / District General Hospital: Non-Teaching

☐ Other (specify): _____

6. On average how many patients (of any age) do you see per week? _____ # patients/week

7. On average how many patients that are 65 years of age and older do you see per week? _____ # elderly patients/week

B. Assessment for Functional Decline

8. How often do you ask elderly patients if they have difficulty performing the following activities of daily living (ADL)?

	Always	Often	Rarely	Never
a. Eating	☐	☐	☐	☐
b. Dressing and undressing	☐	☐	☐	☐
c. Getting in and out of bed	☐	☐	☐	☐
d. Walking	☐	☐	☐	☐
e. Using telephone	☐	☐	☐	☐
f. Preparing meals	☐	☐	☐	☐
g. Taking own medications	☐	☐	☐	☐
h. Taking care of own appearance	☐	☐	☐	☐
i. Bathing/Showering	☐	☐	☐	☐
j. Getting to bathroom on time	☐	☐	☐	☐
k. Driving or taking transportation	☐	☐	☐	☐
l. Shopping for groceries	☐	☐	☐	☐
m. Handling finances	☐	☐	☐	☐
n. Doing housework	☐	☐	☐	☐

C. Required Sensitivity

9. If a clinical decision rule were available to identify elderly patients at high-risk of functional decline 6 months after sustaining a minor injury (injury that is treated on an outpatient basis without being admitted), how sensitive would you require such a rule to be, before you would be willing to use it?

_____%

(Sensitivity = probability of correctly identifying a patient at high-risk of functional decline at 6 months)

D. Measuring Functional Decline

The following 14 tasks make up the Older Americans Resources and Services (OARS) Activities of Daily Living and Instrumental Activities of Daily Living (ADL/IADL) scale:

- | | | |
|------------------------------|----------------------------------|--------------------------------------|
| 1. Eating | 6. Preparing meals | 11. Driving or taking transportation |
| 2. Dressing and undressing | 7. Taking own medications | 12. Shopping for groceries |
| 3. Getting in and out of bed | 8. Taking care of own appearance | 13. Handling finances |
| 4. Walking | 9. Bathing/Showering | 14. Doing housework |
| 5. Using telephone | 10. Getting to bathroom on time | |

Each task is given a point value of 0, 1 or 2 based on ability to perform the activity:

- **2 points:** can perform the activity **without help**
- **1 point:** can perform the activity but **with some help**
- **0 points:** **completely unable** to perform the activity

10. Assuming all 14 tasks are used in determining functional decline what point drop from a baseline of being completely independent (i.e. 28 points = 14 tasks x 2 points each) would you say is clinically significant to imply functional decline 6 months after sustaining a minor injury?

- a) Total point drop if the patient has NO support at home: total point drop (from initial score of 28)
- b) Total point drop if the patient has extensive support at home (i.e. lives with spouse/child who is able to help): total point drop (from initial score of 28)

11. If we were to only look at the basic ADL tasks (i.e. the 7 tasks listed below) what point drop from a baseline of being completely independent (i.e. 14 points = 7 tasks x 2 points each) would you say is clinically significant to imply functional decline 6 months after sustaining a minor injury?

- | | | | |
|-----------------------------|---------------------------|---------------------------------|-----------|
| ✓ Eating | ✓ Dressing and undressing | ✓ Taking care of own appearance | ✓ Walking |
| ✓ Getting in and out of bed | ✓ Bathing/Showering | ✓ Getting to bathroom on time | |

- a) Total point drop in basic ADL if the patient has NO support at home: total point drop (from initial score of 14)
- b) Total point drop in basic ADL if the patient has extensive support at home (i.e. lives with spouse/child who is able to help): total point drop (from initial score of 14)

E. Relevance of Activities of Daily Living to Functional Decline

12. Six months after sustaining minor injury (injury that is treated on an outpatient basis without being admitted), how important do you consider each of the following tasks in terms of performance by an elderly patient who was completely independent prior to the injury? Assume the patient has NO support at home.

	Very Important	Somewhat Important	Less Important	Not Important
a. Eating	☐	☐	☐	☐
b. Dressing and undressing	☐	☐	☐	☐
c. Getting in and out of bed	☐	☐	☐	☐
d. Walking	☐	☐	☐	☐
e. Using telephone	☐	☐	☐	☐
f. Preparing meals	☐	☐	☐	☐
g. Taking own medications	☐	☐	☐	☐
h. Taking care of own appearance	☐	☐	☐	☐
i. Bathing/Showering	☐	☐	☐	☐
j. Getting to bathroom on time	☐	☐	☐	☐
k. Driving or taking transportation	☐	☐	☐	☐
l. Shopping for groceries	☐	☐	☐	☐
m. Handling finances	☐	☐	☐	☐
n. Doing housework	☐	☐	☐	☐

Thank you for taking the time to complete this questionnaire. Your input is appreciated.

Appendix E – Pre-notification Letter

Date

Dr. First Last

Organization Name

Address 1

Address 2

City, PROV A1A 4A9

Re: Functional Decline in Elderly Patients Questionnaire

Dear Dr. [Last Name],

The Ottawa Hospital Research Institute with the University of Ottawa is conducting an important research project concerning functional decline in elderly patients after sustaining minor injury and we are seeking your expertise for this project.

As a [geriatrician, emergency physician, family physician] you have been selected and identified with expertise in providing patient care to elderly individuals and hence a valuable source to receive good feedback from, through a brief questionnaire. Your responses will lead to the development of a sensitive clinical decision rule to help physicians, including yourself, in identifying elderly patients at high-risk of functional decline.

All data collected will be kept confidential unless required by law. Each questionnaire has an identification number so we will not mail you reminders once you return your completed questionnaire. Your name will be removed from the mailing list and will not be linked to your answers. Participants will not be identified in any publications or presentations resulting from this project.

We are contacting you in advance to let you know that you will soon be receiving a request to fill out a brief questionnaire that will take about five minutes to complete. Your feedback is very important and critical in the process of developing a clinical decision rule to identify elderly patients at high-risk of functional decline.

Thank you for your time. We look forward to receiving your completed questionnaire in the near future.

Sincerely,

Dr. Jeffrey Perry, MD, MSc, CCFP-EM
Emergency Physician, The Ottawa Hospital
Associate Professor, Department of Emergency Medicine
Senior Scientist, Ottawa Hospital Research Institute
New Investigator, Canadian Institutes for Health Research

Appendix F – Cover Letter

Date

Dr. First Last
Organization Name
Address 1
Address 2
City, PROV A1A 4A9

Re: Functional Decline in Elderly Patients Questionnaire

Dear Dr. [Last Name],

We are writing to ask for your help for a research project being conducted by the Ottawa Hospital Research Institute and the University of Ottawa, **to develop a sensitive clinical decision rule to identify elderly patients at high-risk of functional decline**, 6 months after sustaining minor injury. Identifying patients at high-risk of functional decline can lead to **effective interventions, referral and follow-up to prevent or minimize poor outcomes and/or loss of independence**.

As a [geriatrician, emergency physician, family physician] you have been selected and identified with expertise in providing patient care to elderly individuals and hence a valuable source to receive good feedback from, through a brief questionnaire.

Participation is voluntary and you may withdraw at any time. Completion and return of the questionnaire implies consent to participate in the research. All data collected will be kept confidential unless required by law. Each questionnaire has an identification number so we will not mail you reminders once you return your completed questionnaire. Your name will be removed from the mailing list and will not be linked to your answers. Participants will not be identified in any publications or presentations resulting from this project. The study records will be kept for 10 years after the termination of the study. The Ottawa Hospital Research Ethics Board and the Ottawa Hospital Research Institute may review the relevant study records under the supervision of Dr. Perry for audit purposes.

Enclosed is a small token of appreciation (\$10 Tim Hortons gift card) for helping us with this important project, and the **brief questionnaire that will take about five minutes to complete**.

We would appreciate if you could complete the questionnaire and return it in the enclosed postage-paid envelope within the next few days. **Your feedback is very important and critical** in the process of developing a clinical decision rule to identify elderly patients at high-risk of functional decline.

If you have any questions please do not hesitate to contact us at 613-798-5555 ext. ### or by sending us an e-mail at ###@ohri.ca.

Thank you for your time. We look forward to receiving your completed questionnaire.

Sincerely,

Dr. Jeffrey Perry, MD, MSc, CCFP-EM
Emergency Physician, The Ottawa Hospital
Associate Professor, Department of Emergency Medicine
Senior Scientist, Ottawa Hospital Research Institute
New Investigator, Canadian Institutes for Health Research

Appendix G – Final Questionnaire

Questionnaire ID _____

FUNCTIONAL DECLINE IN ELDERLY PATIENTS - FOR DR. JEFF PERRY, UNIVERSITY OF OTTAWA

Are you currently practicing emergency medicine AND treating patients 65 years of age and older?

☐ Yes ☐ No

If No, please return the questionnaire in the postage paid envelope

If Yes, please complete and return the questionnaire in the postage paid envelope

A. Professional Status and Practice Settings

1. Are you: ☐ Male ☐ Female

2. Year of Birth: 19____

3. How many years have you been practicing medicine? _____ years

4. How many years of residency training have you had in total? _____ years

5. In what setting do you perform MOST of your emergency medicine clinical activity?

☐ Teaching Hospital

☐ Community / District General Hospital: Teaching

☐ Community / District General Hospital: Non-Teaching

☐ Other (specify): _____

6. On average how many patients (of any age) do you see per week? _____ # patients/week

7. On average how many patients that are 65 years of age and older do you see per week? _____ # elderly patients/week

B. Assessment for Functional Decline

8. How often do you ask elderly patients if they have difficulty performing the following activities of daily living (ADL)?

	Always	Often	Rarely	Never
a. Eating	☐	☐	☐	☐
b. Dressing and undressing	☐	☐	☐	☐
c. Getting in and out of bed	☐	☐	☐	☐
d. Walking	☐	☐	☐	☐
e. Using telephone	☐	☐	☐	☐
f. Preparing meals	☐	☐	☐	☐
g. Taking own medications	☐	☐	☐	☐
h. Taking care of own appearance	☐	☐	☐	☐
i. Bathing/Showering	☐	☐	☐	☐
j. Getting to bathroom on time	☐	☐	☐	☐
k. Driving or taking transportation	☐	☐	☐	☐
l. Shopping for groceries	☐	☐	☐	☐
m. Handling finances	☐	☐	☐	☐
n. Doing housework	☐	☐	☐	☐

C. Required Sensitivity

9. If a clinical decision rule were available to identify elderly patients at high-risk of functional decline 6 months after sustaining a minor injury (injury that is treated on an outpatient basis without being admitted), how sensitive would you require such a rule to be, before you would be willing to use it?

_____%

(Sensitivity = probability of correctly identifying a patient at high-risk of functional decline at 6 months)

D. Measuring Functional Decline

The following 14 tasks make up the Older Americans Resources and Services (OARS) Activities of Daily Living and Instrumental Activities of Daily Living (ADL/IADL) scale:

- | | | |
|------------------------------|----------------------------------|--------------------------------------|
| 1. Eating | 6. Preparing meals | 11. Driving or taking transportation |
| 2. Dressing and undressing | 7. Taking own medications | 12. Shopping for groceries |
| 3. Getting in and out of bed | 8. Taking care of own appearance | 13. Handling finances |
| 4. Walking | 9. Bathing/Showering | 14. Doing housework |
| 5. Using telephone | 10. Getting to bathroom on time | |

Each task is given a point value of 0, 1 or 2 based on ability to perform the activity:

- **2 points:** can perform the activity **without help**
- **1 point:** can perform the activity but **with some help**
- **0 points:** **completely unable** to perform the activity

10. Assuming all 14 tasks are used in determining functional decline what point drop would you say is clinically significant to imply functional decline 6 months after sustaining a minor injury? (Point drop = number of points lost due to change in ability from a baseline of being completely independent (i.e. 28 points = 14 tasks x 2 points each))

- a) Point drop if the patient has NO support at home: point drop (points lost from initial score of 28)
- b) Point drop if the patient has extensive support at home (i.e. lives with spouse/child who is able to help): point drop (points lost from initial score of 28)

11. If we were to only look at the basic ADL tasks (i.e. the 7 tasks listed below) what point drop would you say is clinically significant to imply functional decline 6 months after sustaining a minor injury? (Point drop = number of points lost due to change in ability from a baseline of being completely independent (i.e. 14 points = 7 tasks x 2 points each))

- | | | | |
|-----------------------------|---------------------------|---------------------------------|-----------|
| ✓ Eating | ✓ Dressing and undressing | ✓ Taking care of own appearance | ✓ Walking |
| ✓ Getting in and out of bed | ✓ Bathing/Showering | ✓ Getting to bathroom on time | |

- a) Point drop in basic ADL if the patient has NO support at home: point drop (points lost from initial score of 14)
- b) Point drop in basic ADL if the patient has extensive support at home (i.e. lives with spouse/child who is able to help): point drop (points lost from initial score of 14)

E. Relevance of Activities of Daily Living to Functional Decline

12. Six months after sustaining minor injury (injury that is treated on an outpatient basis without being admitted), how important do you consider each of the following tasks in terms of performance by an elderly patient who was completely independent prior to the injury? Assume the patient has NO support at home.

	Very Important	Somewhat Important	Less Important	Not Important
a. Eating	☐	☐	☐	☐
b. Dressing and undressing	☐	☐	☐	☐
c. Getting in and out of bed	☐	☐	☐	☐
d. Walking	☐	☐	☐	☐
e. Using telephone	☐	☐	☐	☐
f. Preparing meals	☐	☐	☐	☐
g. Taking own medications	☐	☐	☐	☐
h. Taking care of own appearance	☐	☐	☐	☐
i. Bathing/Showering	☐	☐	☐	☐
j. Getting to bathroom on time	☐	☐	☐	☐
k. Driving or taking transportation	☐	☐	☐	☐
l. Shopping for groceries	☐	☐	☐	☐
m. Handling finances	☐	☐	☐	☐
n. Doing housework	☐	☐	☐	☐

Thank you for taking the time to complete this questionnaire. Your input is appreciated.

Appendix H – OARS ADL scale

ACTIVITIES OF DAILY LIVING

Now I'd like to ask you about some of the activities of daily living, things that we all need to do as part of our daily lives. I would like to know if you can do these activities without any help at all, or if you need some help to do them, or if you can't do them at all.

[BE SURE TO READ ALL ANSWER CHOICES IF APPLICABLE IN QUESTIONS 56. THROUGH 69. TO RESPONDENT.]

Instrumental ADL

56. Can you use the telephone ...
- 2 without help, including looking up numbers and dialing;
 - 1 with some help (can answer phone or dial operator in an emergency, but need a special phone or help in getting the number or dialing); or
 - 0 are you completely unable to use the telephone?
 - Not answered
57. Can you get to places out of walking distance ...
- 2 without help (drive your own car, or travel alone on buses, or taxis);
 - 1 with some help (need someone to help you or go with you when traveling); or
 - 0 are you unable to travel unless emergency arrangements are made for a specialized vehicle like an ambulance?
 - Not answered
58. Can you go shopping for groceries or clothes [ASSUMING S HAS TRANSPORTATION] ...
- 2 without help (taking care of all shopping needs yourself, assuming you had transportation);
 - 1 with some help (need someone to go with you on all shopping trips); or
 - 0 are you completely unable to do any shopping?
 - Not answered
59. Can you prepare your own meals ...
- 2 without help (plan and cook full meals yourself);
 - 1 with some help (can prepare some things but unable to cook full meals yourself); or
 - 0 are you completely unable to prepare any meals?
 - Not answered

60. Can you do your housework ...
2 without help (can clean floors, etc.);
1 with some help (can do light housework but need help with heavy work); or
0 are you completely unable to do any housework?
- Not answered
61. Can you take your own medicine ...
2 without help (in the right doses at the right time);
1 with some help (able to take medicine if someone prepares it for you and/or reminds you to take it); or
0 are you completely unable to take your medicines?
- Not answered
62. Can you handle your own money ...
2 without help (write checks, pay bills, etc.);
1 with some help (manage day-to-day buying but need help with managing your checkbook and paying your bills); or
0 are you completely unable to handle money?
- Not answered

Physical ADL

63. Can you eat ...
2 without help (able to feed yourself completely);
1 with some help (need help with cutting, etc.); or
0 are you completely unable to feed yourself?
- Not answered
64. Can you dress and undress yourself ...
2 without help (able to pick out clothes, dress and undress yourself);
1 with some help; or
0 are you completely unable to dress and undress yourself?
- Not answered
65. Can you take care of your own appearance, for example combing your hair and (for men) shaving ...
2 without help;
1 with some help; or
0 are you completely unable to maintain your appearance yourself?
- Not answered

66. Can you walk ...
2 without help (except from a cane);
1 with some help from a person or with the use of a walker, or crutches, etc.; or
0 are you completely unable to walk?
- Not answered
67. Can you get in and out of bed ...
2 without any help or aids;
1 with some help (either from a person or with the aid of some device); or
0 are you totally dependent on someone else to lift you?
- Not answered
68. Can you take a bath or shower ...
2 without help;
1 with some help (need help getting in and out of the tub, or need special attachments on the tub); or
0 are you completely unable to bathe yourself?
- Not answered
69. Do you ever have trouble getting to the bathroom on time?
2 No
0 Yes
1 Have a catheter or colostomy
- Not answered

[IF "YES" ASK a.]

- a. How often do you wet or soil yourself (either day or night)?
1 Once or twice a week
0 Three times a week or more
- Not answered

PERFORMANCE RATING SCALE FOR ACTIVITIES OF DAILY LIVING

101. [RATE THE CURRENT ACTIVITIES OF DAILY LIVING OF THE PERSON BEING EVALUATED ON THE SIX-POINT SCALE PRESENTED BELOW. CIRCLE THE ONE NUMBER WHICH BEST DESCRIBES THE PERSON'S PRESENT PERFORMANCE. ACTIVITIES OF DAILY LIVING QUESTIONS ARE NUMBERS 56-69.]

1. Excellent ADL capacity.
Can perform all of the Activities of Daily Living without assistance and with ease.
2. Good ADL capacity.
Can perform all of the Activities of Daily Living without assistance.
3. Mildly impaired ADL capacity.
Can perform all but one to three of the Activities of Daily Living. Some help is required with one to three, but not necessarily every day. Can get through any single day without help. Is able to prepare his/her own meals.
4. Moderately impaired ADL capacity.
Regularly requires assistance with at least four Activities of Daily Living but is able to get through any single day without help. Or regularly requires help with meal preparation.
5. Severely impaired ADL capacity.
Needs help each day but not necessarily throughout the day or night with many of the Activities of Daily Living.
6. Completely impaired ADL capacity.
Needs help throughout the day

Appendix I – Sample Size Calculations

The sample size for each population (family physicians, geriatricians, and emergency physicians) was determined to yield desired precision around the estimated mean required sensitivity using a two-sided 95% confidence interval, using the following Cochran's sample size formula¹¹⁸:

$$n_o = \frac{(z)^2 * (s)^2}{(d)^2} = (1.96)^2 * (10)^2 / 2^2 = 97$$

Where n_o = sample size

z = z statistic for selected alpha level = 1.96 for alpha of 0.05 or 95% confidence level

s = estimated standard deviation = range of anticipated responses / 4
= (60 – 100) / 4 = 10

d = acceptable margin of error = ± 2 (total width of confidence interval is 4)

The z statistic, estimated standard deviations and acceptable margin of error was the same for the three populations.

If the sample size exceeded 5% of the population the following Cochran's correction for finite population formula was used:

$$n = \frac{n_o}{(1 + n_o / \text{Population})}$$

To account for lost mail and uncooperative subjects we decided that oversampling was necessary and so increased the sample size based on an estimated response rate of 55%. The final sample size for each group was calculated as:

$$n = n / 0.55$$

Emergency Physicians

Population = 2449 (631 Emergency Medicine + 1818 Emergency Family Medicine)

$$n_o = \frac{(z)^2 * (s)^2}{(d)^2} = (1.96)^2 * (10)^2 / 2^2 = 97$$

Five percent of the population = 2449 * 0.05 = 123. Since the sample size did not exceed 5% of the population there was no need for correction

Final sample size for emergency physicians was 97 / 0.55 = **177**

Geriatricians

Population = 235

$$n_o = \frac{(z)^2 * (s)^2}{(d)^2} = (1.96)^2 * (10)^2 / 2^2 = 97$$

Five percent of the population = $235 * 0.05 = 12$. Since, the sample size exceeded 5% of the population there was a need for correction:

$$n = \frac{n_o}{(1 + n_o / \text{Population})} = 97 / (1 + 97/235) = 69$$

Final sample size for geriatricians was $69 / 0.55 = 126$

For simplicity, the sample size for all three groups was set at 177.

Family Physicians

Population = 33699 (19539 General Practitioners + 14160 Family Practitioners)

$$n_o = \frac{(z)^2 * (s)^2}{(d)^2} = (1.96)^2 * (10)^2 / 2^2 = 97$$

Five percent of the population = $33699 * 0.05 = 1685$. Since the sample size did not exceed 5% of the population there was no need for correction

Final sample size for family physicians was $97 / 0.55 = 177$

Since we wanted to give an incentive to half of the physicians in each stratum we will turned each sample size into an even number and so the sample size was 178 for each stratum.

The total sample size for the survey was = $178 + 178 + 178 = 534$

A random sample of 178 emergency physicians who are specializing in emergency and emergency family medicine, 178 geriatricians, and 178 family physicians who are specializing in family medicine were selected for the survey from the Canadian Medical Directory provided by the Scott's Directories. A computer randomization system was used to select the random samples. This study surveyed a total of **534 physicians**.

Appendix J – REB Approval for Key informant Interviews



Ottawa Hospital Research Ethics Boards / Conseils d'éthique en recherches

725 Parkdale Avenue, Box 411, Ottawa, Ontario K1Y 4E9 613-798-5555 ext. 14902 Fax: 613-761-4311
<http://www.ohri.ca/ohreb>

January 9, 2012

Mr. Kasim Abdulaziz
The Ottawa Hospital, Civic Campus
Department of Emergency Medicine
1053 Carling Ave., Room [REDACTED]
Ottawa, ON K1Y 4E9

Dear Mr. Abdulaziz:

Re: Protocol # 2011882-01H National Survey of Physicians on the Need and Sensitivity of a Clinical Decision Rule to Identify Elderly Patients at Risk of Functional Decline Following a Minor Injury

Protocol approval valid until - January 8, 2013

Thank you for the letter from Angela Marcantonio dated December 22, 2011. I am pleased to inform you that this protocol underwent expedited review by the Ottawa Hospital Research Ethics Board (OHREB) and is approved to pilot the study in English only. No changes, amendments or addenda may be made to the protocol or the consent form without the OHREB's review and approval.

Once the survey has been developed it should be forwarded to the OHREB for review and approval prior to its use.

Approval is for the following:

- OHREB Application
- Thesis Research Proposal, dated November 2011
- English Explanatory In-Depth Interview Guide, received November 22, 2011
- English Dear Doctor Recruitment Letter, dated November 22, 2011

Once the English pilot of this protocol is complete, please submit the French documents for review and approval before moving to the next phase of your study to include both English and French-speaking physicians.

The validation date should be indicated on the bottom of all consent forms and information sheets (see copy attached). If the study is to continue beyond the expiry date noted above, a Renewal Form should be submitted to the OHREB approximately six weeks prior to the current expiry date. If the study has been completed by this date, a Termination Report should be submitted.

The Ottawa Hospital Research Ethics Board is constituted in accordance with, and operates in compliance with the requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans; Health Canada Good Clinical Practice: Consolidated Guideline; Part C Division 5 of the Food and Drug Regulations of Health Canada; and the provisions of the Ontario Health Information Protection Act 2004 and its applicable Regulations.

[REDACTED]

Raphael Saginur, M.D.
Chairman
Ottawa Hospital Research Ethics Board

RS/ll

Appendix K – REB Approval for Survey Mail Out



Ottawa Hospital Research Ethics Boards / Conseils d'éthique en recherches

725 Parkdale Avenue, Box 411, Ottawa, Ontario K1Y 4E9 613-798-5555 ext. 14602 Fax: 613-761-4311
<http://www.ohri.ca/ohreb>

July 3, 2012

Mr. Kasim Abdulaziz
The Ottawa Hospital, Civic Campus
Department of Emergency Medicine
1053 Carling Ave. , Room [REDACTED]
Ottawa, ON K1Y 4E9

Dear Mr. Abdulaziz:

Re: Protocol # 2011882-01H National Survey of Physicians on the Need and Sensitivity of a Clinical Decision Rule to Identify Elderly Patients at Risk of Functional Decline Following a Minor Injury

Thank you for the letter from Angela Marcantonio dated June 20, 2012. The Protocol Amendment Report dated April 26, 2012, is approved.

Approval is for the following:

- English Geriatrician Survey (version 2), dated May 29, 2012
- English Family Physician Survey (version 2), dated May 29, 2012
- English Emergency Physician Survey (version 2), dated May 29, 2012
- English Initial Contact Letter, dated May 26, 2012
- English Survey Cover Letter, dated May 16, 2012
- English Reminder Letter #1, dated May 16, 2012
- English Reminder Letter #2, dated May 16, 2012
- English Reminder Letter #3, dated May 16, 2012
- French Geriatrician Survey (version 2), dated May 29, 2012
- French Family Physician Survey (version 2), dated May 29, 2012
- French Emergency Physician Survey (version 2), dated May 29, 2012
- French Initial Contact Letter, undated, received June 21, 2012
- French Survey Cover Letter, undated, received June 21, 2012
- French Reminder Letter #1, undated, received June 21, 2012
- French Reminder Letter #2, undated, received June 21, 2012
- French Reminder Letter #3, undated, received June 21, 2012

Ethical approval remains in effect until January 8, 2013.

Yours sincerely,

[REDACTED]
RATON SANCHEZ, M.D.
Chairman
Ottawa Hospital Research Ethics Board

/s/