

PREVALENCE, RISK FACTORS, AND HEALTH CARE
UTILIZATION FOR INJURIES AMONG CANADIAN
SENIORS: AN ANALYSIS OF 1994 NATIONAL
POPULATION HEALTH SURVEY

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Prevalence, Risk Factors, and Health Care Utilization for Injuries Among Canadian Seniors: An Analysis of 1994 National Population Health Survey

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INTRODUCTION

Older adults may be especially vulnerable to the effects of injury. Injuries not only cause physical pain and sometimes death; they also can have far-reaching consequences for quality of life and health care costs (Wilkins, 1989). For the 2.1 million older persons injured in the United States in 1985, the estimated lifetime economic cost of injury was US\$5.1 billion, derived from the costs of medical treatment and rehabilitation and from indirect costs associated with life-years lost including the loss of earnings due to short and long term disability and death, with over half of the costs (US\$2.8 billion) resulting from the delivery of health care services (Rice et al., 1989). Even though similar economic data for Canadian seniors does not exist, the Canadian Laboratory Centre for Disease Control (LCDC), using Rice and colleagues' (1989) model, concluded that the direct and indirect costs associated with all types of injuries for all age groups was \$10 billion in 1986, and injuries were ranked second only behind cardiovascular disease in terms of cost (Wigle et al., 1991).

In addition to physical and economic costs, there are lifestyle costs associated with injury. Particularly among seniors, injuries may mean the difference between independent living in the community of choice versus dependent living in an institution (Wolf & Rivara, 1992; Lilley et al., 1995). For example, in Washington State, 20% of seniors who entered a hospital for an injury were moved to a nursing home or intermediate care facility rather than to their own private homes (Wolf & Rivara, 1992). Other studies indicate even higher rates of institutionalization of elderly patients after being hospitalized for an injury (Santora et al., 1994).

Among Canadian seniors in 1966, 1976, and 1986, injuries ranked either fourth or fifth among causes of death (Riley & Paddon, 1989). Injury-related deaths accounted for 2.3% of all deaths among Canadian seniors in 1987 (Statistics Canada, 1991); death rates from injury were

higher among males (128/100,000) than females (105/100,000). Another study also found that mortality rates for injuries among Canadians aged 65 and older were higher among males than females (Raina et al., 1997). In 1991, 3,644 Canadian seniors died from injuries (Statistics Canada, 1991). From 1979 to 1991, most injury related age-standardized mortality rates were on the decline or were stable among Canadians aged 65 or older (Raina et al., 1997). In 1987, 70% of injuries among seniors aged 65 and over occurred to women (Statistics Canada, 1991). One study found that the percentage of hospital discharges and deaths due to injuries was 39.5% for Canadian women aged 65 and over and 14.8% for Canadian men (Riley & Paddon, 1989). The average annual hospital days stay rate due to injuries in Canada increased with increasing age from 65-69 years old to 85 years and older (Raina et al., 1997). The same study found that the hospital days stay rate for seniors declined over time from 1987 to 1991. Another study showed that among older seniors, aged 75 and over, the average length of stay due to injuries was 47.1 days for women and 38.9 days for men (Riley & Paddon, 1989). The most common injuries among seniors that require hospitalization include fractures of the lower limb, complications resulting from medical procedures, fractures of the upper limb, other fractures, poisoning by drugs, intracranial injuries, and contusions and superficial injuries (Raina et al., 1997).

Causes of injury among older adults

Among seniors, the four leading causes of death from injuries are falls, motor vehicle crashes (MVC), suffocation, and fire and flames; whereas the four leading causes of hospitalization from injuries are falls, drugs, MVC, and poisoning (Baker et al., 1992; Lilley et al., 1995; Raina et al., 1997; Riley & Paddon, 1989; Wilkins, 1989; Wolf & Rivara, 1992).

Epidemiology of injury due to falls among older adults

Falls are the most well researched cause of injury among seniors. The Kellogg International Work Group defined a fall as “an event which results in a person’s coming to rest inadvertently on the ground or other lower level and other than as a consequence of the following: sustaining a violent blow; loss of consciousness; sudden onset of paralysis, as in a stroke; or an epileptic seizure” (Kellogg International Work Group, 1987). Approximately 25% of seniors over 70 and 35% of seniors over 75 fall annually in their communities, and 50% of those falls are repeated (Nelson & Murlidhar, 1990; Tinetti & Speechley, 1989). In 1989, falls accounted for 65% of all injury-related separations, 72% of injury-related days of hospital care, and 56% of deaths for those aged 65 and over in Canada (Riley, 1992). The mortality rates during 1979-1991 due to injuries caused by falls for Canadian males and females aged 65 and over were 67 per 100,000 and 54 per 100,000 respectively (Raina et al., 1997). Falls accounted for 57% of deaths due to injuries among females and 36% among males (Raina et al., 1997). Falling is the sixth leading cause of death among seniors, and it is estimated that 5% of all falls will result in injuries requiring hospital care or prolonged disability (Tinetti et al., 1988). For both men and women, the most common type of fall-related injury that required hospitalization was fracture of the hip (Raina et al., 1997; Riley, 1992). In addition, falls may result in or enhance less quantifiable problems such as lack of self-confidence and fear of recurrence, resulting in changes in lifestyle that may have a negative impact on the quality of life for seniors (Commodore, 1995).

It is generally agreed that considerable under-reporting of injuries exists, particularly for those seniors living in their own homes. For example, for falls resulting in minor or no injuries, denial may occur. Consultation, if sought at all, may be with a variety of persons ranging from

visitors, family members, home care professionals, family physicians, or hospital emergency room personnel. As a result, seniors at risk for an initial fall or prone to repeated falls often are identified only after a major injury or complication is discovered (Commodore, 1995).

Risk factors for injuries due to falls among older adults

Among seniors, injuries often occur due to falls. Factors associated with increased risk of falls can be grouped into two general categories: host and environmental factors. Host factors include: advanced age, female sex, living alone, decreased visual acuity, slowed protective reflexes, osteoporotic changes (Felson et al., 1989; Grisso et al., 1991; Lord et al., 1991a; Lord et al., 1991b), cerebrovascular, cardiovascular, and neurologic disorders (Sattin, 1992; Kapoor, 1987; Lilley, 1995), and problems with gait and balance (King et al., 1995; Issacs 1985; Nevitt et al., 1989; Ring et al., 1988) which may be related to change in age, disease, alcohol use, or medication use (Perrine, 1973; Rubenstein et al., 1988). Medications may greatly increase the risk of falls in seniors (Macdonald et al., 1982; Macdonald, 1985; Ray et al., 1989) by decreasing alertness, affecting judgement, compromising neuromuscular function, or causing dizziness and syncope (Ray et al., 1989). Environmental factors are estimated to be involved in one-third to one-half of all falls or fall-related injuries (Lucht, 1971; Schelp et al., 1986; Waller, 1978). Environmental factors associated with falls include both indoor and outdoor risks. Indoor risks include: throw rugs, loose carpets, slippery floors, door jambs, cords and wires on the floor, cluttered hallways and rooms, low-lying objects such as toys or pets, low beds and toilet seats, poorly maintained walking aids and equipment, and poorly lighted and poorly designed stairways. Outdoor risks include stairs, low-lying objects, icy walkways, and cracked sidewalks (Rubenstein et al., 1988; Sattin, 1992).

Epidemiology of injury due to causes other than falls

Motor vehicle crashes are the second leading cause of medical treatment and hospitalizations after falls in Canada (Riley & Paddon, 1989). In Canada, MVC among males and females over 65 years of age were 19 per 100,000 and 9 per 100,000 respectively (Raina et al., 1997; Riley & Paddon, 1989). When the number of annual miles driven is considered, expressed as the number of collisions per million miles driven, drivers aged 65 and older have the second highest MVC rates after young adults; risks of crash involvement is lowest for drivers 40-55 years old (Hogue, 1982; Williams et al., 1989). The number of pedestrian injuries (i.e., being struck by a motor vehicle) among older individuals is higher than that for any other age group (Baker et al., 1992). The mortality rates during 1979-1991 due to pedestrian injuries for Canadian males and females aged 65 and over were 9 per 100,000 and 5 per 100,000 respectively (Raina et al., 1997). Within the definition of self-inflicted injuries, suicides are the most common type. Suicides were the second highest ranked cause of mortality among all types of injury rates after falls in Canadian men aged 65 and over (Riley & Paddon, 1989). The mortality rate among senior men and women due to suicides were 28 per 100,000 and 7 per 100,000 respectively in Canada (Raina et al., 1997; Riley & Paddon, 1989). The causes of burns which result in death are different from those that result only in hospitalization (Baker et al., 1992). In Canada, mortality rates due to fire and flames among senior males and females are 6 and 3 per 100,000 respectively (Raina et al., 1997; Riley & Paddon, 1989; Snelling et al., 1992).

Risk factors for injuries due to causes other than falls

Risk factors for seniors' injuries caused by incidents other than falls are not as well researched. For motor vehicle crashes (MVC), risk factors may include age-related decline in the perception of, and reaction to, the hazards of the road and the ability to read road signs

(Lilley et al., 1995), as well as chronic medical conditions such as Alzheimer's disease (Cooper, et al., 1993; Dubinski, et al., 1992), hearing impairment (McCloskey et al., 1994), and psychoactive drug use (Honkanen et al., 1980; MacPherson et al., 1984; Skegg et al., 1979). For pedestrian injuries, risk factors may include physical inadequacies, decline in making appropriate judgements in shorter periods of time, attitudes of other people, and ability to cope with changes in the traffic environment (Shepard, et al., 1974). For self-inflicted injury and/or suicide, risk factors may include depression (Hirst et al., 1985), being unmarried, divorced or widowed (Baker et al., 1992; Smith et al., 1988), and chronic illness (Sendbuehler, 1977), which may alter a person's sense of self-worth as a result of increased isolation (Baker et al., 1992). For burns or other injuries or fatalities due to fire and flames, risk factors may include low socioeconomic status and cigarette smoking (Baker et al., 1992).

Study Objectives

Overall, as this review has shown, injuries have high physical, economic, psychological, and lifestyle costs among seniors. However, despite the impact injuries have on hospitalization and mortality, relatively little research has been conducted examining injuries among seniors that do not require hospitalizations. Additionally, there is a paucity of research on the utilization of health care resources, other than hospitals, by injured older adults. The objective of this study is to examine the prevalence and characteristics of injuries not captured by the hospitalization and mortality data, risk factors associated with such injuries, and health care utilization among Canadian seniors using Statistics Canada's National Population Health Survey (1994).

Specifically, this report has the following objectives:

1. To examine the prevalence of injuries among 55-64 year olds and seniors (65+).
2. To identify the causes, types, and locations of injuries.
3. To identify risk factors of injuries.
4. To compare health care use between injured and noninjured people.

METHOD

Overview

The National Population Health Survey (NPHS) was conducted by Statistics Canada on the recommendation of the National Health Information Council that an ongoing national health survey be conducted to collect information that would help improve the health status of the Canadian population (Statistics Canada, 1995). To meet this objective, the NPHS was primarily designed to monitor the health goals and objectives of the provinces and territories with emphasis placed on increasing the understanding of health and its determinants, particularly for health conditions that inflict the greatest suffering and cost.

The NPHS was first conducted in 1994-1995 and will be repeated every two years thereafter. Because the survey will be repeated every two years, a longitudinal component was added to the survey by collecting data from a panel of individuals in each of the two year intervals. However, because the 1994-1995 survey was the first conducted, all data presented in this report is cross-sectional in nature.

Sample

The sample population for the NPHS consisted of household residents in all provinces, excluding people living on Native Reserves, Canadian Forces Bases, and some remote areas of Quebec and Ontario. Separate surveys were conducted for the Yukon and North West Territories as well as for people in institutions, but the data were not included in the 1994-1995 survey results (Statistics Canada, 1995). For the household component of the NPHS, a stratified two-stage design was used to select the sample. In the first stage, each province was divided into three types of areas (Major Urban Centres, Urban Towns, and Rural Areas) from which separate geographic and/or socio-economic strata were formed, and independent samples of clusters were

drawn from each stratum, usually the six Census Enumeration Areas selected with Probability Proportional to Size. An additional stage was added for the few cases where the population density was low, which consisted of selecting two or three large Primary Sampling Units, dividing them into clusters, and drawing a sample of six clusters from each. In the second stage, dwelling lists were prepared for each cluster and households or dwellings were selected from the lists.

Surveys were conducted primarily by face-to-face interviews with the interviewer, hired for the Statistics Canada Labour Force Survey, using computer assisted interviewing (CAI) on a laptop computer. General information about all household members was obtained from a knowledgeable household member, typically the person at home at the time of the interviewer's visit. One person from each household, aged 12 years and over, was randomly selected for a more in-depth interview. Proxy reporting for the in-depth interview was allowed only for reasons of illness or incapacity, and represented 4% of the information collected. The total interview took about one hour per household, and many were concluded over the telephone either because the selected respondent was not available at the time of the initial visit or because of the survey's length. The household response rate was 88.7%; a non-rejected responding household had *at least* one general component questionnaire completed for a member of that household (Statistics Canada, 1995). The selected person response rate, that is, the number of health component questionnaires that *were* completed as compared to the number that *should have been* completed, was 96.1%.

The sample used for analyses in this report included all respondents 55 years and older who completed the interview portion of the survey. The total unweighted sample was 1,950 for 55-64 year olds and 3,143 for 65 years and over. The total weighted sample was 2,461,801 for

55-64 year olds and 3,250,967 for 65 years and over. Due to the multi-staged, stratified sampling procedure, it was necessary to use weights for all analyses in order to have population estimates correctly reflect the Canadian population. Each respondent in the survey was assigned a weight corresponding to the number of people the respondent represented based on the weighting procedure used for the Labour Force Survey, except for Quebec where a slightly different sampling procedure was used (and weighting was based on Enquete Sociale et de Sante). These weights were used for all analyses that generated population estimates. However, despite the fact that this weighting procedure produces accurate population estimates, the weighting procedure results in inaccurate significant tests and confidence intervals. Therefore, for all logistic and linear regression analyses, the weights were rescaled by dividing the weight for each respondent by the average weight of all respondents used in the analyses in order to produce more accurate significant tests and confidence intervals.

Survey Instruments

The NPHS primarily consisted of items designed to assess the health and health care of the Canadian population. Of particular importance for this report were items concerning injuries, including whether or not the respondent had experienced an injury in the past year and if so, what caused the injury, where the injury occurred, body site of the injury, and the type of injury. Other survey items relevant to this report covered health professionals visited in the past year, medications taken in the past month, restrictions of activities in the past two weeks, and demographic variables.

Variables

Demographic

The demographic variables covered gender, social support, socioeconomic status, and

health. The variables were: household size (one, two, or three or more members); marital status (single, married / common-law / partner, or widowed / divorced / separated); income level (low, medium, or high); education level (primary or less, secondary, or post-secondary); smoking status (smoking cigarettes daily, occasionally, or not at all); frequency of physical activity (regular, occasional, or infrequent); and drinking status (the number of times a person had 5 or more drinks on one occasion in the past year (0, 1-12, or 13 or more times), or did not drink in past year.

Injury Status

The respondents were asked whether they had an injury in the past 12 months that limited normal activities, and how many times they were injured. In this report, “injury status” refers to whether or not they experienced an injury in the past year.

Cause of injury -- The cause of injury includes: accidental fall, motor vehicle accident, accidentally struck by an object/person, environmental accident, machinery accident, cutting and piercing accident, fire or flames or resulting fumes, physical assault, hot liquids or foods or substances, other including suicide and accidental drowning, don't know.

Location of injury -- The location where the injury occurred includes: home or surrounding area, street or highway, place for recreation or sport, farm, building used by general public, residential institution, industrial place, other.

Type of injury -- The type of most serious injury includes: sprain or strain, broken or fractured bones, burn or scald, dislocation, cut or scrape, bruise or abrasion, concussion, poisoning by substance, internal injury, multiple injuries, other.

Body site of injury -- The body site of injury includes: back or spine, legs or feet, arms or hands, eyes, head (excluding eyes), neck, shoulder, hip, trunk (excluding back and spine), multiple

sites, other.

Chronic illness

The existence of chronic health conditions that have lasted or were expected to last six months or more was assessed. Respondents were specifically asked to indicate if the following conditions had been diagnosed: food allergies, other allergies, asthma, arthritis or rheumatism, back problems excluding arthritis, high blood pressure, migraine headaches, chronic bronchitis or emphysema, sinusitis, diabetes, epilepsy, heart disease, cancer, stomach or intestinal ulcers, effects of stroke, urinary incontinence, Alzheimer's disease or other dementia, cataracts, glaucoma, and any other long term condition. A co-morbidity index for chronic health conditions was created based on how many long-term conditions were indicated. Respondents were classified into the following groups: no chronic illness, one chronic illness, two chronic illnesses, three or more chronic illnesses.

Medications

Respondents were asked whether in the past month they had taken prescription and over-the-counter medications. The medications examined include: pain relievers, hormones for menopause or ageing, blood pressure, cough or cold, stomach remedies, penicillin or other antibiotics, heart, allergy, asthma, laxatives, diuretics or water pills, codeine or demerol or morphine, diabetes, sleeping pills, tranquilizers, anti-depressants, steroids, insulin, diet pills, and any other medications.

Health Care Use

Respondents were asked in the past 12 months how many nights they have been a patient overnight in a hospital, nursing home or convalescent home, and how many times they have seen

or talked on the telephone with health professionals about their physical, emotional or mental health. The health professionals examined include: general practitioner, another medical doctor, dentist or orthodontist, eye specialist, chiropractor, physiotherapist, nurse, speech therapist, social worker or counselor, and psychologist.

Restriction of Activity

Respondents were asked whether due to a long-term physical or mental condition or a health problem they were limited in the kind or amount of activity they could do either at home, school, work, or in other activities such as transportation to or from work or leisure time activities. They were also asked whether they needed help in Instrumental Activities of Daily Living (IADL), namely preparing meals, shopping for necessities, housework, heavy chores, personal care, or moving about inside the house. Respondents were classified into one of two groups based on whether they indicated that they needed help with at least one IADL.

NPHS-derived variables

Several derived variables were created on the NPHS files in order to facilitate data analysis (Statistics Canada, 1995). The derived variables were created by collapsing categories or by combining several variables to create a new variable. The derived variables from the general questionnaire included: type of household, disability days, consultations with any health professionals in the past 12 months, number of consultations with medical doctor, main condition or health problem which caused the activity limitation, several socio-demographic characteristics, and geographic variables. The derived variables from the in-depth health questionnaire related to: general health description, body weight, smoking, alcohol, physical activity, type of injury by body site, cause of injury by place of occurrence, stress, health status, mental health, and social support.

Analysis

Population characteristics

Descriptive statistics (percentages) of the demographic characteristics, number of chronic illnesses, and injury status are presented. Due to small numbers of respondents, some of the demographic category levels were combined (e.g., frequency of drinking was classified as less than once a week or once or more per week).

Characteristics of injuries

For people who indicated that they were injured in the past year, descriptive statistics are presented detailing the type, body site, cause, and location of the injury, divided by age (55-64, 65 or older).

Restriction of activities due to injury

Logistic regression was conducted to examine the association between requiring help with at least one IADL and injury status after adjusting for sex, household size, marital status, income level, education level, cigarette smoking and frequency of drinking. Frequency of physical activity and chronic illness were not included in the adjusted odds ratio because they were too closely related to experiencing activity restriction and thus with requiring help for IADLs. Adjusted odds ratios and confidence intervals for respondents who experienced an injury as compared to those who were not injured, stratified by age.

Risk factors associated with having an injury

Descriptive statistics are provided breaking down injury status (whether or not a respondent reported having an injury) by the demographic factors. Descriptive statistics are also provided comparing the percentage of injured and uninjured respondents reporting use of medications in the past month, divided by age. Adjusted odds ratios and confidence intervals are

presented to indicate the degree of association between each factor and injury status. The odds ratios were adjusted for chronic illness status, sex of respondent, household size, marital status, income level, education level, smoking cigarettes, frequency of drinking, and frequency of physical activity.

Association between injury status and contact with health professionals

Descriptive statistics are presented indicating the percentage of injured and noninjured people who visited health professionals in the past year. The survey measured the number of consultations with each health professional, and from this a yes/no variable was created for each health professional. The percentages reporting any contact with health professionals in the past year are broken down by age. Adjusted odds ratios and confidence intervals are presented; the reference for the adjusted odds ratios was those who were not injured, and they were adjusted for chronic illness status and demographic characteristics. Adjusted odds ratios indicate the degree of association between contact with health professionals and injury status after controlling for demographic factors. Similarly, the average number of contacts with health professionals in the past year was examined. Multiple regression analyses were used to determine the relationship between injury status and frequency of contact with health professionals after controlling for demographic variables. For these analyses, adjusted Betas and confidence intervals are presented; Betas are adjusted for the same factors as the odds ratios.

Release Guidelines

Guidelines set by Statistics Canada (1995) must be adhered to for the tabulation, analysis and release of NPHS data. If the number of sampled respondents who contribute to the calculation of the estimate is less than 30, then the weighted estimate should not be released regardless of the value of the coefficient of variation for this estimate. This is because the

formulas used for estimating the variance do not hold true for small sample sizes (Statistics Canada, 1995, p. 33). For weighted estimates based on sample sizes of 30 or more, the coefficient of variation of the rounded estimate must be determined and sampling variability guidelines set by Statistics Canada (1995, p. 29) must be followed. The minimum cut-offs for estimates of totals for various age groups at the Canada level are also specified (Statistics Canada, 1995, p. 42-45). For selected Canadians aged 65 and over, estimate sizes smaller than 12,000 may not be released under any circumstances, and those larger than 48,000 may be released unqualified.

Limitations

There were several limitations in the NPHS that should be considered when interpreting the findings presented in this report. They are as follows:

1. The results presented only reflect Canadians who lived in households and not those who were institutionalized.
2. All results reported in this survey are cross-sectional in nature. Therefore, it is not possible to make causal interpretations.
3. Analyses examining restriction of activities and injury covered different time frames. Items assessing activity restriction covered a two week period, while injury covered a one year period. Respondents may have indicated that an injury caused their activity restriction, but this injury may not be the same injury as referred to in their injury status. Thus, it was difficult to determine which injuries resulted in restriction of activities.
4. Analyses examining medications taken and injury status covered different time frames. Items assessing medications taken asked for medications taken in the past month, whereas injury status covered the past year. Thus, any interpretation concerning the

relationship between medicine use and injury status should be made with extreme caution.

RESULTS

Population Characteristics of Canadians 55 Years and Older

Table 1 presents the population characteristics of Canadians 55-64 years and seniors (65 years and older). There is a shift in several demographic variables between the two age groups. For both age groups, there were more females than males, although the percentage of females was higher among seniors (57%) than 55-64 year olds (53.2%). The majority of individuals in both age groups lived in households made up of two or more members, although almost one-third of respondents aged 65 and older lived alone (31.5%) while only 15% of respondents aged 55-64 lived alone. The majority of individuals in both age groups were married, living common-law or with a partner, although fewer seniors were in this category (59.5% versus 77.1% of 55-64 year olds), probably reflecting the higher degree of widowhood among the older age group. In terms of socioeconomic variables, 55-64 year olds had higher income levels and education levels than seniors. Approximately half of 55-64 year olds had a high level of income (51.9%) and a post-secondary education (47.9%). Seniors were more likely to be at the middle level of income (43.1%) and have a secondary education or less (66.3%).

The two age groups also differed on variables related to healthy lifestyle choices. The majority of both age groups were nonsmokers, although 55-64 year olds were almost twice as likely to be smokers than were seniors (26.4% versus 14.6%). Just over half of both age groups engaged in regular exercise (56.5% of 55-64 year olds and 50.5% of seniors). The majority of both age groups also drank alcohol less than once a week. Seniors were less likely to drink once a week or more (27.2%) than were 55-64 year olds (39.1%).

Seniors had more chronic illness than did 55-64 year olds. Among seniors, only 19.3% had no chronic illness while 31.0% of people aged 55-64 had no illness. Almost one-third of seniors had three or more chronic illnesses in comparison to only one-fifth of people aged 55-64.

Approximately 10% of people aged 55 and older had experienced an injury in the past year with 55-64 year olds slightly more likely to be injured than seniors (11.0% versus 9.1%). Among 55-64 year olds, 25% of injured males and 16% of injured females experienced two or more injuries in the past 12 months. Among seniors, the vast majority of those injured (98% of males and 90% of females) experienced only one injury in the past year. Among 55-64 year olds, 79.1% of those who were injured also had at least one chronic illness. Among seniors, 91.7% of those who were injured also had at least one chronic illness.

Characteristics of Injuries

Tables 2a-d describe the nature of injuries for people who were injured in the past year. As can be seen from Table 2a, the two most common types of injuries were sprains or strains and broken or fractured bones. Among 55-64 year olds, over 40% of those injured suffered a sprain or strain, while almost 20% suffered broken or fractured bones. Injured seniors were equally likely to experience these two types of injuries (28.2% suffered from a sprain or strain; 29.9% suffered from broken or fractured bones).

Table 2b describes what part of the body was injured among people suffering an injury in the past year. The distribution of injuries was similar between the two age groups with one exception. People 55-64 years old were twice as likely to suffer a back or spine injury than were seniors (29.4% versus 14.9%). Just over one-quarter of individuals in both age groups suffered injuries to the legs or feet and approximately one-fifth suffered injuries to the arms or hands.

Table 2c describes where people injured themselves in the past year. Approximately half of

all injuries occurred in the home or surrounding area (48.6% and 59.9% for 55-64 year olds and seniors, respectively). For seniors, the street or highway was the next most common place for injuries to occur, accounting for almost one-fifth of injuries. On the other hand, places for recreation and sport (13.0%) and the street or highway (10.0%) were the next most common locations for injuries among 55-64 year olds.

Table 2d presents the most common causes of injury among people injured in the past year. Almost one-third of 55-64 year olds and over one-half of seniors were injured by an accidental fall, the most common cause of injury among both age groups. Other types of accidents accounted for another fifth of injuries in both age groups.

Restriction of Activities Due to Injury

Those who were injured were more likely to have experienced a restriction of activity and thus require assistance with IADLs than those who had not been injured. Table 3 shows that among 55-64 year olds, those who needed help with at least one IADL in the past two weeks were 9 times more likely to have been injured in the past year (OR=9.35) than not be injured. Among seniors, those who needed help with at least one IADL were 4 times more likely to be injured (OR=4.23) than not injured.

Additionally, less than half of the injured 55-64 year olds felt restricted in their activity (44.3%), while almost two-thirds of the injured seniors experienced activity restriction (60.0%). These percentages should be interpreted with caution, however, because respondents may have indicated that they were limited in the kind or amount of activity they could do because of a long-term physical or mental condition or a health problem, but this may not be the same problem as reflected by their injury status.

Factors Associated with Having an Injury in the Past Year

Table 4 presents the percentage 55-64 year olds and seniors who were injured in the past year broken down by population characteristics, along with the associated adjusted odds ratio and confidence interval. A number of factors were associated with being injured in the past year, and the pattern of results, for the most part, was consistent across both age groups. There were no gender differences in injury status among 55-64 year olds (11% were injured); among seniors, however, females were slightly (but not significantly) more likely to be injured than males (10.3% versus 7.5%). Among seniors, marital status was associated with injury status, as seniors who were single, divorced, widowed or separated were more likely to be injured than those who were married or living common-law or with a partner (OR=1.58). Respondents from both age groups who had post-secondary education were more likely to be injured than those who had secondary or less (OR=1.47 and 1.34 for seniors). Among both age groups, smokers were more likely to be injured than nonsmokers (OR=2.09 and 1.44 for seniors). For the frequency of physical activity, 55-64 year olds who were active occasionally were significantly less likely to be injured than those who were regular exercisers (OR=0.59). There was a non-significant trend that 55-64 year olds who engaged in regular physical activity were the most likely to be injured, whereas, among seniors the reverse was true, with infrequent exercisers being the most likely to be injured. Size of household, income level, and frequency of drinking alcohol were not significantly associated with injury status.

Number of existing chronic illnesses was related to injury status, particularly among seniors. As the number of chronic illnesses increased, the likelihood of a senior being injured increased (OR=1.87 for one, 2.03 for two, and 2.81 for three or more chronic illnesses). Among 55-64 year olds, those who had three or more chronic illnesses were significantly more likely to be injured (OR=2.74).

Association Between Use of Medication and Injury Status

Tables 5a and 5b compare the use of medications between injured and noninjured individuals. It should be noted that while the association between medication use and injury status is provided in the form of adjusted odds ratios, the results should be interpreted with caution because the time frame covering medication use and injury is different. Respondents were asked to indicate medications they had taken in the past month, whereas respondents were asked if they incurred an injury during the past year. Therefore, the medications may or may not have been taken prior to or when the injury occurred.

Among 55-64 year olds, being injured was associated with taking cough or cold medication (OR=1.65). Taking pain relievers was not associated with increased injury. However, people who took blood pressure or other medication were less likely to be in the injured group (OR=0.64 and 0.63 respectively). Among seniors, being injured was associated with taking pain relievers (OR=1.74), but was not significantly associated with taking blood pressure medication, stomach remedies, heart medication, laxatives, diuretics or water pills, or any other medication.

Health Care Utilization Broken Down by Injury Status

Tables 6a and 6b present the percentage of individuals who contacted health professionals in the past 12 months divided by injury status and age. Among 55-64 year olds, being injured was associated with more overnight hospital visits (OR=2.09), and more people contacting a general practitioner (OR=1.91), another medical doctor (OR=1.77), chiropractor (OR=2.06), and physiotherapist (OR=3.28) than did people who were not injured. Among seniors, being injured was significantly associated with more overnight hospital visits (OR=1.78), and more people contacting another medical doctor (OR=1.33) and physiotherapist (OR=6.32) than did seniors who were not injured.

Tables 7a and 7b describe the frequency of contact with health professionals over the past twelve months, divided by injury status and age. Among 55-64 year olds, injured people had a higher average number of contacts with general practitioners ($\beta=1.01$), other medical doctors ($\beta=0.45$), chiropractors ($\beta=1.08$), and physiotherapists ($\beta=1.70$) than did uninjured people. Among seniors, injured people had a higher average number of contacts with general practitioners ($\beta=1.21$), physiotherapists ($\beta=3.11$), and dentists or orthodontists ($\beta=0.23$), than did uninjured people, and injured seniors also stayed overnight in the hospital more often ($\beta=2.50$) than uninjured seniors.

DISCUSSION

The results of the National Population Health Survey reveal that injuries represent a significant health threat among Canadians aged 55 years and older. Approximately 10% of people in this age group experienced an injury in the past year, with 55-64 year olds slightly more likely to be injured than seniors 65 years and older. Approximately half of all injuries occurred in the home or surrounding area. Although this finding is in keeping with the notion that the greatest proportion of most people's time is spent at home, it does indicate the need to develop interventions directed at reducing injuries in the home. Also among both age groups, the most common cause of injury was falls, particularly among seniors for whom falls were the cause of over half of all injuries.

Sprains or strains and broken or fractured bones were the two most common types of injuries among both age groups. However, 55-64 year olds were twice as likely to have a sprain or strain than broken or fractured bones, whereas seniors were equally likely to suffer these two types of injuries. The difference may reflect the fact that as seniors become more frail, they suffer more serious injuries when they experience an injury producing event. In terms of what part of the body was injured, injuries to the limbs (arms, hands, legs, feet) represented almost half of all injuries for both age groups. Injury to the back or spine was also a common type of injury, although 55-64 year olds were twice as likely as seniors to suffer an injury to the back or spine.

There is some speculation that taking medication may increase the chances of being injured. However, while the information collected in the survey does not allow this question to be addressed directly, there is some evidence to suggest that taking medication may increase the

likelihood of being injured. Among 55-64 year olds, taking medication for blood pressure, coughs or colds, and other types of medications as a group was associated with injury, but taking pain relievers was not. Among seniors, on the other hand, taking pain relievers was significantly associated with increased risk of injury.

Because questions concerning medication use covered only medications taken in the past month, and injury status covered the whole year, it is not possible to definitely say that taking a particular medication predisposed seniors to injury. These results do suggest that there is a relationship between medication use and injury, but further research will be needed to explore this relationship. For example, after the next NPHS is completed, people who reported in both surveys that they took the same medication and who reported being injured in the second survey would likely have been taking the medication before being injured. Using this type of information, it may be possible to further explore the question of whether taking medication predisposes older adults to being injured.

A number of other factors were associated with being injured. Smokers were more likely to be injured than nonsmokers. Having a post-secondary education was also associated with increased injury. Among 55-64 year olds, those who were occasionally physically active were less likely to be injured than those who were regularly active. Among seniors, those who were single, divorced, widowed or separated, were more likely to be injured than those who were married or had a partner. Chronic illness was related to injury for both age groups, and particularly for seniors; Those who had chronic illnesses were more likely to be injured, and this likelihood for injury increased with the number of chronic illnesses. Additionally, those respondents who needed assistance with at least one IADL were much more likely to have experienced an injury in the past year.

One short-coming of the current survey is that it is not longitudinal in nature. However, because the survey will be repeated every two years with the same panel of people, it may be possible in the future to address issues that require longitudinal data. Such analyses could include investigating the causal relationship between medication use and injury, examining the recurrence of injury, and determining whether increased contacts with health professionals among those who were injured continue beyond the initial year of injury, particularly with physiotherapists and chiropractors who may tend to be involved with longer term treatment.

The impact of injuries on health care utilization revealed some interesting findings. As may be expected, people who suffered an injury in the past year were more likely to have contacted different types of health care professionals including general practitioners (55-64 year olds only), another medical doctor, chiropractors (55-64 year olds only), and especially physiotherapists. Further, injured people were more likely to have had an overnight hospital visit. Injured respondents had more contacts with general practitioners, physiotherapists, another medical doctor (55-64 only), chiropractors (55-64 only), dentist or orthodontist (65 years and older only), and had more overnight hospital visits (65+ only). Unfortunately, data from this survey does not provide information concerning what proportions of contacts with health professionals were as a result of being injured.

The results of the first National Population Health Survey highlight that among individuals 55 years and older, injuries represent an important health issue. Although the cross-sectional nature of the survey does not allow causal interpretations to be made, the results presented indicate some areas where it may be desirable to direct intervention programs. For example, the high incidence of injuries occurring at home indicates that intervention programs should be aimed at reducing injuries that happen in the home. Further, if causal links are found

between psychosocial factors and injuries, finding them means that to change these psychosocial factors may also serve to reduce injury rates.

Table 1. Population Characteristics of Canadians 55 Years and Older

Population Characteristic	55-64 Years n* (%)	65 Years and Older n* (%)
Gender		
male	1,152,384 (46.8)	1,398,620 (43.0)
female	1,309,417 (53.2)	1,852,347 (57.0)
Size of Household		
one member	370,159 (15.0)	1,025,407 (31.5)
two or more members	2,091,642 (85.0)	2,225,559 (68.5)
Marital Status		
married/com-law/partner	1,896,497 (77.1)	1,935,374 (59.5)
single/div/wid/sep	564,632 (22.9)	1,315,593 (40.5)
Income Level		
low	432,600 (18.7)	792,740 (25.8)
middle	679,231 (29.4)	1,324,427 (43.1)
high	1,199,167 (51.9)	954,320 (31.1)
Education Level		
secondary or less	1,278,773 (52.1)	2,144,591 (66.3)
post-secondary	1,174,368 (47.9)	1,091,254 (33.7)
Smoking Status		
no	1,809,813 (73.6)	2,771,727 (85.4)
yes	647,542 (26.4)	472,232 (14.6)
Frequency of Physical Activities		
regular	1,321,822 (56.5)	1,521,681 (50.5)
occasional	428,853 (18.3)	444,049 (14.7)
infrequent	588,683 (25.2)	1,048,770 (34.8)
Frequency of Drinking		
less than once a week	1,498,125 (60.9)	2,362,968 (72.8)
once a week or more	959,947 (39.1)	882,305 (27.2)
Number of Chronic Illnesses		
none	760,843 (31.0)	627,583 (19.3)
one	757,403 (30.9)	947,754 (29.2)
two	431,452 (17.6)	665,779 (20.5)
three or more	504,685 (20.6)	1,004,669 (31.0)
Injury Status		
Injured	270,527 (11.0)	295,191 (9.1)
Not Injured	2,191,275 (89.0)	2,955,775 (90.9)

*Sample weighted by population estimate

Table 2a. Type of Most Serious Injury Among People Injured in Past Year

	55-64 Years (n* = 270,527)	65 Years and Older (n* = 295,191)
Sprain or Strain	40.7	28.2
Broken or Fractured Bones	19.4	29.9
Other	39.9	41.9

*Sample weighted by population estimate

Table 2b. Part of Body Injured Among People Injured in Past Year

	55-64 Years (n* = 270,527)	65 Years and Older (n* = 295,191)
Back or Spine	29.4	14.9
Legs or Feet	27.7	25.9
Arms or Hands	17.0	20.6
Other	25.9	38.6

*Sample weighted by population estimate

Table 2c. Where Injury Happened Among People Injured in Past Year

	55-64 Years (n* = 270,527)	65 Years and Older (n* = 295,191)
Home or Surrounding Area	48.6	59.9
Street or Highway	10.6	18.0
Place for Recreation or Sport	13.0	----†
Other	27.8	22.1

*Sample weighted by population estimate

† The number of respondents 65 years and older who were injured on a street or highway was less than 30, and thus the percentage could not be released under Statistics Canada's guidelines.

Table 2d. Cause of Injury Among People Injured in Past Year

	55-64 Years (n* = 270,527)	65 Years and Older (n* = 295,191)
Accidental Fall	32.1	52.2
All Other Accidents	21.5	20.9
Other	46.4	26.9

*Sample weighted by population estimate

Table 3. Restriction of Activity (in least 1 IADL) in Past 2 Weeks by Injury Status and Age

	55-64 Years	65 Years and Older
Injury	Adj Odds Ratio* (95% CI)	Adj Odds Ratio* (95% CI)
No	Ref	Ref
Yes	9.35 (2.24-38.80)	4.23 (2.39-7.69)

* Odds ratios were adjusted for sex of respondent, household size, marital status, income level, education level, smoking cigarettes, and frequency of drinking.

Table 4. Breakdown of population characteristics by injury status.

Population Characteristic	55-64 Years		65 Years and Older	
	Percent Injured**	Adj Odds Ratio* (95% CI)	Percent Injured**	Adj Odds Ratio* (95% CI)
Gender				
male	11.0	Ref	7.5	Ref
female	11.0	1.05 (0.77-1.45)	10.3	1.27 (0.94-1.73)
Size of Household				
one member	13.7	Ref	10.7	Ref
two or more members	10.5	0.59 (0.31-1.14)	8.4	1.24 (0.79-1.95)
Marital Status				
married/com-law/partner	10.9	Ref	7.6	Ref
single/div/wid/sep	11.2	0.61 (0.33-1.14)	11.3	1.58 (1.01-2.47)
Income Level ¹				
low	13.4	Ref	12.7	Ref
middle	9.0	0.71 (0.45-1.13)	8.4	0.78 (0.56-1.10)
high	11.6	0.90 (0.58-1.40)	7.4	0.69 (0.46-1.04)
Education Level ¹				
secondary or less	9.4	Ref	9.0	Ref
post-secondary	12.8	1.47 (1.07-2.03)	9.3	1.34 (1.00-1.79)
Smoking Status				
no	9.6	Ref	8.7	Ref
yes	14.9	2.09 (1.50-2.90)	11.7	1.44 (1.02-2.04)
Frequency of Physical Activities ¹				
regular	12.9	Ref	7.3	Ref
occasional	7.3	0.59 (0.37-0.94)	7.5	0.99 (0.65-1.51)
infrequent	9.3	0.72 (0.49-1.05)	11.2	1.34 (0.99-1.80)
Frequency of Drinking				
less than once a week	11.2	Ref	9.4	Ref
once a week or more	10.7	0.98 (0.71-1.35)	8.2	1.08 (0.78-1.49)
Number of Chronic Illnesses				
none	7.4	Ref	3.9	Ref
one	9.8	1.41 (0.92-2.15)	8.6	1.87 (1.15-3.07)
two	8.9	1.19 (0.71-1.98)	9.5	2.03 (1.21-3.41)
three or more	20.2	2.74 (1.80-4.16)	12.5	2.81 (1.75-4.52)

** Percent injured in the total sample by each age group (e.g., # of males aged 55-64 injured / total # of males in 55-64).

* Each odds ratio was adjusted for the other variables (population characteristics) in this table.

¹ The weighted n's for injured respondents 55-64 years old, and 65 years and older, respectively, due to missing responses were: income level (258,088; 282,714), education level (270,526; 294,058), physical activity (270,004; 262,786). The weighted n's for the other variables were 270,527 for injured 55-64 year olds and 295,191 for injured seniors.

Table 5a. Percentages Reporting Use of Any Medication in Past Month among 55-64 year olds

Medication ‡	Not Injured (n* = 2,191,275)	Injured (n* = 270,527)	Adj Odds Ratio*
Pain Relievers	56.6	70.1	1.38 (0.98-1.94)
Blood Pressure	17.9	16.1	0.64 (0.41-0.99)
Cough or Cold	10.0	15.1	1.65 (1.07-2.55)
Any Other Medications	51.3	50.4	0.63 (0.45-0.88)

*Sample weighted by population estimate

Table 5b. Percentages Reporting Use of Any Medication in Past Month Among Seniors (65+)

Medication ‡	Not Injured (n* = 2,955,775)	Injured (n* = 295,191)	Adj Odds Ratio*
Pain Relievers	57.5	73.1	1.74 (1.28-2.36)
Blood Pressure	29.4	27.0	0.75 (0.56-1.03)
Stomach Remedies	10.9	14.6	1.13 (0.76-1.67)
Heart	21.2	22.2	0.88 (0.63-1.24)
Laxatives	8.8	13.7	1.17 (0.77-1.78)
Diuretics or Water Pills	10.7	13.3	1.10 (0.74-1.63)
Any Other Medications	47.3	55.1	1.10 (0.83-1.45)

*Sample weighted by population estimate

‡ The percentages reflect the number of respondents who answered yes to taking the specified medication.

* The reference for the adjusted odds ratios was “did not take medication”. All odds ratios were adjusted for chronic illness status, sex of respondent, household size, marital status, income level, education level, smoking cigarettes, frequency of drinking, and derived frequency of physical activity.

Table 6a. Percentages Reporting Any Contact with Health Professionals in Past 12 Months among 55-64 Year Olds

Health Professional ‡	Not Injured (n* = 2,191,275)	Injured (n* = 270,527)	Adj Odds Ratio*
Overnight Hospital Visit	10.0	19.4	2.09 (1.39-3.13)
General Practitioner	79.7	90.7	1.91 (1.15-3.16)
Dentist or Orthodontist	47.5	46.2	0.91 (0.65-1.28)
Eye Specialist	40.1	48.1	1.17 (0.85-1.59)
Another Medical Doctor	29.4	45.9	1.77 (1.29-2.44)
Chiropractor	9.1	20.6	2.06 (1.35-3.14)
Physiotherapist	7.2	24.9	3.28 (2.16-4.98)

*Sample weighted by population estimate

Table 6b. Percentages Reporting Any Contact with Health Professionals in Past 12 Months among Seniors (65+)

Health Professional ‡	Not Injured (n* = 2,955,775)	Injured (n* = 295,191)	Adj Odds Ratio*
Overnight Hospital Visit	15.7	28.3	1.78 (1.30-2.43)
General Practitioner	87.4	88.9	1.05 (0.67-1.65)
Dentist or Orthodontist	38.6	34.5	1.03 (0.77-1.39)
Eye Specialist	47.8	53.0	1.25 (0.95-1.65)
Another Medical Doctor	32.1	35.0	1.33 (1.00-1.76)
Chiropractor	8.0	9.6	1.09 (0.68-1.75)
Physiotherapist	5.9	28.0	6.32 (4.51-8.87)

*Sample weighted by population estimate

‡ The percentages reflect the number of respondents who answered yes to visiting the health professional or to staying overnight in the hospital.

* The reference for the adjusted odds ratios was “not injured”. All odds ratios were adjusted for chronic illness status, sex of respondent, household size, marital status, income level, education level, smoking cigarettes, frequency of drinking, and derived frequency of physical activity.

Table 7a. Average Number of Contacts with Health Professionals in Past 12 Months among 55-64 Year Olds

Health Professional ‡	Not Injured (n* = 2,191,275)	Injured (n* = 270,527)	Adj Beta*
Overnight Hospital Visit	0.71	1.10	0.40 (-0.09-0.90)
General Practitioner	3.40	5.06	1.01 (0.37-1.64)
Dentist or Orthodontist	1.03	1.12	-0.01 (-0.25-0.24)
Eye Specialist	0.52	0.75	0.05 (-0.10-0.21)
Another Medical Doctor	0.78	1.46	0.45 (0.16-0.74)
Chiropractor	0.74	2.08	1.08 (0.53-1.62)
Physiotherapist	0.69	2.69	1.70 (1.08-2.31)

*Sample weighted by population estimate

Table 7b. Average Number of Contacts with Health Professionals in Past 12 Months among Seniors (65+)

Health Professional ‡	Not Injured (n* = 2,955,775)	Injured (n* = 295,191)	Adj Beta*
Overnight Hospital Visit	1.59	4.74	2.50 (1.75-3.25)
General Practitioner	4.78	6.38	1.21 (0.52-1.91)
Dentist or Orthodontist	0.77	0.93	0.23 (0.06-0.41)
Eye Specialist	0.78	0.83	-0.05 (-0.22-0.12)
Another Medical Doctor	0.92	0.99	0.13 (-0.14-0.40)
Chiropractor	0.68	0.59	-0.26 (-0.70-0.17)
Physiotherapist	0.60	3.79	3.11 (2.60-3.61)

*Sample weighted by population estimate

‡ The percentages reflect the number of respondents who answered yes to visiting the health professional or to staying overnight in the hospital.

* The reference for the adjusted Beta was “not injured”. Betas were adjusted for chronic illness status, sex of respondent, household size, marital status, income level, education level, smoking cigarettes, frequency of drinking, and derived frequency of physical activity.

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IESOP RESEARCH PAPERS

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