

# Fact sheet: Prevention of Falls among Elderly

## Elderly Safety-Focus on Accidental Injuries

### Accidental Injuries among Elderly People

Falls are the dominant cause of injury among elderly (65+ years) followed by:

- Traffic accidents
- Burns and fires
- Drowning and
- Poisoning

Evidence based good practices show that it is possible to reduce injuries among elderly by 38% by means of relatively cost effective methods. Reduction of injury can improve the quality of life and lessen the high health care expenditure due to injuries in this age group.



**"invite elderly to a safer and better life"**

### FACTS

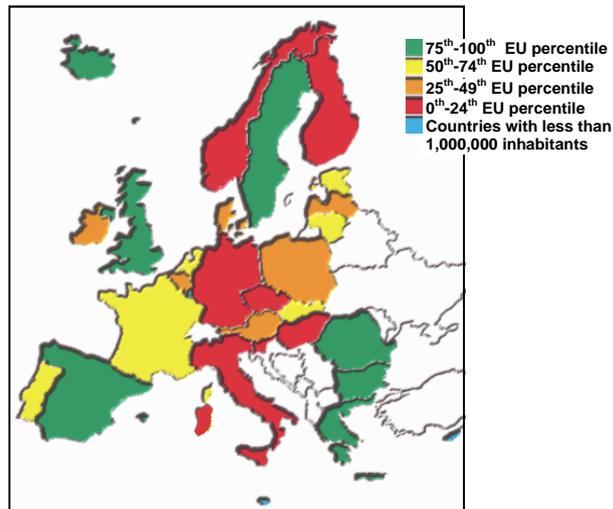
#### All injuries

- ◆ Senior citizens in the EU-27 and the EEA account for an appalling toll of about 105,000 fatal injury cases per year out of which 85,000 are categorized as unintentional and 20,000 as intentional<sup>1-3</sup>
- ◆ Elderly people are involved in 40% of fatal injuries in the EU<sup>1</sup>
- ◆ In the EU-27 there is a 4-fold variability in the frequency of injury death among elderly. Hungary has the highest mortality rate followed by the Czech Republic, France, Finland and Denmark whereas Bulgaria, Greece, Spain, UK and Germany have the lowest rates<sup>3</sup>
- ◆ Deaths due to injuries are only the tip of the iceberg. In the EU every day 15,000 elderly sustain an injury severe enough to seek medical care, out of whom 5,500 are ending up in a hospital and 275 eventually die, whereas several hundreds never get back home as they enter a nursing home
- ◆ The proportion of elderly people in the EU population is steadily increasing, which will have immediate impact on the burden of injuries in this age group

#### Falls

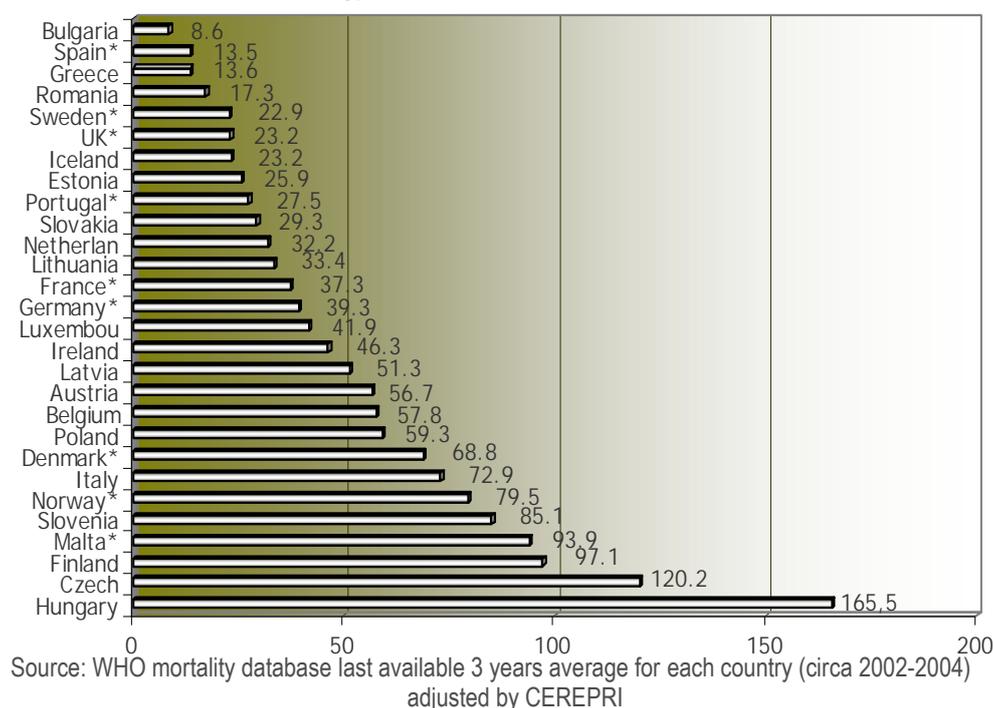
- ◆ There are nearly 40,000 deaths from falls among elderly in the EU-27 Region<sup>4,5</sup>
- ◆ People aged 80 and over have 6-fold higher mortality compared to elderly 65-79 years, as they are not only more likely to fall but also more frail than others<sup>4</sup>
- ◆ The variation of the mortality rates due to falls in this area is the highest compared to any other type of injury with Bulgaria, Spain and Greece having the lowest rates (< 15) and Hungary, Czech Republic and Finland the highest (> 100). This discrepancy shows the high potential for prevention
- ◆ Injuries among elderly generate high health care costs. The major sources of hospital costs are fractures, mainly of the hip.<sup>6</sup>
- ◆ A large proportion of the EU-27 and EEA countries seem to enjoy during the last decade decreasing annual rates from accidental falls of about 4%<sup>7,8</sup>

Geographic distribution of age adjusted mortality rates due to fall injuries among Elderly<sup>2</sup>



Source: WHO mortality database last available 3 years average for each country (circa 2002-2004) adjusted by CEREPRI

Age adjusted mortality rates due to fall injuries per 100,000 among elderly in the EU-27 and EEA<sup>3</sup>  
(data for Cyprus and Liechtenstein are not available)



- ◆ Each year about 1 out of 10 elderly is treated by a medical doctor due to an injury, amounting to a total of 8 million injuries in the EU-27 and EEA<sup>2</sup>
- ◆ Falls are the leading cause of injury among people 65 and older;<sup>4,9,10</sup> In several EU countries, falls comprise ~75% of all patients who need medical attendance<sup>2</sup>
- ◆ Older adults are hospitalized for fall-related injuries five times more often than they are for injuries from other causes<sup>11</sup>
- ◆ Age is a major risk factor for fall injury. 30% of people over 65 and 50% of those over 80 years fall each year<sup>12</sup>
- ◆ Older adults who fall once are two to three times as likely to fall again within a year<sup>12</sup>
- ◆ For women over 55 and men over 65 years, the age-specific death and hospital admission rates for injury increase exponentially with age. > 1/3 of women sustain one or more osteoporotic fractures in their lifetime, the majority caused by a fall<sup>13</sup>
- ◆ Falls have several causal components including state of osteoporosis linked to climatic and nutritional conditions, quality of housing and mobility patterns<sup>3</sup>
- ◆ ~25% of those who fall suffer injuries that reduce mobility and independence and increase the risk of premature death. Fall rates among institutionalized residents are much higher than those among community-dwellers<sup>12,14,15</sup>
- ◆ ~50% of falls among elderly occur in their own home<sup>16</sup>

Distribution of fall injuries among elderly by place<sup>16</sup>

Proportional Indicators: Place of fall	Austria		Denmark		France		Greece	
	N	%	N	%	N	%	N	%
Inside the house	640	46,2	6943	37,1	6102	54,8	12336	40.2
<i>Bedroom</i>	246	17,8	3930	21	1524	13,7	3770	12.3
<i>Kitchen</i>	110	7,9	252	1,3	286	2,6	2053	6.7
<i>Bathroom</i>	86	6,2	873	4,7	289	2,6	1480	4.8
<i>Other inside the house</i>	198	14,3	1888	10,1	4003	35,9	5033	16.4
Around the house	159	11,5	4132	22,1	678	6,1	7661	25.0
Road, pavement	286	20,6	3286	17,6	1647	14,8	6652	21.7
Farm area	5	0,4	4	0	9	0,1	778	2.5
Hospital or nursing home	117	8,5	2597	13,9	-	-	868	2.8
Commercial & service areas	33	2,4	379	2	1091	9,8	920	3.0
Other or unspecified	144	0,4	1360	7,3	1598	14,4	1479	4.8
<b>Total</b>	<b>1384</b>	<b>100</b>	<b>18701</b>	<b>100</b>	<b>11125</b>	<b>100</b>	<b>30694</b>	<b>100.0</b>

Source: Injury Database in Austria, Denmark, France (~2003) and Greece (1996-2003); presented in the Injury Statistics Portal, CEREPRI

## OUTCOME

More and more people are enjoying life into their 80s and 90s. However older people, in particular the frail elderly, are more vulnerable than others to fall injuries, particularly in and around the home. The consequences of an accidental fall injury might reduce the quality of life of the older person considerably.<sup>17</sup>

Apart from the possibility of death, individuals may face a lifetime disability and endure lengthy expensive rehabilitation. They may also require support and intervention from a range of agencies, such as health, social protection, housing, education, and rehabilitation<sup>1</sup>

Injuries are a major cause of long-term disability having a profound impact on the lives of family members and carers<sup>1</sup>

Costs per capita (i.e. absolute costs divided by the number of inhabitants of a country) are the product of the injury incidence and the mean costs per injury patient. This increase exponentially in older age groups, due to the combined effect of high incidence and high costs per patient.<sup>6</sup>

Though women sustained only 45% of the total number of injuries, they account for 59% of the costs. This is mainly because many of the injuries suffered by older women require a high level of care.<sup>6</sup>

Distribution of fall injuries among elderly by outcome<sup>16</sup>

Outcome	Austria	Denmark	France	Greece
	%	%	%	%
Examined	0,1	12,1	2,3	6,0
Treated	2,8	23,4	22,6	22,6
Treated & followed up	56,3	34,8	36,8	45,6
Hospitalized	40,8	29,7	35,5	25,5
Deceased	0	0	0,5	0,3
Unspecified	0	0	2,3	0
Total	100	100	100	100
Median length of stay	8 days	6 days	6 days	12 days

Source: Injury Database in Austria, Denmark, France (~2003) and Greece (1996-2003); presented in the Injury Statistics Portal, CEREPRI<sup>12</sup>

## Recommendations

Injuries among elderly generate high costs and should be a priority area in public health policy in all European countries.

The major sources of hospital costs of injury in Europe are hip fractures, fractures of the knee/lower leg, superficial injuries and open wounds, and skull-brain injuries. The causes and possible interventions of these injury types should therefore –by priority- be further investigated<sup>24</sup>

## RISK FACTORS FOR FALLS AMONG ELDERLY PEOPLE

Risk factors for falls can be broadly classified into three categories: intrinsic (or individual) factors, extrinsic (or environmental) factors and exposure to risk<sup>12</sup>

### Intrinsic risk factors

- ◆ History of falls
- ◆ Age
- ◆ Gender: female
- ◆ Living alone
- ◆ Psychotropic medication
- ◆ Multiple medications (more than four)
- ◆ Chronic disease
  - ◆ chronic obstructive pulmonary disease
  - ◆ depression and
  - ◆ arthritis
- ◆ Impaired mobility and gait
- ◆ Fear of falling
- ◆ Nutritional deficiencies
- ◆ Vitamin D deficiency
- ◆ Impaired cognition, dementia
- ◆ Visual impairments (cataract, glaucoma, etc.)
- ◆ Foot problems (bunions, toe deformities, ulcers, etc.)
- ◆ History of Stroke, Parkinson's Disease
- ◆ Acute infections/illness (urinary tract infections, influenza etc)

### Extrinsic risk factors

- ◆ Environmental hazards (poor lighting, slippery floors, uneven surfaces, etc.)
- ◆ Inappropriate footwear and clothing
- ◆ Inappropriate walking aids or assistive devices
- ◆ Falls by getting on and off buses, by jerks in bus and train, falls from stool, chair, bed, ladder, roof, tree, etc, hot water, as pedestrian or car driver, use of tools etc<sup>17</sup>

### Exposure to risk

- ◆ Some studies suggest that the most inactive and the most active people are at the highest risk of falls
- ◆ Specific activities seem to increase the risk of falls, either by increasing exposure to risky environmental conditions (slippery or uneven floors, cluttered areas, degraded pavements), acute fatigue, or unsafe practice in exercise sessions

## FALLS PREVENTION

Prevention falls can be accomplished through a combination (multi-factorial intervention)<sup>18-21</sup> of :

- ◆ awareness raising and attitude modification measures such as mass media campaigns, leaflets, video
- ◆ behaviour modification measures such as training and exercise, rewards and incentives
- ◆ structural modification measures such as environmental changes, and regulations

Based on the results of a systematic literature review conducted in the context of the EUNESE<sup>22</sup>, high or medium level evidence exists for the efficacy of the following interventions to prevent falls and their consequences:

- ◆ targeted exercise and gait-training programmes: i.e. brisk walking, mixed exercise, osteofit, chronic eccentric training, nurse delivered, exercise plus medication withdrawal, tai chi with computerised balance training programme, balance-board, physical therapy, treadmill, and low – intensity.
- ◆ prevention and treatment of osteoporosis: i.e. calcium and vitamin D, calcium and exercise, calcium and hormone replacement therapy, and alfacalcidol.
- ◆ environmental safety measures: creating a physical setting - including homes, roads and institutions – that minimise the risks of injuries from falls and other causes.
- ◆ multi-faceted fall prevention programmes i.e using a combination of approaches – clinical, educational and environmental – with emphasis varying depending on circumstances.
- ◆ the wearing of hip protectors in vulnerable older people – usually evaluated in the setting of a supervised residential institution.
- ◆ periodic review of medication - especially psychotropic drugs as these are associated with side-effects causing confusion and postural instability.

### Food Sources of Vitamin D

USDA databases compiled in the 1980s list the following foods as rich in vitamin D. The amounts given are for 100 grams or about 3 1/2 ounces. Three servings of herring, oysters, catfish, mackerel or sardines plus generous amounts of butter, egg yolk, lard or bacon fat and 2 teaspoons cod liver oil (500 iu per teaspoon) yield about 4,000 IU vitamin D—a very rich diet indeed!

### Good D Vitamin Foods

- Animal
  - ◆ oily fish
  - ◆ fish liver oils
  - ◆ egg yolk
  - ◆ butter
  - ◆ milk commonly fortified with vitamin D
  - ◆ liver
- Plant
  - ◆ dark green leafy vegetables
  - ◆ sweet potatoes
  - ◆ oatmeal
  - ◆ vegetable oils
  - ◆ alfalfa sprouts
  - ◆ parsley

## SUMMARY of preventive measures to address fall injuries

- ◆ Physical activity and balance training promotion
- ◆ Medication review
- ◆ Dietary supplements
- ◆ Vision assessment and modification
- ◆ Feet and footwear review
- ◆ Home modification
- ◆ Promoting safety equipment & associated devices
- ◆ Cognitive or behavioral interventions

## TIPS FOR ELDERLY

Things you can do to prevent falls

It might be that you should consider some important issues with regard to keep yourself fit and to avoid injuries.<sup>17</sup>

- ◆ **Take care of your fitness!** Exercise regularly. Exercise makes you stronger and improves your balance and coordination.
- ◆ **Take part in social activities:** There are a lot of associations, health centres etc. in all municipalities where you can meet other people and participate in various social activities. Social gatherings increase the quality of life and prevent loneliness.
- ◆ **Think about nutrition and liquid:** Your diet should contain ample calcium and vitamin D to reduce the risk of bone fracture. Milk, cheese and yoghurt are sources of calcium, but try to choose lower fat versions where possible. Vitamin D can be found in oily fish such as sardines and tuna, and in meat. It is also produced by the sunlight, so walking in sunshine will also add vitamin D in addition to the mobility training! Drink plenty of fluids when exercising. Drink six to eight glasses of water per day.
- ◆ **Take care of your medication:** If you are using medications -even over-the-counter medicines, review them with your doctor or pharmacist and ask about side effects as some of them can make you sleepy or dizzy. If you are using many medications during a day or a week, use a pill organiser to avoid confusion. Also ask about how the various medications are influencing each other and might create some unwanted effects.

## Check your environment-Live in a safer house!

Most of the tips following are common sense. They are listed here just as a reminder.<sup>23</sup>

### In the bathroom:

- ◆ Keep the floor dry after taking a shower. If possible place a bathroom mat, but secure it properly to diminish the chances of tripping over it
- ◆ Install safety rails
- ◆ Never use a towel rack, soap tray, shelves or similar items that are not anchored in the wall
- ◆ Add non-slip strips to the tub/shower floor
- ◆ If you are unsteady, use a shower chair and a handheld shower attachment
- ◆ Do not lock the bathroom door
- ◆ Install a phone in the bathroom
- ◆ Install a handheld shower hose with extra long cord

### In the bedroom:

- ◆ Get up slowly after you sit or lie down. Sit on the edge of the bed/ chair until you are sure you do not feel dizzy
- ◆ Wear sturdy shoes with thin, non-slip soles
- ◆ Improve the lighting in your bedroom
- ◆ Put in brighter bulbs. You may want to buy compact fluorescent light bulbs that cost less to use. Use lampshades to reduce glare
- ◆ Organize your clothes for easy reach
- ◆ Place clothes in drawers no lower than your knees or higher than you chest
- ◆ Do not wear clothing that is too long or too loose
- ◆ Keep a telephone within easy reach
- ◆ Avoid using slippery fabrics such as satiny sheets or comforters
- ◆ Install a night-light

### Stairs:

- ◆ Make sure steps and treads of all staircases are even
- ◆ Make sure stairs are slip resistant
- ◆ Paint a contrasting colour on the top front edge of all steps so you can see the stairs better. For example, if you have dark wood use light coloured paint
- ◆ Remove things you can trip over (such as papers, books, clothes, and shoes) from stairs and places where you walk
- ◆ Remove small throw rugs or use double sided tape to keep the rugs from slipping
- ◆ Place anchored hand rails on both sides of stairs
- ◆ When climbing a staircase keep at least one hand on the handrail, concentrate on what you are doing, and don't be distracted by sounds. Also, never carry any package that will obstruct your view of the next step

### Lighting:

- ◆ It is safest to have uniform lighting throughout a room. Add lighting to dark areas. Hang light weight curtains or window shades to reduce glare from bright windows and doors

### Household:

- ◆ Eliminate obstacles
- ◆ Keep items you use often in cabinets you can reach easily without using a step stool. Always keep cabinet drawers closed so you won't stumble over them
- ◆ Eliminate torn or worn coverings, or folds in the carpet
- ◆ Keep emergency numbers in large print near each phone
- ◆ Use a portable phone and keep emergency numbers close
- ◆ Put a phone near the floor in case you fall and can't get up

## Food Sources of Calcium

Food	Serving	Milligrams of Calcium per Serving
Dairy Products		
Milk (whole)	1 cup	291
Milk (skim)	1 cup	302
Fortified soy and rice milks	1 cup	300
Cheddar cheese	1 ounce	191
Mozzarella cheese, part skim	1 ounce	207
Ricotta cheese, whole	1/2 cup	257
Swiss cheese	1 ounce	272
Ice cream	1/2 cup	88
Frozen yogurt	1/2 cup	104
Yogurt, low-fat	1 cup	345-415
Protein Foods		
Beans (legumes), cooked	1 cup	90
Soybeans, cooked	1/2 cup	130
Clams	4 ounces	100
Crab	3 ounces	132
Canned salmon (with bones)	3 ounces	167
Canned sardines (with bones)	3 ounces	371
Tofu (If calcium is listed on the label)	1/2 cup	434
Hummus	1/2 cup	66
Almonds	1/2 cup	188
Vegetables		
Broccoli, cooked	1/2 cup	89
Greens, cooked	1/2 cup	74
Kale, cooked	1/2 cup	90
Spinach, cooked	1/2 cup	61
Fruits		
Rhubarb	1/2 cup	174
Dried figs	1/2 cup	144
Orange	1	92
Calcium-fortified orange juice	1 cup	300
Cereals		
Total Corn flakes/Total Raisin Bran	1 cup	200
Oatmeal	1 cup	170

## TIPS FOR CARE GIVERS

Care givers might help with information, advice and statistics provided to the older people you have contact with in order to prevent fall accidents and injuries. If so, the older persons might:

- ◆ participate in activities and social life
- ◆ shift for themselves
- ◆ live in their own house or apartment
- ◆ enjoy the life and do as they want, as putter about in the garden, go shopping, enjoy the companionship with children, grand- and great grand children, traveling with spouse or friends and make themselves useful for friends, neighbors and family.

## TIPS FOR PROFESSIONALS

### How to help elderly people to prevent falls <sup>12,22</sup>

Health professionals can help elderly people to prevent falls whereas they have also specific roles and responsibilities when working with people who have fallen.

Specifically:

#### **Geriatricians (rheumatologists, orthopaedic surgeons, emergency department doctors)**

- ◆ individualize programmes in rehabilitation and outpatient packages
- ◆ review ward (hospital) environment
- ◆ identify reversible contributory factors and suggest evidence-based interventions
- ◆ investigate risk of osteoporosis and treat as necessary
- ◆ consider encouraging patients to use hip protectors.

#### **Health authorities**

- ◆ implement fall-risk assessment for all older patients being admitted to hospital
- ◆ devise a protocol for reviewing reversible risk factors for high-risk individuals
- ◆ initiate prompt questions in any data collection practices
- ◆ establish a specialized outpatient hospital-based fall service
- ◆ support the role of the physiotherapy services rehabilitation of fallers
- ◆ consider falls and fracture prevention as a joint strategy.

#### **Voluntary organizations (NGOs) providing services for older people**

- ◆ include Tai Chi in the activities offered
- ◆ promote leisure activities involving movement

#### **Emergency department medical staff**

- ◆ assess main risk factors and implement appropriate referral and advice
- ◆ arrange follow up of older patients seen because of fall and refer to a specialized outpatient hospital based falls service, if available.

#### **Primary health care teams**

- ◆ include individualized risk assessment in care package for frail older people
- ◆ encourage patients to be physically active
- ◆ review medications and physical activity of at risk residents of care facilities
- ◆ investigate the risk of osteoporosis and treat as necessary.

#### **Managers and staff of residential care facilities for older people**

- ◆ organize exercise sessions or physical activity options for residents
- ◆ review the home environment for safety
- ◆ assess residents after falls for reversible risk factors
- ◆ encourage residents to use hip protectors

#### **Sports and physical activity departments-centers**

- ◆ make Tai Chi sessions and other appropriate activities available in community settings
- ◆ train specialized exercise instructors in effective fall prevention exercise
- ◆ promote leisure activities involving movement

### Screening for elderly at high risk for falls

Six single questions can guide the care giver to predict elderly at high risk for falls. The more positive answers to the questions, the higher the risk for falling:

- Did s/he have any fall in the last year?
- Does s/he take more than four medications daily?
- Does s/he have a diagnosis of stroke or Parkinson's disease?
- Does s/he have any problems with the balance?
- Does s/he stop walking when you or s/he talks?
- Is s/he unable to rise from a chair of knee height without using the arms?

If there are three or more "yes" replies then the person you know or care for is at relatively high risk, and should be referred to a geriatric clinic or to a general practitioner for assessing preventative measures, review medications etc.<sup>17</sup>

## TIPS FOR POLICY MAKERS

A number of interventions targeted to individuals have shown to be effective, although there is no proper evaluation of population-based strategies. Health and social care agencies need to work together to prioritise fall prevention as part of their overall strategy for promoting healthy ageing. Coherent multidisciplinary programmes should be developed at the national level, ensuring data collection mechanisms that evaluate interventions by outcome rather than process or structure.<sup>12,24</sup>

Evidence based and promising strategies for the prevention of unintentional fall injuries among elderly include:

- ◆ promoting physical activity and balance training
- ◆ medication review
- ◆ modifying the environment within the home
- ◆ vision assessment and modification
- ◆ cognitive/behavioural interventions

*Why the need for action on injury prevention and safety promotion among elderly people in the EU countries?<sup>1</sup>*

- ◆ *Falls are an important cause of morbidity, disability and mortality among elderly people*
- ◆ *Falls reduce the length and quality of life and represent a large proportion of the health expenditure*
- ◆ *Injured elderly have a higher fatality and longer hospital stays because of their co-morbidity*
- ◆ *Elderly are more vulnerable because of their frailty*
- ◆ *The proportion of elderly people in the EU population is steadily increasing, which will have immediate impact on the burden of injuries in this age group*
- ◆ *Efforts to prevent injuries among elderly people have been so far limited, inconsistent, and dispersed across different settings*

**Proposed strategies for injury prevention efforts<sup>1</sup>**

- ◆ *Accurate data are a prerequisite for both needs assessment and evaluation processes and guarantee high return on the investments:* Use of current sources (existing mortality and morbidity injury surveillance systems) and harmonization of future data collecting efforts at EU level to monitor and provide standard and comparable information in the form of clearly defined and validated indicators for injury prevention among elderly for all EU Member States and EEA countries.
- ◆ *Skilled professionals can make a difference:* Strengthening capacity building efforts for professionals aiming to reduce and prevent unintentional injuries among independently living elderly and those in residential care.
- ◆ *Passive prevention has more immediate and visible impact:* Acting locally and facilitating communities to develop and implement customized action plans; addressing concrete engineering interventions, and paying special attention to avoid instigating fear into older people.
- ◆ Creating synergies and trying to increase awareness on the preventability of incapacitating injuries among elderly.

***What could Central Governments do<sup>4</sup>***

- ◆ prioritize fall prevention in national targets for injury prevention
- ◆ prioritize fall and fracture prevention in health provision for older people
- ◆ prioritize health promotion information and policy on physical activity among older people
- ◆ advocate the inclusion of injury-prevention issues in pre-retirement courses
- ◆ support nationally recognized training in delivery of appropriate forms of physical activity.

### Key messages<sup>4</sup>

Reducing fall injury in the European Union to the lowest national rate could prevent nearly 31,000 deaths<sup>7</sup>

Effective interventions include a combination of risk assessment followed by environmental modification and the promotion of physical activity and balance training<sup>4</sup>

The health sector needs to work with the housing sector to reduce the burden from falls<sup>4</sup>

## Policy Recommendations<sup>2</sup>

### Recommendation no. 1

That each member state in the EU and in the EEA should establish national action plans for prevention of injuries in elderly people. Targets should be defined in a way that it would be possible to measure whether they are met. Prevention measures should be taken, and annual reports should be available. An interministerial taskforce lead by the Ministry in charge may further facilitate co-ordinated action in the countries.

### Recommendation no. 2

That each member state in the EU and EEA establish health based injury registration systems enabling sound and valid injury statistics to be produced. The European Commission should ensure that such systems are working. With such systems it will be possible to compare the statistics across the countries in Europe, in order to monitor the injury situation, and to find the factors involved in the injuries in order to design preventative measures.

### Recommendation no. 3

That each member state in the EU and EEA report the fatalities in elderly people according to common coding rules, ensuring that it is possible to compare mortality statistics across Europe. That World Health Organization should increase their efforts to create a common understanding of the coding system and to control the quality of the statistics.

### Recommendation no. 4

That each member state in the EU and EEA, together with the European Parliament and European Council establish one day of the year as a Day for Elderly Safety. Such a common day across Europe might raise awareness on prevention of injuries in elderly people.

### Recommendation no. 5

That each member state in the EU and EEA build capacity for conducting research on injuries in elderly people: to understand their causes; to develop preventative measures; to plan and implement interventions; and to evaluate interventions for cost-effectiveness.

### Recommendation no. 6

That each member state in the EU and EEA develop networks at central and local levels to promote implementation of evidence-based best practices to reduce injuries in elderly people.

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