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Queensland Stay On Your Feet®

community good practice guidelines

Queensland Stay On Your Feet® Community Good Practice Guidelines – preventing falls, harm from falls and promoting healthy active ageing in older Queenslanders.

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Queensland Stay On Your Feet®

Community Good Practice Guidelines

Preventing falls, harm from falls and promoting healthy active ageing in older Queenslanders

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Why these guidelines were developed

Falls prevention guidelines for hospitals and residential aged care facilities had been developed in 2005, leaving a gap in updated guidelines for falls prevention in the community. These guidelines were developed to fill that gap. These guidelines reviewed and updated the Queensland Health, Best Practice Guidelines for Public Hospitals and State Government Residential Aged Care Facilities, Community Integration Supplement (Version 3, 2003) developed by the Quality Improvement and Enhancement Program.

How these guidelines were developed

The Queensland Falls Injury Prevention Collaborative Cross Continuum Working Group led the development of these guidelines. The group reviewed the existing Community Integration Supplement according to the latest research and identified gaps and areas that required updating. Due to many advances in research, the writing of the guidelines required a dedicated author. Dr Nancye Peel was contracted as the primary author of these guidelines.

A number of iterations of the guidelines were reviewed and commented on by members of the Queensland Falls Injury Prevention Cross Continuum Working Group and their respective local networks. Feedback was collated and included in the guidelines where appropriate. A draft document was disseminated via email to a wide section of health professionals across Australia (though predominantly within Queensland) who work in with older people in the community. They were requested to read the document and submit their comments via email or telephone. Queensland Health received an extensive range of useful, high quality responses that were incorporated into the guidelines.

A significant amount of additional writing was completed by Rebecca Bell and Kate Smith during the incorporation of comments and feedback. The final draft document was sent to three internationally renowned independent quality reviewers, two who work specifically in falls prevention and one who works in injury prevention and public health. Their comments and feedback have been included in the guidelines where practical. An external editor has reviewed the guidelines.

The guidelines are based on the latest research evidence of effective falls prevention approaches, risk awareness, screening, assessment and interventions for the community. A number of good practice points have been summarised from the evidence that provide guidance of what needs to occur within the community in order to effectively reduce the number of falls and the associated harm.

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Abbreviations

ABS	Australian Bureau of Statistics
ADL	Activities of Daily Living
AIHW	Australian Institute of Health and Welfare
BBS	Berg Balance Scale
BMI	Body Mass Index
CALD	Culturally and Linguistically Diverse
COTA	Council on the Ageing
EFST	Elderly Fall Screening Test
EPC	Enhanced Primary Care
FROP-COM	Falls Risk for Older People- Community Setting
GPSS	Geriatric Postal Screening Survey
HA	Health Assessment
HACC	Home and Community Care
HRT	Hormone Replacement Therapy
MMSE	Mini Mental State Examination
NARI	National Ageing Research Institute
NICE	National Institute for Clinical Excellence
NPHP	National Public Health Partnership
PHC	Primary Health Care
PMSEIC	Prime Minister's Science Engineering and Innovation Council
POMA	Performance Oriented Mobility Assessment
PPA	Physiological Profile Assessment
QIEP	Quality Improvement and Enhancement Program
QTR	Queensland Trauma Registry
RACGP	Royal Australian College of General Practitioners
RCT	Randomised Controlled Trial
TUG	Timed Up and Go
U3A	University of the Third Age
WHO	World Health Organisation

Executive Summary

The purpose of these *Queensland Stay On Your Feet® Community Good Practice Guidelines*, as outlined in Part 1, is to inform good practice in preventing falls and minimising harm from falls among community-dwelling people over 65 years of age and for Aboriginal and Torres Strait Islander people in Queensland over 50 years of age. It is expected that health care professionals will use their clinical knowledge and judgement to apply the general principles and specific recommendations contained in these guidelines, according to the organisational structure in which they work and the level of available resources.

Part 2 discusses the implications of population ageing. It is essential to understand the demographic profile, and appreciation of the diversity of the target group prior to undertaking activities to prevent falls. Part 3 outlines the incidence and consequences of falls in community-dwelling older people, particularly for older Queenslanders. Good practice recommendations from this section relate to the application of a consistent definition of 'a fall', for proper management of data collection and documentation, and the need for a core set of falls indicators to be measured.

Guiding principles for falls and injury prevention in community-dwelling older people are discussed in Part 4. Depending on the target population (well aged, early risk, high risk) across the health continuum, the prevention models that can be adopted for falls range from whole of community public health to individual health assessment and care plans. Corresponding programs will include multi-strategy, multifactorial interventions for promotion of healthy ageing to targeted single or multiple interventions for risk reduction following screening and assessment.

Part 5 examines risk factors for falls and fall-related injuries in older community-dwellers based on reviews of studies of falls predictors. These factors are classified as socio-demographic, psychological, functional, sensory and neuromuscular, medical, medicine-

related, lifestyle and environmental risk factors. Good practice recommendations from this section include the need to address risk factors that can be modified and that have a strong evidence-based association with falls. Since falls are usually caused by complex interactions of a number of risk factors, it is recommended that risk reduction strategies should target multiple factors.

Measurement of falls risk for the purpose of awareness raising, screening or assessment is discussed in Part 6. Reviews of measurement tools and resources are outlined, together with recommended pathways for measuring falls risk. Prior to embarking on falls risk assessment and intervention it is important to understand the relevance and acceptability of interventions to the target group. Good practice recommendations for risk screening and assessment suggest that, where possible, tools used should have been validated in the target population. Adaptation or modification of these tools is not recommended except in a research context. Assessment of falls risk should be followed by action to develop a plan for preventing falls based on the identified risk factors.

Part 7 outlines the evidence of effective interventions in falls and falls injury prevention for the community-dwelling older population. It includes a summary of effective intervention strategies to address modifiable risk factors. Good practice recommendations in this section suggest that untargeted multi-strategy, multifactorial health promotion and preventive health care programs should target the general population of older community-dwellers, while targeted multi-strategy, multifactorial prevention of falls programs should target those assessed to be at risk. Interventions should make use of multidisciplinary personnel as well as existing resources and infrastructure. Where possible preventing falls interventions should be linked with, and integrated into, current health programs for the target group, looking broadly at promoting healthy ageing, preventing and managing chronic disease, and reducing avoidable admissions. There should also be an emphasis at all levels (state, Area Health Service, Health Service District and individual service providers) on

coordination of services and agencies that have complementary roles in preventing falls. This includes considering standardising assessment and referral procedures, streamlining individual access to the most appropriate service/s, and minimising duplication. This approach recognises the contribution of preventing falls to better outcomes for both physical and mental health and well-being.

Queensland Health has demonstrated a commitment to implementing initiatives to prevent falls. The *Queensland Stay On Your Feet® Community Good Practice Guidelines* will support addressing the unacceptably high rates of falls and fall-related injuries in Queensland.

Part 1 **Purpose**

1. Purpose

"There is a consensus among those who work in the field of falls prevention that the time has come to implement what is already well known- the most effective way to address the economic burden of falls is to focus on prevention rather than the treatment of resulting injuries (p.22)" [1].

The purpose of the *Queensland Stay On Your Feet® Community Good Practice Guidelines* (to be referred to as the *Community Guidelines*) is to provide current evidence of good practice in preventing falls for those who work with older people in the community. These guidelines are a revision of the original *Community Integration Supplement* in the *Quality Improvement and Enhancement Program (QIEP) Falls Prevention: Best Practice Guidelines for Public Hospitals and State Government Residential Aged Care Facilities* [2]. Based on the QIEP guidelines, a nationally consistent approach to best practice in preventing falls was developed for the acute and residential aged care sectors by the Australian Council for Safety and Quality in Health Care (*Preventing Falls and Harm from Falls in Older People: Resource Suite for Australian Hospitals and Residential Aged Care Facilities* [3]). However, preventing falls within the community setting has lacked consistent evidence-based guidelines to inform practice.

The *Community Guidelines* fit within the Health Continuum Model (Appendix A) and are intended to bridge the gap between the existing Australian Council for Safety and Quality in Health Care's guidelines *Preventing Falls and Harm from Falls in Older People* and HACC *Best Practice Falls Prevention Resource Kit* (www.health.qld.gov.au/hacc/HACCfallsprev.asp). The document is aligned with National and State initiatives and plans in preventing falls (including the *National Falls Prevention for Older People Plan: 2004 Onwards* [4], the *Queensland Statewide Health Services Plan 2007-2012* (www.health.qld.gov.au/publications/corporate/stateplan2007/) and *The Development of Evidence Based Recommendations to Support Policy and Practice* [5]),

as well as strategies for population ageing (e.g. the *National Strategy for an Ageing Australia* [6] *and Promoting Healthy Ageing in Australia* [7]).

These *Community Guidelines* should be used as a basis for good practice in preventing falls, harm from falls, and promoting healthy active ageing among community-dwelling people over 65 years of age, and for Aboriginal and Torres Strait Islander peoples over 50 years of age. However it is recognised that primary prevention and early intervention strategies are important at all ages and all stages of life. Such a life course perspective acknowledges that the best way to ensure good health for future cohorts of older people is by preventing disease and disability and promoting health throughout the life span [8].

Health care professionals are expected to use their clinical knowledge and judgement to apply the general principles and specific recommendations contained in the *Community Guideline*s. This will also depend on the organisational structure in which they work and the level of available resources. Consumer participation in health is integral in ensuring that health services are accountable and of high quality [3]. Thus older people and carers should be encouraged to be involved in falls prevention interventions and programs that accommodate their needs, circumstances and interests [3].

Activities to prevent falls take place within a number of settings across the health continuum (Appendix A: Health Continuum Model). These settings include:

- community-dwelling (living independently in the community or living dependently in the community with low to high level support)
- hospital (acute care, rehabilitation or specialist hospital facilities)
- residential aged care (low and high care)

Differences in fall rates and risk factors for different settings mean that different strategies apply. The *Community Guidelines* are intended as a resource to address the prevention of falls among community-dwelling

older people and for those returning to the community after episodes of care in other settings. For community-dwelling older people their first level of care will be in the primary care setting (see definition in Glossary).

Good Practice Points

- Health care practitioners should use the *Queensland Stay On Your Feet® Community Good Practice Guidelines* as a basis for good practice in preventing falls, harm from falls and promoting healthy active ageing among community-dwelling people over 65 years of age, and over 50 years of age for Aboriginal and Torres Strait Islander peoples.
- Given that older people and carers play an integral role in falls prevention interventions and programs, they should be actively involved in the developing of these interventions and programs to ensure that their needs, circumstances and interests are met.

1.1 How to Use These Guidelines

The *Community Guidelines* are divided into the following Sections:

- Section 2 addresses population ageing, since falls and falls prevention activities must be considered within the context of demographic changes due to a rapidly ageing population.
- Section 3 outlines the epidemiology of falls and fall-related injuries as a basis for understanding the public health burden of falls and for monitoring progress towards achieving reduction in falls and fall-related injuries.
- Section 4 discusses guiding principles for the development, implementation and evaluation of interventions and programs in falls prevention, appropriate to the target group.
- Section 5 outlines risk factors for falls and fall-related injuries to determine strategies and points of intervention across the life course.
- Section 6 discusses measurement of falls risk as the basis for planning targeted interventions.

› Chapter 7 addresses evidence-based interventions to address falls and fall-related injuries.

Sections, or sub-sections, are summarised into Good Practice Points, to facilitate application of the *Community Guidelines* in preventing falls and fall-related injuries among community-dwelling people over 65 years of age, and over 50 years of age for Aboriginal and Torres Strait Islanders people. Health care professionals should use their clinical knowledge and judgement in applying the general principles and specific recommendations contained in the *Community Guidelines*, according to the organisational structure in which they work and the level of available resources

Part 2 **Population Ageing**

2. Population Ageing

The health of Queenslanders must be considered in the context of a rapidly growing ageing population [9]: this demographic shift has serious implications for the incidence of falls. The population of Queensland is ageing in line with national and international trends. The proportion of Queenslanders aged 65 and over is projected to increase from 12 percent in 2006 to 26 percent by 2051[9]. The fastest growing segment of the population, both for Australia and Queensland, is the oldest age group i.e. those aged 85 and over [10].

2.1 Demographics

2.1.1 Gender

The proportion of women to men within the 65 and older age group increases markedly with age, which reflects the higher life expectancy at birth for females compared with males. In the 85 years and older age group there are twice as many females as males [10].

2.1.2 Geographic Distribution

Older people in Queensland mostly live in urban areas. Fifty percent (50 percent) of older people live in major cities, 32 percent in inner regional areas and the remainder in outer regional and remote areas [11]. Queensland's population is more decentralised than that of other Australian States and Territories. Areas with the highest proportions of people aged 65 and over are located mainly in coastal areas within the greater south east region including Bribie Island (31 percent), Coolangatta (25 percent), Coombabah (24 percent), Caloundra South (24 percent) and Chermside (22 percent) [11].

2.1.3 Living Arrangements of Older People

In the 2001 census[1], the majority (93 percent) of Australians aged 65 and over lived in private dwellings and 27 percent of these lived alone. Seven percent lived in non-private dwellings mainly cared accommodation. These proportions change as people age and of those aged 85 and over, 70 percent lived in a private dwelling (35 percent alone), and the remainder (30 percent) in non-private dwellings, mainly cared accommodation [12].

2.1.4 Special Population Groups

2.1.4.1 Culturally and Linguistically Diverse

The proportion of the older Australian population from culturally and linguistically diverse (CALD) backgrounds is growing faster than other older Australians [13]. About one in four older Queenslanders (27.3 percent) was born overseas, with one half of these born in mostly English speaking countries (14.8 percent of all older people). Italy, Germany and The Netherlands were the leading countries of birth for older Queenslanders not born in Australia or an English speaking country. Of older Queenslanders who spoke a language other than English at home, one in four (26.1 percent) reported they could not speak English well or at all (ABS Census 2006 http://www.censusdata.abs.gov.au). While the proportion of older Queenslanders from CALD backgrounds is lower than the national average (10.4 percent versus 17.8 percent) [14, 15], cultural and language barriers, geographical location, circumstances of migration and financial status need to be taken into account in understanding their health care needs [15].

2.1.4.2 Aboriginal and Torres Strait Islanders

In 2006, based on census counts, three percent of Aboriginal and Torres Strait Islander peoples in Queensland were aged 65 years and

1 Data related to living arrangements for older people from the 2006 Census was not currently available at time of printing.

over (ABS Census 2006 http://www.censusdata.abs.gov.au). For the period 1996–2001, the life expectancy at birth was estimated to be 59 years for Aboriginal and Torres Strait Islander males and 65 years for Aboriginal and Torres Strait Islander females. About 70 percent of Aboriginal and Torres Strait Islander Australians die before reaching 65 years of age, compared with a little over 20 percent for other Australians [16]. The geographic distribution of Aboriginal and Torres Strait Islander peoples differs from the non-Indigenous population with 31 percent living in major cities, 22 percent in inner regions, 23 percent in outer regions, eight percent in remote areas and 16 percent in very remote Australia [17].

Basic community profiles outlining demographic characteristics by location (e.g. postcode areas, suburbs or local government areas) are available from ABS 2006 Census data http://www.censusdata.abs.gov.au

Good Practice Point

- The demographic shift towards population ageing has serious implications for the incidence of falls. Such factors as the increasing numbers of people aged over 85 years, and the multicultural diversity of the older population need to inform appropriate and culturally relevant interventions and programs for preventing falls.

2.2 The Myths and Reality of Ageing

Older people are often treated as a homogeneous group, which ignores the wide spectrum of abilities, interests and resources characteristic of this 40 year age bracket [18]. Individual differences between people increase with age as more life experiences are enjoyed [18]. An example of these differences with age is shown in Figure 2.1 with relation to functional capacity [8].

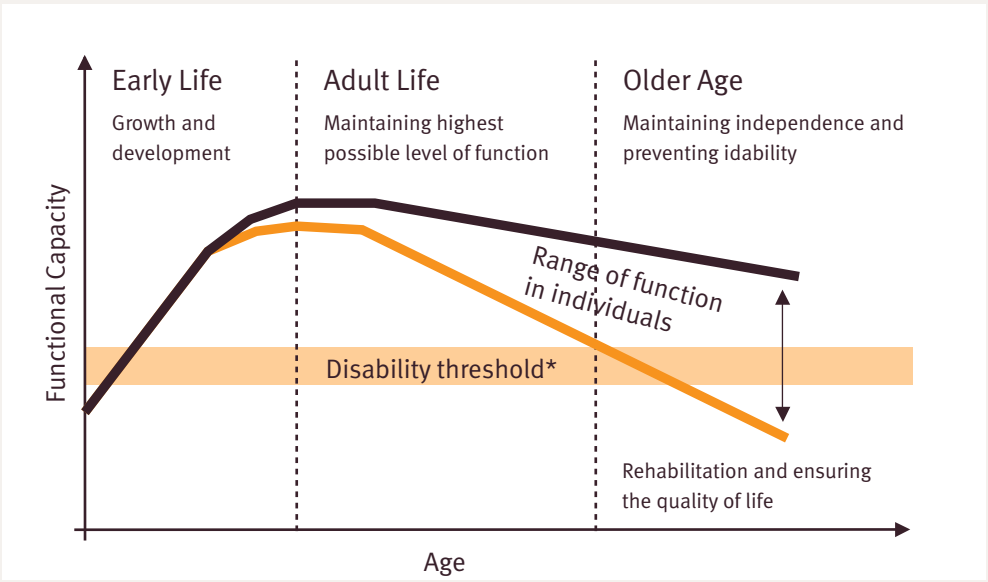
Some of the myths of ageing include stereotyping older people as an economic burden on society and as unproductive, inactive and worthless, which reinforces negative attitudes about ageing and

older people [18]. Such ageism erodes support for programs benefiting older people and undermines well-intentioned initiatives to promote ageing well [19].The knowledge and attitudes of health professionals towards older adults can have a significant impact on quality of health care [20]. For older people themselves, fear of ageing and negative self-perceptions can damage individual potential [18]. Research has shown that positive self-perceptions of ageing can increase longevity [21], and delay the onset of frailty [22].

Another myth of ageing is that growing old is a time of the 'four Ds' (disease, disability, dementia and death). Deterioration in health and functional ability in older age is a common, but not necessarily disabling, part of ageing and the evidence shows that today's older Australians are living longer and healthier lives than previous generations [16]. The majority of older people (77 percent) are satisfied with their life and 67 percent rate their health as good to excellent [23].

Contrary to another myth of ageing, it is not too late to adopt healthy lifestyles in later years and promote healthy ageing [7]. The benefits of health promotion interventions in older age include preventing/ minimising disease and functional decline, extending longevity and improving quality of life [8].

Figure 2-1: Functional Capacity over the Life Course



Notes:

The 'life course' model suggests that functional capacity increases in childhood and peaks in early adulthood, eventually followed by a decline resulting from biological ageing.

The rate of decline is largely determined by factors related to adult lifestyle as well as external and environmental factors. The acceleration of the decline can be influenced and may be reversible at any age through both individual and population health measures.

Changes in the environment can lower the disability threshold and contribute to increasing numbers of healthy aged.

Source: World Health Organisation, 2002 (p. 14) [8]

Good Practice Points

- Health care practitioners should avoid negative stereotyping of older people as these attitudes can impact adversely on the quality of health care provided.
- Older people should not be treated as a homogeneous group. Health care practitioners working with older people should recognise the diverse needs and abilities of this age group and ensure that interventions and programs meet the needs of the individual.

2.3 Healthy Ageing

In response to population ageing, improving older people's health has been declared a national research priority [16]. Good health is a crucial factor for older Australians to be able to enjoy a good quality of life, stay independent and participate fully in the community.

Healthy ageing policies have been adopted at national [6] and state and territory levels [24]. Healthy ageing has been described as a lifelong process optimising opportunities for improving and preserving health, physical, social and mental wellness, independence, quality of life and enhancing successful life course transitions. Other terms often used interchangeably with 'healthy ageing' include 'successful', 'active', 'positive' or 'productive' ageing [25].

Because of differences in measuring healthy ageing, there is considerable variation between studies estimating the proportion

of the population classified as 'healthy agers' [25]. One Australian study [26], defined successful ageing as 'functioning in the community without disability, with excellent or good self-rated health and high cognitive ability'. The same study estimated that 44 percent of 70 year olds qualified as successful agers. However, under the strict terms of their definition, this percentage dropped to six percent for those in their late eighties.

The theme of healthy ageing aims to promote health and minimise disability through population health measures. There is recognition that to promote healthy ageing it is important to consider physical activity, nutrition, and the work, social and built environment [7]. A key strategy to reduce disability is the prevention of falls and fall-related injuries [27], since research suggests that preventing falls is one method to minimise functional decline in older people [28, 29].

Good Practice Points

- While older people are the target population, the best way to ensure good health for future cohorts of older people is to adopt a life course approach, aiming to prevent disease and disability and promote health throughout the life span. This can be achieved by promoting physical activity including fitness, strength and balance activities, good nutrition to support bone and muscle strength as well as social and mental wellness, independence and enhancing quality of life.
- All organisations and services working with older people need to consider ways to reduce falls and promote healthy active ageing.
- Older people and those who work with them need to be informed that it is never too late to adopt a healthy active lifestyle.

2.4 Implications of Population Ageing for Public Health

Anticipated changes in the demographics mean that is important to act now to instigate measures and programs to reduce the health burden of falls. The demographic shift in the population age structure has been likened to an 'ageing tsunami' by COTA Queensland, http://www.cotaq.org.au/uploads/January_February_2007.pdf (p 6). The first of

the post-war baby boomers will reach 65 years of age in 2012. The next five to ten years provides Queensland with the 'window of opportunity' to meet the health care challenges of an ageing population [30, 31]. The aim of promoting healthy active ageing is to ensure the best possible health outcomes for the current generation of older people and also for the cohort of baby boomers about to enter older age.

To achieve healthy ageing there needs to be a focus on primary prevention and health promotion for older people. Some of these general health promotion approaches are likely to impact on the risk of falls, as well as other important outcomes. Investment in prevention and health promotion needs to be informed by the best possible evidence [7].

Good Practice Points

- Changing demographics make it imperative to act now to reduce the public health burden of falls. Health care practitioners should work together with key stakeholders to implement interventions and programs to reduce falls and promote healthy active ageing.
- There is currently a window of opportunity to meet the health care challenges of an ageing population through a focus on primary prevention and health promotion for older people.

Part 3 Falls in Older Community-Dwelling People

3. Falls in Older Community-Dwelling People

3.1 Definition of a Fall

For the purpose of the *Community Guidelines*, the definition of a fall is that adopted by the World Health Organisation [33].

> *A fall is an event which results in a person coming to rest inadvertently on the ground or floor or other lower level.*

This definition excludes falls resulting from an intentional change in position, but does include those where the person inadvertently comes to rest on furniture, against a wall or other objects [32].

3.2 Epidemiology of Falls and Fall-Related Injuries

3.2.1 Incidence of Falls

Valid data on the rate of falls in the community is difficult to obtain because of reliance on self-reporting which may underestimate the true incidence [33, 34]. Despite these limitations, Australian and overseas prospective studies have reported that between 30 percent and 50 percent of community dwelling older adults fall each year, with up to half experiencing multiple falls [35, 36]. In community-dwelling older people about 50 percent of falls occur within their homes and the remainder in public places [35]. Fall rates are higher in older community-dwelling women (40 percent) than in older men (28 percent) [35].

3.2.2 Incidence and severity of Fall-Related Injuries

Within the older age group, the risk of falling increases with age and the outcomes take on greater significance [4]. The concern is not simply the high incidence of falls in older people, but rather the combination of high incidence and high susceptibility to injury. The propensity for fall-related injury is caused by the high prevalence of clinical diseases (e.g. osteoporosis) and age-related physiological changes (e.g. slowed

protective responses) that make falls from a standing height (or even lower) potentially injurious [37].

Although most falls produce no serious injury, between five percent and 15 percent of community-dwelling older persons who fall each year do sustain a serious injury such as a fracture, head injury, or serious laceration [35, 38]. An Australian study reported that, of people aged 65 years and over attending an Emergency Department in Sydney, 18 percent presented as a direct consequence of a fall and over half (58 percent) were subsequently admitted [39]. The rate of fall-related injuries requiring hospital admission increases exponentially from the age of 65 years, with age adjusted incidence rates approximately twice as high in women than in men [40]. National data on hospitalisations due to falls among older people in 2003-04 [41] showed that 4.3 percent of all hospitalisations in people aged 65 and over were fall-related. The total burden was disproportionately higher, representing 10.9 percent of all hospital bed-days for the population [41].

It is estimated that one percent of people who fall sustain a hip fracture [35, 37] which in terms of morbidity and mortality is one of the most serious consequences of falls. As the population ages, the number of hip fractures in Australia is expected to double by 2026 and increase four fold by 2051, based on current incidence rates [42]. In international comparisons of ten-year probabilities for hip fracture, Australia was classified as a high risk country [43].

In addition to physical injuries, falls can produce other serious consequences for older people. Post-fall anxiety syndrome (fear of falling) is recognised as a negative consequence of falls. The resultant self-imposed activity restrictions and loss of confidence in the ability to ambulate safely can lead to further functional decline, depression, feelings of helplessness and social isolation [37]. This in-turn is likely to place an individual at higher risk of another fall.

Multiple falls are a common reason for the admission of previously independent older persons to long term care institutions [37]. Since any loss of ability to live independently in the community has detrimental effects, quality of life is profoundly threatened by falls and fall-related injuries [44].

3.2.3 Queensland Data

In Queensland in the past two decades, there has been a slight reduction in the rate of deaths from falls in people aged 65 and over [45]. Rates of hospitalisation in a similar period have increased by 100 percent for males and 70 percent for females [9]. In 2002-04 the rate of deaths from falls in older Queenslanders was higher than the national rate (24.3 deaths per 100,000 persons, compared with 21.8 deaths per 100,000 persons) [9].

Falls are among the leading causes of avoidable admission to Queensland hospitals [9]. In 2005/06 in Queensland for people aged 65 years and over there were:

- 19,074 hospital separations for falls, of which 67 percent were for females
- 3916 separations per 100,000 persons for fall-related hospitalisation. [9].

Compared with other States and Territories, in Queensland in 2003/04 rates of hospitalisation for fall-related injury in people aged 65 years and older were significantly lower than national rates. These data excludes hospital separations which involve transfer from another acute hospital [41].

The lifetime cost of falls in Queensland has been estimated to be $750 million, twice that of road trauma [46]. In the next 50 years, total health costs attributable to fall-related injury are projected to increase more than three fold [31].

Based on Queensland Trauma Registry (QTR)[2] data for the period July 2005 to June 2006, there were 2400 people aged 65 and over who were admitted to QTR hospitals (Cairns, Mackay, Rockhampton, Toowoomba, Townsville, Gold Coast, Royal Brisbane and Women's, Princess Alexandra, Nambour, Ipswich, Redcliffe and Caboolture) for 24 hours or more for treatment of a fall-related injury. Of these, 698 (29 percent) occurred in a residential institution and 1702 (71 percent) occurred in a community setting. Of the 1702 community-dwellers admitted with a fall-related injury, 82 (five percent) died in hospital and 738 (43 percent) were transferred out to another health facility (including rehabilitation, nursing home, hospice and palliative care) following their hospital stay. It is assumed that the remainder (52 percent) returned to their place of residence. The impact on health services required for the treatment and rehabilitation of fall-related injury has been characterised as a potential future 'epidemic', creating resource demands that will be difficult to meet [4, 30, 31].

3.2.4 Falls Incidence in Special Population Groups

3.2.4.1 CALD Communities

For older people from culturally and linguistically diverse (CALD) communities, the rate of hospitalisation due to injurious falls conforms to the 'healthy migrant' hypothesis: rates are highest in the Australian-born segment and lowest among older people from CALD backgrounds [47]. Rates differ considerably between immigrants born in different countries and regions. For Queensland the highest age standardised rates of hospitalisations for fall related injuries are in migrants from Oceania, North Africa and the Middle East [47].

2 Queensland Trauma Registry, Centre of National Research on Disability and Rehabilitation Medicine, Medical School, The University of Queensland

3.2.4.2 Aboriginal and Torres Strait Islander Peoples

The effect of an increasing rate of falls with age is observed from an earlier age for Aboriginal and Torres Strait Islander people than for other Australians [48]. In this population, deaths due to falls are at lower rates than other injuries, but are still two and a half times higher in this population than for non-Indigenous people [48]. Falls are the second most common cause of injury requiring hospitalisation and contribute to 15 percent of all injury presentations for Aboriginal and Torres Strait Islanders [49]. Hip fracture injury is thought to be uncommon, because it is usually assumed that (as they have a life span considerably less than non-Indigenous Australians) Aboriginal and Torres Strait Islander people do not live long enough to sustain such an age-related fracture [50]. MacIntosh and Pearson (2001) showed that Aboriginal and Torres Strait Islander patients have a lower incidence of these fractures than might be expected on an overall population basis and that Aboriginal and Torres Strait Islander females develop osteoporotic type fractures of the femoral neck at a later age than non-Indigenous females [50].

3.2.4.3 People with cognitive impairment

People with dementia have almost twice the risk of falling compared with cognitively normal older people [37] at an annual incidence rate of around 70-80 percent [51]. They have a threefold increase in risk of fall-related fractures [52]. Poor cognitive functioning and cognitive decline are independent risk factors for falls [53]. Factors specific to people with cognitive impairment include wandering, agitation and perceptual difficulties which contribute to increased falls risk [54]. People with dementia are particularly vulnerable if their attention is divided: even simple additional tasks impair postural control [52].

3.2.4.4 Rural and Remote

About 13 percent of older Australians live in outer regional and remote areas [12]. Generally, people who live in remote and rural areas have a

poorer health status than those in major cities [16]. Age standardized hospital separation rates for falls in Queensland for persons aged 65 and over for the years 2002/03 to 2005/06 showed that those in remote areas had a significantly higher rate than for Queensland as a whole, while those in outer regional areas had a significantly lower rate than for Queensland as a whole [9]. (See the Glossary for definitions of *Rural* and *Remote*).

3.3 Falls Data Monitoring

Several issues should be considered when recording falls data including accuracy of self-reporting and recall of previous falls [34], and differing definitions of what constitutes a 'fall'[55, 56]. Depending on the length of the recall period, falls may be forgotten [57]. Falls are often unwitnessed and unreported, and there may even be disincentives for reporting falls, including embarrassment, perceptions that a fall will be seen as a marker of ageing, and fear of consequences such as loss of independence (e.g. loss of driver's licence) and control (e.g. of finances) and risk of institutionalisation. Many falls go undetected until an injury or disability has occurred.

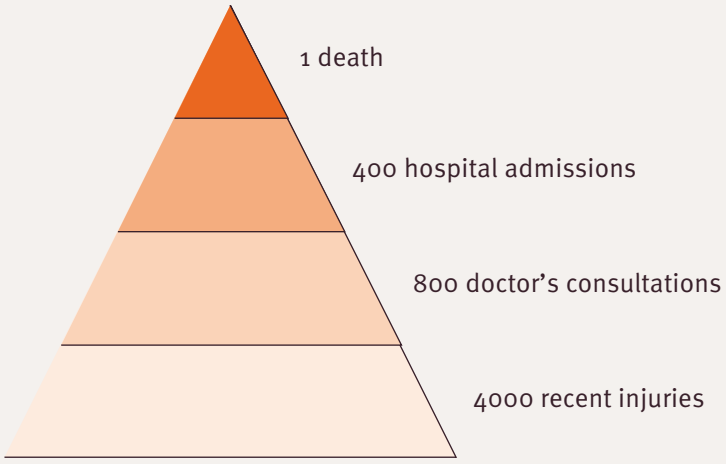
In community studies, various methods for measuring falls are used, including self reports using daily diaries, monthly calendars or monthly telephone interviews [35, 55]. However, at the population level there are few practical methods for monitoring falls. Routine surveillance of health care records is of little use since fewer than 30 percent of fall events are reported to a health practitioner [55, 58]. Administrative data sets such as hospital admissions are most likely to record falls resulting in injury.

Therefore, self reports, despite their limitations, are the only practical option at the population level in the community setting for collecting falls related data. To minimise recall bias, such data should be collected prospectively [35]. Strategies are required to increase reporting of falls by older people by increasing awareness of older people of the value of reporting (e.g. early detection of risk and strategies that

can be implemented to reduce future risk). Also needed are health professional initiatives to encourage asking all older patients at least once each year whether they have had a fall [59].

Harrison (1995) [60] has described the injury experience of a population as a pyramid. The apex represents the relatively small number of fatal cases, and the broader, lower parts of the pyramid represent the more numerous injuries of lesser severity (Figure 3.1). Injury data availability is in direct proportion to case *severity,* and in inverse proportion to *case frequency.* Quite a lot is known about the relatively small number of injury deaths, less about hospital inpatient cases, and still less about cases resulting in neither death nor hospital admission.

Figure 3-1: The Injury Pyramid



Note: Not to scale. These figures are approximate and representative of all injury and all ages.

Source: Harrison, 1995, (p.4-7) [60]

Good Practice Points

- The WHO definition for falls should be consistently used in all settings throughout Queensland.
- In evaluating community projects/programs for prevention of falls for older people, prospective recording is the recommended method for data collection.
- Falls data to be used in planning and evaluating population-based interventions needs to be readily accessible, timely, and widely distributed.
- An agreed core set of fall indicators is required to evaluate falls interventions, including number of falls, number of fallers, the severity of fall related injury and fall-related hospital separations and deaths.

Part 4 Guiding Principles for Preventing Falls

4. Guiding Principles for Preventing Falls

A number of approaches can be adopted for preventing falls amongst older people living in the community (refer to the Health Continuum Model in Appendix A). A summary of the guiding principles is shown in Figure 4.1.

Figure 4-1: Guiding Principles for Preventing Falls

Population	Well-Aged	Vulnerable	High Risk
Prevention Level	Primary	Secondary	Tertiary
Prevention Models	Public health	→	Personal health
	Population	→	Individual
Prevention Program	Health promotion for healthy ageing	→	Primary health care assessment and management
Interventions	Multi-strategy, untargeted multifactorial	→	Targeted, single or multifactorial

4.1 Prevention – Primary, Secondary, Tertiary

Primary prevention programs aim to keep people healthy and prevent diseases and disorders from developing. Secondary prevention programs target those who are at risk but have not yet developed adverse health. Tertiary prevention aims to manage existing health problems and to ameliorate the risk condition or retard its progression [61].

4.2 Prevention Models

A public health model targets the population as a whole, while the personal health model targets the individual. The aim in the personal health or medical model is to identify those at high risk and tailor

individual care plans to reduce risk. The public health model, in contrast, aims to shift the whole population's distribution of risk through community-wide interventions, since small shifts in some risks in the population can translate into major public health benefits [62].

Most of the current activity in the prevention of falls is based on the medical model of individual clinical assessment proximate to the time of risk [30], followed by interventions that target identified risk factors [63]. While treating risk factors can substantially reduce an individual's risk of falling, it is argued that interventions that target high-risk individuals should be only one part of a much wider preventive strategy. The greatest potential for prevention may be through population-based interventions that target universal risks across the life course [62].

4.3 Prevention Programs

4.3.1 Health Promotion

Health promotion is the process of enabling people to increase control over their health and its determinants. This process is a combination of strategies (educational, organisational, economic, environmental and political actions) that enable individual people and communities to bring about attitudinal, behavioural, knowledge, social and environmental changes [64]. Recommended good practice for health promotion approaches to preventing falls in community settings are multi-strategy. They need to involve older people in the design and implementation of strategies, foster partnerships with multiple stakeholders, and access local knowledge, expertise and resources [65]. A successful example of a community development approach to health promotion was the *Stay on Your Feet®* program in Northern Rivers NSW in the 1990s which demonstrated a reduction in fall-related hospitalisation rate [66].

4.3.2 Healthy Ageing

A number of community programs are based on the 'healthy ageing' model. These take a holistic approach to health with the aim to preserve and promote physical, social and mental wellness, independence and quality of life of older people. A range of programs based on the community development model have been developed to promote healthy ageing and have been initiated by government, charitable organisations or local community groups [67]. One such example is the *60 and Better Healthy Ageing Program* sponsored by Queensland Health and located throughout Queensland. Such programs promote self-care and preventive care practices and encourage individuals to take responsibility for their own health through physical activity, good nutrition and health promoting behaviours as well as social interaction and opportunities for new learning. At the local government level examples include programs to promote age-friendly, safe and positive ageing communities and reduce social isolation. Other programs for seniors include chronic disease self-management, support groups, peer education (e.g. *COTA Queensland Falls Prevention*, *Quality Use of Medicines*, and *Beyond Maturity Blues* Programs) lifelong learning (e.g. U3A), seniors' fitness classes (e.g. *Living Longer, Living Stronger*; *Life Steps*), volunteering, walking schemes and other physical activity groups (e.g. *Tai Chi for Arthritis*). Some of these programs have a specific emphasis on preventing falls.

One way to engage older people in programs to prevent falls is through the promotion of healthy ageing [68]. To increase the relevance of preventing falls and therefore support from older people, interventions need to be communicated as a lifestyle-enhancing measure and as a means for staying independent for longer [69, 70]. There is evidence that older people can significantly improve health and quality of life through participation in healthy ageing programs [61], and that healthy ageing strategies play a role in preventing adverse health outcomes such as falls and fall-related injury [71]. The evidence shows that the

benefits of healthy active ageing extend beyond falls prevention to other chronic conditions and disabilities associated with ageing.

Queensland Health has developed the *Stay On Your Feet® Community Good Practice Toolkit* to provide an evidence-based approach to investigate, plan, implement and review actions to promote healthy active ageing and reduce falls and related harm in older people. (http://www.health.qld.gov.au/stayonyourfeet)

4.3.3 Preventive Primary Care

Risk factor screening, assessment and management will be discussed in Section 5.0 (Risk Factors) and Section 6.0 (Awareness Raising, Screening and Assessment).

In the last decade a number of studies have reviewed the effectiveness of preventive primary care interventions that involve health assessments and/or home-based follow-up care, to prevent or delay the onset of functional decline and geriatric syndromes in community-dwelling older people [72-74]. Based on this evidence, recommended current good practice for preventive health care of older people includes the use of structured health assessment protocols, an integrated multidisciplinary approach, targeting patient groups with intermediate levels of disability and handicap, in-home assessments, and carefully structured follow up mechanisms [75]. Although many of the studies reviewed did not examine falls as a specific outcome, comprehensive health assessments and in-home follow-up care of older people are potentially an important component of community-based falls prevention strategies [36], since many geriatric conditions (including falls) share common risk factors [76].

Good Practice Points

- Health care practitioners should use the Guiding Principles for Preventing Falls (Figure 4.1) to determine the prevention models, programs and associated interventions that are appropriate to their practice.
- The Queensland *Stay On Your Feet® Community Good Practice Toolkit* should be used to guide the development, implementation and evaluation of falls prevention and healthy active ageing interventions and programs.

Part 5 **Falls Risk Factors**

5. Falls Risk Factors

5.1 Risk Factor Classification

There are numerous ways to classify risk factors for falls and fall-related injuries which will often determine the intervention required during the life course. These classifications include the following issues.

5.1.1 Intrinsic versus Extrinsic

Typically, risk factors have been grouped into two main categories:

- intrinsic factors (within the individual) and include both demographic (e.g. age and gender) and health factors (e.g. medical conditions and medications)
- extrinsic factors involve either the physical environment (e.g. obstacles and tripping hazards) or socio-economic environment (e.g. living alone and lack of support networks) [77, 78].

Falls among older people under 75 years are more likely to be associated with extrinsic factors while intrinsic factors are more important among people aged 80 and over [78, 79].

5.1.2 Modifiable versus Non-modifiable

Modifiable risk factors are those that can be altered such as, for example, physical inactivity or impaired vision due to cataracts. Changing the risk factor potentially reduces the risk. Even untreatable risk factors that are not modifiable (e.g. age, past history of a fall) may be useful for identifying those at greater risk [80] who may benefit from interventions that may prevent general falls and falls injury.

5.1.3 Single versus Multiple

Often it is not possible to identify a single specific cause for falling as falls are usually multifactorial in their origin [37]. The majority of falls result from interactions between long-term or short-term predisposing factors and short-term precipitating factors in a person's

environment [38]. Risk of falling increases exponentially as the number of risk factors increases [38, 81, 82]. There is a continuum of falls risk that ranges from no risk to high risk. There can be a cumulative effective of mild levels of risk for a person with a small number of risk factors which may place them at a moderate level of risk overall.

5.1.4 Host, Agent or Environmental Factors

Haddon's injury matrix conceptualises injury in terms of interacting factors (host, agent, and environment) and phases (pre-event, event, post-event), when these factors are likely to cause injury [83]. The matrix can be used to design effective interventions to prevent or minimise injury at each of these phases [83]. For fall-related injuries, host factors correspond to intrinsic factors and environmental factors to extrinsic factors in the physical or social environment. Agent factors which play an important role in fall-related injuries include the height and direction of the fall, and the capacity of the body or landing surfaces to absorb energy.

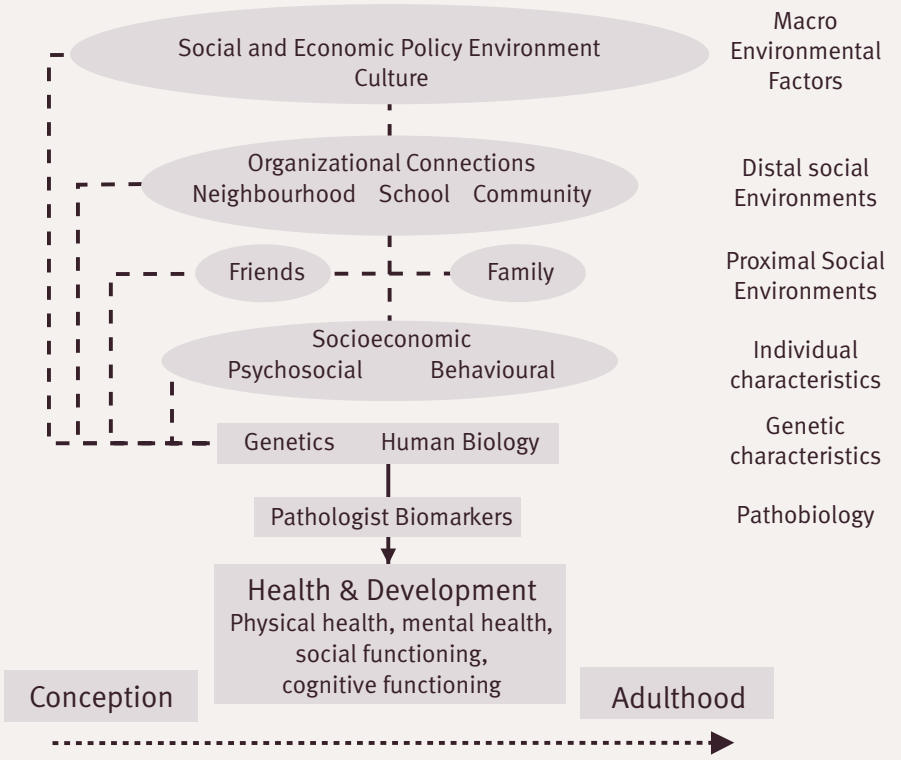
Refer to http://www.health.qld.gov.au/stayonyourfeet for the application of Haddon's injury matrix in preventing falls.

5.1.5 Life Course Risk Factors

The life course approach recognises that many health conditions experienced in later life may arise either as an accumulation of risk or as exposure to risk factors at critical periods of life [84]. These can be socio-demographic, behavioural, biomedical, genetic, environmental, or other factors and these can act independently or in combination [84]. For example, behavioural factors such as smoking, excessive alcohol use, physical inactivity and poor diet in adolescents and young adults can affect peak bone mass and contribute to later development of osteoporosis and risk of fall-related fractures [85]. The chain of causes from socio-economic factors through environmental and community conditions to individual behaviour offers many different points

for intervention, as illustrated in the life course model of health determinants (Figure 5.2) [5, 86] .

Figure 5-2: Life Course Model of Health Determinants



Source: Lynch, 2000 [86]

5.2 Evidence-based Falls Risk Factors

A number of reviews have examined the evidence of risk factors for falls [35-37, 78, 87] and fall-related injuries [88]. Based on these reviews, factors associated with increased risk of falls and fall-related injuries in community-dwelling older people include the following factors.

5.2.1 Socio-demographic Factors

A previous fall is a strong single predictor for future falls. Falls are also generally considered to be a marker of frailty and decreased mobility [35]. Therefore with increasing age, an individual's risk of falling also increases. Most overseas studies in community settings

have also shown women are at higher risk, as are those of Caucasian ethnicity compared with Afro-Americans, Hispanics or South Asians [78]. Additional risk factors for falling include living alone [78] and having poor social networks [87]. Furthermore living alone and/or having poor social networks may be associated with other fall risk factors such as poorer diet, difficulties in activities of daily living, lower levels of physical activity, and fewer resources in times of need [89].

5.2.2 Psychological Factors

Psychological factors such as fear of falling, depression, impaired cognition and risk taking behaviours are associated with increased falls risk [35, 78, 87]. Fear of falling, and avoidance of activities due to fear of falling, are strongly correlated with multiple falls [90]. The relationship between falls and fear of falling is cyclical – falls are an independent predictor of developing fear of falling and fear of falling is a predictor of subsequent falls [91]. The result is a spiralling risk of falls, fear of falling, and functional decline [91]. A range of social, psychological, and physical risk factors for disability are associated with persistence of fear of falling including living alone, cognitive impairment, depression, and impairments in balance and mobility [92]. Additional factors that are shared risks for depression and falls are self ratings of poor health, poor cognitive status, impaired activities of daily living, and slow walking speed [93]. Recent studies have shown that sleep disturbances [94, 95] and/or abnormal sleep patterns [96, 97] are risk factors for falls. There are suggestions that psychological disturbance, particularly depression, may be an intermediary factor in the association between poor sleep quality and falls [94]. Medications for treating psychological conditions such as sleep disturbance, anxiety and depression can increase the risk of falls, indicating that prescription of these medications should be monitored closely. Psychological risk factors may respond to non-pharmacological interventions, including cognitive and behavioural therapy [98, 99].

5.2.3 Impaired physical function

Limitations in the activities of daily living (ADL) have been shown to increase falls risk. Limitations can be caused by impaired balance/mobility/walking ability (gait) or muscle weakness resulting in physical functioning dropping below the threshold where activities of daily living can be carried out [78]. Any lower limb disability is a major risk factor for falls, for example, muscle weakness, orthopaedic abnormality or poor sensation [78]. Difficulty rising from a chair is also associated with increased risk [78].

5.2.4 Sensory and neuromuscular impairments

Sensory or neuromuscular impairments that are risk factors for falls include deficits in vision, peripheral sensation, proprioception, vestibular function and reaction time. An individual will have increased risk of falling with vision deficits, including reduced visual acuity, contrast sensitivity and depth perception, and eye diseases such as macular degeneration and cataracts.

Falls risk is also increased with deficits in peripheral sensation (e.g. peripheral neuropathy), which reduce the ability to sense touch or vibration at the lower limbs which result in instability. Therefore individuals with medical conditions that exhibit these symptoms (e.g. diabetes) will be at increased risk of falls. Adequate visual, somatosensory and vestibular acuity contribute to the detection of postural disturbances and environmental hazards, while adequate strength and reaction time permit appropriate corrections to postural imbalance [35]. There is evidence emerging that there are strong links between vestibular function and falls: when individuals present with a potential vestibular condition there should be further investigation and management.

5.2.5 Medical conditions

Many falls occur as the result of acute and chronic medical conditions [35].Many medical conditions have been associated with increased falls and injury risk and those with multiple chronic illnesses experience higher fall rates than their healthy counterparts [100]. Medical risk factors include stroke, incontinence, acute illness, Parkinson's disease, dementia, arthritis, diabetes, orthostatic hypotension, foot problems and osteoporosis. Many medical conditions increase the risk of falling by impacting directly on physiological mechanisms that affect maintenance of upright posture [35]. (Conditions which affect sensory input (such as diabetes) have been discussed in Section 5.2.4.) Problems with balance can also be experienced due to diseases which impair central processing of sensory information and motor responses, such as stroke, dementia, Parkinson's disease and orthostatic hypotension. Following central processing, anything which affects a person's ability to respond to the sensory input can contribute to the risk of falling, such as disease or disability of the spinal cord, nerves, bones, muscles and joints. Such conditions include arthritis of weight-bearing joints (because of structural deformity, decreased range of motion and pain), foot problems, and muscle disuse following fracture, injury or prolonged immobility.

5.2.6 Medication

The evidence base for appropriate prescribing in older people is strong and as more evidence emerges as to pharmacological interventions for more and more diseases, so the number increases of drugs available for prescription. Polypharmacy could therefore be considered a redundant term and the focus should be on appropriate or evidence-based prescribing. Older people should have access to the best pharmacological agents available and a rational discussion with the patient is often required to weigh up the risks and benefits of different medications and numbers of drugs prescribed [35]. However, studies have found that use of more than four medications increases falls risk significantly [78]. While multiple drug use may be partly a proxy

measure for poor health [35], there is evidence that the use of multiple medications may lead to falls as a result of adverse reactions to one or more of the medications, detrimental drug interactions, or incorrect use. Even taking into account underlying disease, it is known that medications that are central acting like psychotropic medications (antipsychotics), benzodiazepines (sedatives and hypnotics), antidepressants and antihypertensives are independent predictors for falls [35, 101]. Additionally, both the ageing and the disease process affect an older person's ability to deal with, and respond to, drugs, indicating that greater care is needed in considering dosage and potential interactions between medications for older people.

5.2.7 Lifestyle factors

5.2.7.1 Alcohol Consumption

The magnitude of risk posed by alcohol use for falls or fall injuries among older adults remains uncertain. Studies seeking to measure the association between alcohol use and falls may suffer from response and selection biases, in that heavy alcohol consumers may under-report intake or decline participation altogether [35, 102]. However there is sufficient evidence to suggest that light alcohol intake may decrease the risk of falling, while a history of problem drinking increases fall risk [103]. Long-term, high-level consumption contributes to multiple medical conditions such as osteoporosis, reduced peripheral sensation and brain atrophy, which are associated with falls [35]. Results from meta-analysis indicate that alcohol intake above two units per day is associated with a significantly increased risk of osteoporotic fracture, especially hip fracture [104]. Although alcohol abuse has been implicated as a significant factor in geriatric trauma [105], few studies have directly measured alcohol levels in older people presenting to an Emergency Department (ED) following a fall [106-108]. Kurzhaler et al (2005) reported positive blood alcohol concentrations in 22 percent of fallers presenting to ED and concluded that alcohol plays an important role in patients up to 70 years of age in fall-related injuries [106].

An Australian study reported that alcohol misuse may have been a direct cause of the fall in more than 10 percent of ED presentations in older people [39].

5.2.7.2 Tobacco Use

Studies of tobacco use and fall-related injuries have consistently reported that osteoporotic fractures, particularly hip fractures, are a major adverse effect of smoking due to substantial cumulative excess bone loss [109, 110]. Current smoking is associated with a significantly increased risk of hip fracture compared to non-smoking. The risk decreases for former smokers, depending on the years since cessation. Smoking is one of the major preventable risk factors for chronic disease [84].

5.2.7.3 Physical Inactivity

Sedentary behaviour is a risk factor for falls [78]. Individuals who are inactive fall more than those than those who are moderately active [78]. Paradoxically, there is a suggestion in the literature that too much activity increases risk [87, 111], presumably because engagement in frequent physical activity, including household activities, increases exposure to opportunities to fall [111, 112]. The protective effect of physical activity on the risk of fall-related injuries, such as hip fracture, is strong for current physical activity and also with leisure activities from childhood to late adult age [113]. Accumulating evidence suggests that physical activity helps to maintain mobility, muscle strength, reaction time, balance, and bone mineral density, thereby reducing the risk of falls and osteoporotic fractures [114].

5.2.7.4 Under Nutrition

While there is no universally accepted definition of clinical under-nutrition in older persons [115], unintentional weight loss (defined as loss of more than four percent of body weight [115]) and low body mass index (BMI) contribute to frailty [116]. Frailty results from a 'vicious

loop' which includes sarcopenia (loss of muscle mass and strength), neuromuscular impairment, falls and fractures, immobilisation, malnutrition and impaired protein synthesis [117]. Limited evidence supports the hypothesis that malnutrition increases the propensity to fall [118], although the relationship is indirect. The body's ability to maintain balance and postural stability is achieved by a complex interaction between the visual, vestibular, proprioceptive, and neuromuscular systems, all of which can be affected by nutritional deficiencies [118].

The association between nutritional status and fall-related injuries (particularly hip fractures) has been more widely investigated. Studies have shown that a significant risk factor for hip fracture is low BMI [119]. The mechanism for this relationship may be because of muscle weakness associated with nutritional deficiencies of protein or vitamin D [119]. The nutritional needs for optimizing bone health can be met by a diet that is high in fruits and vegetables (five or more servings per day), adequate in protein but moderate in animal protein, and with adequate calcium and vitamin D intakes through diet or supplements [120]. Adequate nutrition is also required to supply the energy levels required to undertake physical activity, including normal daily activities, and to optimise physical gains from an exercise programs [36]. It is important to evaluate potentially reversible causes of poor nutritional intake [115], including oral health and dentition problems, lack of ability to purchase and store food, inability to prepare meals, poor appetite, poor diet and difficulties swallowing.

5.2.8 Environmental factors

5.2.8.1 Home Hazards

A high proportion of falls in community-dwelling older adults occur at home and environmental hazards are frequently implicated as the cause [121]. However, there is scant evidence to suggest that the houses of older fallers are any more hazardous than non-fallers [35]. It seems that the relationship between an older person's functional capacity

and their environment together can place an individual at risk of falls. Therefore reducing hazards in the home is likely to be most effective in those with a falls history and limited mobility.

5.2.8.2 Hazards in Public Places

Although fallers report that outdoor hazards (particularly broken or uneven surfaces) are frequent causes of falls, the issue of environmental risk factors in public places has not been well documented in the literature [35]. Nonetheless, there is evidence that presence of obstacles increases risk of tripping as it involves a complex interaction between a person's visual perception of the obstacle and the implementation of avoidance strategies such as increasing toe clearance, taking a wider step over the obstacle involving hip, knee and ankle flexion, and increasing step time requiring a longer time spent on one leg [122]. Factors that affect the mechanisms involved in obstacle avoidance strategies can increase the risk of tripping. In healthy older people this includes visual impairment. In people with chronic medical conditions such as stroke these include reduced toe clearance, reduced step length and closer limb placement to the obstacle after clearance [123] and an altered centre of mass which can increase instability [124].

5.2.8.3 Footwear

A number of features of shoe design have been implicated as having an impact on balance [35]. However, there is inconclusive evidence to suggest that certain types of footwear increase the risk of falling. In one study [125], wearing shoes with high heels and small contact area increased the risk of a fall in everyday settings and activities, while in another [126], footwear characteristics were not significantly associated with falls either inside or outside the home. However, risk of falling indoors has been found to be associated with going barefoot or wearing socks or slippers [126-128]. (See also Section 7.4.6)

5.2.8.4 Assistive Devices

Use of assistive devices may have a positive or negative impact on the physical abilities or safety of older people. Some studies suggest that the use of devices may increase the risk of falling, while others suggest that assistive devices can increase an older adult's confidence, reduce fear of falling, and improve independence [129]. However, there is limited research on their potential contribution to falls [35, 129]. (See also Section 7.4.5.)

Mobility Aids such as walking aids are associated with increased risk of falls [87, 130], although it may be that use of a mobility aid is simply an indicator of balance impairment and functional decline [130]. Such assistive devices can improve balance and mobility for older adults. However, if incorrectly prescribed or used, they can interfere with one's ability to maintain balance in certain situations, and the strength and metabolic demands can be excessive [130], thereby increasing the risk of falling.

Multifocal glasses may predispose older people to falls because they impair depth perception and edge-contrast sensitivity at critical distances for detecting obstacles in the environment [131].

5.3 Summary of Falls Risk Factors

A summary of falls risk factors for community-dwelling older people, the level of evidence and their potential to be modified is shown in Table 5.1.

Table 5-1: Falls Risk Factor Summary

Risk factors	Level of evidence	Modifiable ✓ = Yes ✗ = No
Socio-demographic factors		
Advanced age	***	✗
Female	**	✗
Ethnicity	**	✗
Living alone	**	possibly
Poor social networks/ social isolation	*	possibly
Psychological factors		
Fear of falling	***	✓
Depression	**	✓
Poor self-rated health	*	✓
Impaired cognition	***	possibly
Sleep disturbance	*	✓
Risk taking behaviours	*	✓
Physical functional capacity		
Limitations in activity for daily living or mobility	***	✓
Impaired balance	**	✓
Impaired gait	***	✓
Sensory and neuromuscular factors		
Reduced vestibular function	*	Possibly (by habituation)
Visual impairments	***	Possibly
Reduced peripheral sensation	***	✗
Reduced muscle strength	***	✓
Poor reaction time	***	✓
Medical factors		
History of falls	***	✗
Stroke	***	Indirectly (potential functional improvement through rehabilitation)

Risk factors	Level of evidence	Modifiable ✓ = Yes ✗ = No
Parkinson's disease	***	Indirectly
Number of chronic conditions	***	✗
Abnormal neurological signs	***	✗
Incontinence	**	Possibly
Acute illness	**	✓
Arthritis	**	Indirectly (symptoms can be managed)
Foot problems	**	✓
Dizziness	*	✓
Medication use		
Use of multiple medications	***	✓
Benzodiazepine use	***	✓
Antidepressant use	***	✓
Anti-psychotic use	***	✓
Lifestyle factors		
Alcohol consumption	*	✓
Inactivity	***	✓
Malnutrition	*	✓
Environmental factors		
Home hazards	–	✓
External hazards	–	✓
Poor footwear	*	✓
Inappropriate spectacles	*	✓
Inappropriate walking aids	**	✓

– Little or no evidence of an association

* Weak evidence of an association (occasionally but not usually found)

** Moderate evidence of association (usually but not always found)

*** Strong evidence of association (consistently found in well-conducted, prospective studies)

Source: adapted with permission from Lord et al, 2007[35]

Good Practice Points

- The three star, modifiable risk factors need to be addressed as a matter of priority. These include fear of falling, limitations in activity for daily living or mobility, impaired balance and gait, visual impairment, reduced muscle strength, poor reaction time, and use of multiple medications specifically benzodiazepine, antidepressant, anti-psychotic medications (psychoactive medications).
- Since falls are usually caused by complex interactions of a number of risk factors, risk reduction strategies should target multiple factors.
- For individuals this will usually involve assessment of falls risk followed by interventions which target risk factors.
- Whole of community prevention of falls strategies should address multiple risk factors prevalent in the population.

Part 6 Awareness Raising, Screening and Assessment of Falls Risk

6. Awareness Raising, Screening and Assessment of Falls Risk

6.1 Measurement of Falls Risk

There are a substantial number of falls risk measurement tools that have evidence to support their reliability and validity [132]. However there is at present no tool that can be applied across all settings. Also, of the existing tools few have been validated in more than one setting [133]. In the community setting, there should be available a falls risk tool that can be used with confidence as an initial step to developing an individualised falls prevention program. Consequently, there should be little need to develop new tools. In fact, further development of fall risk tools unique to individual programs/facilities may be counterproductive because scores will not be comparable across programs/facilities [132].

6.2 Purpose of Measurement of Falls Risk

The purpose of measurement may be:

- Awareness raising: to examine an individual's awareness of falls and/or knowledge of risk factors
- Screening: to determine an individual's level of risk for falls
- Assessment: to examine an individual's risk factor profile and determine referral pathways and appropriate interventions.

6.2.1 Falls Risk Awareness

Falls risk awareness tools are generally designed as an education resource to raise awareness of risk of falls and alert the person to take remedial action and/or seek professional advice. They often take the form of a checklist with action plan and are self-administered. They may also be used to test knowledge of community-dwelling older people and/or health care workers about falls and risk factors in order

to determine the need for, or to evaluate the impact of, an education intervention. (Section 6.5.1 provides examples).

6.2.2 Falls Risk Screening

While there is not a definitive difference between screening and assessment tools, screening is a process that is assumed to be less detailed and may precede assessment [3]. A falls risk screen is the minimum process to determine which older people are at greatest risk of falling. Typically the screen consists of a small number of items (up to five) based on presence or absence of a risk factor. Since one of the strongest risk factors for falling is having had a previous fall [129], a minimum falls risk screen would be a single item question 'Have you had a fall in the last 12 months?' Risk factors that form part of a screening tool may not necessarily be those that can be modified to reduce the risk of falls. When the threshold score on a falls screening is exceeded it would prompt a more detailed falls risk assessment.

6.2.3 Falls Risk Assessment

Falls risk assessment is a more detailed and systematic process than screening. It is used to identify modifiable factors that contribute to a person's increased risk of falling and to develop an individualised plan focussed on prevention of falls. The implicit assumption underlying the concept of assessment of risk is that early detection and intervention (that occurs before overt development of the disorder or adverse event) will lead to a more favourable prognosis or outcome.

There is a continuum of falls risk from 'no risk' through to 'very high risk'. A graded individual falls risk assessment provides the opportunity for primary health care professional to identify risk early and intervene before the risk factor has become moderately advanced. Potentially better health outcomes will be achieved through early identification and intervention.

6.2.4 Summary of Falls Risk Measurement

The circumstances and purpose for which falls risk measurement is undertaken are illustrated in Table 6.1

Table 6-1: Falls Risk Measurement

Tool	Who Administers	Setting[3]	Purpose
Falls Risk Awareness	Self-administered	Community	to educate and raise awareness › to trigger self-referral to seek professional advice › to test knowledge pre-post intervention
Falls Risk Screening	Health Professional	Primary Health Care	› to determine those at high risk › to determine those who warrant more detailed assessment
Falls Risk Assessment	Health Professional	Primary Health Care	› to identify modifiable risk factors › to target and tailor interventions › to implement falls and injury risk management strategies for individuals identified with high risk of fall.

3 For community-dwelling older people their first level of care will be in the **primary health care setting**. See GLOSSARY for definition.

6.3 General Principles of Screening and Assessment

The prevalence of the pre-clinical condition (or risk factors) should be relatively high among the population. If the prevalence of the risk factor is low (or the intervention reaches and changes the risk factors of a limited proportion of the population) there will be little impact at the population level [80].

The resources for conducting risk measurement must be cost effective and the expenses justifiable in terms of ameliorating adverse health consequences. Ethical issues should also be considered such as availability and equity of access for the at-risk population [134].

A suitable test must be available, cost effective, easy to administer, and impose minimal demands or discomfort on those tested. The results must be valid, reliable and reproducible [134]. A number of measurement tools that meet these criteria are listed under Section 6.5

Effective treatment/interventions/care plans need to be available and evidence-based. There must be a follow-up intervention based on assessment [134].

6.3.1 Case For and Against Falls Screening and Assessment

On the basis of the principles outlined in Section 6.3, there is intuitive appeal for falls risk screening and assessment as a public health measure. However, there is still debate about its value, particularly for population-based screening of community-dwelling older people.

In support of falls screening and assessment

- All older people should have documentation that they were asked at least annually about the occurrence of recent falls because falls are common, often preventable, and frequently unreported [129, 135]. One of the strongest predictors of a future fall is having a previous fall, but only a third of older fallers report their falls to a health professional [58].

- Many previously undetected remediable problems, including falls, can be identified among apparently healthy older individuals in community geriatric screening programs [136]. Multiple falls can be strong indicators of accelerating frailty and the presence of underlying, treatable risk factors [135]. The high prevalence of under-diagnosed and under-treated health-related conditions in older people has motivated the development of specialised geriatric screening and assessment programs [137].
- Early identification of risk factors allows detection of impairments before a serious injury, secondary deconditioning, or loss of confidence in mobility can occur [58] and relevant changes can be monitored over time [138].
- Identification of risk factors provides direction for appropriate referrals and is the cornerstone of most preventing fall programs [63, 139].
- Use of standard protocols for assessing risk can improve communication as well as allow a common language around the concepts of functional ability, care planning, reporting and service planning [138].
- Although there is limited evidence in the area of preventing falls, early detection of risk and early intervention in a number of health areas has been shown to improve longer term outcomes.
- Risk assessment identifies a person's needs at a specific time and can be used to reassess their needs as they change over time.

In opposition to falls screening and assessment

- Falls risk screening need not be applied universally to everyone: it can still be based on criteria such as a recent fall which reduces the resource demand of the approach.
- Falls screening and assessment alone will not prevent/reduce falls, and undue emphasis may be placed on assessment rather than the consequent action plan.

- A diagnosis of high fall risk may stigmatise an older person, and raise levels of fear of falling.
- Most of the current activity in preventing falls is based on the medical model of individual clinical assessment proximate to the time of risk [30]. Traditional medical model approaches aimed at screening and treating risk factors are often too late for the purposes of prevention [140].
- Individually-based assessment and treatment may be effective in reducing an individual's risk of falling but it does little to reduce the population burden of risk [80].
- Screening of high-risk populations to predict risk of falling is of limited use [133] because it could be argued that all older people are at risk. Population-based interventions on unselected populations use a public health model that aims to prevent adverse health in all who may be susceptible [141].
- There may not be an assessment tool that can apply to all community-dwelling older people [133].
- Risk assessment needs to be repeated and this can be seen as consuming additional resources.

6.4 Evidence-Based Measures

6.4.1 Falls Risk Awareness Measures

While a number of studies have been undertaken on awareness, knowledge, attitudes and/or information needs of older community-dwelling people concerning falls, awareness tools used have not usually been subjected to rigorous review. Examples of these resources can be found in Section 6.5.1.

6.4.2 Falls Risk Screening and Assessment Measures

A number of falls risk screening and assessment tools have been developed. Reviews of these tools [132, 133, 142, 143] have focussed on acute

care and institutional settings with little attention to tools tested in community settings [133].

The main evidence supporting falls risk screening and assessment comes from reviews of falls prevention interventions. Assessment, as part of a multifactorial approach for the prevention of falls, is supported by evidence of strong associations between multiple risk factors and falls, as well as from experimental studies demonstrating significant fall reductions where assessment is combined with tailored interventions [144].

Assessment of falls risk typically involves either the use of multifactorial assessment tools that cover a wide range of fall-risk factors, or functional mobility assessments that typically focus on the physiological and functional domains of postural stability [133].

The multifactorial assessment tools consist of a checklist comprising questions used to screen the level and nature of risk based on a combined score of multiple factors known to be associated with fall-related risk [133]. A comprehensive multidimensional fall risk assessment may include the following:

- a history of fall circumstances and medical problems
- review of medications
- mobility assessment
- an examination of vision, gait and balance, and lower extremity joint function
- a basic neurological examination
- testing of psychological and mental status
- the assessment of cardiovascular status
- an assessment of foot problems and footwear
- an assessment of continence
- an assessment of environmental risk factors or home hazards.

Other components of the fall risk assessment can include functional performance tests and an environmental assessment of the individual's living circumstances [129].

Functional mobility assessment tools typically include simple performance-based tests of gait, balance, mobility, strength, and reaction times such as the Timed Up-and-Go test, the alternate step, sit-to-stand test with five repetitions and the six metre walk, and functional reach [145] (See section 6.5.2 for more details on these tools).

Both types of tools may be designed as a quick screen for determining high risk or to target specific factors for risk reduction - either may trigger referral for further investigation and testing [133].

To meet the 'Gold Standard Criteria' for quality [133], risk assessment tools should:

- be validated in prospective studies
- have sufficient data to calculate sensitivity, specificity, positive and negative predictive values
- be validated in more than one population setting
- demonstrate good face validity
- demonstrate good inter-rater reliability
- have good adherence from staff
- have clear instructions and allow a score to be easily calculated
- have a grading of risk on a particular risk factor (rather than just a yes or no response) as this is better for identifying mild levels of risk
- have clear guidelines associated that provide recommendations for management strategies for specific risk factors and level of risk identified.

Risk assessment tools should also be described in peer-reviewed journals. At present there is no tool that can be applied reliably across different settings, or for subpopulations within the one setting, to accurately predict risk of falling [133]. At the time of publication there

is no evidence available to make it possible to recommend a risk assessment tool for use in all subpopulations within community settings. However, falls prevention resources for general use, which are available from the Victorian Department of Human Services Aged Care Branch website http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm were reviewed and recommended by the National Ageing Research Institute in 2005.

Tool selection should depend upon knowing the time required to complete the tool, recommended cut-off scores (including the cut-off score which the predictive validity was tested against) and the necessary equipment and training. A 70 percent cut-off for sensitivity and specificity indicates a 'high' predictive value [143]. Predictive values may only be applicable for screening tools. There is debate around the requirement of sensitivity and specificity for assessment tools using evidence-based risk factors to inform interventions. For an explanation of the terms for assessing validity of tools, please refer to the Glossary.

Examples of falls screening and assessment tools can be found in the following Section 6.5.

6.5 Measurement Tools

Some of the most commonly used tools are discussed in the following sections.

6.5.1 Falls Risk Awareness Tools

There are a number of consumer booklets available to raise public awareness of falls risk in older people. Most are available in other languages as well as English. Unlike falls risk screening and assessment tools, they do not provide predictive risk but rather self reported risk.

General information resources for consumers include:

- *How to Stay On Your Feet® Checklist* Developed by Queensland Health and available at: http://www.health.qld.gov.au/stayonyourfeet
- *Staying on. Staying active and independent in your home. A guide and checklist for staying independent and reducing your risk of injury from falling.* Queensland Health Home and community Care (HACC) resource available at: http://www.health.qld.gov.au/hacc/HACCMulti_fallsprev.asp
- *One step ahead. Preventing falls. A guide for older people.* Queensland Health and Department of Housing resource available at: http://www.health.qld.gov.au/PHS/Documents/shpu/22094.pdf
- *Don't fall for it. Falls can be prevented! A guide to preventing falls for older people.* Developed as part of the National Falls Prevention in Older People Initiative and available at http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-injury-falls-documents.htm
- *Stay on your feet and avoid a shattering experience.* Developed by *Stay on Your Feet®*, WA and available at: http://www.stayonyourfeet.com.au/resources.php
- *Falls prevention booklet.* Developed for Department of Human Services, Victoria and available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm
- *DVA Homefront guide to preventing falls for older people*. Developed by the National Ageing Research Institute. http://www.dva.gov.au/media/publicat/2006/preventing_falls/preventing_falls.pdf

Short self-assessment checklists for personal risk factors include:

- *Will I stay active and independent?* Developed by Queensland Health http://www.health.qld.gov.au/stayonyourfeet
- *How safe are you from falling?* Developed by Stay on Your Feet - Adelaide West and available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm

- *How many of these questions do you fall down on?* Developed by *Stay on Your Feet*®, WA and available at: http://www.stayonyourfeet.com.au/resources.php
- *Falls are preventable*. Developed for Department of Human Services, Victoria and available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm
- *Am I at risk of falls? Quick quiz.* Developed for Department of Human Services, Victoria and available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm

In addition to personal falls risk awareness, a number of checklists are available to audit the safety of the environment, particularly the home. Consumer resources for home safety checklists include:

- *Stay on Your Feet. Your home safety checklist.* Developed by NSW Health and available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm
- *Your home safety checklist.* Developed by *Stay on Your Feet*®, WA and available at: http://www.stayonyourfeet.com.au/resources.php

Resources for auditing public spaces include:

- *Improving safety to promote walking in your local area.* Developed for Department of Human Services, Victoria and available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/downloads/imprsafety_promotewalk.pdf
- *Preventing falls in public places Appendix C: Hazards Report Form*. Developed by NSW *Stay on Your Feet* Program and available at: http://www.health.vic.gov.au/agedcare/maintaining/falls/localgov_public.htm

6.5.2 Falls Risk Screening Tools

Below are listed a number of examples of screening tools with reasonable sensitivity and specificity[4] determined for well-conducted studies with adequately-sized samples. A number of these tests, or a battery of tests, may be used in combination to measure falls risk in any one patient.

Alternate Step Test. This test is easy to do and only requires a small amount of additional equipment (step and stop watch). It should be done with shoes removed and using a step that is 19cm high and 40 cm deep. The test requires weight shifting by stepping alternately with the whole left foot and then right foot up onto the step as fast as possible. The test is the time to complete eight steps alternating the feet. Tiedemann et al (2007) found the sensitivity of this test was 69 percent and specificity 65 percent, and with a cut off point of 10 seconds is associated with a 130 percent increased falls risk and identifies multiple fallers [145].

Sit to Stand with five repetitions (STS-5). This test is used to measure lower limb strength [145]. This task requires getting up from a standard height sitting position five times from a chair (height 43cm) without arm rests. Tiedemann et al (2007) found the sensitivity of this test was 66 percent and specificity 55 percent and, at a cut off point of 12 seconds, it could significantly predict subjects who suffered multiple falls [145].

6 – Metre Walk. The six metre walk test is the time taken in seconds to walk six metres at normal walking speed. A two metre approach and a further two metres beyond the six metre distance ensures that walking speed is constant across the timed six metres. Tiedemann et al

4 An important issue when comparing sensitivity and specificity figures is the sampling used – many studies have used those clearly at risk and those clearly not at risk (eg well older people), and so discriminating them is relatively easy. The best studies of sensitivity / specificity include a moderate proportion of the sample in the middle ground, who are much harder to classify. Caution needs to be used in comparing these multiple studies of sensitivity and specificity so that, for direct comparison, studies with similar sampling profile should be used.

(2007) found the sensitivity of this test was 50 percent and specificity 68 percent. The test had strong external validity (it was able to discriminate between multiple fallers and non-multiple fallers) which made the tool a significant predictor of falls risk [145].

Functional Reach. This test involves the measurement of a subject's ability to reach forward as far as possible without losing balance or stepping, and with the arm positioned at 90 degrees of shoulder flexion. At a cut-off score of 20 centimetres, reported sensitivity was 73 percent and specificity was 88 percent [146].

Elderly Fall Screening (EFST) is a five item test used to divide subjects into low and high risk based on history of falls and observations of walking speed and gait style [147]. Cwikel et al (1998) demonstrated that the results of physicians' examinations corroborated the EFST results in 75 percent of the cases, with 83 percent sensitivity and 69 percent specificity for a cut-off score of two or more risk items [147].

Geriatric Postal Screening Survey (GPSS) is a ten item screening tool. Five of the items screen for specific geriatric conditions (falls/ balance problems, urinary incontinence, depression, memory loss, and functional impairment) and five other items are general indicators of health status (health perceptions, weight loss, polypharmacy, and pain) [148]. The screening accuracy of the GPSS compared with clinical evaluation for falls risk showed 94 percent sensitivity and 51 percent specificity, using four as the cut-off point [148].

QuickScreen measures number of risk factors based on tests of vision (low contrast visual acuity test), peripheral sensation (tactile sensitivity test), strength, reaction time and balance (near tandem stand, alternate step, and sit-to-stand tests) [35]. The criteria for identifying impairments that increase risk of falls were identified from prospective studies of community-dwelling older people [149]. When participants in a validation study were stratified into high and low risk groups (high risk being the identification of four or more QuickScreen risk factors), the sensitivity was 74 percent and the specificity was 63 percent [150].

Falls Risk for Older People – Community Setting Screen (FROP-Com Screen). The FROP-Com Screen is a three-item screen that has been developed based on the FROP-Com (see Section 6.5.3.1). Recent research found the sensitivity ranged from 0.67 – 0.70. The results provide another validated risk screening tool for use in the community. For more information refer to http://www.mednwh.unimelb.edu.au/research/research_falls_service.htm

Timed Up and Go (TUG). For this test, the participant sits in a chair with arms. On the word "go" the participant is required to stand and walk at a normal pace for three metres, turn around, walk back and sit back down. As a predictor of falls, this test demonstrated a sensitivity of 86 percent and specificity of 71 percent, using a cut-off score of 10 seconds [151]. This has been recommended by the American Geriatrics Society and British Geriatric Society [59].

6.5.3 Falls Risk Assessment Tools

6.5.3.1 Multifactorial Falls Risk Assessment

Examples of multifactorial falls risk assessment tools include:

Physiological Profile Assessment (PPA) [152] involves quantitative assessment of sensorimotor and balance abilities. It also includes simple tests of vision (high and low contrast visual acuity, contrast sensitivity, depth perception), peripheral sensation (tactile sensitivity, vibration sense, proprioception), lower limb strength, reaction time, and postural sway. The comprehensive version of the PPA contains 18 items and takes 45 minutes to administer. It has been used primarily in dedicated falls clinics and research settings. The shorter version of the PPA takes 15 minutes to administer and contains five items: a single assessment of vision, peripheral sensation, lower limb strength, reaction time and body sway. The shorter version has been used more extensively in clinical practice. In a study of community-dwelling women [149], the PPA measurements correctly classified subjects into a multiple falls group or non-multiple falls group with 75 percent

accuracy. There is a cost involved to purchase these tools. Details about the instrument are available at http://www.powmri.edu.au/FBRG/

Falls Risk for Older People – Community Setting (FROP-Com) grades risk on most falls risk factors on a 4 point scale; there is no cost associated with this tool; it takes about 20 minutes to complete and it has guidelines that will assist with assessment and for recommendations to guide falls management. The falls risk factors included are falls history, medications, medical conditions, sensory loss, foot problems, cognitive status, continence, nutritional status, and function. In a study using the FROP-Com [153], the assessment tool identified a high overall falls risk score for a group of individuals presenting to a hospital Emergency Department after a fall. Details about the instrument are available at http://www.health.vic.gov.au/agedcare/maintaining/falls/providers/home/frop.htm

6.5.3.2 Balance Assessment

Below are a number of commonly used examples of balance assessments requiring little or no equipment.

Berg Balance Scale (BBS) consists of 14 items which include tasks such as transfers, standing unsupported, sit-to-stand, tandem standing, turning 360 degrees and single-leg stance [154]. Overall the Berg Balance Scale has moderate to good specificity but low sensitivity in predicting falls [35]. However, in a study combining the score on the BBS with a self- reported history of imbalance, sensitivity was 91 percent, and specificity was 82 percent [155].

Tinetti's Performance Oriented Balance and Mobility Assessment (POMA) is designed to assess balance and gait during position changes and gait manoeuvres used during normal activities. Performance on 14 balance items and 10 gait items is graded as normal, adaptive or abnormal [156, 157]. The balance assessment evaluates sitting balance, rising from a chair, immediate and prolonged standing balance, withstanding a nudge to the sternum, balance with

eyes closed, turning balance and sitting down. In a validity study, the Tinetti balance scale was used to predict individuals who would fall at least once during the following year [156]. A cut-off score of 36 or less had 70 percent sensitivity and 52 percent specificity for predicting fallers.

6.5.3.3 Home hazard assessment

Instruments have been developed for use by community nursing personnel, occupational therapists, and physiotherapists to identify hazards in the home that may contribute to or increase the risk of falling. The content validity of some of these tools has been established [158, 159]. The HomeFast Tool demonstrated fair to good level of inter-rater agreement (.62) for the identification of home hazards [159]. Details about the instrument are available at http://www.health.vic.gov.au/agedcare/maintaining/falls/providers/home/env_check.htm

6.5.3.4 Comprehensive geriatric assessments

While not designed primarily as a falls risk assessment tool, falls history is generally included in comprehensive geriatric assessments. Also included are many of the known risk factors for falls, such as cognitive status, sensory impairments, pain, weight loss, incontinence, effects of medication use, and mobility impairment. In addition, comprehensive assessment may include lifestyle factors such as alcohol consumption, smoking history, diet, physical activity, and social support.

Examples of health assessments for older community-dwelling people include:

- Enhanced Primary Care (EPC) Health Assessments for Australians aged 75 + (55 + for Aboriginal and Torres Strait Islander people) http://health.gov.au/internet/wcms/publishing.nsf/Content/health-epc-hlthassmnt.htm/$FILE/chklisthlth.pdf

- Royal Australian College of General Practitioners (RACGP) Health Assessment http://www.tdgp.com.au/forms/75YOHealthAssessmentRACGPVersionOct2006.rtf
- Aboriginal and Torres Strait Islanders Health Assessment http://epc.adgp.com.au/resources/download/healthassTSI04purple.doc
- InterRAI assessment tools for geriatric screening and care planning across the continuum of care http://interrai-au.org/
- Falls Evaluation Checklist for General Practitioners http://www.health.vic.gov.au/agedcare/maintaining/falls/providers/home/prac.htm

As part of health assessments, other associated factors may also be assessed such as nutritional status, cognitive ability and social support. Examples of pre-existing scales often included in health assessments [160] include:

- Nutrition. The Australian Nutrition Screening Initiative (ANSI) [161] is a 12 item screening tool that asks about eating habits and conditions associated with nutrition risk. It is not intended to diagnose malnutrition.
- Cognitive Impairment. The 11 item Mini-Mental Status Examination [162] and an abbreviated form using four items [163] are commonly used clinical screening tests to assess cognitive impairment in older adults.
- Social Support. The 11 item Dukes Social Support Index measures social interaction (four items) and satisfaction with support (seven items) and provides a brief and valid measure of social support for use in community-dwelling older people [164, 165].
- Depression. The Geriatric Depression Scale (GDS) [166] has been tested extensively in the older population. Short versions (four, five and 15 item) are useful screening tools in the clinical setting for the assessment of depression [167].

Suggested tools for these measures are available in the *Stay On Your Feet® Community Good Practice Toolkit* at www.health.qld.gov.au/stayonyourfeet. Currently there is no information on sensitivity and specificity for these tools for falls prediction.

The lack of studies on the predictive validity of comprehensive medical assessments likely reflects the fact that such assessments are not undertaken to predict falls risk but to identify areas where medical intervention is required [132].

6.6 The Assessor

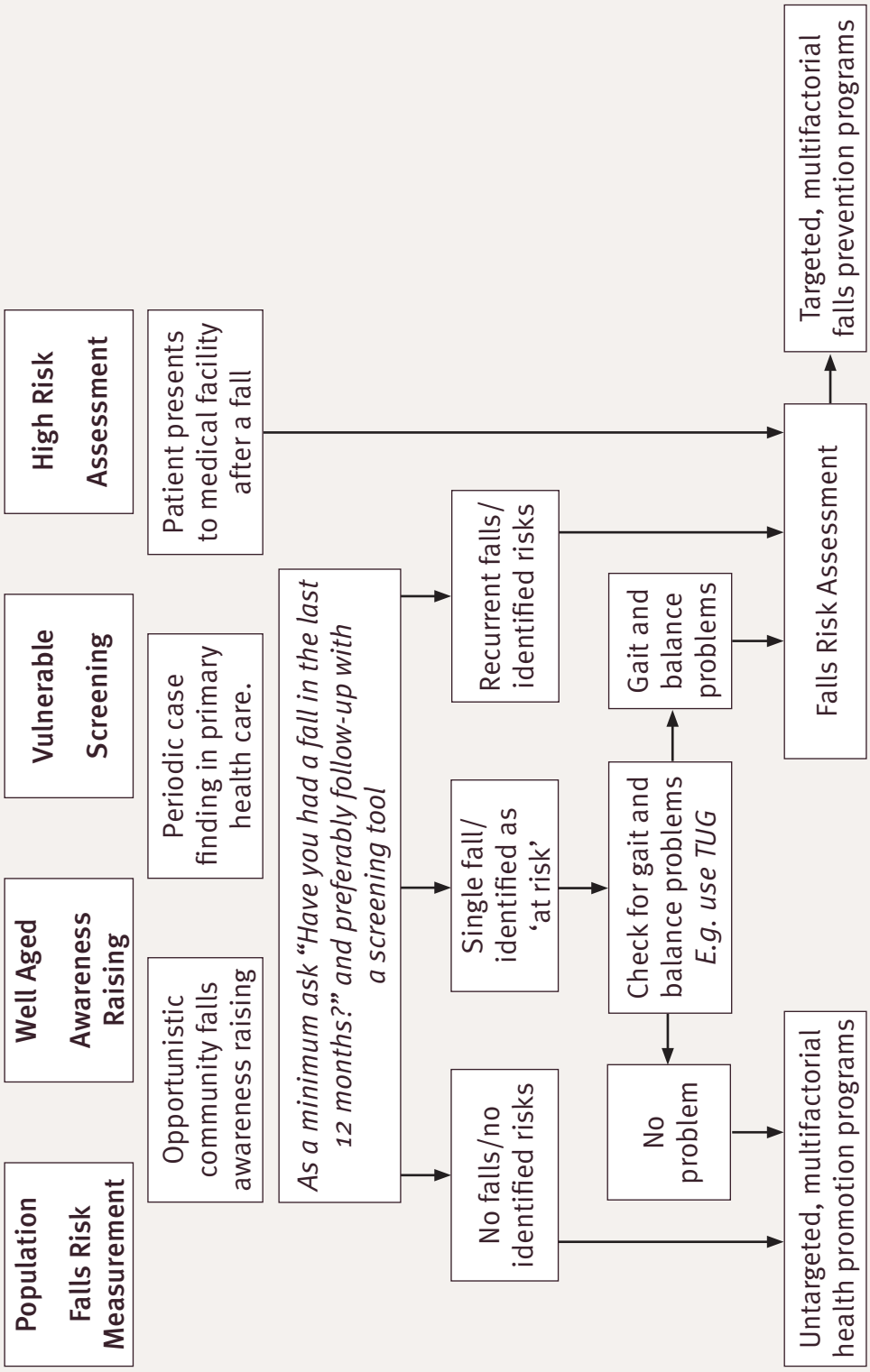
To achieve a comprehensive and meaningful assessment, the assessor must:

- be trained in the assessment tool
- understand the measurements used within the tool, including normative scores for older people of different ages
- have good communication skills, knowledge and experience in the care of older people
- understand ageing across the lifespan (including heterogeneity of older people, their culture their environment and interaction within the community)
- involve the client, and where appropriate, the carer, in discussion of assessment findings, implications and a management plan.

6.7 Recommended Pathways for the Measurement of Falls Risk

The recommended pathways for measurement of falls risk are shown in Figure 6.1.

Figure 6-1: Recommended Pathways for Measurement of Falls Risk



Source: Adapted from American Geriatric Society Guidelines, 2001 (p.666) [59]

Good Practice Points

- A minimum falls risk screen would be the single item question "Have you had a fall in the last 12 months?"
- At least annually, health professionals should ask all older people in their care about the occurrence of recent falls.
- All older people who report a fall should be observed for gait and balance problems, for example using the Timed Up and Go (TUG). Those that have difficulty or demonstrate unsteadiness need further assessment of their falls risk.
- Any assessment of falls risk should be followed by action to develop a tailored plan to prevent falls with a focus on identified risk factors.
- Falls risk assessment needs to be undertaken by trained staff with intermittent reviews to ensure appropriate and consistent use.
- Where possible select tools that have been validated in the target population.
- Adapting or modifying these tools is not recommended.
- Any design or innovation in falls risk assessment tools should be undertaken in a research context to ensure appropriate evaluation of the tool. Ideally the results should be published in a peer-review journal.
- Available evidence at the time of publication does not make it possible to recommend a risk assessment tool for use in all subpopulations within community settings. However a set of resources for preventing falls for general use are available from the Victorian Department of Human Services Aged Care Branch website http://www.health.vic.gov.au/agedcare/maintaining/falls/index.htm. These were reviewed and recommended by the National Ageing Research Institute in 2005.
- A number of tools for assessing risk factors in older community-dwelling people are available in the *Queensland Stay on Your Feet® Community Good Practice Toolkit*. (http:///www.health.qld.gov.au/stayonyourfeet)
- There should be wide dissemination of self check lists and health promotion information with relevance to preventing falls.

6.8 Attitudes of Older People About Falls and Falls Prevention

Research findings about knowledge, attitudes and/or information needs of older community-dwelling people, have the following implications for preventing falls.

6.8.1 Perception of being 'old'

There is a need to recognise that 'older people' represent a large and very diverse group [69]. Targeting 'older people' as a homogeneous group may provoke a negative or non-response among people who do not relate to portrayals with which they do not identify [68]. People may distance themselves from the possibility of a fall and involvement in prevention initiatives, through fear of stigma and stereotyping as being 'old' [168]. Prevention messages need to be framed in positive terms and be built into ongoing health assessments. The information should be included in lifestyle programs such as retirement planning and chromic disease strategies.

6.8.2 Perception of the Language of Falls

The term 'fall' is contentious, has negative connotations, and its use is likely to inhibit engagement with any preventive program [68], as well as signify an admission of being 'old' [69]. 'Falls prevention' is an unfamiliar term [69], but predominantly associated with fixing or removal of hazards, for example, repair of broken footpaths or removal of floor rugs [69, 168, 169]. To improve the likelihood of being taken up by older people, messages should focus on positive healthy ageing, highlighting independence, staying in control, and living in one's home for longer [69].

6.8.3 Perception of Falls Risk

Older people are not ignorant of risks [170] and acknowledge that falls are a problem with serious consequences [69, 169]. However, they do not

necessarily consider themselves at risk [69, 168, 169, 170], unless they have experienced a fall [69, 171]. Falls are generally regarded as a future risk and not a current concern, and are mostly not considered important at younger ages [169]. People tend to consider that "other" older people are more at risk than themselves [169]. Social and cultural differences in acceptance of the ageing process can also influence perceptions of risk, vulnerability, and dependence [68]. There is disbelief among older people that the risk of falling can be reduced [69] because falls are seen as inevitable, unpredictable and not preventable [68, 172].

6.8.4 Attribution of Falls Risk

Falls are often attributed to external factors [169], such as bad luck or the incompetence of others [168]. Perceived causes of falls may relate to health status: those in good health are likely to attribute their fall to their surroundings, while those with compromised health are likely to attribute their fall to their own limitations [173].

6.8.5 Information Needs

Information should counter the belief that falls are inevitable and that nothing can be done [70]. Such information can come from a variety of sources [69] and should be published in different languages [70]. Advice on preventing falls is typically regarded as common sense, potentially patronising, and useful in principle but only necessary for older, more disabled individuals [170].

6.8.6 Relevance of Participating in Programs to Prevent Falls

The perceived relevance of participating in interventions to prevent falls is low until a fall has been experienced [68, 69, 171]. For younger people in the over 65 age group falls may not be perceived to be a current concern and the relevance of preventing falls must relate to their particular context [68]. Persons with the poorest physical, cognitive and psychological functional abilities represent the part of

the population at highest risk of falling – yet these people are often difficult to reach with activities to prevent falls [174].

To make preventing falls more relevant and encourage participation, the emphasis should be on the positive actions and sense of mastery to counteract fear of falling [172], as well as the multiple and positive benefits for health and well-being [170]. The promotion of healthy ageing may be more attractive and appropriate to all age groups [68]. Falls interventions need to be communicated as a lifestyle-enhancing measure and as a means for staying independent for longer [69, 70].

Awareness of health problems that relate to falls (such as osteoporosis) represents a possible route for discourses about preventing falls [68] and is relevant for fallers and non-fallers. Finding ways to enhance confidence, social activity, and promote independence may be particularly effective in facilitating change among those groups for whom falls and, indeed, old age, are perceived to be a distant risk [69, 172].

Yardley et al (2007) examined ways for promoting uptake of, and adherence to, falls-prevention interventions among older people, based on literature review, clinical experience of the core group members, and substantial qualitative and quantitative studies of older people's views [175]. Recommendations address the need to educate the public, to ensure that interventions are compatible with a positive identity, to tailor interventions to the specific situation and values of the individual, and to use validated methods to maintain longer-term adherence.

Black and Hill (2005) examined ways to improve the uptake of interventions at falls clinics in Victoria [176]. They found that people thought interventions were not needed, were of minimal benefit, and were inappropriate. People in the study also thought that the interventions aggravated injuries, their health had declined, and in some cases there was miscommunication due to a language barrier. This report highlighted the need for health professionals to clearly explain the benefit of the intervention and to consider a person's

perspective, current circumstances, and provide a holistic person centered approach to care [176].

Good Practice Points

- Prior to embarking on falls risk assessment and intervention the relevance and acceptability of interventions to the target group should be understood.
- Public education programs should promote greater awareness among older people, carers, and health professionals of the benefits of preventive health activities.
- Programs should be flexible enough to accommodate older people's needs, circumstances and interests.
- In discussions with older people, the term 'falls prevention' should be down played as it may be unfamiliar, difficult to understand or not considered relevant. Messages for preventing falls should be presented in the context of staying independent for longer.
- Information provided should be easy to understand so that older people and their carers can take part in discussions and decisions about preventing falls. This includes offering information in languages other than English if appropriate or necessary.
- Find out what changes an older person is willing to make to prevent falls and help overcome potential barriers that may prevent action to reduce falls.
- Clearly explain the benefits of the intervention and consider the person's perspective, current circumstances, and provide a holistic person centered approach to care.

Part 7 Interventions to prevent falls and falls injury

7. Interventions to prevent falls and falls injury

The *Community Guidelines* are based on reviews of the evidence of effective interventions. However, in preventive health services, there may be a lack of evidence because an intervention is not shown to be effective in properly constituted trials, or because an intervention has not been evaluated using rigorous methodology.

The reliance of evidence based on randomised controlled trials recognises that such trials are the most rigorous form of assessing the efficacy of interventions. However, they may not be adequate or appropriate for evaluating services in the 'real world', which comprise a complex mix of strategies and uncontrollable variables [177]. This is particularly so in population-based interventions and public health programs which differ dramatically from the environment in which falls research studies of randomised controlled trials are generally conducted [178].

For any intervention to prevent falls to be effective and of direct relevance to health care practitioners, Close and Glucksman (2000, p.176) state that it should:

- be acceptable and applicable to the affected population (*applicability*)
- alter outcome in terms of falls or fall-related injury (*efficacy*)
- be cost effective (*cost-effectiveness*)
- be readily applicable to everyday practice (*practicability*) [179].

7.1 Research Evidence

Key findings for preventing falls come from reviews and meta-analyses of intervention studies to reduce falls and fall-related injuries [35, 36, 78, 139, 144, 178]. A number of reviews have also been undertaken of single strategy interventions, for example home modifications [180, 181]; exercise [114, 182-184], including Tai Chi [185]; Vitamin D supplementation [186, 187]; and hip protectors [188]. Reviews have also

been undertaken of interventions targeting specific falls risk factors, such as fear of falling [189] and visual impairment [190].

From these reviews, there is evidence that most falls among older people are associated with identifiable and modifiable risk factors and that preventive efforts are effective [1]. There is less direct evidence for effectiveness of interventions to prevent fall-related injuries. Serious injuries in community-dwelling older people occur in about five to 15 percent of falls [38], so that large sample sizes incorporating long term follow-up are required to capture a difference in rate of fractures or serious injuries between control and intervention groups [36].

7.2 Translating Research Evidence into Practice

There are a number of guidelines, that are based on reviews of evidence, that are applicable across the continuum of care for the prevention of falls [59, 65, 87, 191, 192] and fall-related injuries, such as hip fractures [193, 194].

For sustainability in preventing falls, evidence must be integrated into practice and effectiveness evaluated under real life or usual conditions [1]. This needs to include taking into account the views, preferences and experiences of older people in relation to strategies for preventing falls [70]. (Discussed in Section 6.8)

7.3 Community Interventions of Known Effectiveness

The Glossary defines the terms used to describe types of interventions based on risk factors (single/multifactorial), number of intervention components (single/multi-strategy), target group (unselected/selected on the basis of risk), and type of program (personal health/public health).

7.3.1 Multi-strategy, Multifactorial Interventions

Multi-strategy multifactorial interventions include a range of components that address a number of risk factors. Such programs

have been shown to be effective in the community, both for an untargeted population of older people (not selected on the basis of risk) and for older people either with a history of falling or targeted because of known risk factors based on a falls risk assessment [144]. Specific recommendations for targeted community-dwelling older persons identified as at risk, are that multifactorial interventions should include gait training and advice on appropriate use of assistive devices, review and modification of medication, especially psychotropic medication, exercise programs with balance training as one of the components, modification of environmental hazards and treatment of cardiovascular disorders [59]. Untargeted population-based approaches which incorporate multifactorial multi-strategies (such as education, promotion of physical activity and safe footwear, home safety and medication review) have been shown to reduce fall-related injuries [178].

While current guidelines support multi-strategy, multifactorial falls prevention interventions both for individuals and populations at risk [59, 192], recent evidence suggests that for community programs for populations at risk, targeted single interventions are as effective as multi-strategy interventions, and may be more acceptable to older people, as well as cost effective and less resource intensive [195]. Single interventions are effective when they are directed at the major remedial risk factor for the particular target population [195].

Good Practice Points

- A multi-strategy multifactorial approach is recommended to prevent falls at both community/population and individual levels.
- Where a single modifiable risk factor accounts for a large proportion of the falls risk, based on falls risk assessment findings for individuals or risk factor prevalence in the community, a single strategy intervention directed at reducing that risk is effective.

7.3.2 Exercise Programs

Exercise has been the most thoroughly investigated single intervention, and there is now strong evidence to support specific types of exercise for modifying falls risk and preventing falls [35, 129]. Risk factors targeted in exercise programs include balance and mobility impairments, muscle weakness, poor reaction time, limitations in ability to perform activities of daily living, and fear of falling. In untargeted populations, exercise is an important component of healthy ageing programs [196]. The benefits of physical activity for promotion of physical, psychological and social well-being in older people have been well documented [196].

Based on a systematic review of exercise interventions for falls reduction, Lord et al, 2007 outlined the common features of effective exercise programs [35] (see Table 7.1) The key elements for effect were having a balance component, being of moderate intensity, and providing a moderate to high challenge over a greater length of time (increased dose) [197].

Lord (2006) has also developed an algorithm for exercise prescription (Table 7.2) [198]. While there is some evidence to support targeting these groups with these types of exercises, this approach is limited in at least two key areas: (1) personal preference for type of exercise, which is important for uptake and sustained engagement (2) people who don't fit in to the three groups – e.g. 70 year old with poor balance and mild cognitive impairment – who may benefit more from a one-on-one exercise program.

Table 7-1: Common Features of Effective Exercise Programs for Falls Reduction

Exercise Program	Features
Type of exercise to include	a. balance exercises b. exercises conducted in weight-bearing positions c. exercises reducing amount of arm support d. an additional component of moderate intensity resistance training
Prescription	a. progressive in intensity b. individually prescribed intensity c. addressing key risk factors of individual or population group
Nature of program	a. sessions of 60 minutes duration b. at least three times per week c. for a minimum of six weeks d. delivered in group or individual setting e. containing support mechanisms to motivate and maintain adherence in the long term
Design and Delivery	a. designed by a trained professional (most often a physiotherapist) b. delivered by a trained instructor

Source: Lord et al. (2007) p.194 [35]

Table 7-2: Algorithm for Exercise Prescription

Population	Program
60-80 years › general population › low risk	Untargeted group exercise for balance, strength and endurance
70-80 years or at an increased risk	Targeted group balance and strength training
80 + years or at increased risk	Home-based individualised exercises for balance, gait, strength and endurance

Source: adapted from Lord (2006) [198]

Many exercise trials have shown that balance training can prevent falls [35, 36, 199]. To be effective exercise programs need to include a balance component and need to challenge the balance system of the individual: however it is extremely important that the safety aspects for the individual are considered so as not to cause falls or injury [35]. Prior to commencing an exercise program, the individual should be assessed to determine the best type of exercises, exercise approach, and safety issues. Older people with varying levels of physical functioning may require different levels of supervision to ensure safety. While close supervision may be an issue for exercises conducted at home or in a group setting, several programs that can be safely and successfully conducted in these settings have been developed [199-202]. A group exercise program with a significant balance component, such as Tai Chi, has also been shown to be effective in preventing falls in community-dwelling participants [203-205].

Several trials of exercise programs that have included functional task training (e.g. stair climbing, sit to stand), often in conjunction with balance or strength training, have demonstrably reduced falls [35]. Since a certain level of cardiovascular fitness is required to undertake functional tasks, endurance training may also be an important

component in exercise interventions [35]. Moderate intensity aerobic activity for a minimum of 30 minutes on five days per week has been recommended by the American Council of Sports Medicine, and the American Heart Association, to promote and maintain health in older adults [196]. Walking is one of the commonest physical activities undertaken by older people [206], but there is, to date, no evidence that walking programs (as a single intervention) reduce falls rates [35].

There is strong evidence to suggest that resistance training can improve strength and power and function among older people [207]. However, it is less clear whether resistance training alone can prevent falls, although it has formed part of many successful fall prevention programs [35, 36]. Exercise programs that incorporate resistance and weight-bearing can significantly limit loss of bone mineral density, which should have an effect on fracture rates following a fall [36].

While exercise targeted to a person's particular functional limitations and lifestyle is more likely to be effective, even general exercise programs can be effective in healthy older people to enhance functional ability and minimise age-related decline. The promotion of physical activity in older adults should emphasise moderate-intensity aerobic activity, muscle-strengthening activity, balance exercises, and reducing sedentary behaviour to reduce falls risk [196].

Exercises can be conducted individually or in a group, can have various levels of supervision and be conducted in a variety of settings [35]. At present there are no trials for the most effective way to deliver fall and fracture prevention strategies [208], and no studies directly comparing group and individual (home-based) exercise [35].

A number of factors need to be taken into account to increase participation and adherence to exercise programs. Older people equate the term 'exercise' with formal exercise, which they perceive to be something done only by exceptional people [68]. Using the term 'exercise' will narrow older peoples' view of what they can be involved in to improve their health [68]. Other terms such as 'physical activity'

or 'staying active' may be more acceptable. (Refer to the Glossary for explanation of terms 'exercise' and 'physical activity')

Incentives for participation reported by older people include: having a doctor's advice to attend [209]; social support such as friends and family participating [206, 209, 210]; ease of facility access; and neighbourhood safety e.g. for walking programs [206, 210]. Intention to undertake a strength and balance training program was found to be associated with the belief that: the program had multiple benefits; was associated with a positive social identity; and that family, friends, and doctors would approve of participation [211]. Among factors cited as barriers to exercise participation are; lack of interest, poor health, fear of falling, and low outcomes expectation [206, 212]. Change in health status, perceived frailty, lack of motivation and poor self-efficacy are also cited as common reasons for non-adherence to prescribed exercise programs [212].

Good Practice Points

- The term 'exercise' should be used by health professionals to describe a structured program of physical activity that is prescribed for the individual. However when promoting general activity options to older people, other terminology needs to be used such as 'physical activity', 'healthy activity' or 'staying active'.
- Multifactorial programs in targeted or untargeted populations should include an exercise component.
- Tailored exercise programs should address identified risks and include challenging and progressive balance exercises in combination with resistance, endurance and flexibility training, if appropriate. Such exercise programs should be individually prescribed and monitored by trained personnel
- Untargeted group exercise programs that emphasise moderate to high balance training are effective and should be promoted and implemented across Queensland.

- The promotion of general physical activity in older adults should emphasise moderate-intensity aerobic activity (a minimum of 30 minutes on five days per week which can be done in three lots of ten minutes) and encourage strength training on two non-consecutive days of the week and a balance activity at least once per week (e.g. Tai Chi) [196].
- Physical activity programs should be appropriate for the age and lifestyle of the individual.
- Prior to undertaking a physical activity program, the individual should be consulted about individual and environmental factors which will facilitate uptake and sustained engagement so these can be identified and addressed.
- The most appropriate option for exercise for an individual should be determined through discussion between the practitioner, the client, and if appropriate, the carer. This should consider health status, cognitive status, safety, availability and access, and personal preferences.

For further information about exercise programs such as the Otago and No Falls programs refer to the *Queensland Stay on Your Feet® Community Good Practice Toolkit* (http:///www.health.qld.gov.au/stayonyourfeet).

7.3.3 Environmental Hazard Modifications

Reducing hazards in the home appears not to be effective in preventing falls in the general older population and those at low risk of falls [180]. However, for older people with higher risks of falling (i.e. with mobility limitations, visual impairment and a history of falling) home hazard assessment and modification that is professionally prescribed is effective [144, 213, 214]. Effectiveness may depend on improved transfer abilities and other behavioural changes [213, 215]. Environmental assessment and modification by a trained professional (e.g. occupational therapist) appears to contribute to the success of multi-strategy programs for prevention of falls in at-risk groups [35]. A belief that home modifications can prevent falls and having help at home from relatives enhances adherence to recommendations [216]. Potential

sources of assistance with costs and modifications for eligible clients include the Department of Veterans' Affairs *Homefront* program (http://www.dva.gov.au/health/homefront/intro.htm) and the Queensland Department of Housing *Home Assist Secure* program (http://www.housing.qld.gov.au/programs/ch/support/has.htm). There is insufficient evidence that altering the physical home environment by removing potential hazards reduces injuries due to falls [181]. The effects of interventions to reduce hazards in public places are difficult to assess and there is, as yet, no strong evidence that programs to improve the safety of public places reduce falls rates [36].

Good Practice Points

- Professionally prescribed home hazard assessment and modification by occupational therapists should target those at high risk of falls. This will be more effective when combined with strategies to improve functional ability and modify risk behaviour.
- Targeted multifactorial programs for both individuals and the community should include home hazard reduction as a component.

7.3.4 Medication Review

Medication review is recommended for those who have experienced a fall [59] and is an essential part of a comprehensive geriatric assessment [129, 192].

Reduction of medications, particularly for those taking four or more medications, has been a prominent component in effective multifactorial interventions to prevent falls [59]. Alternatives to the prescription and use of some medications, particularly psychotropics, need to be acceptable to older patients, their doctors and other health professionals [35]. This also highlights the need for education of health professionals and older people on the quality use of medicines. Non-pharmacological interventions for the treatment of sleep disorders and anxiety in older people may be considered as an alternative to pharmacological means. These alternatives may include relaxation,

support, reassurance, avoidance of day time naps, avoidance of heavy meals and coffee before sleeping, and increased exercise [3].

One trial showed that withdrawal of psychotropic medication is effective in reducing falls but longer-term adherence is an issue [217]. Optimal adherence requires weaning off these medications combined with considerable psychological support.

Good Practice Points

- Older people should have access to the best pharmacological agents available based on evidence-based prescribing
- Prescription of medications should be done in discussion with the patient to weigh up the risks and benefits of different medications and numbers of medications prescribed
- Regular medication review should be included in multi-strategy multifactorial interventions for both individuals and the broader community.
- Older people on psychotropic medication should have their medications reviewed and gradually reduced / discontinued if possible.
- Compliance issues with the withdrawal and ceasing of psychotropic medication need to be addressed and monitored, in consultation with relevant health professionals.
- Consider reducing or eliminating the need for psychotropic medications, through non-pharmacological, cognitive-behavioural interventions.
- Alternatives to psychotropic medication use should be considered for older people presenting with sleep disorders, anxiety, etc.

7.3.5 Vision Assessment

While there is evidence that cataract surgery can prevent falls [218], it is less clear that falls are prevented through comprehensive vision and eye examinations with referral for appropriate interventions [219]. Nonetheless older people should be encouraged to have their eyesight checked by an optician regularly (at least annually) to detect

any remedial cause of decline in visual function [129]. The estimated prevalence of low vision increases exponentially with age and in the majority of cases, the causes are readily treatable [220]. Older people need to be advised that their risk of falls may increase in the short term after receiving new glasses or a change in lens prescription. Older people also need to be advised that glasses for reading, such as multifocal and bifocal glasses, can distort their vision of objects and stair edges if worn when walking, which can increase their risk of falling.

Good Practice Points

- Expedite surgical intervention for cataracts if possible.
- Include regular reviews of vision in multi-strategy multifactorial interventions for both individuals and the broader community.
- Advise older people that a change of glasses may initially increase their risk of falls.
- Ensure that people who have had falls involving environmental obstacles (such as stairs and curbs) consider using distance glasses rather than bifocal or multifocal glasses when walking.

7.4 Potentially Effective Interventions

7.4.1 Cardiovascular Interventions

Falls in older persons may sometimes result from arrhythmias, orthostatic hypotension, or other disorders leading to a transient loss of consciousness (syncope) [81]. Falls that have a cardiovascular cause can be assisted by intervention strategies directed to syncope, such as medication change or cardiac pacing [59]. While pacemakers for those with carotid sinus syncope were found to prevent falls in one study [221] the results have not been replicated and this treatment for recurrent falls is not currently recommended [59]. Those individuals with unexplained falls, syncope, or dizziness should be referred for specialist assessment, investigations, and intervention [35].

Good Practice Point

› Reported episodes of dizziness, faintness, syncope, unsteadiness or unexplained falls should be investigated and addressed [3].

7.4.2 Bone Strengthening Medications/Supplements

Fractures can be reduced through a number of medications that are used widely to prevent or treat osteoporosis (e.g. hormone replacement therapy (HRT), calcium, vitamin D, antiresorptive agents) [59]. Every individual with a low trauma fracture should be investigated for exclusion of underlying osteoporosis and considered for effective treatment to reduce future fracture risk. Despite both the magnitude of the problem and the introduction of osteoporosis treatment guidelines, most high-risk individuals (possibly 80%) are still not identified, and thus not treated [222].

Evidence from meta-analysis suggests that supplementation with vitamin D appears to reduce the risk of falls among community-dwelling and institutionalised older individuals [186]. Calcium plus vitamin D supplements reduces fracture incidence, including hip fracture, in institutionalised as well as independently living older people [194].

While research on healthy active adults aged 18-87 years living in Brisbane showed that 42.5 percent of this sample had deficient or insufficient levels of vitamin D [223], there is insufficient research to be able to recommend a safe amount of sun exposure required to synthesise a beneficial amount of vitamin D without exposing people to further skin cancer risks [223]. Health professionals need to review the vitamin D status of older people and consider supplementation as an alternative.

Good Practice Points

- Older people with a history of low trauma fracture should be investigated for osteoporosis and treated as appropriate.
- Older people with an identified vitamin D deficiency should be advised to take supplements of vitamin D and calcium.
- There is insufficient research to be able to recommend an amount of safe sun exposure to synthesise a beneficial amount of vitamin D; therefore, deliberate exposure to sunlight is not advised.

7.4.3 Education Programs

Studies of multifactorial interventions with behavioural and education programs are beneficial [59] resulting in changes to reported knowledge of falls risk factors [36]. However there is limited evidence that targeted or untargeted education in isolation (i.e. with no follow-up) reduces fall rates [59, 87].

7.4.3.1 Social Marketing

There is limited empirical evidence that identifies the elements of a good social marketing campaign for falls prevention [5]. However, an evaluation of *Stay on Your Feet®* (Western Australia) [224] highlighted the need for campaigns targeted to seniors that: (a) convince them that falls are an issue for older people; (b) communicate the serious consequences of falls, including their impact on mobility and independence; and (c) highlight the need for seniors to consider their personal risk of falling. The challenge for social marketers is to raise awareness in the target population of the risk of falling without unnecessarily raising their fear of falling [69, 83].

7.4.3.2 Peer Education

There are a number of community programs for preventing falls that use older people as volunteers or ambassadors to deliver falls education. Such peer education models include the *Stay on Your Feet* program [225, 226] and COTA Peer Education Projects funded through

the Australian Government National Falls Prevention for Older People Initiative (http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-injury-falls-projects.htm). Evaluations of the process and impact of these models have shown the potential of peer education in preventing falls because of apparent acceptability to older people and capacity to empower [227, 228]. The reduction of falls in one study [229] may be partly due to the use of theoretical models for adult learners, such as valuing shared learning among peers and peer modelling for change [65].

7.4.3.3 Cognitive-Behavioural Programs

Because fear of falling and risk of falls share predictors [91], interventions that use cognitive–behavioural strategies to reduce fear of falling have been shown to reduce falls rates [98]. Such interventions emphasise self-efficacy and encourage behavioural change to promote a realistic and adaptive view on falls risk by encouraging older people to perform activities safely [189]. Programs incorporating cognitive-behavioural approaches have reduced fear of falling [189] and have the potential to reduce the effects of other psychological risk factors [36]. It is crucial that changes in falls efficacy remain consistent with actual falls risk, otherwise promotion of balance confidence beyond balance abilities may lead to risk-taking behaviour and so to falls. A trial of *Stepping On*, a community-based program using a small-group learning environment followed by a home visit, showed a 31 percent reduction of falls in the intervention group [98]. This study had a strong focus on participatory methods by empowering older people through providing information, trialling different interventions, and group discussion.

Good Practice Points

- Education strategies to raise awareness and provide information should not be used alone but included in a multi-strategy multifactorial intervention for both individuals and the broader community.
- Cognitive-behavioural approaches to supplement education programs can be included in a targeted multi-strategy multifactorial intervention for individuals.
- Education and social marketing campaigns should note that terms such as 'fall' and 'falls prevention' can have negative connotations: interventions need to be communicated as a lifestyle-enhancing measure and as a means for staying independent for longer.
- Information should be relevant and useable, be available in different languages, and be culturally sensitive.
- Cognitive behaviour therapy to reduce fear of falling should only be used in conjunction with assessment of fall risk and interventions to reduce falls.

7.4.4 Assistive Devices

Studies of multifactorial interventions that consider assistive devices (mainly prescription and/or training in the use of walking aids) have demonstrated benefit [35, 59]. However there is no direct evidence that use of assistive devices alone will prevent falls [35, 36, 59]. (See also Section 5.2.8.4).

Good Practice Point

- Targeted multi-strategy multifactorial interventions should include advice on appropriate use of assistive devices, including correct use and maintenance.

7.4.5 Technological Aids

Smart home technology has the capacity to facilitate ageing-in-place by assisting older people and their carers with emergency response, fall prevention/detection, reminder systems, medication administration

and assistance for those with hearing, visual or cognitive impairments [230]. Such devices can improve physical and psychosocial capacity and enhance independence, especially for those living alone. However, there is no direct evidence evaluating the effectiveness of technological aids (such as personal alarms) in preventing falls or reducing the deaths (mortality) and disability (morbidity) associated with 'long lies' after a fall [36].

Good Practice Points

- Older persons living alone and/or identified as at risk with cognitive/vision/mobility impairment and/or their carers should receive information about the technological aid options to improve their physical and psychological capacity and enhance their independence.
- As part of a multifactorial and multi-strategy intervention older people at risk of falling and/or with a fear of falling should be shown how to get up from the floor safely and independently so as to avoid the risk of long lies.

7.4.6 Footwear and Foot Problems

While some trials of specific footwear interventions report improvement in intermediate outcomes, such as balance and sway, there is little evidence from experimental studies of footwear interventions that consider falls [59]. Although there is little information on the influence of footwear design features on postural stability and falls, it seems reasonable to suggest that older people are advised against wearing of high heeled shoes and shoes with very soft or slippery soles [35]. While advising older people on the potential hazards of certain types of footwear may be a potentially useful for preventing falls, compliance issues may limit the efficacy of such an intervention [35]. Foot and ankle problems are common in older people and are also associated with impaired balance and performance in functional tests [231] as well as the risk of falls [232]. A few studies have targeted foot problems as part of multifactorial intervention strategies [233, 234], but there is a lack of evidence for podiatry referral

as an intervention for preventing falls in community-dwelling older people. (See also Section 5.2.8.3)

Good Practice Points

- Through multifactorial and multi-strategy intervention, older persons and or their carers should be given information about foot care and footwear features that may reduce falls risk.
- The most appropriate shoe has a low heel, a firm midsole, a supporting heel collar and a slip resistant sole.
- Older people should be screened for foot problems which may increase the risk of falls and be referred for podiatry assessment and treatment.

7.4.7 Hip Protectors

There is evidence that hip protectors to minimise fall-related hip fractures are an ineffective intervention for those living at home [188]. Adherence contributes to their reduced effectiveness.

Good Practice Point

- Hip protectors can be recommended for older people who are at high risk of hip fracture (defined as greater than 80 years of age with a history of falls and /or osteoporosis), and for whom there is no perceived barrier to their use [3].

7.4.8 Nutrition

There is limited evidence that nutritional assessment, advice and supplementation alone is an effective intervention for falls in community-dwelling older people [36, 192]. Nutrition counselling was found to be effective as part of a multifactorial risk reduction program [235]. In a recent trial, Swanenburg et al, 2007 [236] investigated whether a program of exercise and nutritional supplement (calcium/vitamin D and protein) would have a larger effect on fall-related outcomes than calcium/vitamin D supplementation only, in older people with low bone mineral density. Results showed there was 89

percent reduction in falls reported in the experimental group (who had exercise and nutritional supplementation) compared with the control group (who had nutritional supplementation only). Further research trials are needed to assess the effectiveness of nutritional interventions on risk of falling.

Good Practice Points

- Advice about adequate nutrition and a balanced diet should be included in multi-strategy multifactorial interventions for both individuals and the broader community.
- Prior to commencing an exercise program, it should be recognised that adequate and appropriate nutrition is an important adjunct to providing necessary energy requirements for optimising physical activity. Refer Section 5.2.7.4

7.4.9 Lifestyle Interventions

Modifiable behaviours such as smoking, excessive alcohol consumption, inadequate activity, low body mass index, and lack of preventive health care, all are risk factors for osteoporotic fractures, particularly fall-related hip fractures [104, 109, 113, 114, 237]. Lifestyle programs that address dietary intake, physical activity, smoking habits and environmental risk factors for osteoporosis and falls have potential to reduce fracture incidence [238-240]. While lifestyle interventions have focussed on behavioural risk factors for falls and osteoporotic fractures, there are other psychosocial factors associated with falls [241, 242] and fall-related injuries [243] that have largely been ignored as the focus of interventions to prevent falls. Programs to increase community integration, raise morale, reduce social isolation, and engage older people in social and productive activity have the potential to reduce falls – this was demonstrated in a controlled study on the impact of professionally conducted cultural programs on the physical health, mental health, and social functioning of older adults [244]. In a non-randomised controlled trial, those participating in a choral group demonstrated a reduction in reported falls as well as better morale

and less loneliness in comparison with a control group [244]. The potential of such 'healthy ageing' programs to reduce fall incidence in community-dwelling older people has been discussed in Section 4.3.2.

Good Practice Point

› Interventions to raise awareness of, and address lifestyle risk factors, should be widely promoted and incorporated into programs for older people to promote healthy active ageing.

7.5 Summary of Intervention Strategies to Address Modifiable Risk Factors

Interventions for preventing falls that address the most important modifiable risk factors (see Table 5.1 in Section 5.3) are summarised in Table 7.3. Since few risk factors occur in isolation, most interventions will be multi-strategy, addressing multiple risk factors. While the focus of interventions in Table 7.3 is on modifiable risk factors, interventions aimed at promoting healthy active ageing and minimising fall-related injury can be adapted for all older people, whatever their risk factor status.

Table 7-3: Intervention Strategies to Address Modifiable Risk Factors

Risk factors	Intervention strategies
Socio-demographic Factors	
Poor social networks/ social isolation	› programs to promote social activity and reduce social isolation
Psychological Factors	
Fear of falling	› education program for cognitive/ behavioural change › exercise including balance and functional exercise program such as Tai Chi
Other psychosocial factors (depression, poor self-rated health, cognitive impairment, sleep disturbances)	› referral to geriatrician, psychiatrist, psychologist, pharmacist or occupational therapist for management › education program for cognitive/ behavioural change › exercise program › general health promotion program
Risk taking behaviour	› cognitive/behavioural education program › home assessment/modification
Physical Functional Capacity	
Limitations in daily living activities	› exercise with functional training › advice on use of aids › home assessment/modification to assist mobility

Risk factors	Intervention strategies
Impaired balance	› exercise specifically for balance retraining › advice on use and maintenance of walking aids
Impaired gait	› exercise for balance and functioning training › advice on need for, use and maintenance of walking aids › home environment assessment
Sensory and Neuromuscular Factors	
Visual impairments	› medical/surgical interventions for treatable eye diseases- specifically cataract surgery › referral to optometrist/ ophthalmologist for vision check and prescription of appropriate spectacles › home hazard assessment and environmental modifications to assist mobility and safety
Reduced muscle strength	› exercise including strength training › nutritional advice/supplements
Poor reaction time	› exercise emphasising co-ordination and rapid responses
Reduced vestibular function	› specialist referral for vestibular rehabilitation

Risk factors	Intervention strategies
Medical Factors	
Medical conditions	› treatment with medical or surgical interventions. › medication review with general practitioner/pharmacist › referral to allied health for treatment/ rehabilitation eg physiotherapy, occupational therapy, audiometry, podiatry › referral to preventive health programs eg chronic disease self-management programs › exercise program specific to needs
Medications Use	
High risk classes of medications	› medication review by general practitioner/pharmacist › medication withdrawal if indicated (may need some emotional/ psychological support and time) › investigation of alternative cognitive/ behavioural strategies for anxiety, depression and sleep disturbances
Polypharmacy	› medication review by general practitioner/pharmacist › education on wise use of medicines
Lifestyle Factors	
Alcohol abuse, smoking	› referral to self-help organisations by qualified practitioner such as an occupational therapist › general health promotion programs

Risk factors	Intervention strategies
Inactivity	› general health promotion programs emphasising physical activity › assessment and management of barriers to participation
Inadequate nutrition/ loss of body weight	› referral as appropriate to dietician › education and social interventions to address causes › dietary supplements (calcium, vitamin D, protein) › exercise to maintain muscle mass and strength together with dietary supplements
Environmental Factors	
Home hazards	› home assessment and modification › exercise (functional training) to assist safe mobility › vision assessment and referral if appropriate › education for cognitive/behavioural change
Foot problems	› education and referral as appropriate to a podiatrist
Poor footwear	› advice with regard to safe shoes for indoor and outdoor use
Inappropriate walking aids	› education in use of walking aids › appropriate prescription by physiotherapist › exercise (gait and balance retraining) to assist mobility

7.6 Preventing Falls in Special Population Groups

7.6.1 CALD Communities

There is a large projected rise in the population of older Australians who were born in countries in which English was not the usual first language. This has led to an increasing requirement for falls prevention programs that are tailored to linguistic and cultural requirements and differences in health-seeking behaviours and attitudes [47]. To date, most studies on preventing falls have focussed on people who speak English: there has been limited research, mostly unpublished, on the effectiveness of strategies to prevent falls in CALD communities [36]. Further research is needed to consider the specific needs of these communities and to identify the cultural differences that may impact on the effectiveness of such programs, for example, how to deliver physical activity within these groups. The need for culturally sensitive falls prevention resources is recognised through funding for a number of projects for CALD communities by the *Australian Government National Falls Prevention for Older People Initiative* http://www.health.gov.au/internet/wcms/publishing.nsf/Content/health-pubhlth-strateg-injury-falls-projects.htm. Most falls prevention activity targeting CALD communities has involved translating existing resources into a limited number of languages, generally those most prominent in the geographic area of distribution. This approach to preventing falls in these communities has limitations: any approach ideally needs to be developed and implemented with in partnership with older members of the CALD communities.

7.6.2 Aboriginal and Torres Strait Islander People

Except for a water-based exercise group with Aboriginal Elders [245], there is little evidence of strategies for preventing falls that specifically target older Aboriginal and Torres Strait Islander communities. Many of the strategies suggest multidisciplinary involvement, and such services may not be available in rural and remote communities [3]. An

analysis of the Health Assessment (HA) items introduced in 1999 as part of the Enhanced Primary Care Package suggests a significant and persistent disparity in the uptake of items for older patients among Aboriginal and Torres Strait Islander peoples compared to other older Australians [246]. The initiatives to promote health checks in the Aboriginal and Torres Strait Islander community are valuable resources. There needs to be further engagement of primary care providers and the community around uptake of the HA items to ensure that the anticipated health benefits eventuate [246].

Principles for good practice in injury prevention, including from falls, are outlined in *The National Aboriginal and Torres Strait Islander Safety Promotion Strategy* [49]. A storybook *Falls are not for me!,* designed to be used by health care professionals, has been developed for use as an education resource for Aboriginal and Torres Strait Islander older people. It is part of the *Resource Suite for Australian Hospitals and Residential Aged Care Facilities* [3] available at http://www.safetyandquality.org . Although it was developed for the hospital and residential aged care settings, there are some elements that are useful for those working in the community setting.

7.6.3 Cognitively Impaired

Many trials specifically exclude people with cognitive impairment, which means that there is limited evidence for effective prevention of falls in this group of older people [192]. A systematic review [247] found conflicting evidence regarding the effect of physical training on motor performance and falls in older people with cognitive impairment. A multifactorial intervention for older people with cognitive impairment and dementia presenting to the Emergency Department after a fall was not shown to be effective [51]. However, in other settings (hospital and residential care settings) successful multifactorial studies of falls prevention have included people with and without cognitive impairment [248-250]. More research is needed on additional or different approaches for effective falls prevention for people with cognitive impairment in community settings.

In the treatment of cognitive impairment and dementia, recent evidence [251] shows the condition can be treated and possibly prevented through interventions that promote mental health, lifelong education, functional intimate relationships and social engagement, and that target healthy eating, dietary supplementation, exercise and effective cardiovascular treatment. Such preventive health interventions that target a major risk factor for falls would also potentially reduce the risk of falling.

7.6.4 Post Hospital Discharge

Another population group with special needs in falls prevention are those recently discharged back to the community following an episode of care in hospital. Many older people are admitted to hospital and during their stay approximately 36 percent will experience a decline in function [252]. Acute illness and adverse effects of treatment can lead to functional decline, prolonged bed rest can result in muscle loss and increased body sway, and medication changes can impact on cognitive status and psychomotor ability [252]. All these factors contribute to increased falls risk immediately after discharge from hospital [252]. Predictive indicators of increased falls risk post hospitalisation are decline in mobility, the use of an assistive device, low MMSE at discharge and self reported confusion post discharge [252].

The first month after discharge is a high risk time for falls. To reduce this risk, a person's mobility function needs to be maintained while in hospital and the causes of confusion detected and treated [252]. Post acute care, the rehabilitation phase should include a multi-component exercise program to improve strength, balance and functional skill as part of outpatient discharge program [253, 254]. An issue identified in the latter study [254] was that the improved functional performance initially gained by program participants did not lead to increased physical activity when the rehabilitation program concluded. Participants returned to their habitual sedentary lifestyle [254]. To sustain rehabilitation efforts there needs to be available community exercise programs that improve strength, balance and functional skills. These

also need to provide social contact, a buddy system, encouragement from a health professional, and transport options [254].

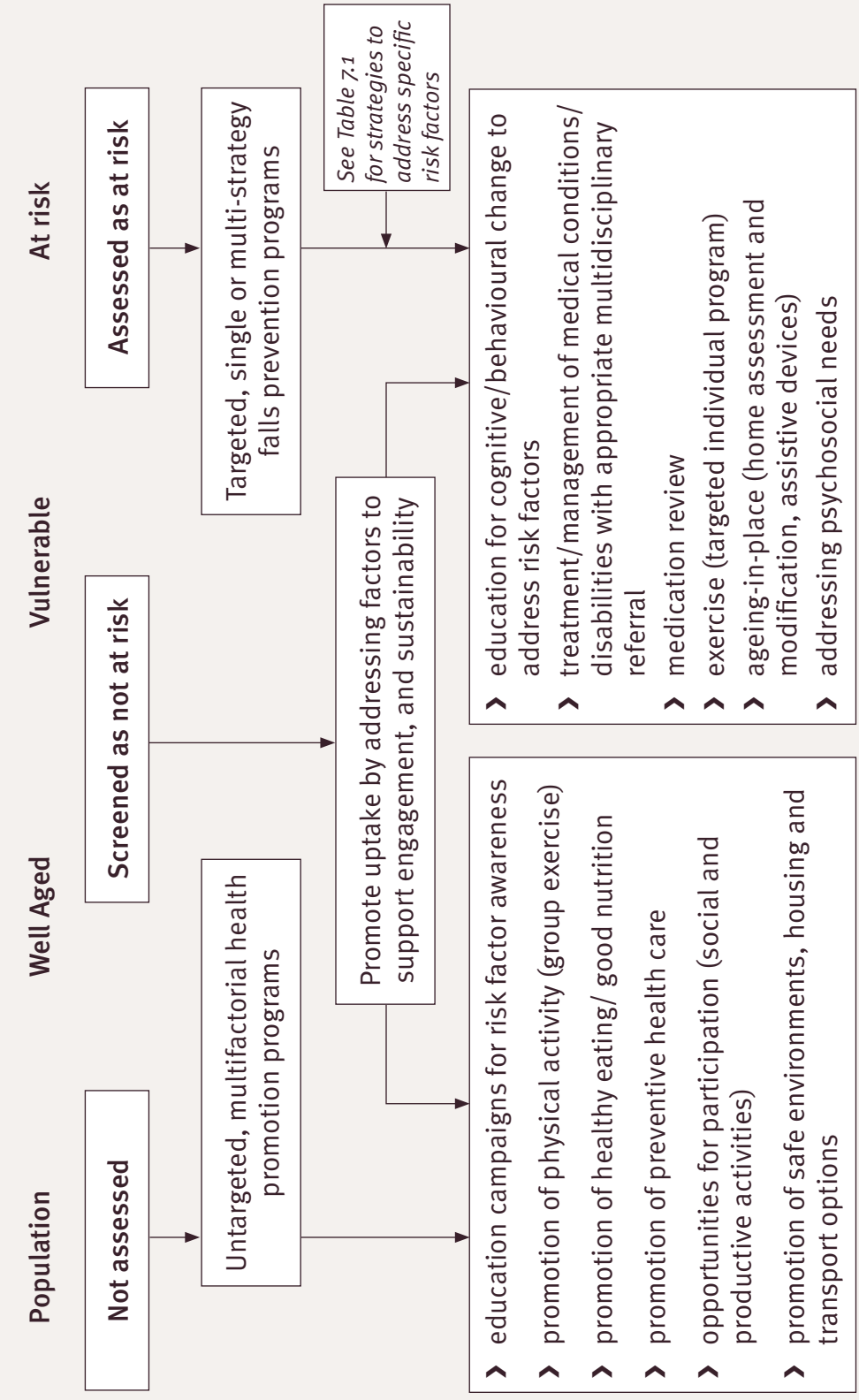
Good Practice Points

- After hospital discharge patients at risk of falls need to be referred to a rehabilitation program that improves strength, balance, and functional skills.
- After completing rehabilitation program health professionals need to encourage and refer older people to community strength and balance programs.
- There needs to be greater availability of community exercise programs that improve strength, balance and functional skills and which also provide social contact and options for transport.

7.7 Implementation of Interventions to Prevent Falls

Recommended pathways of evidence-based interventions to prevent falls interventions are outlined in Figure 7.1.

Figure 7-1: Recommended Pathways for Preventing Falls



7.7.1 Program Coordination

An integral component of any program to prevent falls is the ongoing need for consistent standardised messages, resources, systems and processes of communication about the care of the individual between programs, services, agencies, professionals, family and carers across all settings. This will help reduce duplication of services and increase credibility and acceptance of interventions with older people. In 2008, Queensland Health is trialling a falls safety officers implementation pilot program to create a consistent, coordinated and evidence-based approach to falls prevention in older persons across all levels of the health continuum. This is to be achieved at the local (Health Service District) level, the zonal (Area Health Service) level and ultimately, across the State.

Building on Existing Programs, Resources and Infrastructure

A number of programs operating within Queensland aim to build 'age-friendly' communities and promote healthy, active ageing within their area (e.g. *Stepping Out* and *Steady Steps*). There are also opportunities to link prevention of falls with current health priorities (e.g. chronic disease management, healthy ageing, promotion of physical activity and healthy eating) as well as social priorities (e.g. safe communities, smart housing, and social isolation) [5].

A mechanism for developing interventions at the community level is the Queensland *Stay On Your Feet® Community Good Practice Toolkit* available at: http://www.health.qld.gov.au/stayonyourfeet

7.7.2 Partners and Stakeholders

The responsibility for preventing falls is outside the scope of any one agency, and there is a need for an inter-sectoral and inter-organisational approach. It is anticipated that a wide variety of people who work with older people will partners in implementing community falls prevention strategies [4]. The key partners or stakeholders include:

- older people, their families, carers and organisations who represent them
- organisations and individuals who provide health services to older people;
  - Australian, State, Territory and local health services
  - medical officers including general practitioners, geriatricians and other specialists
  - nurses including specialist, generalist and practice nurses
  - allied health including pharmacists, psychologists, physiotherapists, exercise physiologists, podiatrists, optometrists, nutritionists, dieticians, occupational therapists, ambulance officers and diversional therapists.
  - managers of supported accommodation and retirement services
  - community and population health workers
  - acute, sub-acute and residential aged care workers
  - aged care assessment teams
- planners and service deliverers in relevant non-health settings;
  - local recreational, fitness and leisure facilities
  - transport services
  - local government
  - architects, builders, urban planners
  - businesses and community groups that provide services or products for older people
  - Australian standards
  - training and education providers including universities, TAFE colleges and private training organisations
  - product safety groups

7.7.3 Challenges to Implementation

Despite the evidence of effectiveness, the current application of research findings to practice has yet to affect the unacceptably high

rates of falls and falls-related hospitalisations in Australia [255]. However research is continuing to monitor intervention effectiveness and the results will inform future planning.

Facilitators [5] to implementing evidence based practice include a number of aspects

- Working with partners (including the target group – older persons themselves) for whom activities are already part of core business.
- Sharing knowledge and expertise amongst partners and across disciplines so each understands their contexts, roles and responsibilities in addressing falls prevention and exploring mutual benefits. Ensuring a regional approach to falls prevention services and activities.
- Considering at the outset those who might have a role in ongoing implementation and engaging key stakeholders early to ensure sustainability.

Barriers concerning the adoption of evidence-based strategies in United States populations have been noted in the literature [256], but many would also apply in the Australian context:

- For health care providers
  - time limitations
  - competing demands
  - no mandate to address falls
  - lack of knowledge and skills
  - geriatric conditions not part of professional training
  - complexity caused by multifactorial nature of fall evaluation and management
  - focus is on diagnosing and treating individual diseases
  - fragmentation and lack of coordination
  - need to coordinate and refer across settings and provider groups
  - provider groups do not understand each other's roles and skills
  - components of the programs are outside the health care system

- shortage of multidisciplinary professionals
- lack of sustainability
- requires dedicated people for coordination

- For individuals
  - program has to be relevant, accessible, affordable
  - motivation needs to be maintained.

However, these challenges can be overcome by working together in a coordinated and integrated manner across the health continuum: there is already a strong commitment within Queensland for falls prevention initiatives [5].

Good Practice Point

- Systems should be established within each health district, area health service and state that supports coordinated and integrated falls prevention activities and interventions across these areas.

Part 8 **Glossary**

8. Glossary

What is a fall?

A **fall** is defined by the World Health Organisation as "*an event which results in a person coming to rest inadvertently on the ground or floor or at a lower level.*"

This definition excludes falls resulting from an intentional change in position, but does include those where the person inadvertently comes to rest on furniture, against a wall or other objects [32].

Exercise/ physical activity

Exercise refers to a form of physical activity that involves planned, structured, and repetitive bodily movements to improve or maintain strength, balance and/or physical fitness (e.g. group exercise programs like Tai Chi and individually prescribed programs).

Physical activity is a broad term that encompasses any bodily movement produced by skeletal muscles that result in an expenditure of energy. The World Health Organisation defines physical activity as including all movements in everyday life, such as work, recreation, exercise and sporting activities (e.g. gardening, bowls etc). See the following website: http://www.vichealth.vic.gov.au/Content.aspx?topicID=186

Programs for preventing falls

Personal health programs are individually tailored to achieve maximum benefit, are based on diagnosis, may require many health professionals (physician, occupational therapist, physiotherapist and nurse), but can reach only a small proportion of people. Fall prevention programs for individual patients aim to identify all the contributing factors to the person's fall risk and modify those amenable to intervention.There is also merit in identifying falls risk factors as part of an overall risk profile such as in a generic health review.

Public health programs, in contrast, identify target populations, tend to use a multi-skilled professional, are protocol based and reach larger numbers at lower individual cost. In the implementation of a public health fall prevention strategy there are a number of facts that need to be considered in determining the interventions such as cost, the population most likely to benefit, and public acceptability. In such population-based fall prevention programs, several measures are introduced as a coordinated package across an entire community or a large part of it.

Intervention terms

Multifactorial interventions address multiple risk factors concurrently. Most falls are multifactorial in their origin and result from interactions between long-term or short-term predisposing factors and short-term precipitating factors in a person's environment. While addressing a single major risk factor can be very effective, most interventions for preventing falls aim to modify several risk factors.

Multi-strategy interventions include a number of strategies (e.g. education, home assessment and modification, exercise, and medication review) which together form the intervention program.

Interventions may be either **targeted** (based on risk factor assessment) or **untargeted** (irrespective of identification of specific risk factors). Terms used synonymously are selected and unselected. For targeted interventions the program participants are **selected** based on the presence of the risk factor, whereas untargeted interventions include **unselected** participants, not selected on the basis of risk.

Long lies

Long lies is a term used to describe lying on the floor (or other surface) for a lengthy period after falling, before assistance is obtained.

Primary health care

For community-dwelling older people their first level of care will be in the **primary health care setting**. The World Health Organisation (WHO) Alma-Ata Declaration defines **primary health care** as incorporating curative treatment given by the first contact provider along with promotional, preventive and rehabilitative services provided by multi-disciplinary teams of health-care professionals working collaboratively. http://www.who.int/hpr/NPH/docs/declaration_almaata.pdf

Rural and remote

Rural and remote populations are those located outside of cities with a population greater than 250,000. The common feature of these populations is that they live some distance from the major population centres. Discussion about the health of people living in rural and remote areas uses the geographical terms 'major cities', 'inner regional', 'outer regional', 'remote' and 'very remote', based on the ABS Australian Standard Geographical Classification (ASGC) Remoteness Areas definitions. http://www.abs.gov.au

Screening tests

Face validity is the extent to which the contents of a test or procedure look like they are measuring what they are supposed to measure. A test of external validity of a falls screening instrument is its ability to correctly categorise persons as test-positive (i.e. increased risk of falling) or test-negative (i.e. not at risk).

Sensitivity is defined as the proportion of people who are predicted to fall and who did fall from a population who has been screened.

Specificity is defined as the proportion of non-fallers who were identified as not at risk of falling when screened. The relationship between sensitivity and specificity depends on where the **cut-off score** is set to determine what is high risk and what is not.

With respect to the number of cases detected by a screening test, the measure commonly used is **predictive value**. The predictive value

measures whether or not an individual is at risk, given the results of the screening test.

Inter-rater reliability is a test of the reliability of a measure and assesses the degree of agreement or consensus between different raters or observers.

Part 9 References

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Part 10 Appendix A
Health Continuum Model

10. Appendix A

Health Continuum Model

More information on the Health Continuum Model including explanatory notes and case studies is available at www.health.qld.gov.au/stayonyourfeet


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