Thesis submitted to Charles Sturt University
for the
Doctor of Philosophy

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Exploration of Fall Risk in Regional Australia

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Risk taking activities were underpinned by the value the older person placed on independence

Decisions to undertake high-risk activities related to the participant’s desire not to burden family or friends and financial influences

Fear of falling can significantly affect a person’s activities of daily living

Older people not translating knowledge of fall risks across the full range of contexts

Addressing fall risk in regional Australia: a proposed new model

Social ecological framework

I don’t worry about the risks

I have always done it that way

It’s not a risk if you are careful

Being frightened makes me much more wary

Interacting with support

I don’t want to burden my family

Accessing external support is not always easy for me

I have just changed how I do things

How can I prevent falls if people don’t talk to me about it?

Covering up

I’m fine, it’s my family that thinks I cannot do things

Falling is embarrassing

I’m OK so they don’t need to know

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DISCUSSION

Challenges existed in seeking to identify older people at risk of falls

Poor data quality in hospital admission records

Inability to capture data on the entire spectrum of fall events

Older people not disclosing they have fallen

Fall related risk in the older population was inconsistently managed

At risk older people were not consistently referred for falls screening or interventions

Focus on the physical injury rather than contributing factors

Inconsistent use of validated fall risk screening tools

Lack of routine follow up

Variability in access and availability of services

Unclear communication by health professionals regarding fall related risks

The influence independence has on behavioural decisions and the perception of risk

Risk taking activities were underpinned by the value the older person placed on independence

Decisions to undertake high-risk activities related to the participant’s desire not to burden family or friends and financial influences

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Certificate of Authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma at Charles Sturt University or any other educational institution, except where due acknowledgment is made in the thesis [or dissertation, as appropriate]. Any contribution made to the research by colleagues with whom I have worked at Charles Sturt University or elsewhere during my candidature is fully acknowledged.

I agree that this thesis be accessible for the purpose of study and research in accordance with the normal conditions established by the Executive Director, Division of Library Services or nominee, for the care, loan and reproduction of theses.

Signed: .................................................................

Name: .................................................................

Date: .................................................................

Signed: Kristy Robson

Date: 21/3/16
Acknowledgments

Undertaking a PhD is not a sole affair, it takes a community of people to support you along the way. Whether it is supervisors, research participants, colleagues, family and friends, or just people that take an interest in what you are doing, they all contribute to your journey. I have been incredibly fortunate to have my own amazing community of people who have encouraged and inspired me to achieve such a momentous task.

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I feel very privileged indeed to have you all in my community.

“Alone we can do so little; together we can do so much” (Helen Keller n.d.)
Ethics

The studies in this research program were approved by the Charles Sturt University Human Research Ethics Committee. 2011/082.

Additionally, one study (Falls Baseline Survey, Chapter 5) was approved by the Greater Southern Area Health Service Human Research Ethics Committee, as the survey was administered to health sites within this area health service. The ethics approval number is 08/GSAHS/7 SSA 08/GSAHS/27

Approval letters for both Human Research Ethics Committee outcomes are shown in Appendix A.

The names of all the participants and any geographic locations they referred to have been replaced with pseudonyms.
Paid Editorial Assistance

Mr Keith Johns provided paid editorial assistance with the final version of this thesis. Keith is a retired Technical and Further Education (TAFE) teacher and has no similar academic specialisation to the author. Editorial assistance comprised correction of punctuation and minor changes to formatting, to ensure that the presentation conformed to APA guidelines.
Abstract

The aim of this research was to develop a deeper understanding of the contextual factors that influence fall risk within regional Australian communities. Fall related injury in older Australians continues to rise despite concerted efforts to manage fall risks. This trend is of concern, given the ageing Australian population. Although research into falls is vast, the majority of papers investigating fall related risk factors focus on quantitative approaches, and without consideration of the complexities associated with the diversity among communities.

Unique to this research was a focus on regional Australia. An injury risk management framework, was used to provide an overarching structure for the design of the research program. A mixed method approach was employed to collect data from multiple data sources and stakeholders. This provided an opportunity to capture key issues and enable a more comprehensive understanding of the contributing risk factors associated with falls in older people residing in a large regional area of southern NSW.

The research reported in this thesis addressed two key questions:

- What factors influenced the risks and rates of fall related injury in older people living in regional Australian communities?

and

- What are the implications of these factors for fall risk management in regional Australia?
Complex multi-factorial elements were identified from this mixed-method research program. The four findings chapters present data and findings that encompass hospital admission data, health sector surveys and in-depth interviews with older people who had fallen. Collectively, these highlight three overarching issues impacting upon fall risk management in regional Australia:

- challenges associated with identifying older people at risk of falls;
- an inconsistent approach to managing fall related risk in the older population; and
- their desire to retain independence influences people’s behavioural decisions and their perceptions of risk.

The findings help explain why current efforts are failing to curb fall related injury in our communities. They also highlight the need for alternative approaches that are more holistic and broad ranging in order to reduce the risks and rates of fall related injury in the future. The thesis uses the findings to explore the potential to adopt a socio-ecological approach to fall risk management, with a greater focus on empowering and supporting older people to maintain safe independence as they age.
CHAPTER 1 INTRODUCTION TO THE RESEARCH

INTRODUCTION
The program of research reported in this thesis constitutes a unique contribution to knowledge and understanding of the contextual factors associated with fall related injury in older people residing in a large regional\(^1\) area of New South Wales (NSW), Australia. It draws key findings from a mixed method design which integrates both quantitative and qualitative research findings. The findings demonstrate complexities of fall risk in regional Australia that have not been previously reported, and may indicate a need to implement a more holistic approach towards managing fall related injury risks in the population of older people\(^2\) residing in regional Australian communities.

The background to this program of research and the impacts of fall related injuries on the community are introduced in this chapter along with a summary of current research directions in this area. The specific aims of this research program and the use of a mixed method approach to the research, informed by a risk management framework, are discussed. Finally, a brief overview of each of the subsequent chapters is provided.

BACKGROUND TO THE RESEARCH
Fall related injuries in older people constitute a significant public health issue in Australia and internationally. Falling represents the leading cause of unintentional injury in this population (Gelbard et al., 2014). Approximately one third of older adults fall each year (Lord, Delbaere, Tiedeman, Smith & Sternieks, 2011; Watson, Clapperton & Mitchell, 2010) with 20% to 30% suffering moderate to severe injuries as a result of their fall (Stevens, Corso, Finkelstein & Miller, 2006). Falling has a significant impact not only on the individual, but also on their family, friends the community and health service providers. Falls can result in injury, impairment, loss of confidence and subsequent

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\(^1\) For the purposes of this thesis ‘regional’ is defined as non-metropolitan areas of Australia that lie beyond the major cities and their immediate suburbs (Baxter, Gray & Hayes, 2011).

\(^2\) For the purposes of this thesis ‘older people’ are defined as aged 65 years and older.
reduction in general activity and in social engagement within the community (Close et al., 2012). Fall related injury significantly increases the chance of an older person being admitted into a residential aged care facility (Tinetti & Williams, 1997), with only about half of older people hospitalised as a result of a fall related fracture being able to return home (Moller, 2003).

One of the consequences of fall related injury is the significant cost to the health sector and to the community at large. Bradley and Harrison (2007) estimated that in 2003/04 the total cost to the Australian health care system for fall related hospitalisations in older people was $566 million. Economic modelling undertaken by Moller in 2003 predicted that the costs associated with fall related injury for New South Wales (NSW) alone would reach $208.9 million by 2011 (Moller, 2003). Later research by Watson et al. (2010) estimated that the NSW Department of Health in 2006/07 had already reached $558.5 million in annual spending on fall related injury in older people. This is a worrying trend given that in 2001, 12.4% of Australians were aged 65 years and over, and it is now estimated that by 2051, this group will account for over 24% of the population (Moller, 2003) and be potentially at risk of falling, impacting on the Australian health budget. Moller (2003) has estimated that by the year 2051 the amount needed to manage fall related injury in older Australians will reach $1.375 billion per annum. However, given Watson et al.’s. (2010) findings, Moller’s assessment could be a considerable underestimate. As well, these are direct costs and do not take into account the financial burden incurred by the individual, family and friends or the broader community.

Despite concerted efforts to manage fall related injury in the older population, through research and through prevention programs, overall fall rates have continued to increase in Australia (Bradley, 2013; Harvey & Close, 2013; Watson & Mitchell, 2011). Interestingly, standardised rates for fall related hip fractures in Australia are decreasing (Harvey & Close, 2013; Watson & Mitchell, 2011), a trend that is also seen in other international studies (Bauer, Coca-Perraillon, Cutler & Rosen, 2009; Kannus et al., 2006; Langley, Samaranayaka, Davie & Campbell, 2011; Leslie et al., 2009). That said,

3 A large state in Australia
Australian standardised rates for all other fall related fractures and injuries continue to rise (Harvey & Close, 2013; Watson & Mitchell, 2011), indicating that fall related injury is still a significant concern.

There is evidence that fall related hospitalisations differ across NSW. A recent study undertaken by Watson and Mitchell (2011) found that there were differences in standardised rates for fall related hospitalisations in NSW depending in which health district older people resided. It is difficult to discern exactly why inconsistencies in hospitalisations exist, but further exploration of the potential causes of falls leading to fall related hospitalisation in specific communities may provide insight into why these variations exist and why we are struggling to reduce the risk of fall injury in our older population.

**RATIONALE FOR THE METHODS CHOSEN**

The complexity of managing fall risk in the diverse populations found within Australia, coupled with an ageing population and finite resources, drives the need for a more holistic research approach to better understand factors that can influence falling in older populations.

Current research in community based falls prevention in Australia tends to address specific areas such as identification of fall related rates and costs (Bradley, 2013; Cassell & Clapperton, 2013; Harvey & Close, 2013; Vu, Day & Finch, 2015) or implementing and evaluating intervention strategies (Haas & Haines, 2014; Hill, Day & Haines, 2014; Day, Donaldson, Thompson & Thomas, 2014; Khong, Farrington, Hill & Hill, 2015; Lee et al., 2015; McLean, Day & Dalton, 2015; Simek et al., 2015; Tiedemann et al., 2015). What is missing from current falls research is the use of mixed method approaches to explore the complex elements, from different perspectives, contributing to fall related injury in older people living in the community. The ability to comprehensively investigate fall risk from multiple sources, such as hospital admission data, health services and older people, could inform our understanding of the reasons for the increasing rate of fall related hospitalisations.
RESEARCH QUESTIONS

This doctoral research reported here sought to address two overarching questions:

- What factors influence the risks and rates of fall related injury in older people living in regional Australian communities?
- What are the implications of these factors for fall risk management in regional Australia?

THE USE OF A MIXED METHOD APPROACH

Mixed methods research, such as that reported in this thesis, is designed to draw upon and integrate quantitative and qualitative methods so as to contribute to a better understanding of the research problem (Creswell, 2014; Johnson & Onwuegbuzie, 2004). Mixed method approaches are generally applied when the use of one method is insufficient to gain a complete appreciation of the problem (Creswell, 2014). The complexity of falling in the older population is such a problem, requiring a more comprehensive view of the factors associated with fall risk than would be provided by using one approach in isolation. The need to identify key sources of risk through different methodological approaches drove the design of four separate studies within this research program using mixed methods. This approach enabled comprehensive information to be captured in order to build an understanding of falls in a large regional population in NSW, Australia and inform the development of solutions for this problem.

There are numerous approaches to mixed methods research (Creswell, 2014; Johnson & Onwuegbuzie, 2004). The approach taken in this program of research constituted a ‘convergent parallel design’, as described by Creswell (2014). The intent of the convergent parallel design is to collect and analyse both quantitative and qualitative data sets separately, then integrate findings to form an interpretation of the overall results (Creswell, 2014; Onwuegbuzie & Teddlie, 2003). The quantitative studies in this thesis were designed to test whether known risk factors for falls were consistent for older people living in regional communities. The qualitative study was designed to uncover what was unknown about fall related risk factors within this regional Australian community setting. It was important to undertake the quantitative and qualitative studies separately in order to demonstrate the rigour needed for both approaches (Creswell, 2014). In this respect,
the critical element in the design of this body of research was the scheduling of the studies, so that appropriate focus and immersion was achieved for each approach. The three separate quantitative studies were conducted first (Chapters 3, 4 & 5) with data collection and analysis addressed in their entirety. The major qualitative study (Chapter 6) was undertaken last to enable the necessary immersion required to ensure quality research. Data analysis and interpretation of results for each study were conducted in ways congruent with the chosen methods and will be described in detail in the corresponding chapters. As well, detail will be provided to demonstrate ways in which appropriate rigour and trustworthiness was achieved. Consistent with the convergent parallel design, the entire body of research informed the synthesis chapter (Chapter 7) and helped identify a recommended model for future practice.

Research design can be strengthened using appropriate frameworks (Creswell, 2014), which help highlight the breadth of the problem. This is particularly important for mixed methods research (Creswell, 2014). The design of this mixed method body of research was informed by a comprehensively researched risk management guideline, (Standards Australia/Standards New Zealand, 2009). Risk management frameworks are used in health to uncover the range of potential contributors to injury occurrence within a particular environment and to enable the targeted design and implementation of measures to decrease or eliminate the likelihood of these factors contributing to future injury (Reason, 2000; Runciman, 2002). There are many different types of risk management models (Aven, 2012; Hudson, 2014), but all essentially attempt to address the complex mechanisms involved in causing an injury or accident in order to develop preventative measures to reduce the risk of occurrence (Aven, 2012; Hudson, 2014). Traditionally, risk management frameworks were reserved for use in road traffic control, aviation, manufacturing, and construction industries (Runciman & Moller, 2001). More recently risk management frameworks have been shown to be effective for identifying the range of risk factors associated with injury in other contexts, such as, occupational injuries (Aminbakhsh, Gunduz & Sonmez, 2013; Khanzode, Maiti & Ray, 2012; Moraru, 2012), iatrogenic injuries (Lawton et al., 2011; Runciman et al., 2010; Runciman & Moller, 2001) and sporting injuries (Finch, 2006; Fuller, Junge & Dvorak, 2012; Lyons, Finch, McClure, van Beeck & Macey, 2010).
The Australian / New Zealand Risk Management Standard AS/NZS ISO 31000:2009 is a generic set of guidelines developed to assist in the adoption of a consistent and comprehensive approach to identify and manage risk in a diversity of areas including injury risk (Standards Australia/Standards New Zealand, 2009). Using a risk management process such as that provided by the AS/NZS ISO 31000:2009 ensures a comprehensive approach to identifying and managing risk factors, such as the risk of fall injury. The risk management process described in the AS/NZS ISO 31000:2009 employs a systematic procedure involving five key steps, which are: establishing the context, risk identification, risk analysis, risk evaluation, and risk treatment (See Figure 1-1). Essential to all steps within the risk management process are the continual and iterative processes of communication and consultation and monitoring and review, (Standards Australia/Standards New Zealand, 2009).

![Risk Management Process](image)

Figure 1-1: Risk Management Process. Adapted from AS/NZS ISO 31000:2009 (Standards Australia/Standards New Zealand, 2009)

This research aimed to specifically identify the factors contributing to risk of fall related injury, rather than evaluating risk priorities or implemented management strategies. Therefore, only consideration of the first three steps in the risk management process (establishing the context, risk identification, risk analysis), particularly informed the development of the mixed method design of the research. That is, step four and five were beyond the scope of this doctoral program of research.

Step one, establishing the context involved examining the various types of contextual factors, both external and internal (Standards Australia/Standards New Zealand, 2009), that could influence fall risk in older populations. This step prompts researchers to evaluate what is already known about the area of interest and set the scope for the range
of risk variables that should be considered in subsequent steps. The outcome of this step is presented in Chapter 2 of this thesis.

Step two, risk identification seeks to identify what, why, and how risks can arise (Standards Australia/Standards New Zealand, 2009), in this case, risks of falls, fall-related injury and associated adverse sequelae. Risk identification was achieved through each of the specific studies undertaken in this doctoral program and presented in Chapters 3, 4, 5 & 6.

Step three, risk analysis is the process by which levels of risk are estimated by considering the various sources of risk identified in the preceding steps of the risk management process and estimating likelihoods and consequences of risks eventuating from those sources (Standards Australia/Standards New Zealand, 2009). These steps inform the prioritisation of risks for treatment and determination of appropriate risk treatment strategies - methods to manage the risks (Standards Australia/Standards New Zealand, 2009). Analysis of the identified risk factors from each of the studies in this research program is presented in the synthesis chapter (Chapter 7).

The use of this risk management process to inform the research design provided structure that helped identify the range of factors needing to be addressed to holistically examine falls. It also led to the research design that involved the use of a range of sources and types of data including: hospital admission records, health care provider surveys and in-depth interviews and focus groups with older people who had fallen and family members of older people who had fallen. The findings from this mix of quantitative and qualitative data provided greater understanding of the range of risk factors associated with falls and fall related injury in the older population residing in a large regional Australian community.
OVERVIEW OF THESIS

This thesis presents the body of research and associated findings and analysis in eight chapters. This first chapter provides an introduction to the research and rationale for conducting the chosen overarching approach. Chapter 2 presents a review of the available literature on risk factors associated with falling in older populations living in the community. The material presented highlights the fact that there is limited knowledge of fall related risks specifically associated with older people residing in regional Australian communities. An investigation into the standardised rates of fall related hospital admissions for older people residing in NSW over a ten-year period is presented in Chapter 3. That study specifically compared the overall NSW hospitalisation rates and femoral and pelvic fracture rates due to falls in older people across NSW as a whole to the rates recorded for older residents of each of the Area Health Services within NSW.

Findings of an in-depth analysis of fall related hospital admission data from a large Area Health Service in southern NSW - the Greater Southern Area Health Service - are presented in Chapter 4. Specifically, that study investigated the key external causes of falls, places where falls occurred and the activities engaged in at the time of the falls, for all older people who resided in the Greater Southern Area Health Service and were admitted to hospital as a result of a fall, over a five-year period. Both of the studies of hospital admission data were undertaken in the initial stages of this part-time doctoral program of research, which was begun in 2007. For the same regional geographic area, Chapter 5 provides findings on the key fall related services and programs available to assist in the management of fall risks in older people. Those findings were derived from the administration of two questionnaires, which were distributed to Hospital and Community Health Centres within the Greater Southern Area Health Service.

Chapter 6 explores findings from a qualitative study which sought to gain a deeper understanding of the experiences of falls and perceptions of fall risk among older people living in southern NSW and family members of older people who had fallen. In that study, semi-structured focus groups and semi-structured in-depth interviews were undertaken across seven rural and regional communities within southern NSW. The synthesis chapter, Chapter 7, presents the three overarching findings arising from this program of mixed methods research. This chapter discusses the implications of these three findings for regional Australian communities. In particular, this chapter explains how this research highlights the need for fall risk management strategies to be more holistic and wide ranging and explores an alternative approach to fall risk management.
A summary of the main findings and the implications of these findings for the management of fall related injury in older people living in regional Australian communities are presented in the final chapter, Chapter 8. Recommendations arising from this research and strengths and limitations of the research program are also considered in the final chapter.

CONCLUSION

Effective management of falls in older populations is complex and challenging. Given that the substantial focus on falls prevention by the Australian government over the last decade has failed to yield a decrease in the rates of fall related hospitalisations, examination of the underlying causes of falls in older people living in our communities is warranted. Understanding what is currently known about the range of risk factors both generally and within a regional context is an important first step in setting the scene for this research and provides some insight into why standardised hospitalisation rates associated with fall injury have continued to rise within NSW. The next chapter will examine this current knowledge, based on a review of the available research literature.
CHAPTER 2 NARRATIVE REVIEW OF THE LITERATURE

It has been estimated that over 30-40% of older people will fall at least once every year (Ambrose, Geet & Hausdorff, 2013; Lord et al., 2011, Watson et al., 2010). For older people living in the community, these falls are not random events (Ganz, Boa, Shekelle & Rubenstein, 2007). Many risk factors for falls in older people have been identified within the literature (Ambrose et al., 2013; Deandrea et al., 2010; Inouye Studenski, Tinetti & Kuchel 2007; Lord, Sherrington, Menz & Close, 2007; Rubenstein & Josephson, 2002). Understanding the diversity of these risk factors is an important element in determining how to best manage fall risks in older people, and in the context of this body of research, it is especially important to do so from an Australian perspective.

The complexity of fall related risks is evident when the range of risk factors is considered. This chapter will explore the literature as it relates to risk factors associated with falling in people over the age of 65, and provide a comprehensive narrative review of the Australian literature that was informed by principles associated with systematic reviews. The chapter begins with an overview of the international literature to provide an understanding of the range and types of risk factors associated with older people falling in the community. This understanding provided the foundation for the design and implementation of the narrative review that is the focus of the chapter. The second section of the chapter details the methods used to perform the narrative review of the Australian literature in this field. The final two sections provide the results of the narrative review and discuss their implications for older people living in communities in regional Australia and for this body of research.

INTRODUCTION

Identification of risk factors associated with falling is dependent upon a clear definition of what a fall comprises. Defining the term ‘fall’ is a challenging but important step that provides context for the range of potential risk factors associated with falling. The World Health Organisation (WHO) defines a fall as “inadvertently coming to rest on the ground, floor or other lower level, excluding intentional change in position to rest in furniture,
wall or other objects” (World Health Organisation, 2007, p. 1). However, the more commonly cited definition, from the Kellogg international working group on the prevention of falls in the elderly, defines a fall as “unintentionally coming to ground, or some lower level not as a consequence of sustaining a violent blow, loss of consciousness, sudden onset of paralysis related to stroke or an epileptic seizure” (Gibson, Andres, Isaacs, Radebaugh & Wormpeterson, 1987, p. 4). Although much of the literature on fall risk does not state the fall definition used, it is apparent from the content of individual articles that authors were referring to falls that are captured by the Kellogg definition. The literature included in this review can similarly be seen to be associated with falls as defined by the Kellogg international working group. That is, the papers discussed in this chapter do not relate to people falling as a consequence of another event, for instance, being hit, or as a result of a stroke.

The international falls literature encompasses a vast body of research. For example, a search using Google scholar, using the term ‘falls in older people’ produced over a million papers. Broadly speaking the literature predominantly focuses on risk factors in two main domains; intrinsic risk factors (modifiable and non-modifiable), which are characteristics of the individual person, and extrinsic risk factors, which are external or environmental factors that interact with the individual person (Ambrose et al., 2013; Haung, Gau, Lin & Kernohan, 2003; Feldman & Chaudhury 2008; Lord et al., 2007; Rubenstein, 2006; Rubenstein & Josephson, 2002; Sartini et al., 2010; Hill, Schwarz, Flicker & Carroll 1999; Lord, Ward, Williams & Anstey 1993;). Examples of intrinsic risk factors include demographic factors, physical limitations, cognitive impairment, general health issues and a history of falling. Commonly cited extrinsic risk factors include hazards in and around the home, such as loose mats, slippery surfaces, poor lighting, uneven ground, or poorly fitting footwear (Ambrose et al., 2013; Boehm, Franklin & King, 2014; Bueno-Cavanillas, Padilla-Ruiz, Jimenez-Moleon, Peinado-Alonso & Galvez-Vargas, 2000; Curl, Ward Thompson, Aspinall & Ormerod, 2015; Leavy, Byberg, Michaelsson, Melhus & Aberg, 2015; Rosen, Macka & Noonan, 2013; Rubenstein & Josephson, 2002; Sherrington & Menz, 2003; Carter, Campbell, Sanson-Fisher, Redman & Gillespie 1997; Clemson, Cumming & Roland 1996). A third domain of risk factors for falls, behavioural risk factors, which is less commonly discussed within the literature, concerns decisions made by older people based on their perceptions (Butler, Lord, Taylor & Fitzpatrick, 2015), their fear of falling (Delbaere, Crombez, Vanderstraeten, Willems & Cambier,
2004; Wolitzky-Taylor, Castriotta, Lenze, Standley & Craske, 2010) and their personality traits (Zhang, Ishikawa-Takata, Yamazaki & Ohta, 2004). Although this list involves single risk factors it is generally accepted that falling is not a result of a single risk factor but rather a result of the interplay between multiple risk factors, potentially across all three domains (Bueno-Cavanillas et al., 2000; Faulkner et al., 2009; Newton, 2003; Rubenstein, 2006). This interplay challenges our ability to determine the specific mechanisms involved in individual fall events.

The subsequent section needed to explore this literature purely as a foundation for the design of the narrative review of falls literature for older people living in Australian communities. Examining relevant systematic reviews seemed to be an appropriate strategy to consider for this purpose. Systematic reviews "adhere to a strict scientific design based on explicit, pre-specified and reproducible methods, and when carried out well, provide reliable conclusions that are defensible" (Centre for Reviews and Dissemination [CRD], 2009, p. v). As such, reviewing systematic reviews was deemed to be a sound way of gaining an understanding of the types of risk factors associated with falling, reported across the vast body of international literature published on falls. Following a comprehensive search, four systematic reviews were found that explored the range of risk factors associated with falling in older populations from an international perspective (Table 2-1). All four reviews evaluated prospective cohort studies, although one review (Inouye et al., 2007) also included retrospective studies.

Table 2-1 - Systematic reviews that evaluated risk factors for falls in older people

<table>
<thead>
<tr>
<th>Authors</th>
<th>Year</th>
<th>Timeframe of studies included</th>
<th>No. of studies included</th>
<th>Study Inclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deandrea et al.</td>
<td>2010</td>
<td>1998 to 2009</td>
<td>74</td>
<td>• Prospective cohort designs</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• At least 80% of the sample is aged 65 years or older</td>
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<td></td>
<td></td>
<td></td>
<td>• At least 80% of subjects living in the community</td>
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<td></td>
<td></td>
<td>• Sample size greater than 200 subjects</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• Number of subjects experiencing one or more falls during follow-up was an outcome</td>
</tr>
<tr>
<td>Authors</td>
<td>Year</td>
<td>Timeframe of studies included</td>
<td>No. of studies included</td>
<td>Study Inclusion criteria</td>
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<tr>
<td>Tinetti &amp; Kumar</td>
<td>2010</td>
<td>Jan 1 1985 to 30 Sept 2009</td>
<td>33</td>
<td>• Prospective cohort designs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(MEDLINE)</td>
<td></td>
<td>• 65 years or older</td>
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<td></td>
<td></td>
<td>• Greater than 50% of subjects were community-dwelling populations</td>
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<td></td>
<td></td>
<td>• Sample size greater than 80 subjects</td>
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<td>• Fall related outcome had to be reported</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>• Reported in English</td>
</tr>
<tr>
<td>Ganz et al.</td>
<td>2007</td>
<td>1966-2004</td>
<td>18</td>
<td>• Prospective cohort designs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(MEDLINE)</td>
<td></td>
<td>• Enrolled participants of mean age 65 years and older</td>
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<td></td>
<td></td>
<td>&amp; 1982-2004</td>
<td></td>
<td>• Community-dwelling or population based sample</td>
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<tr>
<td></td>
<td></td>
<td>(CINHAL)</td>
<td></td>
<td>• Included fall incidence during follow-up as an outcome</td>
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<td>• Reported fall outcome data between 6 &amp; 12 months of follow-up.</td>
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<td></td>
<td>• Reported in English</td>
</tr>
<tr>
<td>Inouye et al.</td>
<td>2007</td>
<td>1990 to 2005</td>
<td>12</td>
<td>• Prospective &amp; retrospective designs</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Age range not stated</td>
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<td></td>
<td></td>
<td></td>
<td>• Community-dwelling &amp; residential care populations</td>
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<td></td>
<td></td>
<td>• Original articles</td>
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<td></td>
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<td></td>
<td></td>
<td>• Identified independent risk factor</td>
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As can be seen in Table 2-1, the four systematic reviews differed in their approach in respects to timeframes, numbers of the studies included and the reported inclusion criteria. In spite of the use of scientific design in these reviews, understanding of fall risk factors is still obscured by the variability in methods used across the studies evaluated by them. In addition, not all papers evaluated in the systematic reviews undertook a multivariate analysis to consider possible influences of multiple risk factors. Focusing attention on a single identified risk factor, and not applying methods to control for the influence of other known, risk factors can be seen as a limitation. For example, investigating balance as a risk factor for falls but not assessing for vision impairment which in combination with poor balance may increase the risk of falling
(Reed-Jones et al., 2013). That is, the complex nature of the combined influences of multiple risk factors associated with older people falling did not seem to be addressed in the research design of some of the papers. There is also a need to recognise that factors from across all three dimensions, intrinsic, extrinsic and behavioural, contribute to fall risk, and is critical to inform understanding of how to best approach this problem (WHO, 2008). There are also limitations associated with systematic reviews as bias can still be evident based on the methods used to estimate the effect of the original studies, and when dealing with a diversity of designs and methodological quality as well as the specific interventions used, as such there can be subjectivity when determining how the data from similar studies are pooled (Bello, Wiebe, Garg & Tonelli 2015). In addition, evidence considered in reviews can be somewhat dated. Despite these shortcomings, findings from international systematic reviews provide useful insight into our current understanding of this issue.

Of importance, the four systematic reviews found focused solely on the domain of intrinsic fall risk factors. While research exists investigating extrinsic and behavioural domains, no systematic reviews were found that evaluated these particular domains. Therefore, it is not surprising that gait and balance abnormalities being risk factors for, or predictive of, falls in older people were common findings across all four reviews. Although this indicates that gait and balance abnormalities warrant attention when managing fall related risk factors in older people, these types of abnormalities can result from a number of different causes, such as muscle weakness, sensation loss, vestibular impairment or neuromuscular disease (Rubenstein, 2006) which may also need to be considered. In addition, an important confounding element was the many different ways the included studies measured gait and balance impairment. This impacted on the ability for the authors to make valid comparisons (Deandrea et al., 2010) and demonstrates the complexity associated with trying to understand fall related risk factors.

One of the earlier reviews found that additional intrinsic factors also played a role, with older age, previous history of falls, functional impairment, use of a walking aid or assistive device, cognitive impairment and impaired mobility or low levels of activities of daily living, being identified as independent risk factors for falling (Inouye et al., 2007). That said, Ganz et al. (2007) found only one consistent predictor of future falls,
gait and balance abnormalities. In their multivariate analysis of original data from 18 prospective cohort studies investigating risk factors for falls in older people aged 65 years and older, Ganz et al. (2007) concluded that risk factors such as vision impairment, medication variables, reduced participation in activities of daily living, impaired cognition, and orthostatic hypotension alone did not consistently predict falls across the included studies.

The different findings of these two reviews reflect different approaches to inclusion and exclusion criteria as well as methods. Ganz et al. (2007) designed their search strategy to focus on cohort studies that favoured specificity over sensitivity. In their review, Ganz et al. (2007) also employed strict exclusion criteria which excluded studies that included data from sources other than the participant, or studies that investigated only high-risk or low-risk participants, based on physical examination. They also excluded studies that screened participants in other ways involving history or physical assessments, such as requiring participants to be able to walk certain distances, not use a mobility aid or not have cognitive impairment. Conversely, Inouye et al. (2007) included all original articles that identified an independent risk factor for falling and pooled populations from both the community and residential aged care facilities, potentially impacting on the results and on the conclusions that can be drawn regarding fall risk factors specific to community dwelling populations.

In more recent reviews multiple intrinsic domain fall risk factors were identified (Deandrea et al., 2010; Tinetti & Kumar, 2010). A large systematic review and meta-analysis of 74 prospective cohort studies was undertaken by Deandrea et al. (2010), investigating risk factors for falls among community dwelling older people. The study found the factors with the strongest associations with future falls included gait and balance (vertigo) abnormalities, a history of falls, walking aid use, Parkinson’s disease and antiepileptic drug use. Tinetti & Kumar (2010) conducted a systematic review encompassing 33 prospective cohort studies, each involving between 152 and 9249 community dwelling participants, 65 years or older. These studies examined multiple risk factors for falls and fall injuries, in order to identify the types of impairments and conditions that predisposed older people to falls. Independent predictors of falls identified
in the multivariate analysis undertaken by Tinetti & Kumar (2010) included gait and balance abnormalities, a previous fall history, decreased muscle strength, visual impairment, medications (>4 or psychoactive medication use), depression, dizziness or orthostasis, functional limitations, age (>80 years), female sex, low body mass index, urinary incontinence, cognitive impairment, arthritis, diabetes and pain.

The systematic reviews identified a broad range of risk factors across only one domain, *intrinsic risk factors*. However, mixed consensus makes it difficult to clearly identify the *key* risk factors associated with falling in older people living in the community. Risk factors, such as demographic factors, physical limitations, cognitive impairment, general health issues and a history of falling, were identified in some but not all of the reviews, and may play a role in causing falls in older people. Interestingly, extrinsic and behavioural risk factors were not identified within these systematic reviews. This gap may reflect the limited number of studies that have investigated extrinsic and behavioural fall risk factors. It may also be due to the wide-ranging and often non-comparable measures used across studies. Despite these challenges, the four identified systematic reviews still provide a useful foundation for a detailed narrative review of risk factors associated with falling in older people living in regional Australian communities. Conducting such a review was important to inform the body of research reported in this thesis.

In the last 10 years, no review of the literature has comprehensively examined risk factors for falls in older people 65 years and older living in the community specifically from an Australian perspective. Rather, those available (for example Boehm et al., 2014; Kvelde et al., 2013) have considered a broader age range or a more limited range of risk factors. On this basis, a narrative review using a systematic approach was undertaken and is reported below to: (a) identify and examine the recent Australian research literature focusing on risk factors for falls; and (b) specifically explore the research literature related to falls affecting residents from communities in regional Australia.
METHODS

The narrative review presented here examined the past decade (2006-2015) of literature published in English on the risk factors associated with falling in community dwelling older people living in Australia. Initial searches were conducted in December 2015 of Scopus, CINAHL, Medline, the Primo database and Google Scholar, for all peer-reviewed papers, both Australian and International, published between 1st January 2006 and 30th November 2015. The search terms and strategy used were as follows: “(aged OR elderly OR “older person” OR “older people” OR “older adult”) AND (fall OR falling) AND (risk* OR caus*)”.

RESULTS

A number of filters were employed as part of the initial search. These filters included (1) adding ‘AND (community OR home)’ to the search terms, (2) limiting the search to publication dates from 1st January 2006, (3) limiting the search results to reports of research conducted in Australia, and (4) limiting results to peer-reviewed papers only. The search outcomes for each of the databases are shown in Table 2-2.

<table>
<thead>
<tr>
<th>Database</th>
<th>Results</th>
<th>Results after filter (1)</th>
<th>Results after filter (2)</th>
<th>Results after filter (3)</th>
<th>Results after filter (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scopus</td>
<td>38,741</td>
<td>30,297</td>
<td>25,535</td>
<td>4,338</td>
<td>2,654</td>
</tr>
<tr>
<td>CINAHL</td>
<td>49,459</td>
<td>35,178</td>
<td>25,385</td>
<td>5,890</td>
<td>5,634</td>
</tr>
<tr>
<td>Medline</td>
<td>14,176</td>
<td>2,818</td>
<td>1,910</td>
<td>221</td>
<td>221</td>
</tr>
<tr>
<td>Primo database</td>
<td>3,523</td>
<td>1,352</td>
<td>1,114</td>
<td>332</td>
<td>180</td>
</tr>
</tbody>
</table>

In addition, an advanced search of Google scholar using the search terms “(fall risk) (Australia community) (aged elderly OR older person OR older people OR older adult)” resulted in 673 articles. The papers were further reviewed and non-peer review articles were excluded, leaving 670 papers.

Potentially relevant papers were subjected to the following specific inclusion criteria:
• investigated and reported risk factors or causes for falls in older people residing in Australian communities
• published between 1st January 2006 and 30 November 2015

Papers were excluded if the study recruited participants from residential aged care or hospital sites or from nations other than Australia. Titles and abstracts were first individually reviewed against the inclusion and exclusion criteria to ascertain eligibility. Clearly ineligible papers were excluded at that stage. Potentially eligible papers were obtained in full text for further, detailed review against inclusion and exclusion criteria and included in the review only if the full text indicated they were eligible.

Key findings of relevance to the aims of the review were extracted from the final set of included studies, tabulated and synthesised using a narrative approach.

From the primary search, a total of 9,359 papers were identified after application of search filters (see Table 2-2 above, and Figure 2-1 below).
Figure 2-1 - A flow chart of the literature review process
In total, 6918 papers were removed on the basis of being duplicates and 2,362 were excluded based on preliminary reviews of their titles and abstracts. A total of 79 papers were retrieved in full text and a further 48 of these papers were excluded on the basis that they included participants younger than 65 years of age or did not adequately specify participant ages.

A total of 31 papers investigating fall related risk factors in older community dwelling populations were retained. Of the 31 included papers, twenty-three focused on evaluating intrinsic risk factors, three papers evaluated both intrinsic and behavioural risk factors, one paper focused on extrinsic risk factors and four papers specifically investigated behavioural risk factors (Appendix B). Ten of the included papers recruited participants from a larger single study, the Sydney Memory & Ageing Study (Sachdev et al., 2010), three papers recruited participants involved in the Vital D study (Sanders et al., 2010), three papers evaluated data from the NSW Falls Prevention Baseline Survey (Centre for Health Advancement and Centre for Epidemiology and Research, 2010), and 2 papers evaluated different aspects of the same case-control groups (see Table 2-3). Therefore, out of the 31 papers, only 19 studies were based on different participant groups.

Table 2-3 - Larger research studies from which participants were recruited for included studies

<table>
<thead>
<tr>
<th>Overarching study</th>
<th>Papers included in narrative review</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory &amp; Ageing Study</td>
<td>Delbaere et al. (2010a)</td>
</tr>
<tr>
<td></td>
<td>Delbaere, Close, Brodaty, Sachdev &amp; Lord (2010b)</td>
</tr>
<tr>
<td></td>
<td>Delbaere, Close, Kochan, Sachdev &amp; Lord (2012a)</td>
</tr>
<tr>
<td></td>
<td>Delbaere et al. (2012b)</td>
</tr>
<tr>
<td></td>
<td>Haere, Delbaere, Bartlett, Lord &amp; Rowland (2012)</td>
</tr>
<tr>
<td></td>
<td>Kvelde et al. (2015)</td>
</tr>
<tr>
<td></td>
<td>Menant et al. (2012)</td>
</tr>
<tr>
<td></td>
<td>Menant et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>Suttanon et al. (2012)</td>
</tr>
<tr>
<td></td>
<td>Wong et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>Zheng et al. (2012)</td>
</tr>
<tr>
<td>Vital D Study</td>
<td>Sanders et al. (2010)</td>
</tr>
<tr>
<td></td>
<td>Scott et al. (2014)</td>
</tr>
<tr>
<td></td>
<td>Scott et al. (2015)</td>
</tr>
<tr>
<td></td>
<td>Mitchell, Watson, Milat, Chung &amp; Lord (2013)</td>
</tr>
</tbody>
</table>
The majority of papers (twenty-one) were based in a metropolitan setting, six papers pooled participant data from both metropolitan and regional/rural areas, and only three papers collected data from participants living in regional areas. One paper did not state where the participants were drawn from. A quantitative research approach was used in all 31 of the papers.

A wide range of intrinsic, extrinsic and behavioural risk factors were identified by the papers included in this review (Table 2-4)

Table 2-4 - Risk factors for falls in older Australian people

<table>
<thead>
<tr>
<th>Intrinsic fall risk factors identified</th>
<th>Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General health issues:</strong> Chronic disease/co-morbidity, high Body Mass Index,</td>
<td>Boersma et al. (2012) Menant et al. (2012) Menant et al. (2013)</td>
</tr>
</tbody>
</table>
Intrinsic fall risk factors identified

<table>
<thead>
<tr>
<th>Factor</th>
<th>Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>polypharmacy, dizziness/light-headedness, vitamin D insufficiency, calcium supplementation</td>
<td>Mitchell et al. (2014) • (Metro &amp; Regional setting)</td>
</tr>
<tr>
<td></td>
<td>Mitchell et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>Sanders et al. (2010)* (Regional setting)</td>
</tr>
<tr>
<td></td>
<td>Vu, Finch &amp; Day (2011) • (Metro &amp; Regional setting)</td>
</tr>
<tr>
<td>History of falling</td>
<td>Delbaere et al. (2010a)</td>
</tr>
<tr>
<td>High Physiological Profile Assessment score</td>
<td>Carty et al. (2015)</td>
</tr>
</tbody>
</table>

Extrinsic fall risk factors identified

<table>
<thead>
<tr>
<th>Factor</th>
<th>Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home hazards</td>
<td>MacKenzie, Byles &amp; D’Este (2009)* (Metro &amp; Regional setting)</td>
</tr>
</tbody>
</table>

Behavioural fall risk factors identified

<table>
<thead>
<tr>
<th>Factor</th>
<th>Papers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of falling</td>
<td>Clemson et al. (2015)</td>
</tr>
<tr>
<td></td>
<td>Delbaere et al (2010a)</td>
</tr>
<tr>
<td></td>
<td>Delbaere et al. (2010b)</td>
</tr>
<tr>
<td></td>
<td>Delbaere, Sturmiexks, Crombez &amp; Lord (2009)</td>
</tr>
<tr>
<td>Lifestyle choices</td>
<td>Heesch, Byles &amp; Brown (2008) • (Metro &amp; Regional setting)</td>
</tr>
</tbody>
</table>

As can be seen in Table 2.4, some authors identified multiple risk factors. For example, Clemson et al. (2015) found that age, reduced gait speed, depression and fear of falling all contributed to fall risk. Mitchell et al. (2013) also found multiple risk factors for falls, including age, using a walking aid and general health issues such as co-morbidities, medication use and increased weight. However, other papers focused on a single factor, for example Stanaway et al. (2011) who evaluated fall risk associated with ethnicity and Scott et al (2014) who investigated the relationship between muscle strength and falling. This is important, because evidence supports the concept that the aetiology of falls is multifactorial in nature (Newton, 2003; Rubenstein, 2006; WHO, 2008). As such, investigating one fall risk factor in isolation from others may not provide an adequate understanding of the interplay between risk factors that contribute to the fall. That is, focusing on one specific risk factor, such as muscle strength, fails to appreciate the interaction between that factor and other known risk factors such as age or balance. It also does not consider how an older person with reduced muscle strength interacts with their environment or the behavioural decisions they make towards risk.
Of the twenty-six papers that examined intrinsic risk factors, twenty-two papers identified six types of factors associated with risk of falling. These included demographic factors, physical limitations, mental health and cognitive capacity, general health issues, a history of falling, and high Physiological Profile Assessment Scores (PPA), (Lord, Menz & Tiedemann, 2003) (Table 2-4). Three papers did not find a relationship between the intrinsic risk factor being evaluated and fall risk (Haerer, Delbaere, Bartlett, Lord & Rowland, 2011; Isenring, Baker & Kerr, 2013; Wong et al., 2013) and two papers demonstrated a reduction in fall risk associated with the intrinsic risk factor being evaluated (Prince et al., 2008; Wong et al., 2013). The latter risk factors were Vitamin D supplementation and angiotensin system-blocking medications.

Only one paper in this review focused on extrinsic risk factors (MacKenzie et al., 2009), investigating the presence of home hazards and their association with fall risk (Table 2-4). They found that environmental risk factors alone had a weak association with falling but a stronger association in the presence of intrinsic risk factors for falls (MacKenzie et al., 2009).

Behavioural risk factors were identified within seven of the papers and involved two main factors, fear of falling (Clemson et al., 2015; Delbaere et al., 2009; Delbaere et al., 2010a Delbaere et al., 2010b) and the impacts of lifestyle choices on fall risk (Heesch et al., 2008; Peel et al., 2006, 2007) (Table 2-4).

Only three papers involved older people in regional communities (Table 2-4). All of these papers focused on evaluating intrinsic risk factors for falls. It is important to note that all three papers reported on the participants from the same larger Vital D study (Sanders et al., 2010; Scott et al., 2014; Scott et al., 2015). Gait and balance risk factors were investigated in two of the studies (Scott et al., 2014; Scott et al., 2015) and the third study investigated vitamin D levels (Sanders et al., 2010).
SYNTHESIS OF KEY FINDINGS

Overview
The studies included in this narrative literature review found a wide variety of risk factors that are associated with falling in older people living in Australia. Table 2-4 shows how these risk factors might be classified as intrinsic, extrinsic and behavioural. However, important to our understanding and our capacity to address the problem of falling in older populations is assessment of whether a risk factor is non-modifiable, that is, unable to be changed, such as age, or modifiable, that is, able to be altered, such as gait and balance impairment or fear of falling. The included articles tended to only apply this approach to intrinsic factors, perhaps reflecting the main focus of attention of research published in this area to date. However, extrinsic factors could also be found to be non-modifiable (e.g. rough terrain on a farm that is home to an older person), or modifiable (e.g. removing a trip hazard such as a rug). Essentially, establishing a more complete understanding of the range of risk factors associated with falling should facilitate strategies to be implemented to manage the risks associated with the non-modifiable risk factors and interventions to be implemented to address modifiable risk factors.

Identified non-modifiable intrinsic fall related risk factors
Non-modifiable intrinsic factors, including age and ethnicity, were both identified as risk factors for falling in the included studies. Three studies found that age was a strong predictor of falling (Clemson et al., 2015; Mitchell et al., 2013; Smee et al., 2012). Ethnicity was specifically investigated by one study within this review (Stanaway et al., 2011). This prospective cohort study of 1,183 Italian and Australian born men, aged 70 years or older, found that Australian born men were more likely to fall than their Italian born peers (Stanaway et al., 2011). This differs from a retrospective cluster analysis of 45,000 Victorian hospital patient records, (Vu et al., 2011) that found an upward trend in the proportion of fallers from non-English-speaking birthplace countries, of which Italy was the most frequently recorded. The gender profiles of people of each ethnicity, which were identified by Stanaway et al. (2011), were not specified in the study undertaken by Vu et al. (2011). Given both these studies used different methodological approaches it is difficult to speculate on the role of ethnicity plays in falls risk and these studies demonstrate the challenges in determining the range of risk factors for falls when the research is focused on specific risk factors and not approached from a broader perspective.
Identified modifiable intrinsic fall related risk factors

A broad range of modifiable risk factors were identified across all three risk factor domains (intrinsic, extrinsic and behavioural). As with the international literature, older people with physical limitations, especially gait and balance abnormalities, leading to increased risk of falling was an area of focus in the Australian literature. Clemson et al. (2015), in a prospective cohort study of 1000 older adults, found that reduced gait speed was predictive of injurious falls. Two studies undertaken by Scott et al. (2014) and Scott et al (2015) investigated 135 females with high-risk of fracture, using an eligibility algorithm that employed risk factors such as age and diagnosed osteopenia or osteoporosis, as described by Sanders et al. (2009). They found that changes in gait parameters over 3 to 5 years were significantly associated with the likelihood of being a recurrent faller (Scott et al., 2015). They also found that quadriceps muscle strength was a significant predictor of falls (Scott et al., 2014). Both these studies involved older women with high-risk of fracture, a population that is possibly likely to have factors such as underlying medical conditions that could contribute to musculoskeletal impairment. As Scott et al. (2014) and Scott et al. (2015) did not examine other factors, it is difficult to know if additional factors played a role, contributing to gait and muscle weakness being identified as a risk factor.

Reduced physical function was found to be a predictor of falling in two studies (Delbaere et al., 2010a; Smee et al., 2012). Smee et al. (2012) investigated the association between physical function and fall risk in 32 adults and found that older people with poor physical function, as measured by the Continuous-Scale Physical Functional Performance 10 test, reported more falls over the previous 12 months. Delbaere et al. (2010a), evaluating 500 older people in a prospective cohort study, found that level of disability, using the World Health Organisation Disability Assessment Schedule, and poor performance on physical tests, assessed via the Physiological Profile Assessment, were both risk factors for falls.

Suttonan et al. (2012) also evaluated a range of balance and mobility impairments, but they did so with 25 participants with mild to moderately severe Alzheimer’s disease compared to 25 age and gender matched, cognitively intact individuals. Suttonan et al. (2012) found that the level of balance and mobility impairment was greater in people with
Alzheimer’s disease, increasing their fall risk (Suttanon et al., 2012). Even though a range of gait impairments were directly observed in the Alzheimer group, Suttanon et al. (2012) concluded that it was difficult to definitively conclude that the observed reduced balance and mobility in people with Alzheimer’s disease was directly related to the presence of Alzheimer’s disease. In a more representative community sample of 201 older people, Carty et al. (2014) evaluated a range of sensorimotor functions, using the validated Physiological Profile Assessment (Lord et al., 2003), and balance recovery ability in baseline testing and then undertook a 12-month prospective cohort study to identify those who experienced falls. They found that poor balance recovery was an independent predictor of future falls (Carty et al., 2014).

Mental health issues and cognitive impairment have also been shown to increase the risk of falling. Depression was found to be associated with fall risk in the study by Clemson et al. (2015) and in another prospective cohort study of 488 older adults, Kvelde et al. (2015) found that depression and the use of antidepressants were independent risk factors for falling. In a prospective cohort study of 787 older adults who had fallen, Anstey et al. (2008) found that negative mental health issues were associated with an increased risk of falling. In three separate studies associated with the Memory and Ageing Study (Sachdev et al., 2010), cognitive impairment and reduced executive function were associated with an increase in fall risk (Delbaere et al 2010a; Delbaere et al., 2012a; Delbaere et al 2012b). Delbaere et al. (2010a; 2012a), who used the same participant group (from their involvement in the broader Memory & Ageing Study) of 500 older adults, found that falling was significantly associated with a decrease in executive function. In a subsequent study of 419 older adults without dementia, Delbaere et al. (2012b) demonstrated that the incidence of multiple falls in people with mild cognitive impairment was almost twice that observed in people with normal cognitive function. Zheng et al. (2012), in a prospective cohort study of 287 community dwelling older people, found that older people with greater white matter hyperintensity burden were at an increased risk of falling over a 12-month period.

Poor general health and the existence of co-morbidities were also linked to fall risk. In their population based study of 5,681 older people investigating health and lifestyle factors associated with falling, Mitchell et al. (2013) found that older people with general
health issues were likely to experience more falls. In a subsequent study Mitchell et al. (2014) found that older obese individuals had an increased risk of falling when compared to older people in a healthy weight range (Mitchell et al., 2014). Additionally, Mitchell et al. (2015), found a sedentary lifestyle, chronic health conditions and medication use were identified as contributors to obesity and falling. Links between chronic disease and fall risk were also found by Vu et al. (2011) in a large retrospective cluster analysis of 45,000 hospital records of older people who had been admitted as a result of a fall. They found five specific chronic disease clusters to be associated with people who had fallen, including cardiopulmonary/metabolic, neurological, sensory, stroke and cancer clusters (Vu et al., 2011). Dizziness or light-headedness was also found to be associated with fall risk in a prospective cohort study of 516 older adults undertaken by Menant et al. (2013).

Conflicting findings surround Vitamin D and its role as a risk factor for falls. Vitamin D insufficiency was observed to be associated with postural instability, increasing the potential for fall risk, in a cross-sectional study of 145 adults who had fallen in the previous six months (Boersma et al., 2012). In support of this, Menant et al. (2012), in a prospective cohort of 463 adults, found a significant association between Vitamin D insufficiency and falls, but in men only. Conversely, Vitamin D supplementation in the form of a single annual dose of cholecalciferol, in randomised controlled trial of 2,256 older women at high-risk of fracture, was found to result in an increased risk of falling (Sanders et al., 2012). Adding to the complexity, is the finding from a randomised controlled trial of 302 older women living in a sunny climate, that Vitamin D supplementation in the form of daily ergocalciferol reduced the risk of having at least one fall over a 12-month period (Prince et al., 2008). The conflicting results from these studies means that the link between fall risk and Vitamin D insufficiency and calcium supplementation remains unclear.

A previous history of falling was specifically identified as a risk factor for falls in only one study in the review (Delbaere et al., 2010a). However, a number of the studies included in the review specifically recruited participants who had previously fallen or evaluated risk factors explicitly associated with the participants who had fallen over the study period. Therefore, although this could be seen as a component of risk, a previous history of falling as a risk factor was not generally evaluated as part of the studies.
The final intrinsic risk factor for falls identified by studies included in this review was a high Physiological Profile Assessment score (PPA). The PPA is a validated screening tool for identifying fallers and non-fallers with 75% accuracy in over 2,000 adults (Lord, et al., 2003). It evaluates a range of measures including, vision, sensation, muscle strength, reaction time, postural sway and dynamic balance and provides a quantitative measure to determine an overall fall risk score (Lord et al., 2003). Only one included study, undertaken by Carty et al. (2014), specifically evaluated the PPA and found a positive relationship between a high PPA score and increased fall risk, in their prospective cohort study of 201 older adults.

In addition to the study undertaken by Prince et al. (2008), there were three other included studies that did not find a relationship between intrinsic factors and fall risk. Isenring, et al. (2013) found no association between malnutrition and the risk of falling in their study in which they evaluated 254 participants aged 65 years and older for their nutritional status and then prospectively assessed occurrence of falls. Wong et al. (2013) investigated the relationship between the use of cardiovascular medications and fall risk using a prospective cohort study of 520 community dwelling older people. They found that the use of cardiovascular medications in older people did not increase the risk of falling and that the use of angiotensin system-blocking medications was associated with reducing the risk of falls (Wong et al. 2013). Haere et al. (2011) found that statin medication use was not associated with falls, however, participants who were using statins performed worse in balance testing, which possibly could increase the risk of falling.

**Identified modifiable extrinsic fall related risk factors**

A gap is evident in reported Australian research on extrinsic risk factors associated with fall risk as only one study (Mackenzie et al., 2009) was found in this review to have evaluated factors in this domain in the past decade. Their study focused on identifying home hazards related to falling in 727 community dwelling older people, using the Home Falls and Accidents Screening Tool, which evaluates physical features of the home as well as the functional capacity of an older person within their home. They found, in their prospective analysis, a relationship between identified hazards within the home environment and self-reported falls over the 3-year follow up period. It is difficult to
speculate why this has not been a current focus for Australian researchers. However, there is sufficient evidence in the international literature and in previous Australian original studies not captured by the parameters of this review to indicate that extrinsic risk factors are a contributing factor to falls (Clemson, Roland & Cumming 1997; Clemson, Cumming & Roland 1996; Hill, Schwartz, Flicker & Carroll 1999; McLean & Lord 1996; Campbell, Sanson-Fisher & Gillespie 2000; Carter et al., 1997). However, it would seem there still needs to be dedicated research into the role extrinsic risk factors may play in fall related risks specifically in regional Australia.

Identified modifiable behavioural fall related risk factors
The key behavioural risk factor of interest to Australian researchers was fear of falling. Fear of falling was found to be associated with an increased risk of falling by Delbaere et al. (2010a). However, as fear of falling is a complex issue often associated with older people who have other risk factors (Clemson et al., 2015) (such as experiencing a previous fall) it may not directly cause a fall in isolation. Fear of falling was specifically linked to intrinsic non-modifiable factors such as increasing age and being female, and potentially modifiable factors such as cognitive impairment and reduced social activity (Clemson et al., 2015). In addition, Delbaere et al. (2009) found in their experimental study of 44 adults that participants with a fear of falling showed greater physical gait adjustments when under conditions of postural threat. While fear of falling is considered a behavioural risk factor on its own, these studies demonstrate the complex interplay between behavioural and intrinsic risk factors and their association with falling.

Other behavioural risk factors relating to lifestyle choices were also found in the included Australian studies. Behaviours that drive lifestyle choices linked to fall risk were identified in three papers (Heesch et al., 2007; Peel et al., 2006, 2007). In a case-control study of 387 adults, involving 126 adults with a history of hip fracture and 261 adults in a control group, Peel et al. (2006, 2007) found that negative behaviours that involved smoking, excessive alcohol use, poor diet, reduced physical activity and psychosocial factors were linked to occurrence of fall related hip fractures. Reduced physical activity was also found by Heesch et al. (2007), in their prospective study of 8,188 women aged 70 – 75 years, to increase the risk of falling.
These studies demonstrate that behavioural risk factors such as fear of falling or lifestyle decisions may be important. Given that only four papers in the review evaluated both intrinsic and behavioural risk factors (Clemson et al., 2015; Delbaere et al., 2009; Delbaere et al., 2010a; Mitchell et al., 2014), it would appear that behavioural decisions and influences associated with fall risk in older people with known intrinsic risk factors warrants further investigation.

**Regional Australian perspective on fall related risk factors**

From an Australian regional perspective, this review found that our understanding of specific fall related risk factors associated with older people living in regional areas is deficient. Given the limited number of papers on this topic, all derived from a single study, it is difficult to determine the kinds of intrinsic, extrinsic and behavioural fall related risk factors that are most important for older people living in regional communities. While nine of the 31 papers included in the review involved participants from regional areas, only three papers (Sanders et al., 2010; Scott et al., 2014; Scott et al., 2015) isolated data specific to regional older people; the other six papers pooled participant data from both metropolitan and regional areas without comparing participant groups. All three regional papers focused on evaluating intrinsic risk factors (gait, balance and Vitamin D status) in a very specific population, older women at high-risk of fracture.

**DISCUSSION**

Similar to the broader international literature, the Australian literature reviewed here reveals a diverse range of identified fall related risk factors, highlighting the complexity in understanding how best to manage this problem. Despite a great deal of focus on fall related research, there are still major gaps in the available evidence, particularly for the Australian and Australian regional contexts. It is apparent that fall related risk factors in older people arise from different domains, intrinsic, extrinsic and behavioural, but our current understanding of the interplay between these different sources is limited. Research on how the known risk factors interact within the context of the older person is important to enable appropriate falls prevention strategies to be implemented so that a higher quality of life can be achieved for older people and that fall related health costs can be contained (Fukukawa et al., 2008).
The current Australian research focus on the contributions of intrinsic risk factors to falls risk limits our ability to gain a complete understanding of the interactions between fall risk factors affecting older people. Prevention strategies that specifically target isolated factors, such as gait and balance abnormalities, narrow our focus with older people being regarded as primarily responsible, rather than the wider community playing a role. This focus fails to address the complex interplay between risk factors from all three domains, intrinsic as well as extrinsic and behavioural, and the role that this complexity plays in our thinking on how to prevent falls in older people.

The diversity of fall related risk factors, and associated multiple modifiable risk factors that could be addressed in older populations, also makes it challenging to translate research outcomes into cost effective falls prevention strategies. Financial constraints associated with current health care provision for a growing ageing population, limit the possibility of overstretched health care services providing falls prevention strategies to every older person to modify one or several identified risk factors. When this challenge is coupled with what is unknown, especially in relation to behavioural risk factors, the task is made much more difficult. This is possibly why we are struggling to curb the rates of fall related injuries in older Australians. As such, alternative approaches to falls prevention may be needed to more holistically manage this problem.

Specific knowledge of the fall related risk factors associated with older people living in regional Australia is currently inadequate, as the majority of papers in this review focused on metropolitan participants. It has also been noted that a paucity of epidemiological data on fall related injury for regional areas of Australia (National Ageing Research Institute, 2004) impacts on our ability to critically evaluate the types of risk factors that may be evident for older people living in regional communities. A more holistic understanding of fall risk factors is imperative given evidence suggests that older adults living outside of metropolitan areas have poorer health outcomes (Aged & Community Services Australia, National Rural Health Alliance 2004; Boehm et al., 2014; Dixon & Welch, 2000) and as such may be at greater risk of falling. Therefore, it is evident that research into risk factors associated with falling for older people living in Australian regional communities is warranted to gain a better understanding of this problem. In particular,
research that involves collecting data from multiple sources may assist in providing greater insight on the complex interplay between fall risk domains for these people.

CONCLUSION

Fall risk in the older population is an important issue for our communities, given the personal and broader community costs associated with falling. Despite substantial research on fall related risk factors, significant gaps remain that impact upon our understanding of this complex problem. Translating knowledge of fall risk factors into effective falls prevention strategies is difficult, especially when multiple, interdependent factors have not been adequately explored.

Of importance to this research, fall related risk factors for older people living in regional areas of Australia have been under-researched and require attention. A mixed methods research program that integrates knowledge from multiple sources on fall related risk factors may provide greater clarity on the complexity of these risk factors for older people living in regional communities. This thesis reports such a mixed methods program of research. The following chapter will present the first study in this research program and provides epidemiological information on the rates of fall related injury for older people living in regional areas of NSW, Australia, when compared to their metropolitan counterparts.
INTRODUCTION
The first study undertaken in this mixed methods doctoral research program was an analysis of NSW hospital admission data relating to falls. This study, undertaken in 2011, investigated the rates of fall related hospital admissions for older people residing in New South Wales (NSW) during the period July 1997 to June 2008. It also examined the rates of fall related hospital admissions for older people residing in NSW who sustained a femoral or pelvic fracture as a consequence of their fall. Exclusively reviewing femoral and pelvic fracture admission rates enabled the researcher to minimise the effects of variability in hospital admission decisions across jurisdictions on results of comparisons of fall related hospital admission rates. It is standard practice for all patients presenting with femoral and pelvic fractures to be admitted to hospital and it is unlikely that many, if any, patients with these injuries would not have been admitted. Specifically, the study compared the NSW rates to the rates in each of the Area Health Services (AHS) within NSW and compared the rates that occurred across the different area health services.

Using the same timeframe, the study also analysed the rates of fall related hospital admissions for older people residing in the Greater Southern Area Health Service (GSAHS) who sustained a femoral or pelvic fracture. The admissions analysis was to determine any differences in rates between geographically defined communities of different population sizes. Understanding the rates of fall related injury is an important step in providing a greater awareness of the extent of falling in the older population in regional communities. Identifying whether there are differences in standardised rates across different regional communities also provides valuable information that may directly impact the provision of falls prevention services.
Fall related hospital admission rates are highest in older people and are the leading cause of injury related hospitalisation (Lord et al., 2011). In NSW, admission rates for older people due to fall related injury are estimated to be increasing by 2.5% per year (Harvey & Close, 2013). If this trend continues at the same rate over the next decade, it is expected that almost a million bed days per year will be attributed to fall related hospitalisation (Harvey & Close, 2013).

Fall injury can be complex and multifactorial in nature (Carter, Campbell, Sanson-Fisher, Redman, Gillespie, 1997). Effective injury prevention requires an understanding of injury rates and patterns (Gabbe, Finch, Wajsweimer & Bennell, 2002). In NSW, there are state-wide policies aimed at reducing the incidence and severity of falls among older people (NSW Department of Health, 2011). Therefore, it is important to determine whether all Area Health Services (AHS) within NSW have similar rates of fall related hospitalisation. Injury surveillance data such as hospital admission data provides the opportunity to estimate the incidence of fall related rates of injury (Bhalla Shahraz, Naghavi, Lozano & Murray, 2008) across different AHS and to determine the impact that fall related injuries are having on the community (Gabbe et al., 2002; Hayden & Mitchell, 2006; Houry et al., 1999; Langley, Davie & Simpson, 2007). Identifying the rates in different environments also enables policy makers to determine funding priorities that support cost-effective approaches to reduce the rates of fall related injuries in older Australians (Watson et al., 2010). Finally, if rates are lower in some environments than others, research to identify potential protective factors based on these contextual differences is both feasible and valuable to guide further development of public health practices.

**AIM**

The aim of this study was to identify the rates of hospitalisations associated with fall related injuries in individuals aged 65 years and over living in NSW during the period of July 1997 to June 2008, through the examination of hospital admission data records.
Three research questions guided this study.

- What were the rates of fall related hospitalisations for individuals aged 65 years and over living in NSW and were there any differences in rates between different AHS within NSW during the period of July 1997 to June 2008?
- What were the rates of femoral and pelvic fracture hospitalisations as a consequence of falls in individuals aged 65 years and over living in NSW, and were there any differences in rates between different AHS within NSW during the period of July 1997 to June 2008?
- What were the rates of fall related femoral and pelvic fracture hospitalisations in individuals 65 years and over living in the Greater Southern Area Health Service (Greater Southern AHS), and were there any differences in rates between geographically defined communities of different population sizes within this AHS during the period of July 1997 to June 2008?

**METHOD**

**Study Design**
A retrospective, observational study design was employed, in which hospital admission records were reviewed to determine the standardised rates of fall related hospitalisations in older people residing in NSW during the period of interest.

**Research Setting**
At the time the data was extracted, there were eight AHS within NSW (Figure 3-1). Four of these AHS were identified as regional and included Greater Southern AHS, Greater Western AHS, Hunter New England AHS and North Coast AHS. The other four AHS were identified as metropolitan and included Sydney South West AHS, South Eastern Sydney and Illawarra AHS, Sydney West AHS and Northern Sydney and Central Coast AHS.
The Greater Southern AHS extended over most of southern NSW (Figure 3-1). However, over the data collection timeframe there were changes to the geographical boundaries of this AHS. In January 2005, the Greater Southern AHS formed as a result of an amalgamation of the former Greater Murray AHS and Southern AHS (Figure 3-2). As this study was designed to investigate older people residing in southern NSW over the 10-year period during which these changes occurred, it was decided to include hospital admission records from individuals residing in both the Greater Murray and Southern AHS from 1st July 1997 until 31st December 2004 and then follow on with hospital admission records of the newly formed Greater Southern AHS from 1st January 2005 until the 30th June 2008.
Due to another shift in direction from the NSW Department of Health, all AHS in NSW were subsequently disbanded in December 2010. This included the Greater Southern AHS, which was replaced by two Local Health Districts, the Murrumbidgee Local Health District and the Southern Local Health District (Figure 3-3), which commenced operation on 1st January 2011. Given that the data set for this study was collected before this change occurred, the previous names of the NSW AHS (Figure 3-1) have been used throughout this chapter.
Data Source

Hospital admission data was sourced from the NSW Admitted Patient Data Collection (APDC), which was accessed through the NSW Health Department’s Health Outcomes Information Statistical Toolkit (HOIST). The HOIST system provided a common data set that included all patients admitted to all public hospitals, private hospitals and private day procedures centres in NSW (NSW Department of Health 2009) over the study period. The inpatient data in the HOIST database is categorised based on ‘separation mode’; that is, when a patient is discharged, is transferred or dies, a new record is created. From July 1998, a separation mode has been based on an episode of care within the hospital facility. An episode of care ends with a separation mode recorded in the database as either discharge, transfer or death of the patient. A new episode of care may also occur if a patient has a change in the type of service they are receiving during a single admission to hospital, such as when a patient is transferred from an acute service to a rehabilitation service. Prior to July 1998 the inpatient records were based on ‘periods of stay’ which did not adequately capture changes in service category, for example from acute care to
rehabilitation and so a single record may have included multiple episodes of care (NSW Department of Health, 2009).

The data used in this study were based on the International Classification of Disease version 10 Australian Modification (ICD-10-AM). The Australian Modification (AM) of the International Classification of Disease, version 10 (ICD-10) was developed by the World Health Organisation and was implemented in Australia from 1st July 1998. Prior to this date coding of data was based on the 9th revision of the International Classification of Disease, Clinical Modification (ICD-9-CM), using the Australian version (NSW Department of Health, 2009). For this study mapping tables designed by the National Centre for Classification in Health (NCCH) were used by the NSW Department of Health epidemiologist, who assisted the project, to match the disease codes between the ICD-9-CM and ICD-10-AM classifications and ensure consistency in the data set between the two classification systems (NCCH, 2010).

Ethics and Access Approvals

Ethical approval for the study was sought and granted by the Human Research Ethics Committee, Charles Sturt University, protocol number 2011/082. Approval to release the non-identifiable NSW data set was obtained from the Acting Director of the Centre for Epidemiology and Research, NSW Department of Health.

Data Extraction Procedures

The inclusion and exclusion criteria for the data set were established by the researcher. However, these data sets have strict privacy regulations that preclude researchers from working with the raw data. To address this, permission was gained for a NSW Department of Health epidemiologist to access the data, implement initial analysis determined by the researcher and then provide the researcher with the final non-identifiable data set for subsequent analysis. The specific data inclusion and exclusion criteria developed by the researcher enabled the epidemiologist to extract the relevant NSW hospital admission data from the HOIST database for the study.
**Inclusion criteria**

Hospital admission data for people aged 65 years and older residing in NSW (Figure 3-1) who were admitted to any NSW hospital as a result of a fall during the period July 1997 to June 2008 (10 years of separation) were included in this study. Records for NSW residents who were admitted to an interstate hospital during the study period were also included in the data set.

Within the ICD-9-CM and ICD-10-AM classification systems, data can be entered based on the principal diagnosis and a number of concurrent diagnoses. Data can also be added to reflect information regarding the external cause of any recorded injury. Currently up to fifty-four diagnoses and eight external cause codes for injury can be included in any one hospital admission record (NSW Department of Health, 2009). For this study, records of all NSW hospital admissions during the period of July 1997 to June 2008 with an ICD-10-AM external cause code relating to fall related injury listed in the HOIST dataset as W00 to W19 (injury sustained as a result of a fall) and the ICD-09-CM external cause codes relating to fall related injury listed in the HOIST dataset as E880 to E886, E888 and E929.3 (accidental falls) in any of the eight external cause fields of the hospital admission record were included in the analysis.

**Exclusion criteria**

In order to reduce the risk of multiple counting of hospital admissions related to the same injury incident, all admission records involving a hospital episode ending with transfer to another hospital or type change from one type of service to another were excluded from the data set prior to analysis. Within the HOIST data set there is also information on the source of referral into hospital. To further minimise the risk of multiple counting, all hospital admissions with a source of referral of hospital within the same AHS were excluded. As the study was designed to investigate rates of fall related injury in the community setting, a further exclusion criterion was incorporated to exclude all hospital admissions with a referral source of nursing home referral. Hospital admissions for individuals who were admitted to a NSW hospital during the study period but usually resided in another state were also excluded from the data set.
Data Analysis

The raw data was extracted by the NSW Department of Health epidemiologist. The epidemiologist also undertook three initial analyses, which were pre-determined by the researcher, using Statistical Analysis System (SAS) software (Version 9.2) with programs modified from the Centre for Epidemiology and Research, NSW Department of Health. The three separate analyses covered the 10-year period July 1997 to June 2008 (see Figure 3-4 for a summary of this process). The first analysis involved all fall related hospital admission records within NSW. This involved the calculation of the standardised rate, with 95% confidence intervals (CI), of all hospitalisations in NSW related to fall injury. Subsequent calculations of this same rate were made for each of the AHS within NSW in preparation for a comparative analysis.
Figure 3-4 - Summary of the three separate hospital admission data analyses

The second analysis examined only hospital admission records related to NSW fall related hospitalisations that involved a femoral or pelvic fracture to provide standardised rates of these types of admissions for NSW as a whole and for each of the AHS within NSW. For this second analysis, admission records associated with femoral or pelvic fractures signified by a relevant ICD-10-AM code or corresponding ICD-9-AM code were used (see Appendix C).

The third analysis was based on fall related hospitalisations that resulted from a femoral or pelvic fracture within the Greater Southern AHS only. This final analysis separated the admissions data based on population sizes within the GSAHS catchment to identify any
differences in rates between geographically defined communities of different population sizes. The extracted data set allowed for identification of the Local Government Areas (LGA) where patients lived. The LGA within the Greater Southern AHS were categorised based on the standard Australian Bureau of Statistics (ABS) population sizes; 4,999 or less, 5,000 - <17,999, 18,000 - <47,000 and 48,000 - <249,999 so that comparative analyses could be undertaken between categories of communities of different population sizes.

In all three analyses age-based adjustment of the hospital admission rates was undertaken through the use of a direct age-standardisation method. This enabled the epidemiologist to adjust for the effects of differences in the age compositions in the various populations in NSW used in this study, across time and geographic regions (NSW Department of Health, 2009). The direct age-standardised rate is defined as the weighted sum of age specific rates, where the weighting factor correlates to the standard age-specific population (NSW Department of Health, 2009). For this study, the Australian estimated residential population as at 30th June 2001 was used as the standard population. This same standard population was used for separation of male and female rates to allow for valid comparisons between sexes. The epidemiologist extracted the data set for the study and calculated the ninety-five per cent confidence limits around the directly standardised rates in each of the analyses listed above using the method described by Dobson et al. (1991).

Within the hospital admission data, the majority of recorded injuries had a documented principal diagnosis that represented an injury. However, there were also a substantial number of hospitalisation records where the injury was recorded in an additional diagnosis column within the data set, rather than as the principal diagnosis. In some cases, for example, ‘Rehabilitation’ was recorded as the principal diagnosis and the specific injury, such as a fracture, was recorded as an additional diagnosis (NSW Department of Health, 2009). Due to this variability within the data set the first analysis of all fall related hospitalisations included all diagnosis columns, regardless of which column listed the injury. Preparatory assessment of the data set revealed that fall related fractures had a fall recorded in the first, second or third external cause column in 99.99 per cent of cases,
with a fracture recorded in the first, second or third diagnosis column in 96.27 per cent of cases. On this basis, nearly all admissions due to fall related fractures could be identified in these first three diagnosis and external cause fields.

The first analysis in this study included records containing a fall code listed within the first three external cause fields and an injury within any diagnosis field. The second analysis included records containing a fall code listed within the first three external cause fields and a femoral or pelvic fracture indicated within the first three diagnosis fields. In the final analysis conducted in this study the data fields considered were expanded so that the analysis incorporated any record with a fall documented within the first five external cause fields and a femoral or pelvic fracture coded within the first ten diagnosis fields. This was important because of the smaller number of admission records arising from the smaller catchment area for this analysis. These procedures for the final analysis increased the number of hospital admissions that met the selection criteria and so improved the precision of the resulting estimates of fall related hospital admission rates for each geographic area of interest (i.e. reduced the size of the associated 95% confidence intervals) in order to increase the statistical power to detect differences between population-based categories of LGA in rates of hospital admissions due to fall related pelvic and femoral fractures.

RESULTS
Rates of fall related hospitalisations for individuals 65 years and over living in NSW by Area Health Service
Over the time period of July 1997 to June 2008, 237,076 NSW hospital admission records met the inclusion criteria for the study. This resulted in an overall NSW age- and sex-standardised rate of 2,637.22 (95% CI: 2,626.6 - 2,647.86) hospital admissions per 100,000 population aged < 65 years due to fall related injuries. Among the regional AHS only Greater Southern AHS had a fall related hospital admission rate that was significantly higher than the NSW state average. All other regional AHS had a significantly lower rate of fall related hospitalisations compared to the NSW state average, over the 10-year study period of interest. These included Greater Western AHS, North Coast AHS, and Hunter New England AHS (Figure 3-5; Table D-1 in Appendix
Three of the four metropolitan AHS had a significantly higher rate of fall related hospital admissions than the NSW state average. These included South Eastern Sydney & Illawarra AHS, Sydney West AHS, and Northern Sydney & Central Coast AHS. The fourth AHS, Sydney South West, had a significantly lower rate of fall related hospital admissions than the NSW state average (Figure 3-5; Table D-1 in Appendix D).

When the data set was separated into male and female records, the age- and sex-standardised NSW rate of fall related hospital admissions for males over the study period was 1,983.39 (95% CI: 1,968.57 – 1,998.29) per 100,000 population and the female rate was higher, with an age-and sex-standardised rate per 100,000 population of 3,079.24 (95% CI: 3,064.34 – 3,094.2). All AHS had significantly higher rates of female fall related hospital admissions than male fall related hospital admissions. This was consistent with the NSW fall related hospital admissions rates for both sexes (Figure 3-6; Table D-2 in Appendix D).
Among the regional AHS only the Greater Southern AHS demonstrated significantly higher age- and sex-standardised rates of fall related hospital admissions for both males and females when compared to the NSW state averages having a male rate of 2,104.34 (95% CI: 2,041.2 – 2,160.64) per 100,000 population and a female rate of 3,302.96 (95% CI: 3,245.74 – 3,360.93) per 100,000 population. All other regional AHS had a significantly lower rate of fall related hospitalisations for both males and females over the 10 year study period (Figure 3-6; Table D-2 in Appendix D).

Similar to the results of the first analysis reported above, when separated by sex, the same three of the four metropolitan AHS had a significantly higher age- and sex-standardised rate of both male and female fall related hospital admissions when compared to the NSW state averages. The rate for males in the fourth metropolitan AHS, Sydney South West, was not significantly different to the NSW state average, with an AHS rate of 2,009.83 (95% CI: 1,971.29 – 2,048.92) per 100,000 population. However, the rate for females in the AHS was significantly lower than the NSW state average, with an AHS rate of 2,962.06 (95% CI: 2,924.79 – 2,999.68) per 100,000 population (Figure 3-6; Table D-2 in Appendix D).
Rates of hospital admissions due to fall related femoral or pelvic fractures for individuals 65 years and over living in NSW by Area Health Service

When the data set was refined to include only hospital admissions due to femoral or pelvic fractures resulting from falls, the overall age- and sex-standardised rate for NSW was 878.33 admissions (95% CI: 872.23 – 884.47) per 100,000 population. Among the regional AHS, both Greater Southern AHS and Greater Western AHS had a similar rate to the NSW state average with 883.3 (95% CI: 860.71 – 906.32) and 846.29 (95% CI: 818.5 – 874.79) admissions respectively per 100,000 population due to femoral or pelvic fractures resulting from falls. The other regional AHS had a significantly lower age- and sex-standardised rate of hospital admissions due to fall related femoral or pelvic fractures (Figure 3-7; Table D-3 in Appendix D). All the metropolitan AHS had a significantly higher age- and sex-standardised rate of hospital admissions due to femoral or pelvic fractures resulting from falls compared to NSW state average (Figure 3-7; Table D-3 in Appendix D).

![Figure 3-7 - Rates of hospital admissions due to fall related femoral or pelvic fractures for individuals 65 years and over living in NSW by Area Health Service with 95% confidence intervals.](image-url)
Rates of hospital admissions due to fall related femoral or pelvic fractures in individuals 65 years and over living in NSW, by sex and Area Health Service

The NSW age- and sex-standardised rate of hospital admissions for fall related femoral or pelvic fractures in males over the 10-year study period was 565.19 (95% CI: 557.18 – 573.28) per 100,000 population, and the female rate was higher with an age-and sex-standardised rate per 100,000 population of 1,078.88 (95% CI: 1,070.18 – 1,087.64). All AHS and NSW as a whole had significantly higher rates of hospital admission due to fall related femoral and pelvic fracture in females when compared to males (Figure 3-8; Table D-4 in Appendix D).

In the regional AHS only the Greater Southern AHS had a similar age- and sex-standardised rate of hospital admissions in males due to fall related femoral or pelvic fracture when compared to the NSW state average. The Greater Southern AHS statistic was 562.63 (95% CI: 533.63 – 592.78) per 100,000 population. All other regional AHS had significantly lower rates of hospital admissions in males due to fall related femoral and pelvic fractures. The age- and sex-standardised rate of hospital admissions in females due to fall related femoral and pelvic fracture in the Greater Southern AHS was 1,097.11 (95% CI: 1,064.53 – 1,130.42) per 100,000 population, similar to the NSW state average.
Greater Western AHS also had a similar hospital admission rate for females due to fall related pelvic or femoral fractures when compared to the NSW state average, with 1,069.57 (95% CI: 1,029.36 – 1,110.93) per 100,000 population. The two other regional AHS both had significantly lower rates of fall related hospitalisations involving femoral or pelvic fractures in females over the 10-year study period, than the NSW state average for females (Figure 3-8; Table D-4 in Appendix D).

With one exception the metropolitan AHS all had a significantly higher age- and sex-standardised rate of hospital admissions due to fall related femoral or pelvic fracture in both males and females when compared to the NSW state average for each sex. The exception was the male age- and sex-standardised rate in Sydney West, which was similar to the NSW state average (Figure 3-8; Table D-4 in Appendix D).

Rates of fall related femoral or pelvic fractures resulting in hospital admissions for individuals 65 years and over within the Greater Southern AHS catchment area, by community population size

Hospital admissions records within the data set that related to individuals residing in the Greater Southern AHS catchment area and which had an external cause code indicating a fall related injury within at least one of the external cause code fields (one to five) and a diagnosis of a femoral or pelvic fracture in at least one of the diagnosis code fields (one to ten) were analysed. The age- and sex-standardised rate for hospital admissions due to fall related femoral or pelvic fractures over the study period of July 1997 to June 2008 was 883.3 (95% CI: 860.71 – 906.32) per 100,000 population. With only one exception there were similar age- and sex-standardised rates of hospital admissions for fall related femoral or pelvic fractures across the different population sizes within the Greater Southern AHS catchment. The largest population size of 48,000 to <249,999 was the exception, with a significantly lower rate of 756.57 (95% CI: 693.49 – 823.84) admissions due to fall related pelvic or femoral fractures per 100,000 population, when compared to the Greater Southern AHS and NSW state average (Figure 3-9; Table D-5 in Appendix D).
Figure 3.9 - Rates of fall related femoral or pelvic fractures resulting in hospital admissions for individuals 65 years and over within the Greater Southern AHS catchment area, by community population size with 95% confidence intervals.

Rates of hospital admissions due to fall related femoral or pelvic fractures for individuals aged 65 years and over and residing within the Greater Southern AHS catchment area, by sex and community population size

The Greater Southern AHS age- and sex-standardised rate of hospital admissions for fall related femoral or pelvic fractures in males over the 10-year study period was 562.63 (95% CI: 533.63 – 592.78) per 100,000 population and the female rate was substantially higher, with an age- and sex-standardised rate per 100,000 of 1,097.11 (95% CI: 1,164.53 – 1,130.42). The higher rate in females, when compared to males, of fall related hospital admissions due to femoral or pelvic fractures was a consistent finding across all the community population sizes within the Greater Southern AHS. This significantly higher rate for females compared to males was also consistent with both the Greater Southern AHS age- and sex-standardised rates and the NSW age- and sex-standardised rates (Figure 3-10; Table D-6 in Appendix D).
In this specific analysis, there were no significant differences found across the different community population sizes in age- and sex-standardised hospital admission rates for males due to pelvic or femoral fractures. Analysis of the same rates for females identified that all but one of the population sizes had a similar female age- and sex-standardised rate. The single population size which differed (48,000 - <249,999) had a female age- and sex-standardised rate of hospital admissions due to femoral or pelvic fracture that was significantly lower than all other population sizes, at 888.85 (95% CI: 802.9 – 981.4) per 100,000 (Figure 3-10; Table D-6 in Appendix D).
DISCUSSION

This study represents the first reported comparative analysis of fall related hospitalisation rates across AHS within NSW over this specific 10-year study period (July 1997 to June 2008). The study used hospital admission data to conduct a comparative analysis of fall related hospitalisation rates across regional and metropolitan AHS, as well as a comparison of rates between sexes within each of the AHS and across the AHS. In this study four key findings have been made.

- Differences existed in age-standardised rates of all fall related hospital admissions between regional and metropolitan AHS.
- Differences existed in age-standardised rates of fall related femoral and pelvic fracture hospital admissions between regional and metropolitan AHS.
- Differences existed in age- and sex-standardised rates for all fall related hospital admissions and fall related femoral and pelvic fractures between males and females.
- Differences existed in age-and sex-standardised rates for fall related femoral and pelvic fractures between communities within the same AHS.

A key finding from this study was the differences in rates of hospital admission due to fall injury when regional and metropolitan AHS were compared. The analysis found that three out of the four metropolitan area health services had a significantly higher age-standardised rate when compared to the NSW state average, and that three of the regional area health services had a significantly lower age-standardised rate when compared to the state average. The Greater Southern AHS was the regional exception, with a significantly higher age-standardised rate when it was compared to the NSW state average. These findings are consistent with those of a similar study recently undertaken in NSW which examined fall related age-standardised hospital admission rates based on NSW local health districts (Harvey & Close, 2013). Harvey and Close (2013) calculated the annual NSW fall related hospitalisation rates and fall related femoral fractures rates from July 1998 to June 2012, along with the percentage annual change in the hospitalisation rate, using the principal diagnosis code and the first external cause code within the hospital admission data set, while utilising the same exclusion criteria presented in the study in this chapter. As part of their analysis Harvey and Close (2013) also calculated the
projected rates to 2020/21 for fall related hospital admission using binomial regression models. The Harvey and Close (2013) study found there were differences in annual age-standardised hospital admission rates that existed between local health districts including regional and metropolitan local health districts, similar to the findings presented in this chapter. They also found that the Murrumbidgee local health district, which forms part of the previous Greater Southern AHS, had a consistently higher annual age-standardised rate for fall related hospitalisation when compared to the NSW average over the reported period. However, there was no discussion presented by Harvey and Close (2013) as to reasons why the differences between local health districts in fall related age-standardised hospital admissions existed or why the fall related age-standardised hospital admission trends were increasing at a faster rate than the NSW average in some local health districts and not in others.

The study reported in this chapter also identified differences between regional and metropolitan area health service rates of age-standardised hospital admissions due to fall related femoral and pelvic fractures. The analysis found that all metropolitan area health services had a significantly higher age-standardised hospital admission rate for fall related femoral and pelvic fractures when compared to the NSW state average and that the same three regional area health services had a significantly lower age-standardised rate when compared to the state average. The Greater Southern AHS was again the regional exception, having an age-standardised rate close to the NSW state average. Consistent with this finding for the Greater Southern AHS, Harvey and Close (2013) reported that the Murrumbidgee local health district had a consistently higher annual age-standardised hospital admission rate for fall related femoral fractures than the NSW annual average rate.

Australian geographical variations in rates for generalised fractures, including fall related fractures, have been documented previously within the literature with two papers reporting that the general injury fracture incidence was significantly lower in rural areas compared to metropolitan areas (Cooley & Jones, 2002; Sanders et al., 2002). The findings of the current study support this observation. Both of the papers by Cooley and Jones (2002) and Sanders et al. (2002) used similar methods, reviewing all radiologist
reports over a twelve-month period to determine the incidence of general injury fractures between rural and metropolitan populations. The study conducted by Cooley and Jones (2002) covering the whole of the state of Tasmania in Australia, found that in all ages; general injury fracture rates were higher in metropolitan than in rural areas. A similar rural-metropolitan difference was also noted in the same study when they analysed hip fractures alone. Sanders et al. (2002) analysed data from the metropolitan area of Geelong and rural areas surrounding Geelong in Victoria, Australia and found that for people aged 60 years and older, the hip fracture rate was 32% lower and the pelvic fracture rate was 45% lower in rural areas when compared to metropolitan areas. Sanders et al (2002) also found that in the same age group the rate for all general injury fractures was 15% lower in rural populations when compared to metropolitan populations.

The current study has identified a key exception to this reported rural-metropolitan pattern with the Greater Southern AHS exhibiting rates similar to those found in metropolitan area health services and to the overall NSW state average. It is possible that a range of factors associated with where a person lives may contribute to explaining these differences, such as access and availability to health services or the variability in environmental landscape. However, no research has been found that has explored such differences in Australia, making it difficult to explain these variations in age-standardised fall related hospitalisation rates across different populations. This demonstrates the need to further explore at a local level the contributing factors to fall risk in specific communities in order to better understand the exception found in this study, which suggests that rurality is not always associated with reduced rates of fall related fractures.

All area health services within the study found a higher female age- and sex-standardised rate of fall related hospital admissions and hospital admissions for fall related femoral and pelvic fractures compared to males. The finding of higher female age- and sex-standardised rates of fall related hospital admissions is congruent with findings reported in the literature nationally and internationally. Studies in New Zealand (Campbell et al., 1990), Finland (Kannus et al., 1999) and America (Stevens & Sogolow, 2005) have shown sex differences in fall related hospitalisations in different communities. Differences between sexes were also identified in the Sanders et al. (2002) study with
females being 30% more likely to be admitted to hospital as a result of fall related injury compared to males and almost 50% more likely to be admitted to hospital with a fall related femoral or pelvic fracture. However, a study by Peel, Kassulke and McClure (2002), who analysed hospital admission data over a twelve-month period from fourteen hospitals in the Greater Brisbane Region in Australia, did not find any significant difference between sexes in older people for fall related hip fractures, but they did note a significant difference between sexes in this particular population when looking at hospital admissions for all fall related injury, with the female rate being twice as high as that for men. The Peel et al. (2002) study, while contradictory to other studies, including this one, on the differences in hip fracture rates between male and female, does support the premise that there are possible variations to standardised rates in different geographic areas. This premise is supported by the findings of this study.

The significant differences between male and female sex-standardised fall related hospital admission rates depending on which area health service an older person resided, found in the current study, is interesting. However, the regional-metropolitan differences seen in this study were not as clear cut. Three of the metropolitan area health services and one regional area health service (Greater Southern AHS) showed male and female age- and sex-standardised fall related hospital admission rates, significantly higher than the NSW state average for both sexes. The age- and sex-standardised hospital admissions for fall related femoral and pelvic fractures for females showed that all metropolitan and two out of the four regional area health services had an equal to or higher age-and sex-standardised rate compared to the NSW state average. In comparison, the male age-and sex-standardised hospital admissions for fall related femoral and pelvic fracture rates found that all metropolitan and one regional (Greater Southern AHS) area health services had a rate equal to or higher than that of the NSW state average. Sanders et al. (2002) in their Victorian study found significant differences between rates for sexes in both rural and metropolitan areas, with a 40% lower rate of hip fracture in males in their rural population when compared to males in the metropolitan population and an 18% lower rate for females in the rural population when compared to females in the metropolitan population. Therefore, it is evident that differences in rates exist between sexes but what is not clear in the current literature is why there are differences in age- and sex-standardised rates for the same sex in different area health services.
Differences occurring in fall related injuries for men and women have been linked to a range of factors such as bone mass, characteristics of the fall and differences in physical activity (Greenspan, Meyers, Maitland, Resnick, Hayes, 1994; Stevens & Sogolow, 2005). Stevens & Sogolow (2005) postulated that differences in physical activity and consequently lower body strength in females may be a contributing factor to the differences seen in female fracture rates. Yoshida - Intern (2007) suggested that increased rates of osteoporosis in females resulted in higher rates of fracture compared to males. However, this does not explain why the age- and sex-standardised rate seen in this study was not consistent across all area health services and why variations were observed between metropolitan area health services as well as between regional area health services. Further investigation is needed of the circumstances surrounding fall related injuries in different communities to address the deficits in our understanding of population differences.

The Greater Southern AHS exception, identified in this study, indicates that different risk factors for fall related injuries may exist in different communities. The lack of a simple cause-effect relationship for fall related injury in the older person is a significant challenge for health professionals and the health department (Close, Hooper, Glucksman, Jackson & Swift, 2003; Close & Lord, 2011). The findings of this study call into question the use of a standardised National or State approach to managing fall risk in older populations. Understanding differences and tailoring falls prevention strategies to populations may be necessary if we are going to effectively reduce fall related hospitalisations.

There were a number of limitations associated with this study. Although this study identified standardised rates for fall related hospital admissions and provided comparable rates between area health services, this does not provide us with an understanding of the true overall incidence of falls in older people in each of the area health services, since only severe injuries will require hospitalisation. Rubenstein (2006) estimated that about 5% of fall related injury would result in hospitalisation. This indicates that a substantial
number of falls in older people would have occurred in the community that did not require hospitalisation and would not have been recorded in the data set used in this study. Based on the findings of this study and using Rubenstein’s estimates, Greater Southern AHS could have as many as 56,236 falls occurring each year, per 100,000 population. Currently we do not know if the variations in hospital admission rates based on geographic location identified in this study are mirrored in the non-hospitalised fall related rates.

Variations in fall hospitalisation rates across different area health services may also result from differences in admission policies between the area health services, or other factors such as service availability (NSW Department of Health, 2009). However, as it is accepted that a diagnosis of a hip fracture requires hospitalisation (Cheng et al., 2011), the approach chosen in this study means it is unlikely that local admission policies or service availability were significant factors in explaining the variance in rates of hospital admission due to fall related femoral or pelvic fractures observed across geographic areas.

This study required the analysis of hospital admission codes. There is the potential for error during conversion of patient data into ICD-10-AM codes on the system, particularly information relating to the diagnosis and mechanism of injury (Boufous et al., 2006). This may have impacted on this study and its findings as issues with coding in medical records are well documented within the literature (Finch & Boufous, 2008; Langley et al., 2007). However, McKenzie et al. (2009) found that coder agreement in the first three fields for external cause codes using ICD-10-AM was 74% and Davie, Langley, Samaranayaka & Wetherspoon (2008) found that a fracture diagnosis was the least likely to contain error in the coding when using the first three diagnosis fields. Given that all diagnosis columns were included for analysis of all fall related hospitalisations and that 96.27% of fall related femoral and pelvic fractures meeting the inclusion criteria were identified in the included first three diagnoses and external cause fields of hospitalisation records in the current study, this strengthens validity and minimises the potential for inaccuracies in the data set to impact on the results of this study.
Although this study highlights important issues such as the hospital admission rates for fall related injury appearing to differ in various communities, it was not designed to identify the circumstances surrounding the fall or why these differences exist. Analysis of the rates of fall related hospitalisation is a useful mechanism for the surveillance of injuries (Bhalla et al., 2008; Runyan et. al. 2005), enabling researchers to assess the burden and cost of injury and identify contributing factors associated with injuries, such as specific geographic locations, (Hayden, Boufous & Harrison, 2007). However, such analysis provides limited information to guide fall prevention efforts. In order to implement effective injury prevention strategies, it is important that we understand specific risk factors and circumstances associated with fall related injuries within different communities. Further research is warranted to investigate why these potential differences exist in order to ensure falls prevention strategies match the needs of each specific community.

This study has shown that there are significant geographical differences in the rates of fall related hospitalisations. Additional analysis of the ICD-10-AM codes within the HOIST system has the potential to enhance our understanding of these differences through the exploration of the hospital data sets, evaluating the external cause codes, places of occurrence and activities at the times of injuries (Langley & Charmers, 1999). This might help uncover possible sources of injury risk in specific communities and may be valuable to guide future prevention policies and interventions. Given the Greater Southern AHS fall related hospitalisation rate was significantly different when compared to other regional area health services, further evaluation of hospital admission data sets and other key sources of information is important to determine why these variations exist.

CONCLUSION
Fall related injury is one of the leading causes for hospitalisation of older people in Australia. Analysis of injury surveillance data, such as hospital admission data, is a useful mechanism for determining the incidence of fall related injury. This type of analysis also provides researchers with an opportunity to examine the patterns of incidence across different geographic locations. Determining whether there are variations in fall related hospitalisations between area health services is important to ensure contextually-bound
circumstances; to ensure risk factors for falls at a local level are identified and investigated; and to inform community-level fall prevention efforts.

This study identified that there were significant geographical differences in fall related hospitalisation rates. Another key finding of this study is that differences also existed across population sizes of fall related hospitalisation rates within one regional area health service. This finding indicates that the circumstances surrounding fall related injury might differ depending on where older people live.

Determining that rates of fall related hospitalisations vary, while useful, does not provide understanding of possible causes of these differences, nor does it explain the local risk factors that are resulting in the variations observed across geographic areas in the current study. Managing and preventing falls in older people are multifactorial and complex endeavours. In this respect, greater knowledge of sources of risk and causal factors associated with fall related injuries in specific communities is fundamental to implementing effective policies and preventative strategies. Targeted interventions, carefully matched to local circumstances, are critical if we are to succeed in reducing the long-term health care cost and burden of injury arising from older people falling. Further analysis of the fall related hospital admission data to investigate the external causes, places of occurrence and activities at the times falls occur is warranted to provide additional insight to why differences were observed in this study. The next chapter of this thesis reports findings from this further analysis phase of the research.
CHAPTER 4  ANALYSIS OF GSAHS HOSPITAL
ADMISSION DATA

INTRODUCTION
This chapter presents findings from a study of hospital admission data for older people residing in the Greater Southern Area Health Service (GSAHS) located in southern New South Wales (NSW) who were admitted to hospital as a result of a fall during the period of July 2000 to June 2005. Specifically, the study identified the key external causes of falls, places where falls have occurred and the activities engaged in at the time of the fall. In addition, this study also separated the hospital admission data by the size of the geographically defined community in which each patient resided, using standard Australian Bureau of Statistics (ABS) population sizes, 4,999 or less, 5,000 - <17,999, 18,000 - <47,000 and 48,000 - <249,999. This approach allowed examination of whether reported sources or causes of falls were proportionally more or less represented in communities of each standard population size. Hospital admission data constitutes a potential source of information for determining risk factors associated with falls. Analysis of factors such as the external causes, places of occurrence and activities associated with falls could lead to identification of common circumstances and mechanisms of falls. Findings from this analysis may provide useful information to enhance understanding of fall related risk factors within the extrinsic risk domain for particular communities.

As discussed (Chapter 3), hospital data has been identified in the field of injury prevention as a useful source of information for surveillance of injuries (Bhalla et al., 2008; D’Souza, Smith & Trifiletti, 2007; Runyan et al., 2005). Establishing incidence and prevalence rates for specific injuries enables researchers to assess the burden of injury as well as evaluate current injury prevention strategies (Hayden et al., 2007). Additional investigation examining other information provided within the hospital admission data sets may provide a more comprehensive view of the events surrounding specific injuries which lead to hospitalisation. This type of information may also be useful in determining extrinsic risk factors associated with variations in injury rates across regional populations to enable appropriate priorities for injury prevention to be established within specific
communities (Finch & Boufous, 2009; McKenzie, Fingerhut, Walker, Harrison & Harrison, 2012).

The introduction of ICD–10 (International Classification of Disease, version 10), used by Australian health departments to classify injuries and disease, has brought with it a significant improvement in the types of data related to fall injury that are available to access. For instance the external cause code changed from being a supplementary item in the data set to being situated within the main body of the classification system. Alongside this change was an expansion of codes available to delineate between different external causes (Langley & Charmers, 1999; McKenzie et al., 2012). These improvements provide the opportunity to develop a greater understanding of the mechanisms associated with fall related injury. In addition, ICD-10 includes revised codes for the place of occurrence of injuries and has introduced a set of codes for the activity at the time of injury (Langley & Charmers, 1999). These revisions of the ICD system of classification enhance the utility of the ICD system to uncover potential sources of risk for injuries associated with falls.

AIM

The aim of this study was to examine the types of external causes, places of occurrence and activities related to fall injury in community-dwelling individuals living in GSAHS during the period of July 2000 to June 2005, through examination of hospital admission records.

Three research questions guided the study:

- What were the external causes, places of occurrence and activities at the time the fall occurred which resulted in hospitalisation of people residing within the GSAHS catchment area, during the period of July 2000 to June 2005?
- What were the external causes, places of occurrence and activities at the times falls occurred which resulted in hospitalisation of people residing in communities of different population sizes within the GSAHS catchment area, during the period of July 2000 to June 2005?
- What were the external causes, places of occurrence and activities at the times falls occurred which resulted in hospitalisation due to femoral or pelvic fracture, of people residing in the GSAHS catchment area during the period of July 2000 to June 2005?

**METHODS**

**Study Design**

A retrospective, observational study design was employed, in which hospital admission records were reviewed to ascertain the *external causes, places of occurrence and activities* at the time the fall occurred which resulted in hospitalisation of people residing in the GSAHS catchment area during the period of interest.

**Research Setting**

The GSAHS extended over most of southern NSW (Figure 4-1). As previously discussed (Chapter 3), there were changes to the geographic boundaries of this Area Health Service (AHS) during the data collection timeframe. As for Chapter 3, data records from individuals residing in both Greater Murray AHS and Southern AHS from 1st July 2000 until 31st December 2004 and then hospital admission records from the newly formed GSAHS from 1st January until the 30th June 2005 were included.
Figure 4.1 - Map of Greater Murray Area Health Services and Southern Area health Service within New South Wales
Map created by the Spatial Data Analysis Network (SPAN), Charles Sturt University

Data Source

Data for the study was obtained from the NSW Admitted Patient Data Collection (APDC) using the Health Outcomes Information Statistical Toolkit (HOIST), which is a Statistical Analysis System (SAS) based ‘data warehouse’ operated by the Centre for Epidemiology and Research of the New South Wales (NSW) Department of Health. HOIST provides access to the APDC, which includes records of all patients admitted to all public hospitals, private hospitals and private day procedure centres in NSW (NSW Department of Health, 2009).

As discussed in Chapter 3, the inpatient data in HOIST is based on episodes of care within a hospital. An episode of care ends when the patient is either discharged, transferred or dies. A new episode of care may also start when the service category for the admitted patient is changed from one type of clinical care to another, such as when a patient moves from acute care to rehabilitation care within the same health care facility. For this reason,
hospital admissions are coded at the time of separation, that is, discharge, transfer or death (NSW Department of Health, 2009).

The data used in the study was based on the International Classification of Disease, version 10, Australian Modification (ICD-10-AM). This Australian modification (AM) of the International Classification of Disease, version 10 (ICD-10), developed by the World Health Organisation, is used in all Australian hospitals. It assigns an alphanumeric code to each individual’s diagnosis, procedures, external causes of disease, place of occurrence and activity during which the injury occurred (where relevant), based on information drawn from their medical records (McKenzie, Enraght-Moony, Walker, McClure & Harrison, 2009). Data related to injury is documented in the medical record by the clinical staff. Clinical coders, using the ICD-10-AM codes, then translate this information into codes and import the coded information into the hospital admission data set (McKenzie et al., 2009).

Based on the current ICD-10-AM classification a number of diagnosis and treatment codes can be recorded against an individual patient at the time of separation within the HOIST data set. These codes represent: the principal diagnosis (the reason for the admission); up to 54 other diagnoses; up to 50 treatment or medical procedures; up to 8 external cause codes for injury and poisoning; up to 3 codes for place of occurrence of injury or poisoning; and up to 3 codes to classify the type of activity being performed by the injured person at the time they sustained an injury or poisoning (NSW Department of Health, 2009).

**Ethics and Data Release Approvals**

Ethics approval for the study was sought and granted by the Human Research Ethics Committee of Charles Sturt University, protocol number 2011/082. Approval for release to the researcher of the de-identified data set was obtained from the Acting Director of the Centre for Epidemiology and Research, NSW Department of Health.
**Data Extraction Procedures**

The inclusion and exclusion criteria for the data set were established by the researcher. However, these data sets have strict privacy regulations that preclude researchers from working with the raw data. To address this issue permission was gained for a NSW Health epidemiologist to access and de-identify the data and then provide the de-identified data set to the researcher for analysis. The specific data inclusion and exclusion criteria developed by the researcher enabled the epidemiologist to extract the relevant NSW hospital admission data from the HOIST database for the study. The data set was extracted using Statistical Analysis System (SAS) statistical software (Version 9.2) with programs modified by the Centre for Epidemiology and Research, NSW Department of Health.

**Inclusion and Exclusion Criteria**

Inclusion and exclusion criteria for the data set were specified by the researcher in consultation with the NSW Department of Health epidemiologist who performed the data extraction. The ICD-10-AM external cause codes relating to fall related injuries are listed in the HOIST dataset as W00 to W19 (*injury sustained as a result of a fall*). Inclusion criteria for the data set extracted for the study specified hospital admission records from the period July 2000 to June 2005, which related to residents from the GSAHS catchment area who were 65 years and over at the time of separation from the hospital and who had one of the fall related codes W00 through to W19 listed anywhere in the 1st to 8th external cause fields of their hospital admission record.

**Data Cleaning and Refinement**

The de-identified data set was released to the researcher for further data cleaning and refinement before analysis. The first stage in the data refinement process involved the exclusion of hospital admission records if they related to individuals with a separation from the hospital episode listed as *Type change* or *Transfer to another hospital*. These exclusion criteria were designed to minimise the risk of individuals being counted twice within the data set due to multiple separations (Watson et al., 2010). This meant that the subsequent record set included only records of individual admissions with an end point of separation for the hospital episode recorded as *discharged, died* (with/or without
autopsy), or transferred to a facility other than a hospital. In addition, a second
refinement was undertaken to exclude hospital admission records if they had a place of
currency coded as residential institution, aged care facility or health service area,
(health service area indicated that the fall occurred whilst being admitted to a health
service facility), anywhere in the 1st to 3rd place of occurrence fields. These exclusion
criteria ensured that the focus of the study remained on fall related injuries causing
hospitalisation of older individuals who usually resided in a community setting rather than
in a residential or hospital facility.

For the purpose of this study and in order to present the analysed data in a meaningful
way, a third refinement process occurred such that similar codes within each of the
external cause field, place of occurrence field and activity field of each record were
combined as described below.

Within the external cause field, the ICD-10-AM codes related to falls range from W00 to
W19. Within a number of these codes there were also subcategories present. For example,
the ICD-10-AM injury code W01, which relates to a Fall on same level from slipping,
tripping and stumbling, is also associated with ICD-10-AM injury codes W01.0, W01.1
and W01.2 (Fall on same level from slipping, Fall on same level from tripping and Fall
on same level from stumbling) as subcategories of the higher level injury code, W01. All
subcategory codes appearing within the external cause field in the data were replaced
with their corresponding higher level code and only the higher level codes were reported
in the results section of the study.

Any ICD-10-AM code in the range W00 to W19 which appeared within the external
cause field in less than 1% of the records within the record set was also replaced with one
overarching code named other specified external cause. Some other ICD-10-AM codes
within the external cause field were also combined in order to manage the data. These
included the ICD-10-AM injury codes of W06 (Fall involving bed), W07 (Fall involving
chair) and W08 (Fall involving other furniture), which were combined to form an
overarching code named fall involving, bed, chair or other furniture. Lastly, the external
cause code W01 (*Fall on same level from slipping, tripping and stumbling*) was replaced with W18 (*Other fall on same level*) in order to combine codes for all falls occurring on the one level.

Within the data set, the *place of occurrence* field included the following codes; Y92.0 (*Home*), Y92.1 (*Residential institution*), Y92.2 (*School, other institution and public administration area*), Y92.3 (*Sports and athletics area*), Y92.4 (*Street and highway*), Y92.5 (*Trade and service area*), Y92.6 (*Industrial and construction area*), Y92.7 (*Farm*), Y92.8 (*Other specified place of occurrence*) and Y92.9 (*Unspecified place of occurrence*). After the exclusion criteria was applied, all ICD-10-AM *place of occurrence* codes that appeared in less than 1% of the records in the data set were replaced with the code Y92.8 (*Other specified place of occurrence*). Similar to the external cause codes, there were a range of subcategories under each of the above *place of occurrence* codes which were replaced with the corresponding higher level *place of occurrence* code, and only the higher level codes are reported in the results section.

Within the *activity* fields, there were only two higher level ICD-10-AM codes. The first was U50 (*while engaged in sports or leisure*), this main code had multiple subcategories ranging from ICD-10-AM code U50.00 through to U72.00. Due to the large number of subcategories, and given the majority were reported in less than 1% of the records in the data set, only the higher level code *while engaged in sports or leisure* was reported in the results section of the study. The other higher level code within the *activity* field was U73 (*while engaged in other activity*). This code also has a number of subcategories associated with it, however, a number of these subcategories were reported in the data set in larger proportions. These frequently recorded sub-codes include U73.1 (*while engaged in other types of work*), U73.2 (*while resting, sleeping, eating or engaging in other vital activities*) and U73.9 (*unspecified activity*). Given the larger proportions of these subcategories in the data set, they are reported separately in the results section. All other subcategories associated with the ICD-10-AM code U73 were reported in less than 1% of records in the data set and were therefore replaced with the higher-level code U73 (*while engaged in other activity*).
Following the above the data set was further refined in order to identify the key *external causes, places of occurrence* and *activities* at the time of injury in records relating to residents of geographically-defined communities of the different population sizes in the GSAHS catchment area. Each record in the data set indicated the Local Government Area (LGA) in which the patient resided. Records within the data set were grouped according to the population size of the LGA within which the patient resided, using groupings based on the standard Australian Bureau of Statistics (ABS) population sizes: 4,999 or less; 5,000 - <17,999; 18,000 - <47,000; and 48,000 - <249,999. This approach enabled the identification of any differences between communities of different population sizes in the patterns and proportional contributions of particular *external causes, places of occurrence* and *activities* associated with fall related injuries, across the GSAHS catchment area.

Finally, to enable identification of key *external causes, places of occurrence* and *activities* associated with *serious* injury, a separate data set was created from the primary data set that included only fall related hospital admissions that resulted in a femoral or pelvic fracture. The primary data set was reviewed to create this additional data set of more serious injuries, and all ICD-10-AM diagnosis codes relating to femoral or pelvic fractures (S72, S32.83, S32.89, S32.1 or S32.3 through to S32.81) (Appendix C) were identified in the first three diagnosis fields of each record. While the first diagnosis field or principal diagnosis is normally used to calculate rates of specific injury types, given the small numbers of femoral and pelvic fractures recorded in the data set, the record identification process was expanded to include a femoral or pelvic fracture diagnosis appearing in any of the first three diagnosis fields of each record within the data set.

A summary of the full refining process that was undertaken with the records in the data set, used in this study, is presented in Figure 4-2 which reflects the data refinement procedures discussed above.
Phase 1 – Researcher
Study design including aim and inclusion/exclusion criteria

Phase 2 – Epidemiologist
Data extraction: all individuals aged 65 years and older residing in GSAHS who were admitted to hospital as a result of a fall

Phase 3 – Researcher
Data refinement of de-identified raw data set

First data refining process:
Exclude hospital separation modes of:
* Type change
* Transfer to another hospital

Second data refining process:
Exclude place of occurrence of:
* Residential Institution, Aged Care Facility
* Health Service Area

External cause field
* Subcategories combined into higher level code
  * W01 combined into W18
  * All codes less than 1% combined into other specified external cause
  * W06, W07, and W08 combined

Activity field
* Subcategories U50-U72 combined into while engaged in sports or leisure
* All codes less than 1% combined into while engaged in other activity except U73.1, U73.2 and U73.9

Third data refining process:
Place of occurrence field
* Subcategories combined into higher level code
  All codes less than 1% combined into other specified place of occurrence

Fourth data refining process:
All remaining hospital admissions were separated into population sizes:
* <4,999
* 5,000 to <17,999
* 18,000 to <47,999
* 48,000 to <249,999

Refined data set

Analysis by population sizes

Primary data analysis

Analysis of femoral or pelvic fractures

Figure 4-2 - Summary of data refining process
Data analysis

Three separate analyses were undertaken in this study to identify the key external causes, places of occurrence and activities related to fall related injury within the GSAHS catchment area within the 5-year period July 2000 to June 2005. The first analysis was undertaken based on all fall related hospital admission records for older people residing within the GSAHS catchment area, after the data set was refined. The second analysis separated the refined data set into population sizes within the GSAHS catchment, to identify any variation between communities of different population sizes. The last analysis was based on all fall related hospital admission records for the GSAHS catchment area that involved a femoral or pelvic fracture. A summary of the three separate analyses is presented in Figure 4.3.

Data analysis involved calculation of the frequencies in which particular factors (external cause, place of occurrence and activity) were associated with the fall related injuries represented in the dataset. Calculation of the proportional representation of each of these factors in the fall related injury records was then undertaken, based on the frequency data. The method used to calculate 95% confidence intervals for each of these proportions was the Wilson score method without continuity correction (Newcombe, 1989).

A further analysis was undertaken using the data set by reviewing each of the external cause codes in conjunction with the place of occurrence and the activity at the time of the fall appearing in the same record, to identify any factors such as common places or
activities associated with specific external causes. However, this analysis did not provide any further insight to factors associated with the external causes, places of occurrence or activities, beyond the insights provided by the first three analyses. As such, this fourth analysis was not reported further in this chapter.

Unspecified codes and missing data within the data set have been presented separately as the use of the unspecified code indicates that the medical coder was unable to determine the external cause, place of occurrence or activity at the time of the fall based on the information provided in the medical records. Whereas missing data indicates that the medical coder had not entered any data into the specific field, which could have included relevant data that was present within the medical record.

The graphs throughout this chapter, when separated by population size, are presented with the lightest colour shade depicting the smallest population size and the darkest colour shade depicting the largest population size.

RESULTS
A total of 16,742 NSW Health patient records were identified in HOIST by the NSW Department of Health as arising from residents of the GSAHS catchment area and related to people aged 65 years or older who were admitted to hospital as a result of a fall (ICD-10-AM W00-W19) within the 5-year period July 2000 to June 2005. From these records, once the data set was refined based on separation mode and place of occurrence, a total of 6,485 NSW Health patient records remained and formed the data set for the first two analyses in this study. Once the data set was further refined to only include admissions associated with fall related injury that resulted in a femoral or pelvic fracture, a total of 1,496 records remained for the final analysis in the study. Percentages in the graphs have been rounded to the nearest whole number. Exact calculations to two decimal points are located in each corresponding table located in the Appendix E.

External causes of fall related injuries resulting in hospital admission in the GSAHS catchment area.
Among the 6,485 selected hospital admissions recorded as occurring during the period of July 2000 to June 2005 in community-residing people from the GSAHS catchment area
aged 65 years or older, the most commonly identified external cause for fall related injury admitted to hospital was other fall on same level, with 55% (95% CI: 54.08 – 56.5) of falls reported in the data set occurring on the same level (Figure 4-4, Table E-1 in Appendix E).

* 27% of cases were recorded in the dataset as unspecified external cause

Figure 4-4 - External causes for fall related injury resulting in hospital admission in the GSAHS catchment area with 95% confidence intervals.

Places of occurrence for fall related injury resulting in hospital admission in the GSAHS catchment area.

The most commonly reported place of occurrence for fall related injury resulting in hospital admission within the data set was within the home, representing 68% (95% CI 66.97 – 69.23) of cases (Figure 4-5, Table E-2 in Appendix E). Data was missing in 2% (95% CI: 1.69 – 2.38) of cases within the place of occurrence field (Table E-2 in Appendix E).
* 17% of cases were recorded in the dataset as unspecified place of occurrence

* 2% of cases had missing data in the dataset for place of occurrence

Figure 4-5 - Places of occurrence for fall related injury resulting in hospital admission in the GSAHS catchment area with 95% confidence intervals.

**Activities reported as associated with fall related injuries resulting in hospital admission in the GSAHS catchment area.**

The most commonly reported activity at the time of the fall within the data set was the code *while resting, sleeping, eating or engaged in other vital activities*, representing 16% (95% CI: 15.39 – 17.19) of cases (Figure 4-6, Table E-3 in Appendix E). Activity data was *missing* in 4% (95% CI: 4.01 – 5.02) of cases (Table E-3 in Appendix E).
Unspecified external cause, place of occurrence and activity associated with fall related injuries resulting in hospital admission in the GSAHS catchment area.

Within the entire data set the use of unspecified codes was a common occurrence. The highest reported proportion of an unspecified code was found in the activity field with unspecified activity, representing 58% (95% CI: 56.81 – 59.21) of fall related admissions recording this code. The place of occurrence field recorded the least number of unspecified codes with 17.59% (95% CI: 16.69 – 18.54) of the fall related admissions being reported as unspecified place of occurrence (Figure 4-7, Table E-4 in Appendix E).
Unspecified external cause, place of occurrence and activity associated with fall related injuries resulting in hospital admission in the GSAHS catchment area with 95% confidence intervals.

External causes for fall related injury resulting in hospital admissions within the GSAHS catchment area, separated by community population size

The most commonly reported external cause within the data set for all of the population sizes was other fall on same level. The percentages of cases reporting this cause were similar, with no significant differences, across all four population sizes (Figure 4-8, Table E-5 in Appendix E).
Places of occurrence for fall related injuries resulting in hospital admission within the GSAHS catchment area, separated by community population size

The most common place of occurrence for fall related injuries resulting in hospital admission in all population sizes within the GSAHS catchment area was the home. The place of occurrence codes of street and highway, other specified place of occurrence and trade and service area were all reported with similar frequency in communities in each of the population sizes within the data set. The only variation was that farm was reported as the place of occurrence in 1% (95% CI: 0.34 – 1.82) of cases in communities with the population size of 4,999 or less (Figure 4-9, Table E-6 in Appendix E). Missing data was seen in 6% (95% CI: 4.69 – 8.22) and 3% (95% CI: 2.1 – 3.37) of cases in the communities with populations of 4,999 or less and 5,000 to <17,999, respectively. Communities with
populations of 18,000 to <47,999 and 48,000 - <249,999 both had missing data in less than 1% of cases (Table E-6 in Appendix E).

Figure 4.9 - Places of occurrence for fall related injury resulting in hospital admission within GSAHS catchment area, separated by community population size with 95% confidence intervals.

**Fall related activities resulting in hospital admission within the GSAHS catchment area, separated by community population size**

The most common reported activity at the time of the fall, for all population sizes, was **while resting, sleeping, eating or engaged in other vital activities**, representing 22% (95% CI: 19.34 – 25.33) of cases for communities with a population size of 4,999 or less, 17%
(95% CI: 15.64 – 18.57) of cases for communities with a population size of 5,000 to <17,999, 14% (95% CI: 12.78 – 15.53) of cases for communities with a population size of 18,000 to <47,999, and 15% (95% CI: 12.77 – 17.94) of cases for communities with a population size of 48,000 - <249,999. The activity codes of other specified activity, while engaged in other types of work and while engaged in sport or leisure were all reported in comparable proportions in communities with each of the four population sizes (Figure 4-10; Table E-7 in Appendix E). Missing data in this field was also evident in cases arising from communities of all four population sizes. The communities with populations of 4,999 or less and 48,000 to <249,999 had the highest percentage of missing data 10% (95% CI: 7.81 – 12.09) and 8.94% (95% CI: 7.09-11.22) of cases respectively (Table E-7 in Appendix E).

Figure 4-10 - Fall related activities resulting in hospital admission within the GSAHS catchment area, separated by community population size with 95% confidence intervals.
Unspecified external cause, place of occurrence and activity associated with fall related injuries resulting in hospital admission in the GSAHS catchment area, separated by community population size.

The *unspecified external cause* code was also evident in high proportions when the data set was separated by population size. In the population size less than 4,999 *unspecified external cause* occurred in 27% (95% CI: 23.95 – 30.32) of cases reported, similarly 31% (95% CI: 29.54 – 33.16) of cases were reported in the population size 5,000 to <17,999, and 27% (95% CI: 25.27 – 28.78) of cases were reported in the population size 18,000 to <47,999. However, in the larger population size of 48,000 to <249,999, the frequency with which an *unspecified external cause* was reported was significantly lower than in the other three population sizes, being 18% (95% CI: 15.29 – 20.82) of cases, (Figure 4-11, Table E-8 in Appendix E).

Figure 4-11 - Unspecified external cause, place of occurrence and activity associated with fall related injuries resulting in hospital admission in the GSAHS catchment area, separated by community population size with 95% confidence intervals.

An *unspecified place of occurrence* was also evident in communities of all population sizes. There was a similar proportion of cases with this code reported in communities of both the 5,000 to <17,999 population size and the 48,000 to <249,999 population size, at
12% (95% CI: 10.25 – 12.74) and 11% (95% CI: 9.19 – 13.78) of cases in communities with each of these population sizes, respectively. However, there were significantly higher proportions of cases with unspecified place of occurrence reported in communities with population sizes of 4,999 or less, at 18% (95% CI: 15.38 – 20.91) of cases, and in communities with a population size of 18,000 - <47,999, at 19% (95% CI: 17.53 – 20.63) of cases (Figure 4-11, Table E-8 in Appendix E).

The unspecified activity code was reported in the highest proportion of cases in all four population sizes with 52% (95% CI: 48.69 – 55.85) of cases in communities with populations of 4,999 or less; 57% (95%CI: 55.16 – 59.02) of cases in communities with populations of 5,000 to <17,999; 61% (95% CI: 58.65 – 62.5) of cases in communities with populations of 18,000 to <47,999 and 59% (95% CI: 55.49 – 62.57) of cases in communities with populations of 48,000 to <249,999 (Figure 4-11, Table E-8 in Appendix E).

External causes for fall related femoral or pelvic fractures resulting in hospital admission in the GSAHS catchment area.

Of the 1,496 admissions that were included within the analysis of reported external causes of fall related femoral or pelvic fractures resulting in hospital admission, the most commonly identified external cause was other fall on same level, representing 54% (95% CI: 51.95 – 56.99) of all such cases. Fall involving bed, chair and other furniture and fall on and from stairs were also reported in similar but smaller proportions, at 5% (95% CI: 4.2 – 6.46) and 5% (95% CI: 4.08 – 6.31) of all such cases, respectively. Other specified external cause, other fall from one level to another and fall on and from ladder were rarely recorded as the external cause of such injuries involving a femoral or pelvic fracture (Figure 4-12, Table E-9 in Appendix E).
Figure 4-12 - External causes for falls related femoral or pelvic fractures resulting in hospital admission within the GSAHS catchment area with 95% confidence intervals.

Places of occurrence for fall related femoral or pelvic fractures resulting in hospital admission in the GSAHS catchment area.

The most common place of occurrence for older people living within the GSAHS catchment area to sustain a femoral or pelvic fracture as a result of a fall was within the home, at 71% (95% CI: 68.57 – 73.17) of reported cases (Figure 4-13, Table E-10 in Appendix E). A small proportion of such cases were missing this information, at 1% (95% CI: 0.76 – 1.89) of cases (Table E-10 in Appendix E).
* 20% of cases were recorded in the dataset as unspecified place of occurrence

* 1% of cases had missing data in the dataset for place of occurrence

Figure 4-13 - Places of occurrence for fall related femoral or pelvic fractures resulting in hospital admission within the GSAHS catchment area with 95% confidence intervals

**Fall related activities associated with femoral or pelvic fractures resulting in hospital admission in the GSAHS catchment area.**

The most common activity of older people living within the GSAHS catchment area reported as related to falls that resulted in either a femoral or pelvic fracture was *while resting, sleeping, eating or engaged in other vital activities*, with 14% (95% CI: 12.43 – 15.96) of associated hospital admissions reporting this activity (Figure 4-14, Table E-11 in Appendix E). In a small proportion of cases, 5% (95% CI: 3.66 – 5.8), activity details were reported as *missing* (Table E-11 in Appendix E).
63% of cases were recorded in the dataset as unspecified activities at the time of fall. 
5% of cases had missing data in the dataset for activities at the time of fall.

Figure 4-14 - Fall related activities associated with femoral or pelvic fractures resulting in hospital admission in the GSAHS catchment area with 95% confidence intervals.

Unspecified external cause, place of occurrence and activity associated with fall related femoral or pelvic fractures resulting in hospital admission in the GSAHS catchment area.

A large proportion of the reported fall related femoral or pelvic fractures were associated with an unspecified external cause or unspecified place of occurrence, with 31% (95% CI: 28.92 – 33.61) of cases and 20% (95% CI: 18.17 – 22.23) of cases respectively. However, the activity field had the greatest proportion of unspecified codes used for fall related pelvic or femoral fracture cases resulting in hospital admission, with 63% (95% CI: 60.67 – 65.64) of all cases reported in this way (Figure 4-15, Table E-12 in Appendix E).
DISCUSSION

This study represents the first reported analysis of key factors related to fall injury in a regional population in Australia. Investigation of the types of external causes, places of occurrence and activities associated with these falls was conducted through the analysis of hospital admission data. In this study a number of key findings have been made.

The most common external cause for fall related injury resulting in hospital admission was falling on the same level. It is well documented that falls can be a result of either intrinsic or extrinsic risk factors which lead to postural instability or an inability to recover balance, such as after a slip, trip or stumble, which are commonly associated with falls on the same level (Bueno-Cavanillas et al., 2000; Delbaere et al., 2010; Faulkner et al., 2009; Lord et al., 2006).
The most frequent place of occurrence for a fall related injury resulting in hospital admission was in the home. The home as a common place for fall related injuries is a consistent finding in the literature in both rural and urban populations (Berg, Alessio, Mills & Tong, 1997; Northridge, Nevitt, Kelsey & Link, 1995; Ruynan et al., 2005; Vu et al., 2011). In a review of the literature, Lilley, Arie and Chilvers (1995) identified a number of studies that found between one third and half of all falls in older people were due to extrinsic factors in and around the home.

The home as a common place to fall was also highlighted in a study undertaken by Thomas, Muscatello, Middleton and Zheng (2011). They analysed NSW Ambulance Service data on fall related call outs to older people living in Sydney and found that 58% of calls were related to falls occurring in the home. Carter et al. (1997) found, in a cross-sectional survey of people aged 70 years and older living in Northern NSW, that 80% of homes had one or more known hazards which could contribute to fall related injuries. They also found that multiple hazards were often found in rooms where older people were performing complex daily routines (Carter et al., 1997).

The most common activity occurring at the time of fall related injuries was reported as while resting, sleeping, eating or engaged in other vital activities. This is not unexpected, given that the majority of falls within this data set were occurring within the home environment, indicating that the older people admitted to hospital in this data set were most likely undertaking general day-to-day activities at the time of their fall. This is consistent with findings of a study undertaken in a rural population in America by Berg et al. (1997), who found that general walking around the home was the most common activity undertaken by older adults at the time of their fall.

Another key finding from this study was that the main external causes, places of occurrence and activities at the times fall related injuries occur were relatively consistent between the different population sizes within the GSAHS catchment area. There was also consistency in these factors between those older people who had been admitted to hospital as a result of any type of fall related injury and those who sustained a serious injury such
as a femoral or pelvic fracture. This indicates that while elements such as *external causes*, *places of occurrence* and *activities* at the time of the fall in this study may be similar between the two groups, there are likely to be other factors contributing to more severe outcomes or consequences of the fall related injury in those sustaining pelvic and femoral fractures and other serious injuries. Intrinsic risk factors such as gender, increasing age and decreased bone density have been cited in the literature as contributing to more serious fall related injury outcomes (Ambrose et al., 2013). Further investigation is warranted to identify whether these contributing factors may explain why older people experienced injuries to varying degrees given the similar external causes, places and activities at the time of the fall in this population.

There were a number of limitations associated with this study. Although this study has identified falling on the same level to be the most common *external cause* of fall related injuries in this population group, the information that can be gained from analysing the hospital admission data set does not provide for any depth of understanding of the interplay between the fall event, the surrounding environment and what was occurring with the older person at the time of their fall. It is well noted in the literature that falls are likely to be the result of multiple complex factors occurring at a given time (Bueno-Cavanillas et al., 2000; Newton, 2003; Rubenstein, 2006). In order to provide further insight into potential risk factors resulting in falls occurring *on the same level* as well as other known *external causes*, alternate data sources or ways of obtaining information in this population group are required.

Another limitation of the study is the general nature of the ICD-AM-10 codes used in the data set, especially in the *place of occurrence* and *activity* fields. While this study has shown that the most common place for older people to fall is within their home environment, the data set does not specifically tell us the actual location within the home where the fall occurred. Within the ICD-10-AM codes there are more specific *place of occurrence* codes available to use. These include Y92.00 (*driveway*), Y92.01 (*outdoor areas*), Y92.02 (*garage*), Y92.03 (*bathroom*), Y92.06 (*laundry*), Y92.07 (*indoor living areas, not elsewhere classified*) and Y92.09 (*other and unspecified place in the home*). The only codes related to the home as a *place of occurrence* recorded in this particular
data set, before the refinement process, were *home, other and unspecified place in home* and *driveway*. The majority of cases were documented as occurring in the *home or other and unspecified place in the home*, and less than 1% of recorded cases were documented as occurring in the *driveway*.

Although better use of the available ICD-10-AM codes for *place of occurrence* would increase knowledge of where fall related injuries occur, the available range of codes did not appear to be used by NSW Health staff during the period of time for which this data set was extracted. This may be due to the available data or data entry from medical records. For instance, medical records may not indicate the exact location of the fall. In addition, it may be standard practice to only allocate *home or other and unspecified place in home* for all fall related injuries in this type of environment (Harrison & Steenkamp, 2002; McKenzie et al., 2009).

The generalising is also evident within the *activity* field, with this study identifying the most common activity at the time of the recorded fall related injuries being *while resting, sleeping, eating or engaged in other vital activities*. This type of code incorporates a wide range of different activities that an older person may be undertaking at the time of their fall. The use of this code makes it difficult to identify the mechanisms contributing at the time of the fall, in the older population group. As such it is of limited value in determining the appropriate fall prevention strategies. The use of more descriptive codes within the *activity* field may assist in resolving this issue.

Finally, the use of the *unspecified* code in all three fields is quite prominent throughout this hospital admission data set, but even more so in the *activity* field in both GSAHS overall and within each of the individual population sizes. The quality and detail of the information documented by the clinicians in patients’ medical records is a key factor to the effectiveness of this type of database system (McKenzie et al., 2009). The ability for medical coders to import appropriate data into programs such as HOIST is critical to ensuring a useable system for identifying key health determinants.
Issues with clinician documentation or coding within the source record where the coding is being performed have been well reported within the literature (Finch & Boufous, 2008; Langley et al., 2007; MacIntyre, Ackland, Chandraraj, 1997; McKenzie et al., 2009).

Preventing falls requires a detailed understanding of the causes of injuries. It is possible that such detail may not be as critical to medical staff working in emergency departments who are assessing older people who have fallen (McKenzie et al., 2006). Their focus is likely to be on clinical management of the patient and their resultant injuries. As such, identifying and documenting the details surrounding the fall event is possibly given a lower priority. This level of priority can culminate in lack of specificity of information for the medical coders to import into the medical records system and ultimately result in the widespread use of the unspecified code in all fields within the data set (Langley et al., 2007). As a consequence, the accuracy and capacity of this type of database to identify key factors associated with fall related injury can be markedly reduced.

Hospital admission data, recorded using ICD-10-AM codes, does have the potential to identify extrinsic risk factors associated with fall related injuries if the quality and detail is evident in documentation within the medical records and is appropriately translated in the coding into the database system. However, as seen in the results of this study, researchers need to be attentive to the shortfalls in specificity and reliability of hospital admission data for identifying key risk factors for falls injury, including data indicating the external cause, place of occurrence and activity at the time of a fall (Langley et al., 2007; MacIntyre, Ackland, & Chandraraj, 1997; McKenzie et al., 2009). Other data sources are critical to identify the contextual factors surrounding fall related injuries in this population. Another source of risk identification may be through the use of falls specific screening tools for older people who present to health professionals, both in and out of the hospital system, as a result of a fall. Validated screening tools can be undertaken in a range of settings and have the ability to identify individual fall risk factors in older people (Russell et al., 2009; Scott, Votova, Scanlan & Close, 2007). They are also not solely reliant on older people presenting to an emergency department as a result of a fall before they can be administered. Understanding how older people are identified as at risk may provide useful information on some of the contextual factors associated with falling in the community. Evaluating the current referral pathways and community programs and resources available to manage at risk individuals may also provide insight into how
identified fall related risk factors are addressed in the community to reduce the risk of subsequent fall events.

**CONCLUSION**

Identifying specific risk factors associated with fall related injuries is important from a public health perspective, as falls continue to impose a major burden on the health care system and the community at large. The use of hospital admission data to identify key *external causes, places of occurrence* and *activities* at the time fall related injuries occur can represent a potential source of information for determining some of the extrinsic risk factors associated with a fall.

This study identified that the most common cause for fall related injury resulting in hospital admission in the GSAHS catchment area, in Australia, was *falling on the same level*. The most common place for a fall to occur was within the *home* and the most common activity at the time of the fall was *while undertaking resting, sleeping, eating or engaging in other types of the vital activities*. The study also found that in this regional area there were no significant differences in recorded causes, locations and activities associated with fall related injuries between communities of different population sizes. Additionally, the study found that there were no differences in the *external causes, places of occurrence* or *activities* at the time of the injuries between those older people who sustained any type of fall related injury and those who sustained a fall related femoral or pelvic fracture.

It was highlighted that this study once again demonstrated that the use of hospital admission data alone does not generally provide the levels of specificity and reliability of information required to enable researchers to draw adequate conclusions regarding specific risk factors that may contribute to causing fall related injuries in older people. The quality and type of information elicited from older people who are admitted to hospital as a result of a fall related injury needs to be addressed so that more detailed and specific information about the external cause, place and activity at the time of the fall is
available for medical coders to import into the data system. This may go some way towards enhancing understanding of the possible mechanisms of injuries related to falls.

In order to determine specific risk factors for fall related injury in older people living in southern NSW and many other geographic areas, alternate sources of information are required. Additional information is fundamental in establishing the causes and burden of fall related injury in this specific population and for determining the most appropriate priorities for injury prevention in relation to falls injury in these Australian communities. Further analysis of how older people living in southern NSW are identified as at risk of falls and what factors contribute to this risk may provide valuable information to help inform decisions on interventions to manage fall related injury in this community. Evaluation of the current processes to identify at risk individuals, as well as referral pathways and community programs and resources available to manage risk factors associated with falling will be discussed in the following chapter.
CHAPTER 5  UNDERSTANDING THE MANAGEMENT AND PREVENTION OF FALLING IN OLDER PEOPLE LIVING IN SOUTHERN NSW

INTRODUCTION

This chapter presents findings on the key fall related services and programs available to assist in the management of fall risk in older people residing in southern NSW in 2008. These findings arose from the administration of two questionnaires that were distributed to all Hospital facilities and Community Health Centres within Greater Southern Area Health Service (GSAHS) (Figure 5-1). The findings serve to illustrate the kinds of issues that can exist in any health jurisdiction or community in relation to services and programs available to manage fall related risks and the impacts these issues may have on broader efforts to prevent falls in older people.
The first questionnaire, *The GSAHS Community Falls Baseline Survey* (Appendix F), was designed to identify baseline information on identification of at risk individuals and the community programs, skills, resources, tools or instruments that existed in the local health service to support older people living in the community to reduce their risk of falling. The second questionnaire, *The GSAHS Falls Referral Baseline Survey* (Appendix G), was designed to identify baseline information on how older people were identified as being at risk of falls when they presented for health care in NSW Department of Health hospital facilities within GSAHS. This second questionnaire also identified the referral pathways for patients either discharged from hospital or not admitted if they were identified as being at risk of falls.

Falling is commonly reported in the literature as the leading cause of injury in the older population (Close & Lord, 2011; Yardley, Donovan-Hill, Francis & Todd, 2007) and is a significant issue often resulting in substantial rates of morbidity or mortality (Rubenstein,
The prevention of falls and fall related injuries has been a major research focus worldwide (Gillespie et al., 2012; Lamb et al., 2007) with a large body of evidence now supporting the role of a systematic approach to fall risk screening and targeted interventions in reducing the numbers of injurious falls in older populations (Australian Commission on Safety and Quality in Healthcare, 2009; Gillespie et al., 2012; National Public Health Partnership, 2005; Rubenstein, 2006). Evaluating the context and types of fall related interventions at a population level provides an understanding of approaches being used locally and the rationales for their use to address the fall injury (Moller, 2005).

Analysing how at risk individuals are identified and determining the range of fall related support mechanisms available to assist older people living in the community can assist our knowledge of the management strategies employed to address the risk factors associated with falling. Findings from this study can inform our understanding of recent practice in falls management and prevention in a regional context. The findings may also inform the future implementation of NSW health policy for reducing rates and consequences of fall related injuries among older people living in communities, particularly in regional areas.

AIM

The aim of the study reported in this chapter was to determine how older people living in the GSAHS catchment area, a regional area of NSW, were identified as being at risk of falls, what fall related programs and services were available to manage older people living in the community, and how older people accessed these fall related programs and services, during the period July 2008 to December 2008.
Three research questions were designed to guide this study, which focused on the July to December period of 2008:

- How are older people living in the community within the GSAHS catchment area screened to identify their level of risk of falls?
- What community programs and resources currently exist within the GSAHS catchment area to assist older people living in the community to manage their risk of falls?
- How do older people living within the GSAHS catchment area access fall related intervention strategies to reduce their risk of falls?

**METHODS**

**Study Conception**

Previous to this study, the GSAHS management had little detailed information on the specific fall related management and prevention strategies that were being utilised at site level across the Area Health Service. Having an understanding of current practice would enable the Area Health Service to identify strengths and inconsistencies across sites in order to instigate change based on NSW Health policy in managing and preventing falls in older people living in the community. The GSAHS Falls Management Committee was deemed the most appropriate committee to help facilitate and guide the research process with the principal researcher. This study involved a collaborative process. Although the principal researcher had specific aims for this study based on the overall research program in this area, additional questions were added to both questionnaires in order to fulfil the needs of the Area Health Service. However, only data directly related to the overall research program and aims of this specific study have been reported here. In order to provide a logical flow, the sequence of reported findings in this chapter follows the sequence used in the original questionnaires.

**Research Design**

As the GSAHS Falls Management Committee wanted to have an understanding of the current services and resources available across the health service, a survey research design was determined to be the most appropriate approach. This approach used two paper-based
questionnaires so that the research tool could be easily distributed across the large geographic area that the Area Health Service covers within a relatively short period of time. This strategy has been well documented in the literature (Kelley, Clark, Brown & Sitzia, 2003; Liamputtong, 2010) as a means to maximise the data collection process.

Question construction was undertaken through a consultative approach involving the GSAHS Falls Management Committee and the principal researcher as it was deemed that the committee could provide contextual knowledge around the organisational structure and function. This increased the validity of the survey design by ensuring that appropriate coverage and relevant questions were included within the two questionnaires matched to the aims of the research (Kelley et al., 2003). The questionnaires (see Appendix F and Appendix G) were designed to encapsulate a range of closed ended questions with pre-coded responses. Open ended questions were also included to enable participants to elaborate on their responses to closed ended questions and to provide further information on issues not identified in the questionnaires.

**Ethical Clearance**

Ethical approval for this research project was sought and granted through the GSAHS Human Research Ethics Committee on 2nd June 2008, protocol number HREC 08/GSAHS/7 SSA 08/GSAHS/27 and for noting at the Charles Sturt University Human Research Ethics Committee on 28th June 2011, protocol number HREC 2011/082.

**PARTICIPANTS**

As the study was targeting a specific area of health management, only staff members who were directly involved with dealing with older people either at risk of a fall or presenting as a result of a fall were invited to participate in the study through a purposive sampling approach. Liamputtong (2010) suggests that targeting specific participants enables researchers to collect reliable information in a defined area. This target population was chosen as it was believed they were the best source of accurate information regarding the current services and resources available to manage and prevent falls within their local area. In order to determine which specific participants at each site were the most
appropriate, the GSAHS Area Falls Prevention Coordinator, who held extensive knowledge on falls staffing at a site level, approached site managers and collectively they determined which staff members should be invited to participate in the study.

It was also decided that, where possible, questionnaires should be completed in a group setting. This approach was used to maximise the response rates of the questionnaire and to meet the needs of the GSAHS by ensuring there was one consensus-based response per site. Using this approach also enabled the maximum amount of information about the current services and resources at a site level to be captured (Boynton, 2004).

Pilot Study
A pilot study using the two questionnaires was undertaken on the 4th July 2008 at the southern NSW town of Deniliquin. This site was chosen because it had both a Community Health Facility and a Hospital Facility with an emergency department. It was also chosen because this site provided outreach services to small rural areas.

Both the principal researcher and the GSAHS Area Falls Program Coordinator met with staff at the Deniliquin sites to undertake focus group discussions with participants who had completed the questionnaires in the preceding week. The aim of a focus group discussion when piloting a survey instrument, as suggested by Burns et al. (2008), is to identify whether the participants understood the wording of the questions and if any questions were ambiguous or irrelevant. The discussion from the pilot study also enabled the principal researcher to determine if there were sufficient response categories available for each of the closed ended questions as well as the length of time it took to complete the survey. This is documented in the literature as important in survey design (Kelley et al., 2003).

The key findings from the focus group discussion were that both questionnaires were easy to complete, but it was difficult to arrange a suitable time when all staff could participate in completing the questionnaire as a group. While staff commented that the questionnaires
took approximately 20 minutes to complete, they preferred the closed ended questions to the open ended questions. It was identified that this was probably due to closed ended questions being quicker to complete. In the focus group discussion, minor wording changes were suggested to clarify some questions.

As an outcome of the pilot study it was decided that, while staff at the pilot site had preferred answering the closed ended questions, the open ended questions were an important aspect to the research because they provided an opportunity for staff to clearly document what was happening at their site and expand on the closed ended responses. Minor word changes for four of the questions in the Community Falls Baseline Survey were made as a result of suggestions from the focus groups.

**Survey Administration**

The GSAHS Area Falls Prevention Coordinator undertook the role of disseminating information about the research project to key staff at all Area Health Service sites and inviting them to participate. Site managers at all GSAHS facilities were identified and approached by the GSAHS Area Falls Prevention Coordinator to determine relevant staff members at their site who matched the participant recruitment criteria. The criteria included any staff members at the site who were involved in the identification of older people *at risk* of falls, and/or the management or prevention of falls in older people living in the community. Managers were asked to make available the information sheets for the study and arrange a suitable time when willing participants could collectively complete the questionnaire.

Administration of both questionnaires to all of the GSAHS sites was undertaken in October 2008. Follow up contact with each site was undertaken by the GSAHS Area Fall Prevention Coordinator at monthly intervals during the three-month administration period to remind the participant groups of the study and of the desire of the research team to maximise response rates and ensure their particular site was represented in the study data with all others.
For the GSAHS Community Falls Baseline Survey all staff located at each of the Community Health Centre sites within GSAHS involved in the identification of at risk older people and/or the management or prevention of falls were invited through the Facility manager to attend a meeting to collectively complete the questionnaire at each site.

For the GSAHS Falls Referral Baseline Survey, all staff members from GSAHS Hospital sites who were involved in identification of at risk older people and/or the management or prevention of falls, including emergency department staff and staff involved in discharge planning, were invited by the Facility manager to attend meetings to collectively complete the questionnaire at each site.

**Data Collection**

The GSAHS Area Falls Prevention Coordinator collected all completed questionnaires from each site within GSAHS. Each Facility manager was provided with an addressed internal mail envelope so that completed questionnaires could be sent directly to the GSAHS Area Falls Prevention Coordinator. They were also given the option to scan the completed surveys and email them back to the GSAHS Area Falls Prevention Coordinator. The questionnaire collection was completed by the end of December 2008. All received questionnaires were given a code reflecting population size by the Area Falls Prevention Coordinator, to de-identify the specific sites, and were subsequently sent to the principal researcher in January 2009 for data extraction and analysis.

Details of the numbers and profiles of specific individuals who voluntarily attended the meeting to collectively complete the survey at each site were not collected, in order to ensure a level of anonymity for those personnel and consistent with the research agreement with the AHS. The joint research team decided this level of anonymity would ensure answers to survey questions were as honest and complete as possible and that no-one considering involvement in responding to the survey would be deterred by concerns of being individually identified.
Data analysis

Following data extraction and transcription into a spreadsheet, descriptive data analysis was applied to responses to the closed ended questions in each of the questionnaires. This involved the calculation of the frequencies of responses or categories. As both nominal and ordinal level data was collected, frequency distributions were a useful method to determine and compare the numbers of responses in each of the categories for each question (Thompson, 2009).

Initial descriptive analysis of the closed ended questions examined overall responses provided in all questionnaires from all the GSAHS facilities combined. A second descriptive analysis was undertaken with data from both the Falls Referral Baseline Survey and the Community Falls Baseline Survey in which the questionnaire responses were categorised and examined according to population sizes within the GSAHS catchment. The four population categories used for this second analysis were consistent with the previous two studies in this thesis (Chapter 3 & 4), being Local Government Area populations of: 4,999 or less; 5,000 to <17,999; 18,000 to <47,999; and 48,000 to <249,999. These population sizes were based on the standard Australian Bureau of Statistics (ABS) population sizes, and the Area Falls Prevention Coordinator noted the appropriate population size category for each questionnaire and supplied this information with each de-identified questionnaire. This approach enabled the identification of differences between communities of different sizes in the patterns and proportional contributions of particular services and resources associated with fall related management and prevention within the GSAHS catchment area.

Analysis of responses to the open ended questions in each of the questionnaires was undertaken through a process of content analysis. Content analysis consists of coding raw data into a systematic classification scheme involving key words, phrases, topics or concepts in order to identify themes or patterns (Hsieh & Shannon, 2005; Kondracki, Wellman & Amundson, 2002). Responses to individual open ended questions in each of the questionnaires were analysed to identify similar topics or concepts. These common concepts identified in the raw data formed the basis for the coding scheme and enabled the researcher to sort the responses into specific categories or sub-themes (Hsieh &
Shannon, 2005). Related sub-themes were then combined into overarching themes and presented alongside the relevant closed ended question results to provide further context of these findings. For example, open-ended responses indicating issues such as lack of staffing, fluctuating staffing levels, or limited ability to provide outreach services were all categorised into an overarching theme titled *the challenges associated with running equitable and adequate programs across a large geographic area.* As there was only one survey from the population size 48,000 to <249,999, to protect the identity of the location of the open ended responses presented, each excerpt was given a de-identified code based on the population size from which the excerpt came from.

**RESULTS**

**Site Response rates**

Ninety seven questionnaires were returned out of an eligible 108 GSAHS sites in either the Community Falls Baseline Survey or the Referral Baseline Survey. On this basis, the overall response rate, calculated as the number of returned questionnaires divided by the number of eligible sites (Beerten, Lynn, Laiho & Martin, 2001), was 89.8%. For the Community Falls Baseline Survey, 54 out of a possible 62 eligible community health sites returned the questionnaire, providing an 87% response rate. With the Referral Baseline Survey, 43 out of a possible 46 eligible hospital sites returned the questionnaire providing a response rate of 93%.

The response rates were analysed for Community Health facilities located in communities of each of the population sizes, for the *Community Falls Baseline Survey* (Table 5-1).

Table 5-1 - Community Falls Baseline Survey Response Rate, by Population Size
Given there was only one questionnaire collected in the 48,000 to <249,999 population size category, graphical representation of frequency data for this population category has not been shown in the figures provided below, as it would always be 0% or 100%, depending on the response to each survey question. However, the specific response provided in the single returned questionnaire is indicated in the text associated with each figure.

The response rates were also analysed for Hospital sites located in communities in each of the population size categories for the Referral Baseline Survey (Table 5-2).

<table>
<thead>
<tr>
<th>Population Size</th>
<th>Number of Responses</th>
<th>Number of eligible sites</th>
<th>Response rate percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to &lt; 4999</td>
<td>15</td>
<td>15</td>
<td>100.00%</td>
</tr>
<tr>
<td>5000 to &lt; 17999</td>
<td>18</td>
<td>20</td>
<td>90.00%</td>
</tr>
<tr>
<td>18000 to &lt; 47999</td>
<td>9</td>
<td>10</td>
<td>90.00%</td>
</tr>
<tr>
<td>48000 to &lt; 249999</td>
<td>1</td>
<td>1</td>
<td>100.00%</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>46</td>
<td>93.48%</td>
</tr>
</tbody>
</table>

Given again there was only one questionnaire collected in the 48,000 to <249,999 population size category, graphical representation of frequency data for this population category has not been shown in the figures provided below, as it would always be 0% or 100%, depending on the response to each survey question. However, the specific response provided in the single returned questionnaire is indicated in the text associated with each figure.
provided in the one returned questionnaire is indicated in the text associated with each figure.

As in Chapter 4, the graphs throughout this chapter, when separated by population size, are presented with the lightest colour shade depicting the smallest population size and the darkest colour shade depicting the largest population size. Percentages presented in each of the graphs have been rounded to the nearest whole number, resulting in the bar values in some graphs not totalling 100%. Exact calculations to two decimal points are located in each corresponding table located in Appendix H.

Findings from this study are presented in the following three sections:

- Identifying older people at risk of falls;
- Intervention strategies to manage older people at risk of falls; and
- Older people accessing fall related intervention strategies.

In section one, identifying older people at risk of falls, information on the processes used to identify older people who had a history of falling is presented. This section also presents findings about the documentation of a fall history in a patient’s case notes. Findings on the use and type of fall risk screening tools, and reassessment of older people’s fall risk status is also presented. Lastly, this section presents information on the referral pathways for older people who presented to the emergency department and who staff assessed as being at risk of falls.

In section two, intervention strategies to manage older people at risk of falls, information about the types of fall related activities and programs that were available to support falls prevention are presented. Also included in this section is data on the use of private health professionals to support the public services in the management and prevention of fall related injury.
In section three, older people accessing fall related intervention strategies, information about access and availability of fall related services is presented, as well as specific criteria for older people to be referred into an organised falls program and waiting periods for such programs.

**Identifying older people at risk of falls**

The first aim of this study was to determine how older people living within the GSAHS community during the period of July 2008 and December 2008 were identified as being at risk of a fall. All questions relating to the identification of risk within both questionnaires were analysed and the following results were obtained.

**Identifying people 65 years and older attending Community Health Centres who have had a history of recurrent falls**

The questionnaire results indicated that the majority of Community Health Centre sites were routinely asking older people, who presented to their facility, whether they had a history of falling (Figure 5-2, Table H-1 in Appendix H).
While the majority of sites did routinely ask older people if they had fallen previously, analysis of the responses to open ended questions in the community health centre questionnaire identified that some health professionals had a perception that older people were reluctant to admit that they had fallen previously.

“Many of our clients won’t admit to you that they have had a fall or don’t think it is important to tell you” (Population size C)

The above excerpt demonstrates that, while there was a formal procedure in place, this process may not have identified all of the older people in the community who may have been at risk for further falls. The challenge of identifying at risk older people potentially means the opportunity to implement timely and appropriate preventive strategies may be lost.
Identifying people 65 years and older attending Community Health Centres within each of the different community sizes who have a history of recurrent falls.

The majority of sites in each population size category had a process for identifying older people who had a history of recurrent falls. However, this was more likely in the larger population size, 18,000 to <47,999. In the 48,000 to <249,999 category the single survey indicated this site had a process for identifying histories of recurrent falls. The smaller population size category had a larger number of sites with no formal fall identification process (Figure 5-3, Table H-2 in Appendix H).

![Bar chart](image)

Figure 5-3 - Identifying people 65 years and older attending Community Health Centres within each of the different community sizes who have a history of recurrent falls.

Information about previous falls, such as location, time and activity at the time of fall documented in Community Health Centre case notes.

Results indicated a variable approach between Community Health Centre sites when documenting information about an older person’s previous falls. Although 61% of sites
indicated that they either always or mostly documented information about a previous fall,
31% of sites within the GSAHS stated they only did this occasionally (Figure 5-4, Table H-3 in Appendix H).

![Bar chart showing the percentage of sites documenting information about previous falls.]

Figure 5-4 - Information about previous falls, such as location, time and activity at the time of fall documented in Community Health Centres case notes.

**Information about previous falls, such as location, time and activity at the time of fall documented in Community Health Centre case notes within the different community sizes.**

Further exploration revealed that facilities within the population size category of 4,999 or fewer were more likely to document information about a previous fall history compared to facilities within the larger population size categories (Figure 5-5, Table H-4 in Appendix H). The facility in the largest population size category, 48,000 to <249,999, indicated that they always documented relevant information about the location, time and activity surrounding the fall event.
The use of specific screening tools to determine the fall risk status for older people, in Community Health Centres.

Screening older people is one way to determine their level of fall risk. When respondents were asked whether facilities were using a specific screening tool, the results indicated that the majority of Community Health Centre sites across the GSAHS were using a screening tool to determine an older person’s risk of falls (Figure 5-6, Table H-5 in Appendix H).
The use of specific screening tools to determine the fall risk status for older people in Community Health Centres within the different community sizes.

Analysis of the data based on community size showed that screening tools were more commonly used at sites in the smaller population size categories than at sites in the population size category of 18,000 to <47,999, where only half the sites were using specific screening tools to determine the fall risk status for older people living within the community (Figure 5-7, Table H-6 in Appendix H). In the population size category of 48,000 to <249,999, the site indicated that they did routinely use a screening tool to identify the fall risk status for older people living in the community.
The use of specific screening tools to determine the fall risk status for older people in Community Health Centres within the different community sizes.

Of the sites that indicated they were using a specific tool, results showed that there was no consistent approach across the GSAHS. Only 19% of sites were using the validated tool Quickscreen\(^4\). A smaller proportion of sites (11%) indicated that they were undertaking functional assessments\(^5\) to determine an older person’s risk of falling. Few

\(^4\) Quickscreen is a multifactorial assessment tool which is designed for use in clinical settings. It was developed by researchers at Neuroscience Research Australia and involves measuring a range of fall related factors. These include previous falls, medication use, vision, peripheral sensation, lower limb strength, balance and co-ordination in order to determine whether an individual is at risk of a fall and which particular factors contribute to the specific risk (Tiedemann, Lord & Sherrington 2012).

\(^5\) Functional assessments are instruments or measures that focus on functional limitations in gait and balance. They provide a standardised measure of disability and functional limitations. Typically, they either involve the patient walking, getting up from a chair and/or performing other functional activities such as reaching. There are a range of different types of assessments and only some have been validated for predicting fall risk (Perell et al., 2001).
functional assessments have been validated however and sites did not indicate which types of functional assessments were being used at their facility. The use of multiple tools to determine the fall risk status was seen in 19% of sites, but these sites did not indicate which specific combination of tools they were using. The ‘other’ category was ticked in 17% of sites, and among these facilities, respondents from some sites indicated they were using a locally developed tool while others did not indicate what specific tool they were using to identify an older person’s risk of falls (Figure 5-8, Table H-7 in Appendix H).

Figure 5-8 - The types of fall risk screening tools used at Community Health Centres within the GSAHS.

Analysis of the open ended responses also identified that screening and assessment of fall risk varied within specific facilities as well as across the organisation. Although screening tools were available at the majority of sites this didn’t necessarily mean that every older person had the same screening assessment undertaken.
“We need a screening tool to be used on every client referred to the community health service” (Population size B)

This excerpt indicates that there may not be a consistent approach to screening every older person who may be *at risk* of falls. Sites that were not routinely screening every older person did not indicate how they determined who was screened and who was not. Respondents also highlighted that staffing issues impacted the ability to undertake appropriate screening of older clients in their facility. This may indicate one reason why screening processes for falls varied across facilities.

“As a solo nurse, I am so pressed for time that I don’t have the time to do extra screening as I already work many more hours than I am paid for” (Population size A)

This excerpt demonstrates the difficulty sites may have in balancing workloads and providing comprehensive services to clients *at risk* of falling.

Community Health Centre respondents were also asked to comment through open ended questions on the strengths and limitations of the fall risk screening tool/s they were using at their site. The data revealed that the perceived benefits of using a particular screening tool included providing an avenue to discuss openly the risk status of the older person and increasing self-awareness among older people of their own level of risk. Falls screening also enabled staff to modify treatment interventions based upon the screening results.

“It enables you to identify what areas the client has deficits in and alerts clients who are less likely to admit the reality of their fall risk”  
(Population size B)
The reluctance by older people to admit to falling was again perceived by some health professionals who noted the importance of identifying *at risk* individuals and reducing the reliance on self-reporting.

Another benefit of screening tools highlighted by respondents was that they provided staff with standardised information on clients’ fall risk status while allowing them to explore the range of contributing factors on an individual basis.

“It identifies and clarifies issues around falls and provides basic standardisation of information, which is readily available for health professionals involved in the older person’s care” (Population size B)

The use of screening tools provided health professionals at the site with a broader understanding of the range of fall related issues that an older person had so that appropriate intervention strategies and referral could be implemented.

Respondents also identified a range of limitations when using particular screening tools such as the time it took to undertake a thorough screening assessment.

“Functional assessments and Quickscreen often take too long to complete” (Population size B)

This excerpt may explain why the validated screening tools are not always used. Some respondents believed that screening tools were not useful in capturing all risks associated with falls and this impacted on the reliability of their assessment.

“Some of the tools are not sensitive enough to pick up all at risk individuals” (Population size C)
Validated screening tools appeared to be used inconsistently due to staffing pressures and non-validated tools were chosen for their ease of administration. Combined, these factors could lead to failure to identify high-risk or moderate risk individuals.

Some of those respondents who did use validated screening tools indicated that they lacked knowledge of how to move forward once the screening was completed.

“Lack of training and understanding of the tool often results in inconsistent use and lack of knowledge about what to do next once the form is completed” (Population size C)

While it was perceived by the respondents that there were significant benefits in using a screening tool to identify fall risk, lack of training in the use of validated screening tools impacted the confidence of staff administrating such tools. The inability of staff to easily formulate a falls management or prevention plan based on the information obtained in the screening tool questions impacted on the usefulness of such tools to assist in reducing the incidence of falling in older people.

The types of fall risk screening tools used at Community Health Centres within the GSAHS within the different community sizes.

Analysis of the data, based on community size, also showed variation in the responses regarding the use of specific screening tools. A number of sites in the smaller population size categories were not using any form of screening tool, but those sites that were screening were most likely to use either Quickscreen or functional assessments. The majority of sites in the 18,000 to <47,999 population size category were using either a range of tools other than Quickscreen or functional assessments, or were using multiple tools to screen older people (Figure 5-9, Table H-8 in Appendix H). In the community with the population size category of 48,000 to <249,999, respondents indicated that only
functional assessments were used to identify the fall risk status for older people living in the community.

Reassessment of an older person’s fall risk status at Community Health Centres.

The results identified that 46% of Community Health Centre sites within the GSAHS did not have a formal process to reassess an older person to determine if their fall risk status had changed over time (Figure 5-10, Table H-9 in Appendix H).
Not having a formal process to reassess an older person’s fall risk status was also evident in the responses to open ended questions. In the sites where no such process existed, respondents identified that this impacted on their ability to follow up on individuals and ensure that the interventions implemented were still appropriate and meeting the needs of the older person, as seen by the excerpt below.

“Once the risk is identified there needs to be put in place a follow up procedure and report on how the risk factors or concerns have been addressed over time” (Population size C)

Changes in an older person’s risk status directly impacts on the level of support that they may require. Over time older people may need less support if they have recovered from a fall and are able to resume normal functioning. Conversely they may require increased support or interventions if further deterioration occurs. Even if risk factors were addressed
at the time of initial identification there was often no mechanism to review whether interventions had been appropriately implemented after this initial assessment.

**Ability to reassess an older person’s fall risk status within the GSAHS, reported by community size.**

When the data was analysed based on community size, it was found that communities in three out of the four population sizes did not have a formal process to reassess older people once a fall risk status had been determined. 42% of sites in the communities with population sizes less than 4,999 indicated that there was no formal process. In the communities with population sizes of 5,000 to <17,999, 54% of sites indicated that there was no formal process. In communities with a population size of 18,000 to <47,999, 40% of sites indicated that they did not have a formal process to reassess older people (Figure 5-11, Table H-10 in Appendix H). The community with a population size of 48,000 to <249,999 indicated that there was a formal reassessment process to determine whether an older person’s fall risk status had changed over time.

![Figure 5-11 - Ability to reassess an older person’s fall risk status within the GSAHS, reported by community size.](image-url)
Are older people, presenting to hospital emergency departments, questioned in relation to whether their injuries were a result of a fall?

When older people presented to an emergency department 56% of sites reported asking whether their injuries were a result of a fall. Conversely, over 40% of sites were not routinely asking every patient who presented with an injury, potentially resulting in missed opportunities to identify at risk individuals and provide appropriate referral pathways to minimise this risk (Figure 5-12, Table H-11 in Appendix H).

Figure 5-12 - Are older people presenting to hospital emergency departments asked if their presenting injuries are a result of a fall?
Are older people who present to hospital emergency departments questioned in relation to whether their injuries are a result of a fall, within different community sizes?

In the smaller communities the trend was similar to the overall trend with between 95% and 100% of sites either asking every patient, or most older patients, whether their injuries were a result of a fall. However, in the communities with a population size category of 18,000 to < 47,999, this figure fell to 77%, and 11% of sites were only asking some older people who presented to the emergency department (Figure 5-13, Table H-12 in Appendix H). In the community with the population size category of 48,000 to <249,999, respondents stated that they asked most of their older patients if their injuries were a result of a fall.

Figure 5-13 - Are older people who present to hospital emergency departments questioned in relation to whether their injuries are a result of a fall, within different community sizes.
Is detailed information about the fall recorded in the older person’s case notes when they present to emergency departments?

Responses indicated that the majority of sites within the GSAHS were not routinely recording detailed information on the circumstances of the fall for every older person who presented to the emergency department following a fall. Only 16% of sites were recording such information for every older patient that presented following a fall (Figure 5-14, Table H-13 in Appendix H).

![Figure 5-14](image)

Figure 5-14 - Is detailed information about the fall recorded in the older person’s case notes when they present to emergency departments.

Is detailed information about the fall recorded in the older person’s case notes when they present to emergency departments, within the different community sizes?

In the smaller communities (population size 0-<4,999), the majority of sites reported they were recording information about the fall either most of the time or some of the time, whereas in the communities with the population size category of 18,000 to <47,999, the majority of sites were only recording detailed information about falls in the patient’s case notes some of the time (Figure 5-15, Table H-14 in Appendix H). In the community with
the population size category of 48,000 to <249,999 respondents stated that documentation in the patient’s case notes of details related to the fall occurred most of the time.

**Figure 5-15 - Is detailed information about the fall recorded in the older person’s case notes when presenting to emergency departments, within the different community sizes?**

*Is there a process for referring older people who may be at risk of falls who present to the emergency department?*

Whether a formal referral process existed for older people who present to the emergency department as a result of a fall is presented in Figure 5-16. These results show that in 44% of sites there was no formal referral pathway for older people who may be at further risk of falling (Figure 5-16, Table H-15 in Appendix H).
When the data from the responses to open ended questions was analysed some hospital sites identified that it was common to have a breakdown in referral pathways; this could result in individuals failing to receive appropriate follow up after presenting to an emergency department as a result of a fall.

“Discharge planning is presently not in place and there is no feedback from the hospital” (Population size B)

Respondents also commented that even if an older person was admitted to the hospital as a result of a fall they might be discharged without appropriate assessment of their fall risk being undertaken and without appropriate support mechanisms being in place.
“Clients are being discharged from hospital without a review of their medications that contribute to their fall risk and they are often discharged late in the day or on a Friday/weekend, without organised community support” (Population size C)

Alongside this issue, appropriate referrals were not always undertaken during this discharge process, perhaps increasing risk for subsequent falls.

“If a client presents to a hospital as a result of a fall, or near miss, then information about the incident is never forwarded to community health. Often there are falls and near misses happening that community health staff are unaware of” (Population size B)

The above excerpt demonstrates the challenges sites may be experiencing in gaining all the relevant information needed to manage an older person who is at risk of future falls.

*Is there a process for referring older people who present to the emergency department who may be at risk of falls, within the different community sizes?*

In the smaller communities only between 40% and 50% sites had a formal referral process for older people who may be at risk of further falls. There was a better outcome for those older people who presented to emergency departments in communities with a population size category of 18,000 to <47,999, where the majority of sites did have a formal referral process (Figure 5-17, Table H-16 in Appendix H). In the community with the population size category of 48,000 to <249,999, there was a formal referral pathway in place for older people who presented to the facility as a result of a fall.
Is there a process for referring older people who present to the emergency department who may be at risk of falls, within the different community sizes?

Intervention strategies to manage older people at risk of falls

The second aim of this study was to determine what falls prevention or intervention strategies existed for older people living within the GSAHS community during the period of July 2008 to December 2008. Questions from both questionnaires relating to the range of falls prevention interventions offered and the staff to facilitate these interventions were analysed and the following results were obtained.
Activities and programs available to support falls prevention run through Community Health Centres within the GSAHS.

Across the GSAHS, 72% of sites offered fall specific exercise programs\(^6\). A small percentage of sites provided either general exercise\(^7\) or activity groups\(^8\) that targeted older people, but these programs did not specifically focus on falls prevention. 25% of sites indicated that they had no community program related to falls interventions. 4% of sites indicated they had other programs running but did not state specifically what these were (Figure 5-18, Table H-17 in Appendix H).

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\(^6\) Fall specific exercise programs were defined as exercise programs that had a strength and balance component incorporated.

\(^7\) General exercise was defined as older people undertaking a general exercise program that was not specifically related to the prevention of fall related injury.

\(^8\) Activity groups were defined as general structured groups where older people were invited to attend on a regular basis and a range of different activities were incorporated. In a number of cases there was an exercise component included in these activity groups; exercise was not however the main focus of the group.
Seven key themes were identified from Community Health Centre responses to open ended questions about the provision of falls management and prevention resources. These were:

- older clients often living at home with multiple fall risk factors
- long wait times to access home assessments for older people at risk of falling
- the challenges associated with running equitable and adequate programs across a large geographic area
- limited resources available in rural areas to provide services for older people with fall risk factors who have not yet fallen
- poor uptake of programs by older people
- lack of understanding by older people of the risks associated with falling
- limited community awareness of fall related programs offered

The most common theme reported by the respondents were the difficulties in managing older people with multiple fall risk factors. These included pre-existing injuries or
medical history, decreased mobility, and polypharmacy in individuals with no recent medication reviews.

“Our clients are, or appear to be, getting older and are still residing in their own homes. 80+ and 90+ frail age with multiple fall risk factors including multiple medications and poor mobility which result in them having a number of falls” (Population size A)

Managing the complexity of falls was also a challenge when resources were limited, especially if an older person had multiple risk factors. This was further compounded if there were lengthy wait times to access critical interventions such as home assessments, as seen from the excerpt below,

“Waiting times are lengthy to access home assessments undertaken by Occupational Therapists. They are also difficult to access given the limited resources and site isolation from referral points” (Population size A)

The ability to provide an equitable health service over a large geographic area or dispersed population further impacts the provision of fall intervention strategies.

“Trying to run equitable and adequate programs across a large geographical area is difficult with minimal resources” (Population size D)

Commonly, respondents reported older people were living in isolation and on rural properties. This influenced the ability of older people to access services regularly, especially if their independence was compromised, such as by not being able to drive.
“Working in a rural community environment does have limitations. Often people live alone in isolated situations with limited access and/or interest in accessing services” (Population size B)

Respondents also noted the majority of fall related resources offered at their site were designed for older people identified as moderate to high-risk with a history of falling, rather than older people who were identified as at risk, but had not yet fallen.

“Patients in the community generally have to have had a fall before fall prevention strategies are implemented” (Population size D)

This excerpt indicates that in some sites there may be reduced capacity to manage older people through early intervention strategies before they have a fall.

Ineffective communication was also highlighted by some respondents who felt that the community at large needed better education on the importance of falls prevention strategies. It was also perceived that local general practitioners needed to take a more active role in referring older people with a risk of falls to undertake falls intervention programs.

“There is poor uptake of our programs by clients, there needs to be better education of the community and more promotion by local doctors” (Population size D)

Another aspect identified by the respondents in the responses to open ended questions was a lack of awareness by older people of their true risk of falling. Respondents believed that some older people were in denial about needing extra support and as such they did
not actively seek out services to support them. Even when they might attend programs, if older people did not perceive they were the ones at risk, they might not comply with the interventions suggested.

“Some older people don’t perceive the need to actively seek intervention for prevention of further falls, this is often related to poor insight of their risk or cognition problems. Compliance with interventions is also a problem” (Population size C)

Finally, respondents identified a greater need to increase the awareness within the community about the risk of falls and about the services available to manage those risks.

“General opinion is that there is not enough public awareness regarding availability of services available to help with falls” (Population size C)

The points raised here indicate there are a number of challenges associated with effectively managing older people at risk of falls in a regional environment.

Activities and programs available to support falls prevention run through Community Health Centres within the GSAHS, within the different community sizes. In the two smallest population size categories, 47% and 54% respectively of the Community Health Centre sites had programs that specifically focused on falls interventions. In these same population sizes, 27% and 33% of sites did not have a specific falls component in their programs. In communities with a population size category of 18,000 to <47,999, all sites offered a range of fall related activities and programs (Figure 5-19 Table H-18 in Appendix H). This was also seen in the population size category of 48,000 to <249,999, where multiple programs existed.
Private health professionals/providers in the community involved in falls management and/or prevention in older people

Across the GSAHS 33% of sites indicated they were using private health professionals to assist in the management of falls for older people living in the community (Figure 5-20, Table H-19 in Appendix H).
Private health professionals/providers in the community involved in falls management and/or prevention in older people, within the different community sizes. In the smaller communities the majority of sites did not engage private health professionals in the management of falls in their local community. However, in communities with a population size category of 18,000 to <47,999, 80% of sites indicated that they routinely used private health professionals to assist with management of falls in the older person (Figure 5-21, Table H-20 in Appendix H). There was no response to this question in the community with the population size category of 48,000 to <249,999.
Older people accessing fall related intervention strategies

The third aim of this study was to determine how older people living within the GSAHS catchment area during the period of July 2008 and December 2008 accessed fall related intervention strategies. All responses relating to access, availability, eligibility, and waiting periods within both questionnaires were analysed and the following results were obtained.

Access to community based fall related services.

There was a common perception by Community Health Centre respondents, shown in the responses to open ended questions, that access to services was a major issue for older people living within their community, (as demonstrated by the excerpt below). The difficulty for some older people to travel long distances to access services is a significant challenge in regional or rural locations.
“The Physiotherapist is located in a nearby town and doesn’t outreach to other towns. Finding transport for our clients to go to where the Physio is located is often difficult” (Population size A)

This excerpt indicates that limited access to transport in both regional and rural communities may impede an older person from attending fall related services, especially if they are located in isolated towns and farming communities. This could impact on their ability to personally manage their own risk associated with falling.

**Availability of fall related services conducted by Community Health Centres**

Availability of services was highlighted as a major issue for a number of older people residing in these communities. Lack of resources and staffing to manage the increasing number of older people requiring assistance was also a significant concern to respondents.

“Our small facility experiences the difficulties that most of its type would with lack of staff and high workloads, with a small number of staff having to fulfil a number of different roles” (Population size A)

Lack of consistency in staffing levels was also identified by the respondents as another barrier to maintaining effective levels of intervention strategies.

“There are some very good community programs in the whole area which are working well. Problems arise when local community trainers retire as often the program will need to stop until someone else is trained. It also can be difficult to find new trainers and maintain motivation levels within the community until a program can be recommenced” (Population size B)
These issues all impact on sites’ abilities to provide appropriate and sustainable intervention strategies. The inconsistent approach towards running intervention programs reported by some sites may impact on an older person’s ability to maintain motivation to continue with fall related strategies, such as exercise programs, while they wait for new programs to start.

*Eligibility criteria for older people to access Community Health Centre organised falls programs or activities.*

Within the GSAHS 60% of sites indicated that there were no specific eligibility criteria for older people to be referred into a falls program or activity conducted by Community Health Centres. Only 25% of sites indicated that they did have specific criteria that needed to be met (Figure 5-22, Table H-21 in Appendix H).
Analysis of the data from sites that did have specific eligibility criteria for older people to attend a falls program or activity organised by Community Health Centres identified a range of ineligibility criteria. These criteria included such issues as dementia; people under the age of 65 years; those who had a history of only one fall, and people at risk of falls or fear of falling but without a history of falls.

“Falls clinic only sees one client per week, which results in limited availability of clinic time. This means clients with dementia are excluded, clients under 65 years of age are excluded, and clients who have only had one fall are excluded. Even if a client has risk factors for falls or has a fear of falling, but have not had a fall they are still excluded” (Population size D)

The above excerpt implies that there may be little opportunity for early intervention strategies to be implemented at some sites before the potential fall related injury occurs. Limitations around the numbers of clients reviewed per week has negative implications for managing fall risk.

Eligibility criteria for older people to access falls programs or activities organised by Community Health Centres, within the different community sizes.

In the smaller communities, between 58% and 79% of sites did not have any formal criteria to access falls programs or activities organised by Community Health Centres. Seventy percent of sites in the population size category of 18,000 to <47,999 indicated that they did have specific criteria in order for clients to be referred into fall related programs or activities (Figure 5-23, Table H-22 in Appendix H). There were also specific criteria that needed to be met before older people were eligible for fall related programs or activities in the community with the population size category of 48,000 to <249,999.
Figure 5-23 - Eligibility criteria for older people to access falls programs or activities organised by Community Health Centres, within the different community sizes.

*Waiting periods for older people to access appropriate fall related programs conducted by Community Health Centre sites.*

Across the GSAHS 52% of Community Health Centre sites indicated that there were no waiting periods for older people to access a fall related program. Only 20% of sites indicated that there were waiting periods (Figure 5-24, Table H-23 in Appendix H).
Figure 5-24 - Waiting periods for older people to access appropriate fall related programs conducted by Community Health Centre sites.

Analysis of data from the responses to open ended questions for sites that did have waiting lists to access programs or activities identified two key points. First, waiting lists impacted on the motivation of older people to attend. Second, restrictions in group numbers for programs that ran over several weeks meant that older people were often having to wait several months before being able to access the program.

The ability to provide timely interventions impacted negatively on the motivation of older people to attend such programs to reduce their risk of falls.

“Waiting lists affect motivation for people to attend, increased waiting times equals decreased motivation. Staffing levels also affect the capacity to provide timely assessment and deliver services”

(Population size C)
The excerpt above demonstrates some of the challenges noted by participants with respect to the provision of fall related services within the community.

Another issue raised was on the delivery of programs. If a program ran over a number of weeks, older people would often have to wait until the next program began before they were able to access particular intervention programs.

“Active Ageing Program is popular but classes are restricted to 15 people maximum and there are few time slots remaining available to commence another class in. If we had the ability to conduct more classes during day therapy times, we would” (Population size C)

Respondents reported that having delays in getting their older clients into specific programs made it more challenging to appropriately manage their risk of falls in a timely manner.

**Waiting periods for older people to access appropriate falls programs conducted by Community Health Centres, within the different community sizes.**

No waiting period was identified in accessing fall related programs organised by Community Health Centres in 50% to 68% of sites in the smaller communities. However, in communities with the population size category of 18,000 to <47,999, 70% of sites indicated that there were waiting periods for older people to access community health programs (Figure 5-25, Table H-24 in Appendix H). In the community with the population size category of 48,000 to <249,999, respondents indicated there were waiting periods for older people to access appropriate community health falls programs and activities.
DISCUSSION

This study represents the first reported analysis of the identification processes, falls prevention resources and referral pathways implemented in support of older people at risk of falls across a regional Area Health Service. In this study five key findings have been made. These include:

- identifying older people at risk of falls is challenging
- the documentation of falls, particularly in relation to the circumstances of the fall, is often inadequate to support falls prevention and prevent recurrence
- broad inconsistencies were evident in the screening of older people who may be at risk
- inconsistencies were evident in referral pathways for older people who present to emergency departments as a result of a fall
- challenges associated with rurality to accessing appropriate falls intervention strategies
The study demonstrated that identifying older people who may be *at risk* of falls can be a challenging process. One of the concerns identified in this study was the failure to attain a consistent approach to asking older people if they had previously fallen. Early identification of older people who are *at risk* of falls is crucial so that appropriate interventions can be implemented before serious injury occurs (Etman, Wijlhuizen, van Heuvelen, Chorus & Hopman-Rock, 2012). The Australian Commission on Safety and Quality of Health Care (2009) recommends that a history of two or more falls in the previous year should initiate more detailed assessment in an older person. However, if there is inconsistency in the approach to identifying all older people *at risk*, this can significantly impact further assessment or opportunities being offered to undertake intervention strategies.

Another challenge highlighted in this study was the perception by some health professionals that older people are reluctant to admit they have fallen. Relying on older people to self-report their history of falls may be problematic given that a study undertaken by McKay & Anderson (2010) found that failing to report a fall may be common in older people, especially if the falls have been considered minor or no injury occurred. Evidence suggests that even those who fall without injury can suffer negative health consequences (Boyd & Stevens, 2009). Thus, it is important that all older people who have the potential to fall are properly assessed. Even if sites are being proactive and regularly inquiring, if the older person doesn’t admit to falling there will be a percentage of the older population with a risk of further falls that may go undetected. Health professionals may need to look at whether the approach of asking older people, which was commonly seen in this study, is the most suitable to identify *at risk* individuals. Further research is also warranted to understand if older people are reluctant to admit to health professionals that they have experienced a fall and if so, what the reasons might be behind this reluctance.

The findings from this study also identified a lack of detailed documentation of the circumstances of falls. The history can be a critical part of the falls assessment as it can provide important information to establish the context around the fall (McKay & Anderson, 2010; Rubenstein, 2006). Without having this contextual knowledge, it is
difficult to identify specific individual risk factors that may contribute to subsequent falls. Documentation of the circumstances of the fall can also highlight the interaction between specific extrinsic risks and an individual’s susceptibility to these risks (Rubenstein, 2006). Without such information, the recommended targeted intervention approach (Gillespie et al., 2012) is difficult to implement. Improvements in the approach and consistency in the documentation process after an older person has fallen may go some way to ensuring that contributing factors and appropriate intrinsic and extrinsic risk factors can be addressed.

Fall risk screening, the process by which older people are identified if they are at an increased risk of falls (Close & Lord, 2011), is an important first step in the falls prevention process. The use of screening is based on studies of populations with specific risk factors so that older people identified as at risk can be referred for more detailed falls assessment (McKay & Anderson, 2010). The third key finding from this study was that screening of older people to determine their risk status was inconsistently undertaken across the Area Health Service. Early screening of at risk individuals is important to enable timely and appropriate interventions to be implemented (Etman et al., 2012) and to minimise the risk of subsequent falls. As recurrent falling is a leading cause of hospitalisations in this population group (McKay & Anderson, 2010), determining who is at risk of recurrent falls is critical.

Establishing the range of potential fall related risk factors an older person may present with can be comprehensively and systematically achieved through the use of fall risk screening tools (Close & Lord, 2011). Such tools can also enable health professionals to monitor a person’s risk over time. Currently there are a range of screening tools available to use with older people living in the community (McKay & Anderson, 2010). However, only some have adequate predictive validity (Close & Lord, 2011). This is a concern, given that this study identified that only a little over half the sites were using screening tools to identify older people at risk and not all of the tools used were validated. Alongside the problem of inconsistent practice of using validated screening tools is the issue that most validated screening tools focus on postural stability, gait and balance (Close & Lord, 2011). Given the range of other risk factors (noted in Chapter 2) that also contribute to an increase in fall risk, screening tools that also focus on a variety of other risk factors in
addition to stability, gait and balance may also be seen as useful (Rubenstein 2006) within this community context.

While the benefits of using screening tools are well documented (McKay & Anderson, 2010; Rubenstein, 2006; Russell et al., 2009), respondents in this study identified a number of limitations within their contexts associated with this practice. The inconsistent use of screening tools may be due to a lack of understanding of the tool or due to the complexity of fall related risks and the need to assess multiple individual risk factors related to the older person. This may seem overwhelming for health professionals (Close & Lord, 2011). Not knowing where to start with the information gained from the screening process may also mean that health professionals are reluctant to consistently use this approach and this reluctance may result in less effective interventions being implemented.

Time constraints were also commonly cited barriers to using comprehensive fall risk screening tools. Staff reported having to undertake multiple roles, due to lack of staffing, limiting their ability to specifically undertake identifying fall risk in older people living in the community. This was especially evident in smaller communities and resulted in either inconsistent or minimalist approaches to fall risk assessment. In these situations, it may be more appropriate to assess risk factors over a number of consultations (Close & Lord, 2011) so that a complete picture can be obtained and early intervention instigated (McKay & Anderson, 2010).

Both Australian and International guidelines recommend that health professionals should be reviewing the fall risk status of older people on an annual basis (Close & Lord, 2011). This study identified that almost half of sites had no formal process in place to reassess an older person’s fall risk status over a period of time. Annual follow up of older people who have been through the screening process is critical as recurrent falls are a common precursor to admission into nursing home care (Rubenstein, 2006). As such, it is important to regularly assess an older person to determine whether their fall risk status has changed over time (McKay & Anderson, 2010) and ongoing management of specific
risk factors can be instigated or changed as necessary. Without reassessment, older people may have no interventions or inappropriate interventions, perhaps heightening the risk of falling (Ganz, Alkema & Wu, 2008; Lamb et al., 2007). Annual review of older people may pose challenges for some staff in this regional setting who identified that they find it difficult to undertake even the initial screening for all older people who present to their facility due to time constraints and filling multiple roles.

Identifying older people who present to an emergency department as a result of a fall also provides a useful opportunity to screen for risk factors and refer on for further assessment (Close & Lord, 2011; Russell et al., 2009). This study found that it was common practice to ask older people who presented to the emergency department whether their injuries were the result of a fall. However, the study also found that while the circumstances of the fall were mostly recorded, this was not always the case and the circumstances of the fall were less likely to be documented in the larger communities. Highlighting the circumstances of the fall event can provide insights into potential risk factors that need to be managed (Rubenstein, 2006) as well as identifying what referrals are necessary, but often opportunity for preventative care competes with the management of specific injuries and timely discharge from the emergency department (Close, Ellis, Hooper, Glucksman, Jackson & Swift, 1999; Russell et al., 2009). This is likely to result in lost opportunities for making older people aware of their risk for subsequent falls and reduce the ability to provide useful information when referring older people who are at risk to falls intervention programs.

A lack of appropriate fall related referral processes from emergency departments was a concern identified in the study. Only 53% of older people attending the emergency department as a result of a fall were referred on to appropriate services to have a comprehensive assessment undertaken. Opportunities to instigate appropriate fall related interventions in this high-risk group before subsequent injuries occur are likely to be missed. Hospital staff respondents in this study identified that there were limited standardised referral pathways for older people who presented as a result of a fall. This may be one explanation as to why referral rates were low. More work needs to be done in this area to fully understand why referral rates are so low in a known high-risk group.
and to maximise the capacity of health services to reduce the risk of re-injury due to subsequent falls.

Given the challenges raised by this study, regarding identification and referral processes, it is feasible that a large percentage of people who fall without an injury are even less likely to be appropriately identified and provided with timely referral pathways to reduce their risk before a subsequent injurious fall occurs (Snooks et al., 2006). This situation may result in an additional significant gap in the early identification of older people at risk of subsequent falls, further exacerbating risk of fall-related injury and increasing the rates of hospitalisations, as seen in Chapter 3.

The final key finding from this study pertained to the lack of access for older people to attend appropriate falls prevention interventions when living in rural/regional communities. The evidence supports our understanding that multiple risk factors can all play a role in contributing to a falls event (Ganz, et al., 2008; McKay & Anderson, 2010; Rubenstein, 2006). As such, a multifactorial approach is likely to be the most useful to address the complexity of risk factors evident in older populations (Gillespie et al., 2012). However, providing a multifactorial approach may prove challenging, especially in regional communities, given that this study found that staff fluctuations resulted in inconsistent running of programs and limited available places in programs. This meant that, in some cases, there were waiting lists for services and in particular sites exclusion criteria had been initiated to help manage demand. These issues are likely to limit access by older people to appropriate programs in a timely manner. In addition, Cubit & Meyer (2011) indicate that these strains on the current health care system are likely to increase given our ageing population. On this basis, it is notable that in a number of communities in this study, especially the smaller communities, utilisation of the private sector health workforce was not routinely occurring. Greater involvement of the private sector may provide opportunities to enhance, at a local level, a more consistent and integrated approach to fall-related interventions. No research could be found that specifically evaluates the role private sector allied health professionals may play in meeting the demand for fall-related services within regional Australia. Further research in this area is
warranted to identify innovative strategies for reducing current fall rates and so add to efficiencies within the struggling public regional Area Health Services.

Respondents also noted that another barrier to attending falls interventions was, in some cases, older people routinely having to travel large distances to access particular programs or to be assessed by a specific health professional. Older people travelling has been identified in the literature (Davis & Bartlett, 2008; Goins, Williams, Carter, Spencer & Solovieva, 2005) as a significant barrier to accessing health care, and this is especially evident in rural or regional communities where problems exist in the delivery of comprehensive services, due to lack of resources (Wakerman et al., 2006). Most rural areas have minimal public transport and often community transport arrangements tend to be ad hoc (Davis & Bartlett, 2008). As older people age, independence becomes increasingly important (Yardley, Donovan-Hall, Francis & Todd, 2006a), and if the ability to drive is impacted, this could result in older people being reliant on public transport or having to pay for transport services. Poor availability of transport, evident in some communities within the GSAHS, was identified as an issue for older people failing to access fall related services. Even the most effective prevention programs are useless if older people are unable to attend them. Distance and poor access to services and transport present great challenges to facilitating healthy ageing in rural and regional areas (Davis & Bartlett, 2008). Falls management and prevention programs are no exception and so can be affected by these challenges. Alternative solutions, such as the implementation of home based exercise programs, which have shown success in reducing the risk of falling in older people (Gillespie et al., 2012), across regional areas may assist in resolving some of the issues noted by this study. In addition, the use of telehealth consultations has also demonstrated improved access to services in regional and rural areas of Australia (Knight et al., 2016), although a number of regulatory, financial, cultural, and technological barriers have been noted with this approach (Janq-Jaccard, Nepal, Alem & Li 2014).
CONCLUSION

The management and prevention of falls in the older person have been a major focus world-wide for a number of years now. The published literature supports developing a systematic approach to fall risk screening and targeted interventions to minimise the physical and psychological risk factors for falling in our older populations. Analysis of a range of fall related support mechanisms at an Area Health Service level is a useful way to review contemporary practice and identify strengths and inconsistencies in service delivery to determine the best ways to manage this challenging problem.

Implementing a standardised approach across an Area Health Service to the identification and referral processes for comprehensive risk assessment of older people living within the community may be a useful strategy to managing fall risk. Due consideration of the challenges faced by older people in regional and rural settings is important when instigating falls prevention strategies at a population level as the delivery of falls prevention services in rural and regional areas will be very different to their delivery in metropolitan areas (Davis & Bartlett, 2008; Moller, 2005). These types of issues cannot be sustainably dealt with at an individual level, but must be addressed at a population level with adequate support from the public health sector (Moller 2005), preferably in close collaboration with the private health sector, to ensure that vulnerable populations are not overlooked.

Identification of older people who are at risk is the fundamental first step in the falls management process. Given there is some evidence that suggests older people are reluctant to admit to falling, reliance on self-reporting, by older people, of their falls history may not be the most effective way for identifying those individuals at risk. As it is unlikely that significant changes in staffing levels and resources in rural and regional areas will be instigated in the foreseeable future, health professionals in these communities are likely to continue to rely on older people to self-report their falls history. Further research is necessary to determine whether older people are indeed reluctant to admit to falling. In addition, investigation into the reasons why people do or do not admit to falling could help identify appropriate strategies to increase the level of self-reporting by older people living in these communities. As such, the following chapter will explore
older people’s experiences of falls and their perception of fall risk to contribute to our overall understanding of how older community members can be actively involved in the management of fall related risks.
CHAPTER 6  LIVING THE FALL EXPERIENCE, 
PERCEPTIONS OF RISK

INTRODUCTION
This chapter reports findings from the final study conducted in a qualitative research paradigm. Qualitative methodology is informed by a philosophical framework that strives to understand how people interpret their world and what motivates them to act in particular ways (Minichiello, 2004). The study presented in this chapter sought to gain a deeper understanding of the experience of falls and perceptions of risk for older people living in southern NSW. Qualitative inquiry is a powerful tool that facilitates both a deep and detailed understanding of participant responses (Patton, 2014). It was used in this study to elicit new insights on interdependent elements of why older people make decisions related to fall risk, from the perspective of the older person and family members.

There have been studies that have specifically researched older people’s perceptions and awareness of individual risk associated with falls (Braun, 1998; Delbaere et al., 2010b; Dollard, Barton, Newbury & Turnbull, 2012; Wiens, Koleba, Jones and Feeny, 2006), and only two studies looked at older people’s perception of risk in a regional Australian context (Commonwealth Department of Health and Ageing, 2001; Hughes et al., 2008). Delbaere et al. (2010b), undertook a prospective cohort study in the metropolitan area of Sydney, NSW, and found that 31% of older people either underestimated or overestimated their level of fall risk when compared to their actual risk, determined by a range of physical assessments. In a qualitative study interviewing 9 older women and men, Dollard et al. (2012) found that participants had negative perceptions of falling and they presented themselves as ‘not the type to fall’, regardless of whether they had fallen previously. Underestimating risk was a phenomenon also found in the study undertaken by Wiens et al. (2006), who concluded that older people exhibited deficits in their awareness of the range of risk factors that could increase their chance of falling. However, a survey administered by Braun (1998), in a large metropolitan area in America, found that older adults did understand that there was a range of fall risk factors that could be
managed to reduce the chance of falling, but failed to appreciate that they were personally at risk.

Hughes et al. (2008) undertook a large telephone survey of 3,202 older people 60 years and over, as well as focus groups with 73 older people. All of these participants had attended a falls prevention program in one of two regional areas of Australia - Northern Rivers, in the state of NSW, and Wide Bay, in the state of Queensland. In this study they found more than 60% of respondents perceived their fall risk status to be ‘low’ even though a large proportion of these respondents had reported a fall in the previous 12 months. The Commonwealth Department of Health and Ageing (2001) commissioned and conducted research in which 59 participants from both metropolitan and regional areas in NSW were interviewed. They found that while older people acknowledged that ageing increases the risks associated with falling, there was general belief that falling was accidental and unpreventable, resulting in a reluctance to accept the necessary adaptive changes to minimise this risk.

The above studies provide us with insight into older people’s general beliefs on falls and perception of risk. What is evident from these studies is that older people do not always appreciate their actual risk of fall related injury. Being aware of known fall risk factors but believing these factors do not apply to them is likely to result in an underestimation of risk, making it difficult to engage this population group in falls prevention strategies to further reduce their personal risk. In sharp contrast, older people who overestimate their level of fall risk are likely to impose restrictions on physical activity levels, potentially further increasing their risk of falling in the future (Delbaere, Crombez, Vanderstraeten, Willems & Cambier, 2004).

It would seem from the research discussed above that there is an element of misjudgement by older people in their subjective perception of their personal fall risk, when this is compared to their actual risk of falling. This is important, but what the research does not explain is why this misjudgement is occurring and what factors contribute to older people taking fall related risks, other than a general belief that they do not see themselves as at
risk (Stevens, Noonan & Rubenstein, 2009; Yardley et al., 2006a; Yardley et al., 2006b). Only one study has specifically investigated factors affecting fall risk behaviour in older people (Zhang, Ishikawa-Takata, Yamazaki, Ohta, 2004), and found certain personality traits increased the risk taking behaviour among some older people in China. Through the use of a self-administered questionnaire they found that Type A behaviour patterns were independently associated with falling in males but not in females (Zhang et al., 2004). There were a number of cited limitations with this study, such as small numbers and the use of the Type A scale, which had not been validated specifically for use in the context of falling. This still leaves us with a significant gap in our current understanding of how older people decide whether or not to undertake a task that poses a risk. This gap is important, as without knowledge of the interdependent elements associated with an older person’s perception of fall risk, it is difficult to speculate why some older people either overestimate or underestimate their own level of fall risk or continue to knowingly undertake tasks that pose a risk. Further research on the perception of fall risk and how this awareness influences behaviour may provide valuable knowledge in informing a more comprehensive approach to falls prevention for this population group.

Therefore, the purpose of this study was to explore older people’s experience of falls, their perception of the risks associated with falls and the factors that informed their decisions on whether to undertake tasks that pose a risk.

AIM
Specifically, the aim of this study was to gain a deeper understanding of the experiences and perceptions of falling among older people living in southern NSW. In particular, this study sought to address the following questions:

- How does the experience of having a fall influence older people’s perceptions of risk and behaviours that might be associated with a heightened fall risk?
- How do older people respond to their perceived risk of falls?
- What informs older people’s decisions to undertake activities that may place them at risk of a fall?
The chapter presents details of the qualitative approach used in the study and discusses how this methodological approach enabled the researcher to gain a deeper understanding of the experiences and perceptions of older people who had experienced a fall.

Findings from this chapter constitute new knowledge in this area that may assist in the development of targeted strategies to curb the high rates of fall-related injuries in this population.

**METHODOLOGY**

Much of the previous research on perceptions of fall risk has been undertaken using an empirico-analytical paradigm or quantitative approach. In contrast, the research reported here arises from an interpretive theoretical perspective (Crotty, 1998), where the main goal was to understand human experience and actions (Fossey, McDermott & Davidson, 2002). Researchers adopting an interpretivist stance believe that knowledge is not fixed to a permanent reality - rather it is derived from one’s interpretation or perspective and, as such, knowledge is relative to the specific context (Finlay, 2011). Given the aims of this study, a qualitative approach, specifically hermeneutics, founded in constructivism and using an interpretative viewpoint, was deemed appropriate to facilitate a deeper understanding of participants’ perspectives and address the study questions (Liamputtong 2010; Patton, 2014).

Qualitative studies explore the social world (Liamputtong, 2010), enabling researchers to unpack meanings and interpretations as well as the individuals’ subjective experiences (Denzin & Lincoln, 2008). They provide a rich and in-depth description of the specific phenomena under study, through the observation of patterns and relationships (Cupchik, 2001).

Hermeneutics, congruent with qualitative research, is informed by beliefs about the nature of the social world and what can be known about it, ontology; and the nature of knowledge and how it can be acquired, epistemology (Snape & Spencer, 2003). Describing the
ontology and epistemology inherent in hermeneutics situates the research and is important for facilitating the reader’s understanding of the type of knowledge arising from addressing the research question (Crotty, 1998).

All research is underpinned by ontology (Crotty, 1998). Ontology can be described as our perception of the nature of reality and therefore what can be known about that reality (Guba & Lincoln, 1994). Our understanding of a ‘real’ world is therefore based on our knowledge of how things really are and how things really work (Guba & Lincoln, 1994). Ontology related to hermeneutics (also referred to as relativism) views that different people have different realities and therefore may have diverse ways of knowing (Crotty, 1998). Therefore, specific influences contributing to behavioural decisions regarding fall risk may not be common to all older people. As such, the ontological questions related to this study are concerned with the reality of each individual person and how this reality influences their decision making on fall risk activities.

Epistemology is described as the ways of knowing and learning about the social world (Snape & Spencer, 2003) or the understanding of ‘how we know what we know’ (Patton, 2014). It is concerned with the nature of the relationship between the ‘knower’ or the ‘would-be knower’ and what can be known (Guba & Lincoln, 1994), providing a context for how we can know about the reality of the social world and what forms the basis of our knowledge (Snape & Spencer, 2003). Epistemology related to hermeneutics (also referred to as constructivism), enables the researcher to draw meaning from research results through the eyes of the researcher or participants studied (Liamputtong, 2010). This approach was chosen for the current study in the understanding that each older person’s experience of a fall would be unique and embedded in his or her own social cultural context. Individual older people will construct meaning from a fall in different ways. This diversity provides an opportunity to illuminate different perspectives of falling and the ways in which individual perceptions and experiences may influence behaviour towards risk.
HERMENEUTIC METHODOLOGY

This study employed a hermeneutic approach to illuminate the meaning of the experience for older people who had fallen. The hermeneutic approach is one of many approaches found within the interpretive paradigm. Derived from the Greek language, hermeneutics means to ‘interpret’ or to ‘understand’ and originated in biblical times where it was used to interpret scripture (Crotty, 1998). Modern hermeneutics is now more broadly used in the interpretation of human action (Crotty 1998), helping researchers discover meaning through the use of textual data (Annells, 1996), and clarify human experiences by making clear what is seemingly unclear (Bauman, 2010). From an interpretive perspective, hermeneutic researchers construct a ‘reality’ by establishing the context and meaning behind what people do (Patton, 2014). Hermeneutics enables the researcher to move beyond a description of a particular experience to seek the meaning that is embedded in that experience (Lopez & Willis, 2004). Using a hermeneutic theoretical framework enables new knowledge to be uncovered by establishing the context and meaning through the construction of reality based on interpretations of the data (Patton, 2014).

Hans-George Gadamer (1900 – 2002) has been recognised as central to the modernisation of hermeneutics. Gadamer offered an interpretative approach to understanding which he argued could be achieved through ‘bringing together the horizon of the past and the horizon of the present’ (Gadamer, 2004, p. 305). Gadamer held that researchers bring to the interpretative process a pre-understanding of the phenomena (horizon of the past) that illuminates meaning in the text (horizon of the present) to form a new understanding. This process, referred to by Gadamer as the ‘fusion of horizons’ (Gadamer, 2004), is central in the conduct of hermeneutic methods. Through the use of a circular process, depth of understanding is achieved as one moves from a pre-understanding of the phenomena to immersion in the individual parts (textual data), and then emerging to create new understandings (Debesay, Naden & Slettebo, 2008). This process enables the researcher to evolve their interpretation as they move in and out of the hermeneutic circle or spiral and to gain a deeper understanding of the phenomena being studied (Lindseth & Norberg, 2004).
Adopting Gadamer’s hermeneutic approach required that this researcher recognised her pre-understanding of being an allied health professional working with older people who had fallen (horizon of the past) in order to develop new understanding from the interpretation of participant data (horizon of the present) and to form a new horizon (understanding) of older people’s perceptions of the risk of falling.

**My pre-understanding of the perception of fall risk in older people**

Hermeneutic research requires the researcher to consciously reflect upon their pre-understandings of the phenomena under study (Geanellos, 1998), as this historical knowledge enables us to make sense of people and events (Gadamer, 2004). It is important to note that reflecting on one’s pre-understanding also allows the researcher to recognise their own prejudices and biases and develop approaches to maintaining a naïve perspective throughout the data analysis phase (Whitehead, 2004), thus adding to the trustworthiness of the research.

In qualitative research, it is acknowledged that individual researchers have unique pre-understandings. Pre-understandings and fore-meanings provide preliminary insight into the research questions and this preliminary insight is represented as the past horizon of understanding (Walsh, 1996). Hermeneutic theory requires that one must know about the researcher to place the research in a hermeneutic context (Patton, 2014). My personal experience over fifteen years as an allied health professional in regional Australia informed my interpretation of the experiences described by older people who had fallen. Reflecting on my personal experience enabled me to be aware of what prior understandings might influence my analysis of the data and to develop techniques (described in the section *Rigour of the research*, page 189) to ensure I maintained a naïve perspective, to the greatest extent possible, so that the true meaning of the participants’ data could be illuminated.

As part of the hermeneutic process, and before undertaking the data collection, it was important for me to document my own pre-understandings of falls, fall risk and the impact these may have on people’s behaviour or responses. In my fifteen years of clinical
experience as a podiatrist, I have treated a considerable number of older people who had experienced a fall; some had minor consequences, while others were more significant. My experience occurred before the research and encompassed regional and rural environments in both private and public health settings within southern NSW. A reflexive journal was used to record my pre-understandings and perspective before data collection. Reflexivity is described by Finlay (2003, p.108) as ‘a process of continually reflecting upon our interpretations of both our experience and the phenomenon being studied so as to move beyond the partiality of our previous understandings and our investment in particular research outcomes’. As such the use of a reflexive journal is a useful strategy to enable researchers to begin the process of entering into the hermeneutic circle (Koch, 1996) and is important to the rigour and trustworthiness of data collection and analysis, which will be discussed later in the chapter. While pre-understandings can influence the data analysis, Koch (1996) contends that understanding the historical background makes the research meaningful to the reader.

METHOD

In order to achieve the study aims, semi-structured focus groups and semi-structured in-depth interviews were undertaken with 33 participants residing in communities in southern NSW.

Setting

In order to maintain consistency throughout the research program, the setting for this study, once again, incorporated communities geographically located within the former Greater Southern Area Health Service (GSAHS) catchment area (see Figure 6-1 & Figure 6-2), rather than the newly formed Murrumbidgee Local Health Network.
Figure 6-1 - The GSAHS catchment area.

Map created by the Spatial Data Analysis Network (SPAN), Charles Sturt University

Figure 6-2 - The GSAHS sectors.

Map provided, with permission, from the GSAHS Falls Prevention Coordinator.
Seven rural and regional communities throughout the Western and Central sectors of the former GSAHS catchment were chosen for the semi structured focus groups and semi-structured in-depth interviews to take place, with an option of going to a further three communities in the Eastern sector if sampling adequacy was not achieved. The concept of sampling adequacy will be discussed later.

Consistent with all other studies in this research program, the seven communities to be included in the study were determined by first categorising Local Government Areas based on Australian Bureau of Statistics (ABS) standard population sizes of: less than 4,999; 5,000 to <17,999; 18,000 to <47,999; and 48,000 to <249,999. All Local Government Areas within each population size category, in each of the GSAHS sectors, were compared on a range of additional ABS criteria. The criteria were specifically chosen to ensure that the Local Government Areas selected for participant recruitment were not biased towards particular subgroups within the population, which might disproportionally influence the outcomes in the data collection and analysis. The selection criteria included the following:

- Population size
- Percentage of males versus females in the population
- Percentage of indigenous people in the population
- Percentage of individuals aged 65 years and over in the population
- Percentage of individuals born in Australia
- Percentage of individuals who speak English at home
- Percentages of individuals married, never married, separated or divorced, and widowed
- Average individual income and average household income
- Distance to nearest Hospital

In each population size category for which at least one community existed within the Western and Central sectors of the former GSAHS, the means for the above variables were determined and the Local Government Area with the closest match to the means across all criteria was identified as the most appropriate location to undertake the data
collection. This resulted in 3 communities in the Western sector and 4 communities in the Central sector being identified for inclusion. Note that no community of the largest population size existed in the Western sector.

**Sample**

A purposive sampling method was adopted in order to achieve the aims of the study. Purposive sampling is consistent with the hermeneutic approach, as it provides the ability to purposively recruit participants to enable inquiry into and understanding of the phenomenon in depth (Patton, 2014). The study recruited older people who had experienced a fall, and family members of older people who had fallen. The decision to include both older people and family members during the data collection phase enabled a broader range of perspectives to be included in order to establish a more comprehensive understanding of the specific aims of the study through these different perspectives. Inclusion criteria were subsequently developed to ensure the aims of the study were met for both the semi-structured focus groups and semi-structured in-depth interviews. The inclusion criteria for the semi-structured in-depth interviews provided an opportunity to explore in more depth the specific risk factors associated with injury as a result of a fall.

Separate semi-structured focus groups were conducted for older people who had fallen and for family members of older people who had fallen. The inclusion criteria for each of the focus groups were designed to ensure participants were able to draw on either their own experiences of falling or those of their respective family members. Having the semi-structured focus groups separated for fallers and family members allowed participants to speak freely from their own perspectives on risk, which may not have been achieved if both groups were brought together.

To be eligible to participate in the semi-structured focus groups for older people who had fallen, participants were required to:

- be aged 65 years or older;
• have experienced a fall within the previous 12 months, regardless of whether they had sustained an injury or not;
• reside in one of the selected Local Government Areas; and
• have sustained their fall within the geographic boundaries of the Local Government Area.

To be eligible to participate in the separate semi-structured focus groups for family members of older people who had fallen, participants were required to:

• be over the age of 18 years;
• have an older family member aged 65 years or older who had fallen in the previous 12 months within the geographic boundaries of one of the selected Local Government Areas.

To be eligible to participate in the semi-structured in-depth interviews for older people who had fallen, participants were required to:

• be aged 65 years or older;
• have experienced a fall within the previous 12 months, within the geographic boundaries of one of the selected Local Government Areas; and
• have sustained an injury that required medical attention as a result of their fall.

To be eligible to participate in the semi-structured in-depth interviews for family members of older people who had fallen, participants were required to:

• be over the age of 18 years;
• have an older family member aged 65 years or older who had fallen in the previous 12 months within the geographic boundaries of one of the selected Local Government Areas and who had sustained an injury that required medical attention as a result of the fall.
Participants were recruited by sending information flyers about the study to a range of service groups and clubs, community groups, and local organisations within each of the selected Local Government Areas (see Appendix I). These flyers were also sent to local health professionals and pharmacies to put up in their rooms to notify older people of the study. The aim was to disseminate the flyers across a wide cross section of the community in order to enhance recruitment of participants who had a range of different falls experiences and perspectives on fall risk.

Once a person expressed interest in participating in the research contact details were obtained and potential participants were screened to determine whether they met the inclusion criteria described above. Based on the inclusion criteria participants were sent the relevant information sheet for either the focus group or interview session (either as a faller or family member); (Appendix J). The participant information sheets for the focus groups and interviews outlined the general nature and purpose of the research, including what would be expected from the participants. This also provided potential participants with an opportunity to ask any further questions about the research before they agreed to participate. Along with the information sheet, participants were sent a consent form (Appendix K) to sign, which indicated they agreed to be involved in the study.

**Participants**

As a result of the recruitment process 33 people agreed to participate in the study and met the inclusion criteria. Of the 33 participants, 18 met the interview criteria and agreed to participate in a semi-structured in-depth interview. The results of the purposive sampling and recruitment process are shown in Table 6.1 and Table 6.2.
Table 6-1 - Participant gender and age, with n equalling the number of participants.

<table>
<thead>
<tr>
<th>Participant profile</th>
<th>Gender</th>
<th>Age (Years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>People who have fallen</td>
<td>Female: n=21</td>
<td>65-69: n=3</td>
</tr>
<tr>
<td></td>
<td>Male: n=5</td>
<td>70-74: n=9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>75-79: n=12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80-84: n=2</td>
</tr>
</tbody>
</table>

| Family Members       | Female: n=5 | 45-49: n=3 |
|                      | Male: n=2   | 65-69: n=1 |
|                      |             | 70-74: n=1 |
|                      |             | 75-79: n=1 |
|                      |             | 80-84: n=1 |

Table 6-2 – Numbers of participants from each community size and breakdown of numbers attending semi-structured focus groups and semi-structured in-depth interviews, with n equalling the number of participants.

<table>
<thead>
<tr>
<th>Participant profile</th>
<th>LGA size</th>
<th>Semi-structured focus groups</th>
<th>Semi-structured In-depth interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>People who have fallen</td>
<td>Less than 4,999:</td>
<td>n=2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5,000 - &lt;17,999:</td>
<td>n=4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18,000 - &lt;47,999:</td>
<td>n=13</td>
<td>n=5</td>
</tr>
<tr>
<td></td>
<td>48,000 - &lt;249,999:</td>
<td>n=2</td>
<td></td>
</tr>
<tr>
<td>Family Members</td>
<td>Less than 4,999:</td>
<td>n=2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5,000 - &lt;17,999:</td>
<td>n=2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18,000 - &lt;47,999:</td>
<td>n=2</td>
<td>n=2</td>
</tr>
<tr>
<td></td>
<td>48,000 - &lt;249,999:</td>
<td>n=1</td>
<td></td>
</tr>
</tbody>
</table>

All population sizes were represented by participants. Semi-structured in-depth interviews were undertaken in all population sizes with participants who had fallen and in three out of the four population sizes for family members, across the seven different communities. In the semi-structured focus groups, adequate group sizes were unable to be achieved in the smaller population sizes or in the largest population size, due to participant availability. In the population size of 18,000 - <47,999, two separate semi-
structured focus groups were undertaken for faller participants in one community due to the availability of the participants (4 participants in focus group one, 3 participants in focus group two). A third focus group involving 6 participants was undertaken in a different community within this population size, (18,000 - <47,999). This process was informed by the principle of sampling adequacy to ensure there was adequate diversity to sufficiently answer the research questions (Marshall, 1996) while providing depth and maximum opportunity for transferability of the findings (Spencer, Ritchie, Lewis & Dillon, 2003).

Data Collection
Semi-structured focus groups and semi-structured in-depth interviews, informed by hermeneutics, were used to gather data for this study. Semi-structured focus groups are a useful means by which the researcher can gain a broader perspective and synthesis of a range of views (Liamputtong, 2010). In contrast, the use of semi-structured in-depth interviews enables the researcher to gain a deep appreciation of another person’s perspective (Patton, 2014). Further details on each approach are provided below.

Semi-structured focus groups
Semi-structured focus groups are a useful strategy to prompt participants to think about and discuss aspects of their experiences that they may not have otherwise considered or thought about through listening to other participants’ points of view. This approach also allows for cross-referencing of opinions and provides insight into the range and diversity of opinions on the topic (Patton, 2014). All semi-structured focus group sessions were held in a private meeting room which was centrally located within the town in which the participants resided.

Separate semi-structured focus groups were conducted for those who had fallen and for family members of older people who had fallen. Having two separate groups (fallers and family members) was a useful approach for allowing a broader understanding to be obtained through exploration of different perspectives and experiences. Separating fallers
and family members enabled participants in each group to speak freely from their own understanding of what they perceived were risk factors associated with falls.

A semi-structured focus group question guide was developed to facilitate discussion within the group (Appendix L). Rules on confidentiality and respecting the right of individuals to talk freely were discussed at the beginning of each focus group session with the researcher assuming the role of group moderator. In focus groups, the moderator role led the group discussion and facilitated the group dynamics (Davidson, Halcomb & Gholizadeh, 2013) to ensure all participants had an equal voice in discussions. At the end of each semi-structured focus group session a summary of the critical points was provided to the participants and they were asked to confirm the accuracy of the points. In addition to the guided questions, the researcher used similar techniques to those used in the semi-structured in-depth interviews (described below), to ensure that rich, quality data was obtained.

*Semi-structured in-depth interviews*

All semi-structured, in-depth interview sessions were held in a private meeting room which was centrally located within the town in which the participant resided. This provided an opportunity to explore in more depth people’s experiences of falls and the perceived risk factors associated with injuries as a result of falls. Semi structured in-depth interviews provided an opportunity to engage individually with participants in a conversation that explored their perceptions and experiences (Serry & Liamputtong, 2010).

Patton (2014) describes three alternative approaches to collecting qualitative interview data; the informal conversation interview; the general interview guide approach; and the standardised open-ended interview. The approach taken for this study was the general interview guide approach as it provided a basic structure for the lines of inquiry for each participant while allowing some spontaneity to build upon the conversation. This approach was deemed the most appropriate for the study design as it enabled identification of commonalities and differences between participants and population
sizes. Using this technique facilitated exploration of key topics that were focused around a range of predetermined subject areas while ensuring a systematic and comprehensive approach when interviewing multiple people (Patton, 2014).

An initial themed list of questions was developed to form the basic structure of the interview guide (Appendix L). These themed questions were informed by current falls literature, findings from chapters 3, 4 and 5 in this thesis and the researcher’s previous experience as a health professional working in regional Australia. Three key themes were identified from the preceding studies and formed the basis of the interview guide. These included the fall experience, consequences of a fall, and strategies employed to reduce risk of future falls. As part of the interview process, the first question, “Tell me about your last fall” or “Tell me about your family member’s fall” was used as an “ice breaker” to establish a rapport with the participant and to start to develop an understanding of the context of participants’ previous falls experiences. In addition to the themed question list, a range of strategies was used in order to gain sufficiently rich data to explore the research questions. These strategies, as described by Serry and Liamputtong (2010), include the use of active listening, open-ended questions, adopting a naïve perspective, avoiding leading questions and allowing participant silences.

Active listening was important throughout the interviews as it enabled the exploration of unexpected ideas (Serry & Liamputtong, 2010). Open-ended questioning techniques were used to enable the participants to talk about their own falls experiences rather than providing them with forced options from which to choose. In addition, questions that implied a ‘not knowing’ approach or naïve perspective were asked to allow participants to speak freely about their experience without assuming the researcher was an expert in the field, as suggested by Serry and Liamputtong (2010). In order to elicit rich, deep data from the participants, leading questions were avoided, so that participants could discuss what they really felt about particular aspects of fall risk. Periods of silence were also important within the interviews, as they allowed participants to reflect on their perceptions of falls and think about their responses, adding to the depth of data collected (Serry & Liamputtong, 2010).
Data collection saturation was achieved when no new data was being uncovered or discussed by the participants during the data collection phase and it was clear that there was enough data to build a comprehensive and credible theory based on the research questions, as suggested by Morse (1995).

**Raw data management**

The researcher undertook the data collection for all semi-structured focus groups and all semi-structured interview sessions. Congruent with qualitative approaches, data collection occurred concurrently with the data analysis phase. All semi-structured focus groups and semi-structured in-depth interviews were digitally recorded and transcribed verbatim. All references that could specifically identify a town or location were replaced by pseudonyms to protect the identity and locations of participants. Each participant was identified by a pseudonym and geographic locations were described by population size rather than the town name when transcribing. This was especially important for Local Government Areas within the smaller population sizes, where participants may be identified more easily.

The data collected for this study consisted of digitally-recorded audio from semi-structured focus group and semi-structured in-depth interviews sessions and the associated transcripts. During the data collection phase, this data was securely stored under the pseudonym assigned to each participant, and in turn under each specific population size. Digital audio recordings were stored on a computer hard drive and were identified by population size, focus group number or interview number, pseudonym and then whether the participant was a faller or family member (e.g. less than 4,999; interview 1; pseudonym; family member). Care was taken to maintain confidentiality of participants when storing and retaining digital recordings. All records were stored on a password protected computer accessible only to the researcher.

Transcripts of the digital recordings were stored in an NVivo database (QSR software program NVivo version 8.0) on the researcher’s computer hard drive, with password protection and using the same labelling system as that used for the digital recordings. This
approach assisted in linking the data sets within the database. The result of this data management process was a series of electronic files all stored within the NVivo database. The value of using a system such as NVivo software was that it facilitated the capacity for ordering hierarchical data at a macro and micro level. The use of memos in the system ensured researcher thoughts and analysis decisions were captured in the data analysis phase. These thoughts and decisions could then be linked to individual or multiple data files, contributing to the rigour and trustworthiness of the methods, which will be discussed later. Retrieval of data was facilitated by NVivo, with items identified as being from a single participant could be retrieved together or all items linked under a specific node could be retrieved into one document. Finally, the entire database could be searched using a range of search tools to assist in linking ideas and themes and aid in organising the dataset to facilitate researcher immersion in the data throughout the analysis phase.

DATA ANALYSIS

Data analysis undertaken in the study was informed by Gadamer’s approach to hermeneutics (Fleming, Gaidys & Robb, 2003). Text interpretation or analysis is achieved through a process of moving between the text as a whole and the individual parts of the text (Gadamer, 2004). As one moves from the whole text to the parts and back to the whole again layers of interpretation are revealed and the process continues until depth of understanding is achieved (Gadamer, 2004). Fleming et al. (2003) describe a systematic process for using Gadamer’s theory, which is divided into several stages and enables the researcher to gain depth of understanding to illuminate new knowledge.

- Stage one: Examination of the text as a whole to elicit the fundamental meaning.
- Stage two: Examination of the individual parts to expose understanding of subject matter.
- Stage three: Examination of each of the individual parts in light of the whole text with a purpose of expanding the understanding of the whole text.
- Stage four: Identification of representative passages that provide a shared understanding between the researcher and the participants.
This process guided the approach used in this study.

In *Stage one*, the researcher “reflects on the fundamental meaning of the text as a whole” (Fleming et al., 2003, p. 118). In order to achieve this, the researcher listened to the recorded focus groups and interviews in their entirety while reading the text from the transcripts. This enabled the researcher to develop an overarching understanding of the data while beginning to enter into the hermeneutic circle. After each transcript had been read, the researcher engaged in free writing as suggested by Ayers, Kavanaugh and Knafl (2003), around the key ideas that had emerged from the discussions with the participants and the pre-understandings. This enabled the researcher to establish a first level of understanding of older people’s experiences of falling.

During *Stage two*, systematic reviewing of each sentence from the transcripts was undertaken to search for common patterns and individual thoughts (Fleming et al., 2003) on the perception of what constitutes a fall risk, the level of risk, and strategies to minimise risks. The QSR NVivo 8 software assisted with the organisation of the data. During this stage, active search for points of commonality and difference, as described by Rudolfsson, von Post and Eriksson (2007) was undertaken. This process provided an initial understanding upon which to base opinions about the phenomena as a whole. A review of these initial ideas and themes was then undertaken to ensure they were supported by the participants’ data, as suggested by Patton (2014). As a result of this Stage two process, 40 separate themes were identified (Appendix M) from the data. To assist in this process, mind mapping techniques were used, and specifically Freeplane© mind mapping software (open source version 1.3.14, 2014) was used, to collate the themes with evidentiary quotations from the participants (Appendix N).

*Stage three* involved a review of each of the themes in relation to the whole text. This process of moving from the part back to the whole further expands understanding of the phenomena being studied (Gadamer, 2004). With an expanded insight to the whole provided by the use of the hermeneutic circle, a deeper understanding of the parts is appreciated (Fleming et al., 2003). During this phase the researcher needed to be further
immersing in the data to develop an understanding of the experience of falls and the participant’s perception of risk. Repeatedly moving between the parts and the whole enabled the researcher to gain clarity on the relevance of each of the themes and how they related to the research questions. This new understanding led to a refinement of the themes (Appendix O).

Throughout this process discussion with the researcher’s supervisors was important. These discussions helped the researcher to challenge the understanding and the conclusions that had been drawn from the data, assisting in the iterative development of the new understanding. Further enhancing the reflective process, the researcher continually questioned her own pre-understanding with the plausibility of the interpretation of the data as she moved into and out of the hermeneutic circle (Debesay et al., 2008).

The final phase, as described by Fleming et al. (2003), was stage four, involving the identification of the key text that represented the essence of a shared understanding between the participants and the researcher. According to Fleming et al. (2003), these textual extracts should provide the reader with an insight into the understanding developed by the researcher. It is through this stage that the researcher endeavours to make sense of the entirety of the whole through the fusion of perceptions from the participants and the understandings of the researcher (Rudolfsson et al., 2007). As a result of this process, key themes emerged as a new horizon of understanding older people’s perceptions of the risk of falling. Through a shared understanding of the whole and the parts and back to the whole again, the themes were illuminated from the data as new knowledge. Gadamer (2004) viewed this type of new understanding through the fusion of horizons as the ‘joy of knowledge’.

As suggested by Bowen (2008), in order to ensure that data saturation was achieved, categories within the data set were first identified and relationships between these categories were uncovered. Throughout the coding process, categories were compared and ideas and thoughts were recorded through the use of memos. The process of using
memos assisted in the development of an evolving understanding of the data. The categories were then further refined into areas of commonalities and differences so that theoretical relationships were able to be seen. Through this process there was consideration of the true patterns in the data to continuously ascertain whether new concepts or ideas were being uncovered that warranted further investigation or data collection. The process was continued until each key theme had emerged and it was evident that data saturation had been achieved when no new categories within the data were revealed.

**Rigour of the research**
All research is critiqued on the basis of its rigour. Rigorous research can be defined as research that is trustworthy such that the findings can be relied upon by others (Liampittong, 2010). In qualitative research, studies should be judged according to the concept of ‘trustworthiness’ (Creswell, 2003). Trustworthiness, defined as the ability to trust that the findings of the research are authentic (Shenton, 2004), incorporates the criteria of credibility, transferability and dependability (Guba & Lincoln, 1994). These are explained in detail below.

**Trustworthiness**
All research requires the researcher to establish the trustworthiness of the research process (Patton 2014). In qualitative research, one must demonstrate an auditability of the decisions made throughout the analysis phase (Fleming et al., 2003). For research to be auditable, another researcher must be able to understand the data analysis process employed by the researcher (Koch, 1994). To demonstrate the trustworthiness for this research, each stage of the analysis process was documented while moving in and out of the hermeneutic circle. Additionally, emerging themes at each stage were supported by evidence provided in Appendix M, Appendix N and Appendix O, to increase the credibility of the research. The use of direct excerpts from the participants’ data throughout the findings sections to demonstrate interpretation of individual perspectives further enhanced the trustworthiness of the research. In Gadamerian research one can argue that there is no universal truth, as interpretation is complex and different for each individual (Gadamer, 2004). Therefore, as suggested by Fleming et al. (2003),
trustworthiness is achieved through providing sufficient detail on the process of the research as well as the findings, rather than simply presenting the conclusions alone.

Throughout the data analysis phase, a reflexive journal was maintained, documenting the changes in understanding that developed as further immersion in the data occurred. Gadamer (2004) suggests that data analysis is an ongoing process as we continually refine and extend the knowledge gained from a study, which then sheds further light on new understanding of the data. In the analysis phase of stage three a new understanding came to light of the key themes from the data and how these linked to the research questions. To gain a deep understanding of the phenomena being studied, a process of writing, re-reading the data and once again re-writing occurred while cycling through the hermeneutic circle, and this process enabled new insights to arise (Smythe, Ironside, Sims, Swenson & Spence, 2008). Critical elements were: remaining true to the data; reviewing the pre-understanding; and adopting a naïve perspective to ensure the new understanding matched the intentions of the participants’ voices.

The use of multiple sites within the GSAHS allowed for triangulation of the data through the ability to explore the commonalities and differences of perceptions surrounding falls that occurred across data sources (Patton, 2014), including different population sizes and different participant perspectives. Triangulation of multi-sourced data also enables the researcher to reduce the possibility of findings being an artefact of one source (Patton, 2014). Commonalities and differences across the participants assisted in providing different perceptions of risks and influencing factors associated with fall risk, which in turn helped highlight aspects of the phenomena being studied and strengthened overall understanding. As suggested by Wilson and Hutchinson (1991), this type of approach enabled ideas to be illuminated in a holistic and credible way, while the researcher moved in and out of the hermeneutic circle, enhancing the interpretation of new knowledge.

Gadamer (2004) argues that textual analysis incorporates not only the written words (in this case, transcripts of focus groups and interviews) of the participants, but also observations and written comments by the researcher. By undertaking both the data
collection and data analysis phases, the researcher was able to include non-verbal observations as well as the researcher’s own thoughts and interpretations based on the focus groups and interview sessions. This helped create a common understanding of the phenomena being studied by facilitating a closeness to the reality of the data captured (Gadamer, 2004). All participant data was digitally recorded and transcribed verbatim. Member checking occurred with the interview participants only, to ensure accuracy of the content and authentic understanding of the questions.

**Ethical Considerations**

Ethical approval for this research project was granted through the Charles Sturt University Human Research Ethical Committee on 28th June 2011, protocol number HREC 2011/082. Four key ethical issues were considered relevant to this research and the recruitment of participants: informed consent, confidentiality, avoidance of coercion and minimisation of harm to the participants. These will now be elaborated.

**Informed Consent**

All participants were provided with an information sheet that informed them about the research process and stated that they were free to withdraw at any time without prejudice. Written consent was obtained from all participants and none withdrew from the study.

**Confidentiality**

Information sheets for participants involved in the focus group sessions informed them that their confidentiality could not be guaranteed during the session, as they would be attending with other participants. Participants had an opportunity to choose not to be involved in the study if this posed a concern for them. At the start of each focus group, a set of rules was provided, which included respecting each member’s right to confidentiality. The focus group sessions were held in a private meeting room within a public facility which was centrally located within the town in which the participants resided. The interview sessions were also undertaken in a private meeting room which was centrally located within the town of the participants. All information provided by the participants was treated as strictly confidential, and all notes, digital recordings and
transcripts were securely stored by the researcher. Furthermore, confidentiality and anonymity of the participants was maintained by careful use of non-identifying pseudonyms and removing the specific town each participant resided in or any other identifying features.

Avoidance of Coercion
As the researcher had no previous relationship with any of the participants, there was no expectation that participants had to be involved with the study. All participants were informed that their participation was voluntary and they could withdraw from the study at any time. This information was included on both the participant information sheet (Appendix J) and consent form (Appendix K) and was reinforced at the beginning of each session. Also included on the information sheet for the focus group sessions was a statement that if a participant wished to withdraw from the study after they had started the focus group session, the information they had provided up until that point would remain as part of the data set. This was reinforced at the beginning of each focus group session.

Harm Minimisation
Due to this research investigating the experiences and perceptions of risk surrounding falls in older people it was recognised that recollection of traumatic events, such as a fall, may have negatively impacted on some participants or their family members. Care was taken to adopt an open, empathic and non-judgemental approach during all aspects of the data collection. Alongside this approach, before the focus groups and interviews were undertaken, a range of appropriate counselling services was identified that were available at the time in each geographic location. Details were made available to the participants so that they could access these services if the need arose. Participants were informed, before agreeing to be involved in the study that any costs associated with these counselling services would be the responsibility of the participant. It was also discussed at the beginning of each session that if a participant became distressed during the session, they could withdraw from the study at any time.
FINDINGS

Thematic analysis of participant focus group and interview data illuminated six interrelated themes that impacted on participants’ perceptions of risk (see Figure 6-3). Within the illuminated themes there was one overarching theme, independence, which traversed all others. The theme of independence was the foundational element underpinning each of the other five identified themes.

The six identified themes were

1. Independence
2. Experiencing a fall
3. An understanding of the risks
4. Interacting with support
5. Covering up
6. The influence of finances

Figure 6-3 - Fall risk spectrum

Figure 6-3 depicts the complex balancing act that older people are managing in respect to their personal risk of falls. At one end of the fall risk spectrum a person will instigate strategies to actively be safe or alternatively, at the other end of the spectrum, undertake activities that knowingly or unknowingly put them at risk of falling. Each of the themes within the fall risk spectrum are portrayed on a sliding scale which illustrates mobility.
between ends of the spectrum. These themes are weighted according to the degree of influence they have on everyday decisions older people make. For example, a person may have the financial means to pay for added support to keep them safe, thus the *influences of finances* theme would move towards the actively being safe end of the spectrum. However, if that person failed to recognise that they were *at risk* of falling because their previous fall experience has resulted in little or no consequences (physical or psychological) they were more likely to continue to undertake a task that puts them *at risk* because their previous experience was a greater influence on their behavioural decisions.

The findings of this study revealed that participants placed significant value on independence when making everyday decisions and as such it is represented as the largest and foundational theme in Figure 6-3. The influence of the other five themes to varying degrees also demonstrated that the experience of falling was more than just a physical event for the participants. The outcome of an older person’s previous fall experience while undertaking specific tasks provided a context of whether that task was perceived to hold risk or not. An older person’s level of understanding of whether a particular task could be a fall risk also influenced their decision making. Their ability or willingness to engage with support likewise played a role on where an older person was placed on the fall risk spectrum. The extent to which older people covered up their fall history was an interesting finding and lastly, financial status also impacted on older peoples’ decisions towards fall risk activities.

Together the findings highlighted that participants were balancing a variety of factors that impacted their everyday decisions and behaviour, but it was the interrelationship of independence with the five other themes that had the greatest influence on what was understood or perceived as a risk and whether it was necessary to undertake an activity that may pose a risk. The reality of managing fall risk for participants was a daily balancing act where they struggled with both internal and external influences that would either move them towards the *actively being safe* end of the spectrum or the *risking a fall* end of the spectrum.
Independence

As the theme of independence was so significant to participants’ decisions on risk, it will be discussed now as a foundational theme and highlighted throughout the findings on the other five themes which will be discussed in depth later in this chapter.

Striving to be independent was a profound influence on participants because it was defined by their beliefs and their personal circumstances. It was the value participants placed on independence alongside their current situation that influenced the decisions on everyday tasks as well as more high-risk activities. Although independence played an important role on its own, it was the interrelationship of independence with the other themes that influenced decisions related to falls safety. This complex interrelationship is highlighted in Audrey’s excerpt below.

_I have a lovely little ladder which I’ve used for many years and it’s a sturdy, strong ladder to get to the top of the cupboards. I have just noticed now since we’ve both turned 80 it’s a bit difficult to get up the ladder, and we feel we shouldn’t do it, because it is dangerous. I haven’t stopped using it though. I used it last night. But I know I should stop. I haven’t got anybody to do anything for me, we have to be independent._ (Audrey-faller)

Audrey’s excerpt typifies the balancing act that the participants talked about in making everyday decisions. As can be seen by the excerpt, the decision to use the ladder was complex and multifaceted. Audrey recognised that, at the age of 80, her diminished physical capabilities probably increased her risk. However, she continued to undertake the task in the belief that the ladder was sturdy and strong and therefore felt this reduced her risk. Key to her decision was that there was no-one to help her so she needed to independently use the ladder. Also important to the decision was her previous experience of successfully undertaking this particular task. That is, successfully using the ladder in the past confirmed her ability to continue with this activity even though she understood she probably should not do so. Interestingly, Audrey previously experienced a fall
tripping up a step, but this fall experience had not led to her considering that she might be at risk of falling when climbing the ladder. That is, she possibly did not link falling up a step with her ability to get up on the ladder. In some situations an inability to access or unwillingness to ask for support may be why people take such risks. Audrey saw there was no one to do things for her. That is, her isolation required her to be independent and this led to her decision to complete the task herself. She openly admits that using a ladder was a risk, but the necessity to be independent overshadowed any reluctance she may have had for taking the risk.

Audrey was not alone in the value she placed on independence which influenced her daily decisions. The interrelationship between the theme of independence and the other five themes: Experiencing a fall; Understanding the risks; Interacting with support; Covering up; and Influences of finance is evidenced in the excerpts below.

The experience of previous falls tended to shape the understanding of whether a task presented a risk or not. Nevertheless, regardless of the previous fall experience, independence still played a role in deciding whether to undertake the task or not, as can be seen in Colleen’s excerpt below.

*My husband has also fallen a couple of times. I’m worried about him falling because he needs a knee replacement and it will be a big job to get it fixed if he has a nasty fall. He is stubborn and he won’t listen to me he keeps saying he has to run the farm. But he doesn’t have to do everything, the boys will do it, but in his mind he’s the only one that can do it. (Colleen - faller)*

Colleen, who has fallen herself, is also concerned about her husband falling, especially given he needs a knee replacement. It would seem that Colleen would like her husband to slow down and delegate some of the farm jobs to their sons. Even though Colleen’s husband has previously fallen and is probably at risk of further falls, his desire to maintain
independence and continue to run the farm his way has overruled Colleen’s concern for his sustaining an injury as a result of a subsequent fall. This situation differs from the previous one with Audrey, as in this case Colleen’s sons could help if her husband let them, while Audrey was on her own.

Understanding the risks associated with falling was also an important element in reducing risk of further falls. Even when there is an understanding that particular tasks do pose a risk, the value placed on independence was still an influential factor as seen in Gabrielle’s excerpt below.

*I love my garden, I think I’ve got one of the tidiest gardens, even if I say so myself. I have fallen a few times down near the orange tree, and down near the tap another day and I’ve sort of have to pull myself up. It’s a bit awkward getting up when I fall in the backyard. Usually my husband is away playing bingo or something and we have a big yard, no one would hear me, so that’s why I’ve got to be very careful but I’m so used to it. (Gabrielle - faller)*

Gabrielle admits to falling several times in the backyard. On one hand she recognises that this environment is a risk for her because she states she has to be careful, but on the other hand she enjoys her garden and it is important to her. Gabrielle seems to have the belief that because she has previously been able to pull herself up after falling in her backyard, she is still able to independently manage her garden. This perceived confidence influences her understanding of how much of a risk falling in the backyard is for her.

Interacting with support was also influenced by independence. In some cases, participants did not actively seek support because independence was more important to them. This can be seen in the excerpt from Mitch below.
We have thought about the Vitacall\textsuperscript{9} system in case I fall again, but I’m not mad on the idea. You’re asking other people to virtually be responsible and I just didn’t want to do it. I’ve got a phone I’ll be alright. (Mitch - faller)

Mitch seems to have considered a system such as a Vitalcall, given his previous falls history. While this support mechanism is designed to provide assistance if he was to fall again, Mitch preferred to remain independent opting to use the phone in case of an emergency rather than not to be dependent on family or friends to assist him. This approach may be problematic as it relies on the assumption that Mitch would be able to reach the phone in the event that he fell again.

Independence also featured in the Covering Up theme, which often motivated participants not to disclose a fall event or events, as can be seen by Beryl’s excerpt below.

\textit{I’m so utterly independent, I hate being dependent on anyone for anything and I didn’t want my kids to have to worry about me so I don’t tell them [about my falls].} (Beryl - faller)

Independence was very important to Beryl. She is not prepared to risk her family finding out about her previous falls in case this impacts on her independence. Instead she covers up her fall history so, in her mind, her children have no reason to be concerned and she can continue to maintain her level of independence.

\textsuperscript{9} This system is a button, typically on a cord, which the older person wears around their neck. If they have a fall, for example they can get some assistance by pressing the button. Once the button is pressed a call goes into a call centre and that will ring the older person on the phone. If the elderly person does not respond then the call centre will contact the nominated person on the list who is usually a family member or a friend if no family is located close by. Then the family member or friend will go to the older person’s home to check their wellbeing.
The cost of external support also drove participants to independently undertake tasks that could pose a risk of falling, as can been seen in Arnold’s excerpt below.

*Oh we don’t climb ladders unless we really got to. I only did it because the gutter was blocked and I only had to get up three steps. I wouldn’t go higher than about four steps. Perhaps I shouldn’t do even that, but it is too expensive to get people in.* (Arnold – faller)

Arnold recognises the risk in climbing up ladders and indicates that he only does it when he has to, in this case to clean the gutters. Instead of paying for someone to do this task for him, because he perceives it will be too expensive, he independently completes the task himself. In this situation the influence of finances and the desire to be independent interplay. Arnold values his ability to undertake potential fall risk activities independently to save money and this influences his decision to attempt the task.

As demonstrated, independence was the foundational theme weaving through the other themes underpinning decisions and impacting on the choices made by participants and on their perception of risks. Participants’ views of independence encapsulated their sense of purpose and ability to control their own lives, often without consideration of the potential risks. Importantly, it was the interaction of elements within the six themes that meant participants responded to risks differently when faced with everyday decisions to undertake a task. This complexity caused by individuals’ unique approaches to risky tasks presents the greatest challenge to managing falls in the older person.

The following paragraphs will summarise the five remaining themes that the remainder of this chapter will discuss in detail.

‘Experiencing a fall’ (the largest teal coloured bar in Figure 6-3) underpinned participant knowledge of risks. It had an influential relationship on the other four themes and the
foundational theme of independence. Experiencing a fall was central to participants’ perceptions of what constituted a risk and shaped the level of risk they were willing to accept. Those participants who had experienced a fall with little or no consequences continued to do things that posed a greater risk of falling and were not inclined to actively engage with support. Those who had sustained a more substantial injury as a result of a fall, such as a fracture, described a greater awareness of the potential risks. For some this awareness translated to being over cautious about undertaking any activity that may cause a risk, impacting on their ability to retain independence and maintain quality of life. It is important to note that awareness of risk was specifically linked to a particular fall experience. That is, if they tripped on the hose in the backyard they would be cautious in that context but did not always consider other trip hazards (for example, a rug in the house) because that was not the environment of the fall experienced.

‘An understanding of the risks’ (the orange bar in Figure 6-3) was fundamental to participants’ decisions about undertaking activities that may pose a risk. Some participants indicated they understood certain tasks were a risk but for a number of reasons chose to do them anyway. Other participants were aware of some risks but not all, while other participants had little or no understanding that the activities they were undertaking were potentially putting them at risk of falling. That is, the participants’ understanding of the risks could be seen to rest on a continuum from those who had great awareness to those that had very little awareness of the risks. Where participants were placed on the continuum was strongly influenced by their previous fall experiences and the outcome of those experiences.

The ‘Interacting with support’ theme (the blue bar in Figure 6-3) highlighted participants’ willingness and/or ability to engage assistance that could reduce their risk of falling. There were a number of reasons why the participants found it challenging to interact with support. They described personal challenges centred on not wanting to accept support or burden people as well as barriers arising from not knowing where to access the support they needed. Discussion with health professionals on the level of fall risk and appropriate falls prevention interventions appeared to be inconsistent with the participants. This
meant that opportunities to instigate risk management strategies were missed, further influencing participants’ understanding of potential risks.

The fourth theme ‘Covering up’ (the green bar in Figure 6-3) arose from the participants’ balancing their desire to retain independence in their engagement with support. Participants described how they prevented those around them from knowing the true extent of their history of falls or the day-to-day struggles they were facing. There were a number of reasons why participants felt that this type of action was necessary. These included not wanting to worry family members and not wishing to be judged by other people, especially health professionals and community members.

‘The influence of finances’ (represented by the purple bar in Figure 6-3), a final and important theme related to participants’ abilities to pay for prevention strategies. Financial burdens were not only evident in the initial instigation of prevention strategies but also associated with ongoing costs for the participants to manage. Finances influenced participants’ decisions around undertaking tasks independently or the perceived need to cover up activities and led to behaviours that increased risks for participants. For example, participants discussed not turning on lights at night to manage the increasing costs of electricity.

Each of the five themes will now be discussed in detail.

**Experiencing a fall**
Participants’ fall experiences underpinned their understanding of the risks, and their motivation to maintain independence or actively seek support. It appeared that the degree of impact of their previous fall was strongly linked to motivation to change behaviour. Participants who had sustained a serious physical injury as a result of a fall or sustained psychological impact, were more likely to actively change behaviour in an attempt to reduce their risk of falling again. However, participants who escaped injury often failed to recognise the potential risks and continued to undertake activities that could increase
their risk of falling. Three sub-themes encapsulated the findings associated with this central theme.

- Falling is just one of those things
- Falls are a sign you are getting old
- Falling again frightens me

**Falling is just one of those things.**
For some participants falling was really not significant for them; it was just regarded as something that occurred that they had to get used to. This opinion can be seen in April’s excerpt below.

_I’m good at falling. I’ve practised a lot. Most of them are just little falls; you know you pick yourself up. I’m lucky I have never broken anything. But I’ve been falling over consistently, you know I just fall. I fell off a tram in Melbourne once. A man picked me up. I’ve never broken anything._ (April - faller)

April had experienced multiple falls which at most resulted in minor injuries, such as bruising or torn ligaments. When participants suffered little or no injury it led them to believe that falling was not a major concern and thus required little consideration. April’s excerpt suggests that breaking a bone was the measure of whether the fall was severe or not. Therefore, until participants actually experienced a fracture they were likely to believe that falling was of little consequence. Participants with this experience had little appreciation that falling could cause serious injury and were unlikely to take steps to prevent future falls.

When falling was perceived as a normal part of life, participants seemed to fail to appreciate that serious consequences could occur as a result of a fall. This perception was heightened if participants believed the fall was just a silly mistake or accident.
It’s just one of those things. I mean, I’m so careful, but I just forgot. Just one little thing I forgot. I have also fallen in the house here, well because of my hip I’d say, when I was walking it would just give away and down I’d go. I put them down to just unfortunate accidents, you know I was getting adept at this falling over, I could do it gracefully. (Yvonne - faller)

Participants like Yvonne who had not suffered negative consequences from their falls, felt that it was just an unfortunate event. As a consequence they were less likely to change behaviour as a result of fall. The habits of a lifetime will be further discussed in the theme Understanding the risks (see page 208).

At times participants didn’t believe they needed to consider the consequences of falling because they were unable to change the outcome.

I was fishing on the river and I slipped down on the bank on my backside, lucky I’m quite well padded and didn’t hurt myself at all. I have also tripped over a few times in the garden, but I haven’t hurt myself, I’ve never ended up in hospital. I’m more inclined to fall over now than I ever use to be but I think it’s just as you get older your body is not quite as supple as it used to be. (Alfred - faller)

For these participants there was no strong motivator towards prevention as falling was just part of life. They had little control over this aspect and therefore, saw no reason to change the activities they were undertaking. Alfred’s previous fall, hadn’t resulted in significant injury. Alfred associated the need to change his behaviour with having a major fall, one that would warrant hospitalisation. Until that time there seemed to be no incentive for him to change his behaviour or refrain from undertaking activities that put him at risk.
Falls are a sign you are getting old.
Falls as a consequence of the ageing process was another common perception voiced by participants. Attributing falling to ageing included the belief that as falling was directly related to getting older it could not be prevented.

*I think that it’s sort of a fact of life. As you get older it’s sort of expected that you will have a risk of falls.* (Colleen – faller)

Colleen voices the link between ageing and expectations of increased risk of falling. Linking falls to unmodifiable ageing factors could mean that participants like Colleen fail to recognise some of the modifiable risk factors.

Believing that falls were an inevitable part of ageing could be strengthened by health professionals’ comments. In Gabby’s excerpt below, her doctor expressed that her fall was just bad luck.

*I’m not worried about falling, because I’m walking, it’s just a stupid thing; even the doctor said after my last couple of falls “Jeez you’ve just had bad luck”.* (Gabby - faller)

Gabby was not worried about falling because she was still able to walk. She paid little attention to her previous falls because she perceived they were just ‘stupid’ events and this which was reinforced by her doctor. Placing blame for falling on unavoidable events possibly leads to narrow views on contributing factors and hence underlying risk factors may not be readily identified or behaviours modified. This could perpetuate a person’s fall risk status.
Falls being considered part of the ageing process also had a profound psychological impact on the participants who linked the event of falling to moving into old age and what that meant for them.

I felt quite churned up and unhappy because [the fall] happened. It used to be, you think oh well I must be getting old, falls are a sign of getting old, well that’s what everyone does. (Audrey-faller)

Audrey’s fall meant that she had moved into old age and this was a challenge for her to cope with. In addition, when a participant fell it could trigger action by family members which could further impact psychologically on the older person. This can be seen in Alison’s excerpt below where she describes what happened after falling off her roof while pruning wisteria.

I love my garden. My children came down and they had a great time cutting everything down and poisoning things and getting rid of the climbing roses, and all that. I sat there in the driveway crying thinking I’ve got to let go of my life. I don’t want to do this. I love life the way it was, but I’ve got to let go. The kids said to me “Why are you crying?” and I told them “I’m just entering another stage in my life” and “I don’t want to”, but I can see after my last fall I have to. This is an old persons’ home now. (Alison – faller)

Previous to Alison’s fall she had been doing her own gardening but as a result of the fall her family took over and came in and decided to remove all plants that they felt Alison couldn’t manage. While the family’s actions may have been well intentioned, aimed at trying to protect Alison (after she fell off the roof), they had a significant psychological impact on her as she came to terms with the loss of her garden, her plants and her independence. This made her feel that she was now old.
A common finding was participants’ believing that falling was linked to ageing and thus as one aged it is inevitable that one would fall. This perception was strongly associated with the belief that nothing could be done to prevent falls so one either accepted that falling was just part of one’s life or stopped doing the things one loves. Either way the underlying risks associated with falling were not really addressed.

**Falling again frightens me**

Some participants had been significantly frightened by a previous fall. Usually the fear arose from having sustained a major injury. These participants were more conscious of the risks associated with further falls and had become very focused on the potential risks. As Alison highlighted in the excerpt below, this attentiveness to surroundings often brought its own associated issues.

> You have to be very conscious where you put your feet. It takes the pleasure out of your day sometimes because you want to think of other things but you’ve got to think of your body first or you mightn’t be able to walk there again. (Alison - faller)

Alison’s fear of falling impacted on her mood. She recognised the need to maintain her level of independence by continuing to walk every day but it seemed that walking had become a chore for her, with the need to actively watch every step in order to reduce her risk of falling again. For Alison, this took the enjoyment out of walking and she struggled to come to terms with this change of affect.

In some cases the impact of falling had considerably undermined the participant’s confidence to continue with activities of daily living or resume the activities they were engaged in prior to the fall. This can been seen in Colleen’s excerpt below. These participants adopted extreme measures to reduce their risk of future falls.
I didn’t used to be frightened, but now after the fall, I’m frightened to be out and about. I feel anxious even going out into the local town and things like that. (Colleen – faller)

Colleen had fallen in her kitchen and garden and had badly damaged her shoulder. As a consequence she was afraid of falling again and felt anxious about doing tasks such as going down the street. Falling had an ongoing psychological impact on her which resulted in her limiting her activities for fear of falling again. Self-imposed limitations on activities for fear of further falls were likely to have affected Colleen’s quality of life and possibly reduces her capacity to engage with the community. Fear of falling resulting in limited activities could potentially put Colleen at risk of further falls.

Experiencing a fall significantly impacted on participants’ appreciation of the need to implement changes to prevent falls. When falling had a minor impact it led to little or no adjustments as will be discussed later in the Understanding the risks theme (see below). This could also be because they believed that falling was just an inevitable fact of life. Alongside this, feelings of embarrassment associated with falling, which will be further discussed in the Covering up theme (see page 231), commonly meant that participants were reluctant to admit to other people, including health professionals that they had fallen. All these factors reduced avenues for open discussion of risks that could minimise the potential for further falls. Sadly some participants were so afraid of falling again they overestimated their risk, decreasing their quality of life through self-imposed restrictions on activities. Ultimately it was the varying experiences of falling that influenced participants’ understanding of potential risks and drove their decisions on whether to continue to undertake tasks that continued to put them at risk.
Understanding of the risks

Participants’ understanding of the risks fell on a continuum of awareness as seen in Figure 6-4.

At one end of the continuum participants were aware that the activities they undertook posed a risk, at the other they had no awareness that an activity could cause a fall. Along the continuum were varied understandings of activities and the risk these activities posed in relation to falling.

As previously explained, the interplay between awareness and decision making was influenced by participants’ experiences of falling as well as the value they placed on independence. This section will explore the theme Understanding of the risks to show how a person’s decision making was influenced. This helps to explain why participants’ responses to risk were so varied, which adds to the complexity of designing effective falls prevention strategies.

The four sub-themes associated with this continuum of awareness, were

- I don’t worry about the risks
- I have always done it that way
- It’s not a risk if you are careful
- Being frightened makes me much more wary
I don’t worry about the risks

Some participants indicated that they weren’t concerned about the risks of falling. These participants placed greater value on independence than on avoiding activities that could risk a fall. Undertaking tasks that needed to be done provided participants with a purpose and if this choice were taken away their sense of purpose would be lessened. As can be seen in the excerpt from Alfred below, this sense of purpose was strongly linked to the participants’ perception of quality of life and their independence.

_I get up on ladders, a stool, get up on the roof of the house, maybe it’s a risk, but if you go through life without taking any risks, you might as well be dead already. I take precautions but at the same time if you’re going to stop doing things then you might as well go to bed and retire. The more active you are the more you can do, the younger you remain I think._ (Alfred - faller)

Alfred was aware of the risk but strongly believed that stopping the activities that may pose a risk was not worth it. As he said “you might as well be dead already”. That is, doing these activities seemed to make him feel alive. He believed that by keeping active and not relying on others to do tasks he had a purpose in life and was independent. Alfred also chose to take potential risks in order to maintain his current level of mobility. His belief was that you needed to keep active to retain mobility and independence. From Alfred’s perspective purpose and independence are the driving factors behind the decision to undertake a task or not. As such, he did not worry about whether the activity could pose a risk.

There was awareness by some participants that their activities were a risk and could result in a fall. As quality of life and independence had greater value to them they chose not to worry about it or to modify their behaviour. This can be seen in Alana’s excerpt below.
And I’m doing riskier activities, I don’t have too much trouble walking down the street for instance, but when I’m say walking on the uneven ground, the unfamiliarity. But if I just stay indoors all day I’d go stir crazy and that for me is a far greater risk. (Alana - faller)

Alana was not unaware that she was undertaking a potentially risky activity; on the contrary she was completely honest that she believed she was putting herself at risk. Her decision to continue to take a risk was centred on what she valued as more important to her. Alana chose to be outside doing the things she loves rather than being cooped up inside irrespective of the risk. In her eyes staying inside was associated with reduced quality of life and loss of independence.

Other participants did not consider the risks associated with falling. The concept of falling was not something they contemplated in daily life and as such they were unconcerned about the potential risks. This attitude can be seen in Gabrielle’s excerpt below.

No [not concerned about falls], what will be will be, it’s no good worrying about it. I just keep going because I think you can worry yourself to death, can’t you? (Gabrielle - faller)

Gabrielle was not concerned about falling despite having over ten falls. Her focus centred on continuing to undertake her daily tasks without the need to be concerned about the consequences. As seen by this excerpt, the perception that there was no point in worrying about falling possibly meant that participants were less likely to consider the risks associated with some of the tasks they were undertaking.

I have always done it that way
In discussions with participants it was evident that assessing the level of risk associated with an activity was not something that they routinely contemplated. This seemed to
reflect their experience of undertaking tasks previously without negative consequences, indicating that it was fine to continue. This can be seen in Gabrielle’s excerpt.

*I have done [changed a light bulb], usually on the ladder. I’ve always done that.* (Gabrielle - faller)

Gabrielle used a ladder to do tasks such as change a light globe. As she had always been able to do this without falling, she didn’t consider this task a risk. Even though Gabrielle had fallen in the garden multiple times pruning her fruit trees, as seen in the excerpt below, she contextualised the risks.

*I suppose I’ve had about ten not too bad falls, I broke my wrist in two places, I fell a few times pruning the orange tree. I’ve sort of had to pull myself up and it’s a bit awkward getting up when you fall down in the backyard.* (Gabrielle - faller)

That is, Gabrielle may have identified that reaching up to prune a tree outside was a risk but had not translated this risk to reaching up to change a light globe inside the house. Contextualising will be discussed later (see page 215).

Essentially, participants’ interpretations of which activities were safe played a role in their decisions to undertake those activities or tasks, as seen from Georgina’s excerpt.

*If you’re inside the house and you’ve got a stepladder that’s safe, you can put away the blankets, the winter stuff. I often use a stepladder inside to reach up to certain things.* (Georgina)
Georgina differentiates between inside and outside when using a ladder. She seemed to believe that because it is inside her house and it is a step ladder it is a safe activity. Her belief may have formed from undertaking this task many times before without incident. The ability to continue to successfully achieve this task without incident does not seem to occur to Georgina. This indicates that participants may be determining that some activities are safer because of the environment they are undertaken in.

The awareness that some approaches were safer than others can also be seen in Yvonne’s excerpt below.

_It was only a ladder; it’s only got three steps up the ladder. Oh, if it wasn’t too high, I might have a go, but I am careful. I don’t climb up things unnecessarily. I get up on a chair; that’s alright. I can do that, but I don’t do anything that’s, you know, going to climb up and fall over. [Inside] a chair’s all I’ve got. I can’t do any damage with only a chair. No, I’m careful. I’m more careful than I would have been before, I’m sure._ (Yvonne - faller)

Yvonne recognised that using ladders posed a risk so she used a chair to independently get the necessary tasks done. She believed she was mitigating her risk inside by using the chair and being careful. This meant she was able to continue to do the tasks she needed to do. Yvonne’s previous fall experience involving a ladder meant that she identified that ladders were more dangerous than chairs. This perception may lead participants to perceive that they are safer than they really are.

*It's not a risk if you are careful*

Some participants were aware of some of the risks with tasks, but not all. These participants believed that they could moderate the risk of falling if they modified the task to make it safer or they took precautions. That is, they made the decision to get up on a chair to do a task, but they chose to use a strong chair which they believed helped protect
them. Participants thought that altering the way they approached tasks lessened the potential danger associated with the risk and meant that they were safe to continue, as can be seen in Gayle’s excerpt below.

> And I had taken precautions in the sense that it was a very strong chair and I had propped that back of it against the thing, it wasn’t sitting out in the middle. (Gayle-faller)

Taking precautions to reduce the risk of injury was regularly discussed by the participants as this was one way they felt they were ensuring safety while still undertaking the tasks they needed to. Gayle recognised that getting up onto a chair to put objects away could be a risk. She thought that she needed to use a strong sturdy chair, in order to reduce the risk. She understood that the chair could topple over, so she moved it to a position that limited this occurring, again reducing the risk. Gayle’s focus was on the chair being strong enough and stable enough, rather than her physical ability to get up onto the chair and back down again safely. This does demonstrate an awareness of risk and Gayle has instigated action to reduce this risk. However, this may have provided Gayle with a false sense of security because her focus was on the specific task and how she used objects such as a chair to achieve the desired outcome. This understanding doesn’t take into consideration all of the risks and Gayle fails to appreciate the physical attributes or limitations that the individual may have at the time which also can contribute to the risk of falling.

Other participants commented that they appreciated that some activities were risky and that they needed to stop doing them, but they also had to get the task done. When this occurred they tried to do it carefully as demonstrated by Arnold’s excerpt below.

> Oh our ladder days are gone. I did get up and clean the gutter recently, but only just pretty cautiously. (Arnold-faller)
The contradiction between ‘our ladder days are gone’ and that Arnold, who in his 80’s did use one to deal with the gutter, is clearly evident. He recognised the need for caution to reduce the risk of falling. The driver for Arnold to get up the ladder was to independently complete an important job. This may relate to the ability and willingness to access support which will be discussed later (see page 217). Of importance is the knowledge that if Arnold successfully completed this risky task it may lead him to believe that this task is safe. Sadly, caution alone may not be sufficient to prevent a fall.

Participants commonly described the need to balance risk against the need to get something done. This can be seen in Alison’s excerpt below.

The third time I fell, I shouldn’t have been, but I was up on the roof pruning back a wisteria. I hadn’t done it for about three years. I had somebody there just in case an accident happened and I leaned too far over and I didn’t realise the wisteria got old like me and it was more brittle and it gave way and I ended up on the driveway. (Alison-faller)

Wisteria is a plant that can become invasive if not pruned on a regular basis. Alison had not pruned the plant for three years. It seemed to have got to the point where she felt this job had to be done. Alison, who was in her middle 70’s acknowledged that getting up on the roof was a risk and had put in place a safety mechanism of someone being there to assist her in case of an accident. This indicates she recognised that her decision may have consequences. The fall seemed to have been triggered by the wisteria breaking with her leaning on it such that her centre of gravity may not have been over the ladder. This is important as it indicates that an individual’s capacity to assess risk requires knowledge and experience of the task as well as balance rather than personal physical capability alone. Alison does not seem to have factored this in, highlighting the difficulties participants faced in weighing up the need to independently undertake a high-risk task.
As described earlier, participants commonly contextualised fall risk according to specific environments. This was a key issue with the advice they received on falls from health professionals who assessed their homes. Participants’ linking falling to the health professional identified risk areas is demonstrated in the excerpt from Beryl below.

*She [the Occupational Therapist] pointed everything out to me. What to watch for, so steps, or anywhere I felt imbalance, which is why they put the handrails there (...) Out in my kitchen, to change my clock over for daylight savings, I thought I wouldn’t but in the long run I did because I’ve got a very secure [step ladder], just two steps, out in the kitchen, Why did I do it? Because I wanted the right time. (Beryl - faller)*

Beryl repeats the advice that caution applies to ‘anywhere I felt unbalanced’. But she still climbed up on a stepladder, perhaps indicating this was not a situation that she identified as being unbalanced. Beryl’s previous home assessment had focused on the bathroom and the steps outside her house where she had fallen. As a result of the home assessment they installed handrails in these areas to assist her, emphasising to Beryl that these areas could pose a problem for someone with balance issues. Nevertheless, even though Beryl appreciated that balance was an issue and that handrails would assist her with this limitation, she felt that getting up on a stepladder was safe. This excerpt highlights the complexity of implementing falls interventions without having in-depth understanding of the daily challenges faced by older people.

**Being frightened makes me much more wary.**

Some participants overestimated risks which resulted in their limiting activities for fear of falling again. The participants with this perception had often suffered a significant injury such as a fracture. They had become much more conscious of the risks associated with further falls, with their confidence considerably undermined. Because of their fear, these participants often adopted extreme measures to reduce their risk of future falls. The combination of fear with self-imposed restrictions greatly impacted on these participants’ quality of life. This can be seen in the excerpt from Andrew below.
We had no trouble, I’d get out and cut the lawn, I could walk around. I’d had no trouble whatsoever. But since I had this fall, I can’t do nothing. I mean I feel guilty that I can’t even get down the street. I never go, I can’t get out anywhere. I never go anywhere. I don’t do anything. I’m just frightened that I’m going to fall, keep falling all the time, I’m just too petrified. Too scared to do anything or advance myself to do anything because I’m scared I’m going to fall (Andrew-faller)

Andrew had fallen in his kitchen and sustained head and spinal injury which resulted in his being hospitalised for over a month. As can be seen by this excerpt there were a number of elements that Andrew discussed as a result of this fall. He talked about a sense of guilt associated with not being able to undertake the tasks he would normally do such as mowing the lawn or going down the street. This guilt added to the fear of falling that he identified as the reason he does not attempt to do these tasks. Andrew’s excerpt demonstrates that fear can influence a person’s perception of risk to the point that they overestimate their level of risk and restrict all activities.

In summary, understanding the risks influenced participants’ decision making related to fall risk. Participants talked about continuing to undertake risks despite knowing that it might not be safe to do so. Data presented in this section shows that being aware of a risk does not necessarily reduce risk taking behaviour. Multiple factors, including the value they placed on independence influence participant’s decisions to knowingly undertake activities that may pose risk. These participants adopted measures that they felt mitigated the risk, such as using a sturdy chair to modify the task, possibly resulting in a false sense of security. Other participants unknowingly undertook risks because they had previously managed a task safely. Participants who had experienced significant injuries as a result of a fall often became immobilised by their fear of falling again. These participants would overestimate potential risks, limiting activities for fear of subsequent falls. Essentially, this section highlights the difficulty older people had in accurately assessing their fall risk. This is important as their assessment directly influenced their interaction with
support and with the measures that could enhance their safety. Without an accurate understanding of fall risk it was also challenging for older people to know what type of support they required to manage their own risk of future falls.

**Interacting with support**

The ability and willingness to access support influenced participants’ decisions to undertake activities that may pose a risk for further falls. This section presents findings related to participants’ behaviour towards accessing support and reluctance to seek assistance from family members. Four sub-themes were identified that determined whether the participant actively sought assistance or not

- I don’t want to burden my family
- Accessing external support is not always easy for me
- I have just changed how I do things
- How can I prevent falls if people don’t talk to me about it?

**I don’t want to burden my family**

The importance participants placed on maintaining independence meant they were consistently reluctant to ask for help from family members. Their unwillingness to engage family members also meant that they were more likely to undertake activities that may put them at further risk of falls. The participants’ reasoning for not asking for help was generally focused on a perception that younger family members were busy with their own lives and asking to assist would create an extra burden on them. This is seen in Gayle’s excerpt below.

*I don’t want to because they’re good to me and because they’re so nice to me. There’s no way I’m going to be a burden to them. I manage to do most everything myself. But I don’t make a point of asking them to do much because they’re got their own lives and I’d rather them come to sit and have a talk. (Gayle-faller)*
Gayle appreciates that her family members are busy and she doesn’t want to create extra stress or burden on them. She indicates that she is reluctant to ask for help as these requests could impact on their current relationship, meaning less time to sit and chat with her. It is the social interaction with her family that she values and it is important to her that this is not jeopardised. This perception may be the reason why some participants, such as Gayle, continue to undertake activities that potentially put them at risk.

If a participant found it difficult to impose on family members they were even less likely to ask neighbours or friends to assist them, especially if their family members were not living close by.

I could have rung next door, I suppose, or ask someone maybe. See most of my family, well I’ve got four sons and one daughter, she doesn’t live here, she is coming down soon. They visit when they can but they all have individual lives and they’re married. (Beryl - faller)

Although Beryl suggests that there may have been people she could have asked to assist her, in reality that was not something she would really consider. The excerpt from Beryl highlights that relatives were often living some distance from participants, emphasizing the challenges associated with mobile populations in regional areas. As a result participants either chose to wait until a family member visited to get something done or completed the task independently. Not wanting to ask neighbours or other people in the community could also drive them to independently undertake risks, especially if they felt that the task warranted immediate attention.

It seemed that some families were aware that their elderly relative was struggling and were concerned about the risks an older person living alone faced. In these circumstances, they had instigated measures to assist their relative as seen in Greta’s excerpt below. Her family had made handrails for her bed and had arranged a Vitalcall system, to enable Greta to get help quickly in the event of an emergency such as a fall. This may have given
her family some peace of mind that they had put strategies in place to minimise her risk. Having such a system in place is only effective if older people, such as Greta, are happy to use it when needed.

I was going to the toilet in the ensuite, like I said I don’t know what happened I just found myself between the toilet and the wall with a big black bruise, even then I didn’t press the button. Last year, I put my hand in between the rails that my son made for the bed, because I dropped the remote control on the floor. I put my hand in there to pick it up and I couldn’t get it out because I have no strength, I spent six hours with my hands there, at six o’clock in the morning I started to yell “help”, luckily the next door neighbour was outside smoking a cigarette and he said “Are you alright” and I said “no”, I told him where the key was and he came in and released my hand. I had the [Vitalcall] button, I didn’t press it. (Greta – faller)

Greta’s excerpt demonstrates two issues. First, the installation of a homemade solution that may not have been safe. Second, the challenge associated with a system that relies on an older person’s willingness to use such a system. This second issue is further supported by Greta’s second excerpt where she experienced another fall but again did not use her Vitalcall button.

Over three months ago I had two falls in one week, I went to the sink to get a glass of water and all of a sudden I found myself on the floor in the kitchen. I had a Vitalcall, I should have pushed it but I didn’t because I didn’t want to disturb anybody. (Greta – faller)

Greta says ‘I didn’t want to disturb anybody’. If an older person avoids using the strategies put in place to assist them because they perceive that it would be an added burden on their family the true extent of their day-to-day issues/falls may be hidden from
the family. In Greta’s case her family was unaware of the incident where her hand was stuck in the railing. In the other fall she sustained a bruise to her face which she couldn’t hide from her family but refused to go to her doctor.

I didn’t see the doctor, my son kept hassling me, but he didn’t need to worry. The bruise stayed there for a couple of weeks and then slowly healed. I didn’t think I needed to go [to the doctor]. (Greta – faller)

The sense of not wanting to burden family was an influential factor in participants’ decisions to disclose or not to disclose their falls to both family members and health practitioners. Participants covering up a falls history will be discussed in detail later on page 231.

Family dynamics also influenced participants’ support-seeking behaviour. If the relationship with family members was not positive participants were less inclined or willing to ask for support or assistance in helping them undertake tasks, unless they really had to. This is seen in the excerpt from April below.

Oh I don’t know what I would do, I really don’t know. I’d have to be dependent on my son, he’d screech and you know, he would do things for me but he’d do it under sufferance. I wish they would give him a carer’s allowance because then he wouldn’t moan so much about having to do things for me. (April- faller)

April felt her son was a reluctant carer. She believed he helped her under sufferance and that if he was receiving an income it would change his attitude towards assisting. In her eyes, given their current relationship and lack of incentive for him to offer to assist, she was reluctant to ask for help.
Accessing external support is not always easy for me

A recurring issue for participants was their struggle to access support services that met their personal circumstances. April’s experience, in the excerpt below, highlights the difficulty participants faced when dealing with fall related consequences when support services aren’t known to them.

Well I couldn’t, for a while, I couldn’t brush my hair or clean my teeth, trying to do it with your left hand, you know, and it was really, really bad for about, I suppose two weeks. I had to peg out the washing as well. I couldn’t lift it. I thought I could do with some help, but you know I didn’t know what to do, where to go. That’s when my son, I think he felt sorry for me and he came. (April - faller)

After April’s fall she attended her local doctor where she had further tests which showed she had badly damaged her shoulder. April was left to manage at home by herself for two weeks until her family intervened with assistance. April who identified that her son was a reluctant assistant, had continued to struggle alone with tasks until her son offered. Ideally, services should have been set up to assist this older person living alone but this did not occur, even though April had received medical attention. Older people may be more vulnerable to a further risk of falling while recovering from injuries associated with the initial fall if they are left to manage on their own. That is, support during post injury phases is important. As well, assessing the level of assistance an older person may require shortly after an injurious fall provides opportunities to determine the risk of future falls and implement strategies to minimise risks.

The failure of health professionals to address individual fall related issues when older people present to an emergency department can also been seen in Gabrielle’s excerpt below.
I went to the hospital. They just asked me how I did it, I think they’re so used to doing it; they just plaster it up and sent me out. (Gabrielle - faller)

Gabrielle had broken her arm after a fall and had presented to the emergency department. Treatment focused on the physical injuries associated with the fall rather than what contributed to the fall. There seemingly was no discussion with Gabrielle about risks associated with falling or referrals before she was discharged from the hospital.

Amy, who was a family member participant, described a different service approach. When Amy’s older family member presented to the emergency department of her local hospital a discussion included the need for support. This seemed to be facilitated through a key person within the hospital department.

 Ended up in the hospital, and there was a lot of discussion on how to help us because this person in the Emergency Section, I think deals with carers, and alarm bells were ringing and he really started talking to me about how he could help me and he put us in touch with appropriate services. (Amy - family member)

In Amy’s excerpt it is important to note that the assistance being provided was to the family. If access to services is reliant on the support of family members to instigate the support it can be problematic where family relationships are challenging, as seen in April’s case. Access to support can also be problematic if the older person presents without family as in Gabrielle’s case.

Amy’s excerpt also highlighted that the family had to instigate the contact with appropriate support services rather than the services contacting the family or older person. This is important to note, as it would seem that even when services are available, it is still
an expectation that the family are responsible for arranging suitable assistance or support. This approach may be problematic in circumstances such as April and Gabrielle where there are no family members to explain or advocate for them. The need for the older person or their family to determine what they required and make the initial contact with appropriate services was common. For instance, some participants were handed literature without any discussion of individual needs. Wendy’s excerpt below shows that even though she was provided information on the services available to assist her, this approach was challenging.

_I think when I went there, they gave me a list of numbers, and there were 50 numbers, all different departments that I didn’t have a clue about – State, Commonwealth, whatever they were departments, community this and that was very confusing, very confusing. It was quite daunting; I just didn’t know what to do. I was bamboozled with information and I didn’t understand it, so I tossed it away._ (Wendy-faller)

Wendy was given a list of telephone numbers, but didn’t really know where to begin and was unsure what services she required for her individual circumstances. There was no one to explain the process to her and it was difficult for her to interpret this information. As a result she discarded it and did not, apparently, make progress in actively seeking support. Perhaps health professionals believe they have done enough by providing older people with information on support services. Clearly this is not the case. This approach may result in older people’s continuing to undertake risks without guidance and result in missed opportunities to implement strategies for reducing their risk.

Other participants tried to be proactive in reducing the risk of falling but kept experiencing barriers that frustrated them. In the excerpt below, Alice talked about her dissatisfaction with the Department of Housing when trying to have her linoleum replaced after it had been identified as a trip hazard for her husband, a person who fell repeatedly.
We have approached the Department of Housing. I don’t know how many times we approached the Department of Housing and put an application in to replace the lino on the floor. You might as well talk to that brick wall. They’ve done nothing whatsoever about it. We don’t know what else to do. (Alice - family member)

Alice’s husband had fallen several times in the kitchen and the floor surface had been identified as a fall risk by a health professional during a home assessment. As they did not own their house, they had to apply to the Department of Housing to get the flooring replaced. In spite of multiple submissions the floor remained unsafe. Alice was at a loss as to what to do next since the health professional had indicated to her she needed to replace this flooring, but she had no means of doing that. This excerpt demonstrates that even when health professionals make recommendations which older people are happy to implement, the recommendations are not always addressed, especially where government departments do not share an approach to minimising risk.

When suitable support was provided to participants, it was usually for a defined period of time. Participants described a lack of consultation about their specific situation to determine the duration of support. This can be seen in Winnie’s excerpt below.

They don’t cater for more than a couple of weeks. I wanted someone to come a bit longer, and I said I’d pay, and so I did. I got it for another month, because my daughter was that busy she couldn’t get here all the time to help me shower, she had to do it at weekends. But no, they don’t really ask you. (Winnie - faller)

Winnie, recovering from a serious fall, recognised that she required help beyond that which was provided as part of her recovery after a serious fall. She achieved this by paying for extra support. Limited funding of resources for particular assistance programs
may be driving the decision process of the service rather than the needs of the individual person. People who have insufficient finances to afford extended care may try to continue without support, leaving them vulnerable to further falls.

The availability of services may also be driving health provider decisions. For instance, a family member described the situation below.

I needed her assessed. They said “we’ve assessed her ten years ago” and I go, “Well she has deteriorated in ten years. She is ten years older, could you do it again?” Actually, they said “well, no”. I had to ring the doctor to ask them. (Gemma-family member)

Gemma’s mother was struggling after a fall and Gemma had recognised that she needed to be assessed. Gemma’s experience is important to note, if service providers restrict services to one per person, they are not responding to the dynamic nature of ageing.

I have just changed how I do things

Having independence gave the participants a sense of purpose. Alongside this was a need to prove to family members and friends that they were still able to cope. If participants developed obvious physical limitations as a result of medical conditions, they would seek out alternative ways of doing particular tasks. By adapting the task they believed it was safe to continue and that they did not need extra help. This led them to continue to undertake the activities they desired, without considering that alternative strategies may also pose a level of risk.

I still do my own gardening and everything. Yeah I sit on my bottom with my little short digger so I slide around on my backside around the garden and then I turn over onto my stomach and up onto all fours and get up. (Gwen-faller)
Gwen had previously fallen several times in her backyard. Therefore, she modified how she undertook the task to enable her to continue to garden independently, instead of getting someone in to do her gardening for her. She was quite proud of the fact that she was still able to do her own gardening, rather than seeking support. She seemed to feel she had appropriately addressed the risks the activity still posed. The reluctance to seek support in order to maintain independence can also be seen by Gwen’s second excerpt below.

I’ve got a walking frame that I use to load the groceries out of the car and things like that. I can’t lift anything unless it is at chest level. If I want to get the roast out of the oven I’ve got to get a chair beside the oven and I sit down and put a towel over my knee, put the roast on my knee and then lift it up (Gwen – faller)

As with the previous excerpt from Gwen, this highlights that decisions whether to seek support can be influenced by the value that participants place on their independence. Gwen recognised that she was no longer able to perform some of the tasks she had previously. She therefore adapted the way she undertook the task to maintain her independence. Participants may perceive that adapting a task is a safe option, and in some cases it might be. If independence is driving decisions, compromises may mean that even the modified task has safety issues.

**How can I prevent falls if people don’t talk to me about it?**

The participants reported that health professionals did not routinely ask about falling or explore participant’s needs after falling. As with accessing support, it was the perception of the participants that it was their responsibility to inform the health professional about their falls history.
Gayle’s apparent attitude that she is responsible for notifying her doctor regarding falling and that he should not routinely ask her about falls is noteworthy especially in the knowledge that some participants did not disclose this type of information. This means health professionals may be unaware of a patient’s true risk of falling. The excerpt from Catherine below highlights participants’ acceptance of health professionals’ practice and their understanding of why this occurred.

Difficultly arises with health professionals failing to ask about falls when time pressures on health consultations constrain time to discuss such matters. Failing to routinely ask about falls may perpetuate a lack of awareness of the challenges faced by older people and limit opportunities for referral on for fall risk assessment or fall prevention strategies. As such, people are likely to continue to take risks in the absence of a discussion of their individual risk of falling.

Doctors were not the only health professionals who failed to ask about falls, as shown in Colleen’s excerpt below.

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My doctor knows that I’ve broken my wrist. He knows that I’ve broke this ankle. He knows this leg’s playing up. But he doesn’t ask me [about falling]. I think he knows that I’d tell him. (Gayle- faller)

To be fair to him he hasn’t got the time, unfortunately, in today’s society to say “OK, have you had a fall? Have you done this? Have you done that?” There’d be no time for the things I went there for. Yes you’ve got to be lenient about these things. (Catherine - faller)
getting very weak. So I don’t think I mentioned to her that I fell.
(Colleen-faller)

Colleen aged in her late 70’s had proactively sought services to address her mobility issues in order to prevent falls. As the physiotherapist had not asked and Colleen had not offered information on her falls history she did not realise that Colleen had fallen multiple times. This may have resulted in a missed opportunity by the health professional to undertake a comprehensive falls assessment to reduce the risk of Colleen falling again.

It was common for participants to report that health professionals did not specifically talk to them about falls prevention strategies. This was the perception even when a fall was the reason they attended. In the excerpt below Yvonne describes going to a health professional because she had identified that her leg was weak and this may have contributed to her fall. She did not specifically tell the physiotherapist that she had fallen; only that she felt her leg was weak.

The [Physiotherapist] didn’t give any advice on falls prevention, but I did go to her after I had this fall here in the kitchen as my hip’s weak. I mean, I know that my leg is weaker. So she’s given me three exercises to do and suggest I get a bike, an exercise bike. So I’ve done that and I’m working on getting it strong, you know, my leg stronger, which will stop any falls, I presume, you know what I mean? It’s for my own good.
(Yvonne-faller)

Yvonne felt that her leg weakness was a contributing factor to her falling. Attending treatment provided a valuable opportunity for the health professional to assess Yvonne for fall risk and provide advice and other preventative measures. Without an open dialogue on falls, treatment may focus on the issue flagged, which in this case was weakness, perhaps missing the range of factors contributing to a fall. Yvonne believed she was actively doing something to reduce her fall risk. How successful this would be in
the absence of advice on risky activities is the key question. Was this approach enough to protect her from all further falls if she continued to undertake high-risk activities?

Findings also showed that even when participants were identified as having a high-risk of falling they may not have had falls prevention information provided to them. This meant they may not have an appreciation of what they could implement to reduce their risk of falling or help them identify activities that put them at risk. This is highlighted in Allan’s excerpt below.

*I overbalanced in my bedroom and I tripped. My feet didn’t do what they are supposed to do and I split my big toe across here. I went to the doctor’s and got six stitches in it and finished up nearly three weeks in hospital before they removed my big toe. My brain is telling the feet what to do but they don’t do it. They didn’t talk to me about falls [in hospital] all they did was put an orange bracelet on me to say that I’m a faller. I didn’t get any advice or wasn’t referred to anyone when I left. (Allan - faller)*

Allan, who had diabetes, was admitted to hospital as a consequence of an injury that he sustained from a fall. This instigated a patient care protocol in order to make the staff aware that he could be at risk of further falls within the hospital setting by wearing an orange wrist band. On discharge, it was Allan’s perception that no discussion of falls prevention strategies occurred for his return home. From his excerpt, it seems that the focus was on the hospital staff knowing he was at risk and as such trying to control the situation while he was in their care. After he left the hospital he was left to his own devices to manage his everyday situation. Alan is therefore unlikely to be aware of strategies that could assist him in reducing his risk of falling in the future.

These excerpts show a lack of attention to fall risk management, a break in continuity of care and a breakdown in communication pathways not only between health professionals
and older people but also health professionals communicating with each other on their patient’s level of fall risk. Of additional concern is the finding that some health professionals seem uninterested even when participants report having multiple falls, as shown in the excerpt below.

*I went to the doctor and I said make a note of it, another fall. I don’t know what they think. I say to them I fall all the time, but they don’t take any notice. A fall’s a fall.* (April - faller)

April’s doctor’s apparent lack of attention to her concerns about falling was a source of frustration for her. If a doctor is not interested in knowing about a fall history they are unlikely to discuss strategies to reduce the risk of further falls. If older people aren’t able to seek advice from the health professional they regularly see, then opportunities are lost for appropriate referrals and advice to facilitate strategies to help reduce the risk of further falls.

Even when participants were provided with support to reduce their risk of further falls there was a sense this occurred without any consultation with the older person. Rather than being part of the decision making process they were excluded. This lack of consultation on the part of the health professional is shown in the excerpt from Adele.

*They let me come home from rehab just for an afternoon and overnight, but I had to get the Occupational Therapist to assess [the house] first. She went in [to the house] and she moved the microwave and the kettle, and moved the whole kitchen around so that it was safe, and changed a big chair in the lounge room. You can’t do that. You can’t. I walked in and burst into tears; this is not my place.* (Adele - faller)
There did not seem to be a link between consent to assess the house and acting on that assessment. In this situation the occupational therapist had rearranged Adele’s house at the time of the assessment to make it safer. Clearly Adele did not consent and was not happy with this outcome. Although this may have been done to speed up the chance for Adele to return home, this approach caused great distress to her. This excerpt demonstrates that a patient centred approach, where the older person contributes to discussion on falls management strategies, is not always occurring. Without a patient centred approach older people may be more resistant to seeking assistance for falls interventions or may strive to readjust what has been done if they did not agree to it, in an attempt to maintain control and preserve their independence.

In summary, the ability or willingness to access support impacted on participants’ decisions to continue to undertake high-risk activities. The importance of independence was influential in their reluctance to seek support as was trying not to burden family members. In an attempt to prove to those around them that they did not need support, participants were inclined to cover up the true extent of the issues they faced. Participants also described their struggle to navigate the type of services available and to know which support they needed. Perceptions of interactions with health professionals also featured strongly. Data related to their experience with health professionals indicated that health professionals were not routinely asking about a falls history or engaging in ongoing collaborative dialogue on strategies that could assist in reducing fall risk. All of these aspects impacted on whether the participant was provided with or was willing to accept support to decrease their risk of future falls.

Covering up

Participants acknowledged that they did not always disclose their falls history or the challenges they faced on a day-to-day basis to health professionals or family members. There were two main drivers for this behaviour. First, their desire to maintain their current level of independence. Second, they did not want to worry their families. Of importance, covering up falls extended to interactions with health professionals. Three sub-themes were identified that help explain participants’ reasons for covering up

- I’m fine, it’s my family that thinks I cannot do things
• Falling is embarrassing
• I’m OK, so they don’t need to know.

I’m fine, it’s my family that thinks I cannot do things
There was a feeling among some of the participants that their family members had an erroneous view of their capability and fall risk and did not think they were capable of doing certain activities. Participants believed that family members and friends were being over cautious and worrying unnecessarily about their ability to undertake everyday activities. The result was that a participant ignored their family’s concerns and continued to undertake potentially risky tasks. Not being completely honest was noted on both sides. For participants this dishonesty was focused on proving they could still do the task despite their family’s concerns. For the family members it was used in an attempt to try and keep the older person safe. Participants still believed they were able to complete tasks despite their family members’ concern. This can be seen in Andrew’s excerpt below.

If she finds out I’m hanging the washing out on the line, or bringing it in, she goes crook\(^{10}\). I can still do it but if I do it I get in trouble.

(Andrew- faller)

Andrew believed that he was capable of hanging out the washing even though his wife thought he shouldn’t. This meant that Andrew had to hide the task from his wife in order to maintain a level of everyday normalcy in the activities he wanted to do.

In some instances, family members went to great lengths to protect participants from themselves and their perceived risk-taking behaviour by covering up their concerns. The use of deception by family members to control a person’s activities can be seen in the excerpt below.

\(^{10}\) The word crook is an Australian colloquial term meaning to be annoyed or lose one’s temper. Oxford Dictionary Online
Until the battery went flat on the mower and they [family] said “you can’t get one of those, they’re not available anymore”, I thought thanks I’ll get a new lawnmower. Then it turns out “we won’t get one because we know that you’ll mow the lawn and you’re not going to”. (Gwen-faller)

Gwen’s family did not say she should not mow her own lawn. They fabricated a story that meant she couldn’t continue to use the mower, a task they believed she should not do. Gwen who has fallen in the garden multiple times believed she was still capable of mowing the lawn and decided to buy a new mower.

Some family members discussed how they developed elaborate stories to get an older relative out of the house so they could complete tasks such as gardening and maintenance without their knowledge, as shown in the excerpt from Yvette below.

Oh she hates it when we try and do things for her, we try and get someone to take her away and the rest of us sneak home and do what we think needs doing. She likes giving, she just doesn’t like receiving. She probably thinks we’re all a pain in the arse and we’re all trying to do stuff all the time and she’s got to realise that we’re family and we can do stuff for her. (Yvette-family)

Both these excerpts illustrate how far family members will go to keep participants safe. These intrusions without negotiation caused participants to be annoyed and seemed to drive them to keep things from family members so that they could limit the interference and continue doing tasks independently, possibly placing them at greater risk of falling.
Falling is embarrassing

Being embarrassed after falling was a common response for participants regardless of their age. When older people fall there may be other implications with potential consequences for their independence and this may drive the decision whether to disclose the incident. Feeling embarrassed and not wanting people to know about their fall seemed to be one reason why some participants actively covered up their fall history. This can be seen from April’s excerpt.

*When you fall you don’t think you’re going down, it feels like the floor comes up to hit you. After my fall [at the local shop], I got up as quickly as I could and didn’t go back there. I felt ridiculous because I mean: how embarrassing.* (April – faller)

April recognised that it was difficult to know when you are going to fall and that the incident of falling was embarrassing for her. She needed to get up before anyone saw her as she was embarrassed, especially as she fell in a public space. She chose not to return to the shop. The sense of trying to get away with a fall or cover it up can also be seen from Gabrielle’s excerpt below.

*My husband he did have a fall on his walk one day, he never usually tells you. He was a bit embarrassed trying to get up on his walk, he’s eighty-two and he goes for an hour walk every morning which is good, half past five and he fell one day, I think he tripped going up the step on the footpath again and I think he might have just tipped his toes and fell then, he said he got up pretty quickly and he said it was a bit embarrassing.* (Gabrielle – faller & family member of another faller)

There are indications in this excerpt that Gabrielle thought her husband had fallen previously without telling her. Gabrielle understands his embarrassment with falling may explain his desire to cover up the event. Embarrassment about fall experiences may mean
fallers are less likely to discuss their falls history with family or health professionals. If this is the case opportunities to identify potential risk factors and implement appropriate strategies to assist older people would be lost.

**I'm OK so they don't need to know**

Participants also covered up a fall to avoid worrying their family. Participants believed that admitting that they had fallen, especially when they had not hurt themselves, would cause families to think they were not coping. One way of deflecting this concern was to hide or not disclose the true extent of the issues that the participant was dealing with.

> I lose my balance a lot and I struggle getting up and down my stairs, we've got stairs everywhere. They [children] would worry terribly if I told them everything so I don’t, I don’t really want to put that burden on her then, and the other’s working hard because they’re paying off their little farm, he’s working hard. (Gabrielle - faller)

Gabrielle felt that if her family understood the full extent of the difficulties she was having it would increase their concern for her. She did not want to impact on their already busy lives. In Gabrielle’s mind she was doing the right thing by the family by not disclosing her limitations and potentially creating angst or causing them more work. This behaviour could put her at further risk for falls as she tries to undertake tasks that place her at risk of falling.

Some participants had a partner requiring greater care or with more health issues. This led the family, and perhaps health professionals to focus on the person with the more obvious needs. Participants in this situation did not want to add extra stress and have the family worrying about them. As can be seen with Gemma below, such behaviour persisted even when their family tried to intervene.
I think she is a risk of falling and she doesn’t tell you lots of things and I’ve actually had to sit down with her and say “Mum, you tell me when I have a migraine to take the day off and saying to you ‘do this, go to the doctor’, and you won’t do it. Please, I do it. Please, please, please”. But she puts everybody else first before her and just carries on, she doesn’t go to the doctor. It’s all about dad. (Gemma - family member)

Gemma was concerned for both her parents, she was aware that her mother was at risk but because her mother covered up her situation it was difficult for Gemma to accurately assess the extent of this risk. It was also difficult for Gemma to provide support when her mother was focused on her husband’s needs and was unwilling to open up about her own issues. Such situations block access to support, hampering a family’s capacity to assist in the prevention of falls.

Participants were particularly reluctant to disclose a fall or seek advice from health professionals if no significant injury occurred. There was a perception that the severity of the injury was what prompted action rather than the fall itself. Participants had the opinion that one only sought assistance from a doctor when one had to, when an injury meant there was no choice but to admit to a fall. As can be seen in the excerpt from Catherine, bruising was not sufficient to encourage a person to disclose a fall.

I knew it was there and I didn’t pay attention and just caught my toe on it and that was sufficient, I lost balance and fell. Why go to the doctor with something like that? I mean you go to the doctor when there is something wrong; not a few bruises because of a fall. (Catherine - faller)

Catherine’s decision not to disclose a fall may be influenced by her own perceptions about the role of the health professional in the management of her general health. Her perception was that doctors are there to fix problems or treat specific complaints, not necessarily look at the issues that are perceived to be minor or preventive in nature. This perception
was commonly shared by the participants and was perpetuated by previous experiences with health professionals who did not question them about falls.

Faller participants also did not want to discuss a previous fall for fear of what the doctor might think or what the repercussions might be, including impact on their independence. They appeared to have the attitude that if the health professional did not ask then they would not tell them, which led to covering up of falls.

_No I didn’t go for a check [after the fall] because we knew nothing was broken and he’d probably gone a bit crook at me._ (Mitch - faller)

Mitch decided not to go to his doctor after several minor falls because he thought he was OK and he did not want to be lectured on the activities he perhaps shouldn’t be doing. This is important as it speaks to the way participants perceive the approach taken by health professionals to fall risk messages, especially if it is likely to impact on their independence.

_Covering up_ meant participants continued to perform tasks that maintained their independence and let them avoid worrying their families. Covering up also protected participants from being judged or from having to prove they were still capable. The participants’ decisions to engage in covering up behaviour was strongly influenced by their ability or willingness to engage with support. The decision made by participants not to be completely honest with those around them likely resulted in a lack of awareness of the true difficulties and/or risks some participants were having. This further reduced the ability to ensure that adequate support was identified and implemented to assist them in managing their fall risk, especially if family were responsible for advocating or arranging appropriate support mechanisms as seen on page 219. From the family’s perspective covering up their concern was necessary to protect their older relative from falling. Either way the issues identified in this theme highlight the challenges associated with finding a
middle ground where open dialogue can be achieved to keep older people safe from falling.

The Influence of Finances
Finances and their impact on participant behaviour related to falls was an important theme to emerge from the data. There was a real financial impact associated with falls prevention strategies which the participants discussed. Participants who did not have the means to pay for support were often left to continue to undertake or cover up tasks that might put them at risk. The affordability of support was seen as a dominant feature in the support seeking decision process for some participants. However this decision was not always solely based on the participants’ ability to pay. That is, while the participants may have had limited finances, greater roles in their decision to use any spare savings on support to decrease risk of a fall were played by their valuing independence and their belief that they were still capable.

This section will discuss the impact of the affordability of prevention strategies to reduce the risk of falling.

I can’t afford the prevention strategies
Participants spoke of the financial burden associated with paying for modifications to their home to prevent further falls. Health professionals had come in and assessed the home, making recommendations to reduce risk. Participants noted that there was very little discussion around the cost implications of these recommendations.

There’s a financial cost that’s a real burden as well because people don’t realise the ongoing costs of even just getting railings. (Gayle - faller)
Gayle, who had experienced multiple falls, had home modifications suggested to her by her health professionals; it was up to her to implement these modifications. She initially had no appreciation of the costs associated with these recommendations until she inquired about them, and found it difficult to fund them. Constrained finances led some participants to choose not to implement all or part of the recommendations. They were also delaying modifications while they saved enough money to pay for them. This could put the participants at risk of further falls, especially if there was little follow up by the health professionals or if no alternative solutions were provided.

The ongoing cost of home and garden maintenance was another aspect that had a significant impact on participants’ capacity to be safe. They described the considerable cost of getting other people in to assist them in jobs or tasks they no longer felt comfortable or able to do.

*And the expense, the expense of it’s been massive, getting people in to do things, just even the garden. I would like to do more but I ran out of money (Adele - faller)*

Adele had to prioritise activities requiring assistance because of the cost. Of importance is her statement that she “would like to do more” but can’t afford it. This heightens the likelihood of her attempting tasks she feels are important but cannot afford to have someone do for her.

The inability to find funds for general maintenance around the home meant that some participants continued to undertake risks. As shown below cost was not the only factor driving risky behaviour. The standards participants were willing to accept also played a role in their decisions to undertake tasks which posed a risk, a heightened risk as shown in Anna’s excerpt.
I do climb up and prune trees which I know is not a good idea but it isn’t only the financial cost of having it done it’s also the finding someone who will do a decent job at a decent price and if you can’t get people in to do the job properly and it costs a lot so you’ve got to do it.

(Anna - faller)

A previous fall may make participants more reluctant to undertake the risky aspects of home maintenance. When unable to find someone to do this for them at a price they could afford they had little option but to continue to undertake the activity. Coupled with this were the participants’ expectations around value for money, that is, what they considered to be an acceptable standard for the money they were paying. These expectations resulted in some participants continuing to do activities because they would not accept what they saw as sub-standard work. Anna recognised that climbing trees was probably a risk. The inability to get someone to prune trees at her price, and to her standards, drove her to do it herself in spite of the risk of falling. The expense and her standards outweighed the risk.

Discussion of financial constraints centred on specific modifications or regular support or maintenance. Some participants described less obvious ongoing costs. For instance, increasing general living costs, such as electricity had an influence on the participants’ capacity to avoid a fall. Some participants actively engaged in strategies to keep themselves safe, but this had to be weighed up against the costs associated with these strategies. This is demonstrated in Alana’s excerpt below.

One thing that I think we do, it’s a safety measure in several aspects which we’re starting to have to think about is leaving a lot of lights on, a lot of lights around the house when you’re in the house, but the way electricity is going this is going to have to be something that we look up, because the bill goes up every quarter and certainly the income doesn’t. (Alana - faller)
In this excerpt the cost of electricity was impacting on Alana’s decision making and thus her safety. As general cost of living pressures impacted upon participants’ abilities to budget, the costs associated with reducing fall risk also had to compete with other expenses. Participants seemingly had to make financially driven decisions that were not always in their best interests. Alana’s excerpt above demonstrates the complexity of preventing falls and the impact of seemingly unconnected factors.

The data reveals the challenges participants faced when deciding what fall risk strategies were economically feasible to undertake. Value for money was important, as was the quality of work when buying in support to assist them. These findings highlight why some older people may choose to continue to undertake an activity even though they knew it to be a risk. This point raises questions about the importance of addressing the financial situation of older people as part of a risk management strategy.

**DISCUSSION**

This study represents the first reported in-depth analysis of perceptions of risks associated with falling of older people living within a large regional area of Australia. Findings provide an understanding of the experiences and perceptions older people have concerning falling, fall risks and the response of others to their personal situations.

The data revealed six key themes that illuminated the challenges surrounding older people and their risk of falls: the role that independence played in decision making on risk; the influence of previous falls experience; the level of understanding of risks; the ability and willingness to engage with support; the need or want to cover up a fall history; and the influences of finances in managing risk. Most significantly the data revealed that managing individual risk was a multifaceted balancing act with competing influences faced by older people. It was a complex interplay between all of these key findings which
drove the decisions older people made that potentially placed them at further risk of falling.

This research found that retaining independence was fundamental to the decisions older people make related to activities or tasks that may pose a fall risk. Participants in this research strongly linked independence with their sense of purpose and with their ability to control their lives. That is, independence overshadowed consideration of risks associated with an activity. This finding is supported in the research literature by other qualitative studies (Berlin et al., 2009; Roe et al., 2008; Yardley et al., 2006a). Roe et al. (2008), who studied older people living in England, found that older people who had fallen, developed strategies to continue with activities to maintain their autonomy. Berlin et al. (2009) studied elderly women in Sweden, and found participants sought strategies to decrease feelings of insecurity while they strove to maintain mobility and undertake daily routines. Yardley et al. (2006a) investigated older people’s perceptions of fall prevention strategies in the United Kingdom and found that participants rejected fall prevention advice because they saw it as a threat to identity and autonomy. What the research presented here provides is a greater understanding of the connection between the value older people place on independence and autonomy and their willingness to knowingly undertake high-risk activities.

Participants in this study, who did not view themselves as someone who was at risk of falls (even though all participants had fallen in the past), held strong views that they needed to continue to perform activities to stay independent. That is, ‘move it or lose it’ campaigns may encourage some people to undertake risky activities. Previous Australian research has shown that older people received falls prevention messages positively when they had a focus on staying active and remaining independent (Hughes et al., 2008). Such messages aim to encourage people to participate in physical activity classes as part of falls prevention campaigns. However, findings from this research indicate there is a risk that “stay active” messages may help perpetuate beliefs that undertaking the types of activities they have always undertaken, for example getting up on step ladders, is good. This approach could potentially put people at risk.
While the notion of independence was seen to underpin the decisions around risk that participants made, what this research found was that the interplay between independence and the participants’ understanding of risks had the greatest influence on whether the participant knowingly or unknowingly undertook activities that could pose a risk. The literature identifies a range of risk factors associated with falls. For example, intrinsic risk factors, such as medications, decreased muscle strength, chronic disease and extrinsic risk factors, such as steps, floor surfaces, and uneven ground (Ambrose et al., 2013; Bueno-Cavanillas et al., 2000; Gillespie et al., 2003; Lord et al., 2006;). Missing from the literature is the level of understanding older people have of these risks and how people interpret and respond to risks that impact on everyday activities or tasks. Findings from this study help to fill this gap by providing insight into the level of awareness older people have of risk factors relevant to them and how this may differ from a health professional’s perceptions. For example, from the findings of this research, if there was little injury as a result of a fall, the participant may dismiss any potential risk factors associated with the fall and consider it as a minor mistake. If the fall occurred in one environment such as the house then some participants failed to appreciate there could be similar risks in other environments such as the garden. Both of these scenarios may result in older people failing to appreciate their true risk and thus not considering strategies to reduce their risk for subsequent falls. This is an important finding from this research with implications on how health professionals should be approaching discussions on fall risk with older people.

There has been a significant amount of research both in Australia and internationally that has investigated aspects of older people’s perceptions of the risk of falling (Berlin et al., 2009; Delbaere et al., 2010b; Hughes et al., 2008; McMahon, Tally & Wyman, 2011; Snodgrass, Rivett & Mackenzie, 2005; Yardley et al., 2006a), but all these papers focused on how that perception impacted upon their level of risk in relation to their willingness to participate in falls prevention activities or programs. What this research specifically adds is an appreciation of how an older person’s perception of their own level of risk leads to risk taking behaviour within their everyday lives. For example, participants who did not believe they were at risk of falling continued to undertake high-risk activities, such as getting up ladders to clean the gutters, even though they had an appreciation that this was a task older people probably should not be doing.
The research presented here highlights a strong link between the participants’ fall experiences and their personal perceptions of the likelihood of falling again. That is, their previous falls coloured their understanding of fall risk factors. Participants could be positioned along a continuum of awareness towards risk. Their position on the continuum was not a fixed one; it reflected the participant’s recent fall experiences and current understanding of the fall risk factors. It also reflected the participant’s need to be independent and their being actively safe or actively taking risks. This study found that participants adopted three different models of behaviour towards fall risk. ‘Move it or lose it’, ‘Contextualising risks’, and ‘Consumed by fear’. These formed the foundation to participants’ understanding of risk and how this understanding influenced their choices around risk taking behaviour. These models of behaviour are explained below and are illustrated through the use of cameos which demonstrate the impact these behaviours have on the participants’ decisions towards risk.

In the first model of behaviour, ‘move it or lose it’, participants often had experienced a fall with minimal or no consequence. As a result, these participants believed there were few consequences from falling. They either dismissed falling as an unavoidable non-event, failing to recognise potential risks for future falls, or did not consider that they were personally at risk. Essentially ‘move it or lose it’ participants were unlikely to change their behaviour to minimise risks. This is illustrated in the cameo below, derived from participant discussions.

| Bob “Yeah I’ve fallen a couple of times in the backyard, probably 3 or 4 times in the last 12 months. You see my eyesight and balance isn’t that good now. The last fall I just didn’t see the damn hose on the grass. But it was my fault I wasn’t paying attention and didn’t really hurt myself just a few bruises and scrapes. Everybody keeps telling me I have to keep active, keep moving otherwise you’re done for. Well I am keeping active; I still prune all of my fruit trees and clean the gutters, I do all my own gardening that’s how I keep moving. I reckon if I stopped doing these jobs then I wouldn’t be as active and my balance issues would get worse. That’s when I would be at risk of falling.” |
Of concern is that current falls prevention strategies are not set up to identify older people like Bob who are not going to seek advice to manage risk because they do not perceive it is relevant to themselves. Further research is warranted to overcome the barriers to appropriately identifying older people who are at low to medium risk of falls. A new approach may be required to enhance the uptake of falls prevention messages for this group to prevent them from sustaining a significant injurious fall that could lead to hospitalisation.

The second model of behaviour, ‘contextualising risks’, involved participants who had an understanding of some of the risks, but not all. Usually this understanding was directly related to their previous fall experience where they may have sustained a moderate injury that required treatment. However, their level of understanding did not always translate into other contexts. For example, if they fell in the garden they were able to recognise risks specific to that environment but not necessarily see risks in other environments, such as inside the house. While this group of participants were more likely to engage in falls prevention strategies, whether it be on the advice of a health professional or through self-referral, this study showed that they were not always well managed from a prevention perspective. The contextualising risks model is illustrated in the cameo ‘Cheryl’ below, derived from participant discussions.
Cheryl “Yes I had a bit of a nasty fall, hurt my knee quite badly when I tripped on the rug here in the lounge room. My knee still isn’t right I don’t have much strength in it anymore and it’s hard to bend but I manage. After my fall the nice young girl came to my house and showed me where I needed to be careful. She got railings put up in the bathroom and toilet and got rid of the rug in the lounge for me so I am all safe now. Well yes, I do get up on a small step ladder; you see I live on a dirt road so the windows get so much dust on them I have to wash them a least once a month, otherwise I wouldn’t be able to look out them. But that’s ok, the girl didn’t say I couldn’t do that. Besides it’s a good strong ladder and I’m careful, I only go up a few steps. I need to use the ladder to reach the top of the window, you can’t have half clean windows can you”.

When participants who were seen to contextualise fall risk, received intervention strategies such as home risk assessments by a health professional, the standardised approach focusing on known key risk areas such as the bathroom, toilet and steps or stairs consolidated their understanding that risks were centred on these spaces. Alternatively, using validated home assessment tools such as the HomeFAST tool (Mackenzie, Byles & Higginbotham 2000), does provide a basis for evaluation of some functional capabilities of the older person, but these types of tools still fail to address the issue of older people not translating risks across locations or tasks. Therefore, it is important that health professionals determine the individual fall risks for the older person and link these risks to the type of activities the older person undertakes in a range of settings so that recognition of risks is based on types of activities or tasks rather than being based on a particular environmental setting. This approach may further enhance people’s knowledge of fall risk across a variety of contexts and enable older people to manage their own risk more effectively.
The findings from this research have significant implications for managing fall risk as the research provides understanding of why older people actively take risks or may perceive they are at a lower risk than they really are. Previous research has identified that it is a challenge to motivate older people towards preventative strategies when they underestimate their risk of falls (Hill, 2004; Horne, Speed, Skelton & Todd, 2009; Kilian, Salmoni, Ward-Griffin & Kloseck, 2008; Yardley, et al., 2006b; Yardley et al.2007b). As demonstrated by either the ‘move it or lose it’ and ‘contextualising risks’ behavioural models, participants with these beliefs were seemingly unaware of all the potential risks that some activities posed. Perception of the level of risk is an important consideration when instigating injury risk management strategies. Without understanding why some older people fail to engage in preventative interventions or health education it is challenging to develop strategies that effectively target those at risk.

In the final behavioural model, ‘consumed by fear’, participants had sustained serious physical injury (such as a fracture) or psychological trauma as a result of their fall. These participants were highly engaged in making changes to reduce their risk. The extreme manifestation of this was an overestimated level of risk where the person limited all activities for fear of falling again. This had significant impact on their quality of life as they struggled to come to terms with the physical and emotional consequences of the fall. Participants exhibiting such behaviour usually experienced a focus on their physical injuries by health professionals with no participant reporting attention to assist them to overcome the psychological impact of their fall(s). Without resources to enable older people within this group to reduce their fear, these participants could become immobilised by fear, over-estimating their risk and minimising activities. This could lead to further falls due to weakness associated with reduced activity as illustrated by Doug’s cameo, derived from participant discussions.
Doug “I feel like my life is over. The last fall in the bathroom I broke my hip. I was stuck there for two days until somebody found me. The pain, the pain was so bad I never want to experience that sort of pain ever again. I had to give up bowling, I used to love to bowl, can’t bend down anymore. Don’t see my friends much nowadays; I don’t like to leave the house in case I fall again. They used to come around and visit but I think they are bit sick of me not wanting to go anywhere with them so they have stopped coming. It upsets me that I can’t do anything. It’s so frustrating that everything takes me so long to do, but I suppose that’s the price you pay if you want to keep safe”.

It is important to ensure health professionals tailor strategies to address all three behavioural types in ways that meet their individual perceptions or understanding to reduce their risk of further falls. More needs to be done to engage and support older people with a tendency towards the ‘move it or lose it’ and ‘contextualising risk’ behaviour models so they continue to live independently but safely. As well, helping people who are traumatised by a fall to address their fears may help increase their independence and assist them to remain active.

**CONCLUSION**

The complex interplay between balancing independence and managing risk was a central finding to this research. This was seen through the competing influences of the six identified themes which drove participants’ decisions on whether they knowingly or unknowingly undertook risky activities and their perceived need to engage in falls intervention strategies or not.

The use of a qualitative paradigm has enabled a deeper understanding of the experiences and perceptions older people have of falling. This new knowledge provides insight into why older people may continue to undertake activities that pose a risk to falling. It would
seem that current falls prevention models fail to address this complex interaction. Consideration of the multifaceted issues older people face when managing fall risk, including behavioural risk factors, is vital if we are to successfully reduce rates of falls injury for this population group. The following chapter will now provide a synthesis of the key findings from this research program and present an alternative model to holistically address the multifactorial risk factors associated with fall related injury in older people living in Australian communities.
CHAPTER 7   SYNTHESIS OF FINDINGS

DISCUSSION

The body of research presented in this thesis is the first to apply a mixed method approach to gain a deeper understanding of the contextual factors that influence falls and fall related injury within regional Australian communities.

Three overarching themes arose from the synthesis of findings from this research:

- challenges existed in seeking to identify older people at risk of falls;
- fall related risk in the older population was inconsistently managed; and
- behavioural decisions and their perception of risk were influenced by a person’s desire to be independent.

These findings help explain why efforts to curb fall related injuries in our communities are not reducing such injuries in the older population. These overarching themes also demonstrate that alternative holistic approaches are required to reduce the risks and rates of fall related injuries in older people in the future.

Forming part of the context for the current research has been the significant focus since 2003 on falls prevention strategies and falls research in Australia (Pointer, Harrison & Bradley, 2003). In response to increasing rates of falls in older people the Australian, State and Territory Health Ministers identified the need for the use of a more coordinated and collaborative approach (National Public Health Partnership [NPHP], 2005). Two comprehensive policy documents, National Injury Prevention and Safety Promotion Plan 2004 Onwards and National Falls Prevention Plan for Older People, formed the basis for a more cohesive and comprehensive response to this issue (NPHP, 2005). In addition, in 2009, the Australian Commission on Safety and Quality in Healthcare (ACSQHC) developed a community based falls prevention guideline, Preventing Falls and Harm from Falls in Older People: Best Practice Guidelines for Australian Community Care 2009, to support health professionals, older people and community groups and reduce the
number of harmful falls experienced by older people (ACSQHC, 2009). Alongside these national initiatives, the NSW Ministry of Health developed policy directives, Management Policy to Reduce Fall Injury Among Older People 2003 – 2007 (NSW Department of Health, 2003) and Prevention of Falls and Harm from Falls among Older People 2011-2015 (NSW Department of Health, 2011) in an attempt to reduce the incidence of falls within the NSW population. Despite this decade long focus, and substantial funding to rein in the prevalence of falls, age-standardised hospital admission rates attributed to falls have increased by 2% per year in Australia from years 1999-2000 to 2010-2011 (Bradley, 2013). Similarly, in NSW age-standardised rates have continued to increase by 2.5% per year, from 2,173 per 100,000 population in 1998-99 to 2,787 per 100,000 population in 2011-12 (Harvey & Close, 2013).

Why has this considerable effort towards reducing rates of falls and fall related injuries not been effective? What is it that we are missing?

Despite prolific research into falls in older people, within the past decade of Australian research examining risk factors associated with falling and fall related injuries (as discussed in Chapter 2) there has been a focus on investigating specific intrinsic risk factors using quantitative approaches. This research has not considered the complexities contributing to fall injury nor the diversity within communities. Unique to the current research was a focus on regional Australia, with a research design that was informed by an injury risk management framework. Of importance, this research used a mixed method approach to collect data from multiple data sources and stakeholders to enable a comprehensive understanding of the factors contributing to falls for community dwelling older people residing in a large regional area of southern NSW. The additional knowledge generated from this research goes some way to explaining why standardised fall rates in this population group have continued to rise despite a concerted effort to reduce them.

This chapter will discuss in detail the overarching themes that arose from the synthesis of findings reported in earlier chapters and will propose an alternative population wide approach, founded on a social ecological model, to address the complexities of managing
fall risk in older people living in the community. The first section will further describe each of the three overarching themes (identified above) arising from this research, and will examine the challenges posed by them to our current approach to managing fall risk. The subsequent section will introduce the proposed Safe Active Living model as an alternative approach to managing fall related risk factors for older people living in the community. This new model will provide a holistic, population wide approach to tackle the identified challenges in current Australian fall related injury prevention strategies that predominantly rely on the Australian health care system.

Challenges existed in seeking to identify older people at risk of falls

Our current approach to fall risk management relies heavily on our ability to identify an older person at risk of falling and then instigate appropriate interventions to mitigate this risk before injury occurs. How successful are we at identifying those at risk of falling? Analysis of hospital admission data in Chapter 3 found that there were differences in standardised rates of fall related admissions in different Area Health Services in NSW. Why is this occurring?

The research presented here found three challenges associated with identifying older people at risk of falls:

- There was poor data quality in Greater Southern Area Health Service hospital admission records with respect to the specific causes, locations and activities at the times the falls occurred. This incomplete information regarding the circumstances surrounding falls limits our ability to gain a thorough understanding of the risk factors leading to fall injury in this geographic area.
- A significant number of fall incidents would appear to be occurring in the community setting without the need for hospitalisation and without any formal data collection mechanism. The inability to capture data on the entire spectrum of fall events limits our understanding of fall risk factors to only those falls that cause significant injury requiring hospitalisation.
- Older people who fall without hospitalisation tend not to disclose that they have experienced a fall, in part due to fearing impacts on their capacity to maintain
independence and in part efforts to minimise perceived burden on family members. In addition, at numerous sites, health professionals reported that they did not routinely ask older people about falls when seeing them for other reasons.

This section will now discuss these three identified challenges in detail.

**Poor data quality in hospital admission records**

Hospital admission data provides an opportunity to examine the circumstances surrounding falls and possible extrinsic risk factors by reviewing data on the reported external cause, place of occurrence and activity at the time of each fall. Such information enables targeting of specific risk factors. Analysis of the Greater Southern Area Health Service (GSAHS) data (Chapter 4) highlighted a range of problems, for example, poor data quality within medical records with respect to the specific causes, locations and activities at the times of the falls. This lack of data quality affects our ability to gain a thorough understanding of the risk factors leading to fall injuries in this geographic area and our ability to target particular fall scenarios that are commonplace. It also adds to the challenge of understanding why standardised rates of fall related hospitalisations, specifically within GSAHS, are so different from other regional Area Health Services in NSW (Chapter 3).

**Inability to capture data on the entire spectrum of fall events**

Adding to the complexity, even if the hospital admission data set could be improved to enhance the quality and types of information collected, this would still only give researchers a small snapshot of the likely causes or risk factors associated with falls within the older population. It has been suggested only 5% to 10% of falls result in serious enough injury to warrant hospital admission (McClure et al., 2005; Rubenstein, 2006). This leaves a substantial number of falling incidents that are not identified through current hospital-based data collection methods. Given the high rates of fall related hospitalisations observed in the GSAHS (Chapter 3), and with the literature suggesting only 5% to 10% of falls result in hospitalisation, it is clear that in the GSAHS there must
be an additional, much higher rate of non-hospitalised falls occurring, for which no data are available.

There are alternative data sources available to capture information for older people whose fall does not require hospital admission. For example, state Ambulance Service databases may provide opportunities to understand the contributing factors associated with older people falling in the community (Thomas et al., 2011). Like the hospital admission data sets, it has been suggested that ambulance clinical records do not systematically capture fall specific data at a detailed level (Simpson, Bendall, Tiedmann, Lord & Close, 2014), indicating there are likely to be similar specificity issues to those found in hospital admission data sets. One way to improve our understanding of the contributing factors related to fall related injury would be to increase the specificity in both the hospital and ambulance data sets. By linking these two data sets, researchers would be provided with a more comprehensive picture (Mitchell, Cameron & Bambach, 2014), but the information gained is still likely to be focused on contributing factors associated with more serious fall injuries (Mitchell, McClure, Williamson & McKenzie, 2008). Although this information is valuable, the fact that there is currently no way to capture fall injury surveillance data outside these two systems means that policy and practice decisions may be based upon a small proportion of older population who have fallen (Mitchell et al., 2008), rather than the majority of at risk individuals.

Current estimates suggest that between 30% and 60% of older people living in the community will experience a fall each year of which 5% to 10% of these falls require admission to hospital (McClure, 2005). This potentially leaves between 20% and 55% of older people falling in the community every year not being detected by any type of data collection. Some health professionals may assume that the data gap is overcome when older people who fall without hospitalisation disclose that they have experienced a fall. The findings from Chapter 6 indicate that older people were reluctant to admit to health professionals or even family members that they had fallen. This phenomenon is discussed further in the next section.
Finally, if older people with minor or no injuries are not routinely identified as being *at risk*, it can be assumed that individuals who are yet to fall (pre fallers) are even less likely to be appropriately identified or have education provided to reduce their future risk of falls. This group of older people may have fewer links with health professionals and may be less likely to have appropriate referral pathways into screening or interventions.

**Older people not disclosing they have fallen**

Alongside the current deficits in systematically identifying *at risk* individuals were the behaviours of people who had fallen. This research found that older people ‘covered up’ fall incidents, failing to disclose them to family and health professionals. A range of factors drove this behaviour (Chapter 6). The findings presented in Chapter 6 highlighted how perceptions of falls and fall risk could be influenced by the fall experience and associated degree of injury. Older people who did not sustain an injury did not seem to recognise the need to seek assistance, and tended to dismiss their fall as an unfortunate event, blaming themselves for its occurring in the first place. That is, older people may not discuss a fall with family, friends or health professionals when they do not injure themselves. This behaviour limits opportunities for them to access interventions to prevent further falls.

The need to maintain independence and minimise the burden to family members were two key reasons participants in this research used to explain why some were hesitant to inform family, friends and health professionals of their fall history. This finding is supported by other literature (Dolland, Braunack-Mayer, Horton & Vanlint, 2014; Stevens et al., 2009). The current research (Chapter 6) also found that according to participants, health professionals were not routinely asking about their falls history, which was supported by the findings of Chapter 5. If older people are not admitting to falling and health professionals are not routinely asking, it is likely that many *at risk* individuals will not be identified. This poses significant challenges for our current falls prevention models. Therefore a systematic approach towards identifying *at risk* older people is required to establish appropriate and timely falls interventions. A range of strategies may be appropriate, for example health professionals regularly asking older people about a falls history. International guidelines state that health professionals should ask older
people, on an annual basis, whether they have fallen or not, even if no falls have been previously reported (Drootin 2011). However, this could be counterproductive when several health professionals ask one individual the same question. Perhaps a more centralised database solution is needed to flag when an older person is due to have an annual discussion on their fall history. Nevertheless, even with a systematic approach to enhance our ability to identify all at risk individuals, this would not solve all the problems facing us. Finite health resources coupled with the ageing population, and for regional Australia, geographically dispersed communities, make it unlikely that the range of modifiable risk factors for fall injuries could be addressed through current approaches to managing fall risk.

**Fall related risk in the older population was inconsistently managed**

The current research indicates that there were missed opportunities to address fall risk factors in a known high-risk group within the GSAHS. Six key deficiencies in current practice affected the ability of health professionals to instigate timely intervention strategies for older people at significant risk in order to reduce risks and rates of further fall related injuries:

- Data showed that only 50% of older people who presented to an emergency department in GSAHS because of a fall were referred for any type of fall intervention, including fall risk screening.
- When fall related injury was managed outside of the hospital context, older people reported that the focus was on their physical injury rather than the contributing factors of the fall. This could have resulted in missed opportunities to address underlying causes through appropriate screening and interventions.
- Survey data showed that there was inconsistent use of validated fall risk screening tools across the GSAHS. This, combined with the lack of documentation pertaining to circumstances surrounding falls, can affect the ability to design and implement targeted falls prevention interventions.
- Survey data also showed a lack of routine follow up after attendance at a falls intervention. This would indicate that intervention strategies are not being progressed or adjusted to meet the changing context of an ageing individual.
Variability in access and availability of services was identified. This would limit the capacity to provide a coherent and equitable approach to fall related interventions and prevention strategies.

Participants reported climbing up on stepladders in the kitchen even though health professionals had placed safety rails in their bathrooms. That is, older people seemed to misinterpret health professionals’ advice on fall related risks.

This section will now discuss in detail the six key deficiencies in instigating timely fall related interventions that this research identified.

**At risk older people were not consistently referred for falls screening or interventions**

The available evidence suggests that a multifaceted approach to falls management is likely to provide the best results (Lamb et al., 2011; Gillespie et al., 2012; Tinetti et al., 1994; Waldron, Dey, Nagree, Xiao, Flicker, 2011). Existing multifaceted approaches require the ability to identify older people in most need of support and ensure that there are appropriate pathways to access necessary services for reducing their risk (ACSQHC, 2009). Currently we are able to identify older people who sustain serious injury because of a fall when they present to an emergency department. These older people are usually at a higher risk of subsequent falls, given the injury itself may increase their risk (Rubenstein & Josephson, 2002). They are also likely to be in the greatest need of further fall risk screening and implementation of fall management strategies to reduce their risk. However, Chapter 5 identified that only 50% of older people who presented to an emergency department because of a fall were being referred on for any type of fall intervention, including fall risk screening. This finding is consistent with two studies undertaken in Canada. Donaldson et al. (2005) found that only 55% of older women who presented to an emergency department as a result of a fall were referred for further fall assessment. Salter et al. (2006) found that only 31% were referred to their family doctor but no participants who attended their doctor received any fall related assessment. It is difficult to know why the referral rate is so low in this high-risk group of older people or why a more consistent approach has not been implemented to enhance the referral pathways. This is important because the current research indicates there are many missed opportunities to address fall risk factors in this known high-risk group. It is likely that
missing such opportunities results in recurrent hospitalisations and associated health care costs (Mikolaizak, Simpson, Tiedemann, Lord & Close, 2013; Russell et al., 2009) so this finding may help explain why fall related hospitalisation rates were relatively high in GSAHS, as indicated in Chapter 3.

As discussed above, when older people do present to an emergency department because of a fall, it provides an opportunity to identify their risk of subsequent falls. In addition, emergency department staff can ascertain the circumstances surrounding the fall so that appropriate referrals can be instigated. Regardless of the current limitations in capturing data on contributing factors for falls, the available evidence supports enhancing referral pathways for older people at high-risk of falling (Donaldson et al., 2005; Salter et al., 2006; Tiedemann, Lord & Sherrington, 2012). As detailed in Chapter 5, referral pathways for at risk older people presenting to emergency departments were problematic, heightening the importance of other mechanisms and data sources to capture and assess information on fall risk factors and ensure relevant referrals occur. This raises questions regarding how we manage at risk older people in need of referral before they present to an emergency department with a serious injury. It is estimated that 1 in 3 older people living in the community will experience a fall each year (McClure et al., 2005). A proportion of these falls are likely to result in some injury that needs to be treated by a health professional providing community based care, creating a valuable opportunity for early preventive intervention.

In 2008-2009, 25% of NSW ambulance responses to older person fall events did not result in their transport to hospital as these people refused treatment or requested an alternate referral pathway (Simpson et al., 2013). A fall significant enough to warrant calling an ambulance would indicate the potential that the older person has fall risk factors that should have been addressed. Metcalfe (2006) suggests that ambulance officers dealing with non-admitted patients post fall should instigate appropriate referral pathways, proposing that this could drastically reduce the number of fall related emergency department admissions. The findings from Chapter 6 indicate that even if ambulance officers are providing alternate referral pathways, such as advising the person to see their local doctor, it may not necessarily mean that the person will heed this advice or that their
doctor will instigate appropriate fall interventions. In an Australian study conducted by Lee et al. (2015), 41.8% of participants surveyed reported discussing falls with their local doctors but did not recall receiving any recommendations to assist in preventing future falls. This was also a common finding in this current research, where older people who presented to their doctor after a fall reported that management focused on treating the subsequent injury rather than prevention strategies (Chapter 6). This approach may result in a vulnerable group of older people who may not access appropriate falls assessment and interventions, resulting in poor health outcomes and repeated need for ambulance (Dixon et al., 2009) and hospital services.

Inconsistent referral pathways to fall risk screening and falls interventions from hospital emergency departments is an important issue raised in the findings of both Chapter 5 and Chapter 6. In Chapter 6 it was also noted that there were varying approaches towards fall related referral pathways for older people from community based health professionals. Even though fall injuries managed by doctors or other health professionals in the community setting are likely to be less severe than those resulting in hospitalisation, it is still probable that older people presenting in this situation are at risk of further falls which could result in more significant injury in the future (Milat et al., 2011).

Focus on the physical injury rather than contributing factors

A falls telephone survey of NSW residents in 2009 found that 22.7% of older people who had fallen in the previous 12 months had sought medical treatment external to a hospital for injuries because of that fall (Milat et al., 2011). When older people do present to a health professional because of a fall, findings shown in Chapter 6 indicate that the focus is typically on treatment of the injury rather than identification of the factors contributing to the fall. Focusing on a curative model based on the presenting injury and neglecting factors contributing to falls is also discussed in the broader literature (Zecevic, Salmoni, Speechley & Vandervoort, 2006). This approach limits opportunities to instigate appropriate prevention strategies to reduce the risk of subsequent fall events, potentially resulting in greater injury and hospitalisation.
In addition, the current research found that for older people who were provided with fall prevention interventions alongside their injury management, the strategies tended to focus on a single element, such as a home assessment or an exercise program over a discrete period of time (Chapter 5 & Chapter 6). Participants in this research reported difficulties accessing ongoing management strategies such as progressive exercise programs or review of home modifications. These experiences provide disturbing evidence that we may not be addressing the development of additional or concurrent risk factors as people age. Instigating a more holistic approach that encompasses a wide range of strategies over a longer period may provide greater opportunities to address the complexity of factors that influence fall risk and so reduce the chance of future falls.

**Inconsistent use of validated fall risk screening tools**

Increasing the referral pathways for older people who have experienced a fall may not be a sound solution if individual risk factors are missed (Chapter 5). Despite the availability of validated fall risk screening tools for identifying fall risk and risk factors within the community setting this research found that they were not consistently employed. This indicates gaps in the identification of relevant fall related risk factors in older people in this regional setting. The inconsistent use of fall risk screening tools across the GSAHS coupled with a lack of documentation in emergency department records of circumstances surrounding a fall event (identified in Chapter 5), means that some GSAHS health professionals would have had difficulty determining the most appropriate fall related interventions for an older person’s circumstances. It is concerning that even when older people are identified as being *at risk* and in need of fall risk screening, we can still fail to address individual risk factors due to inconsistent screening practices. This may provide some explanation as to why the GSAHS has a higher rate of fall related hospitalisations when compared to other regional areas in NSW (Chapter 3).

**Lack of routine follow up**

The ability to follow up on an older person once their level of fall risk was established was also a considerable limitation in the practices observed in the GSAHS. Chapter 5 identified that almost half the sites located in the GSAHS did not have a formal process in place to reassess an older person’s fall risk status over time. This finding was also
supported by findings in Chapter 6 where participants commonly reported no follow-up, or at best limited follow-up, from health professionals after a fall. Evidence suggests that as we age the risk of falling increases (Rubenstein, 2006). The ageing process, alongside the development of co-morbidities associated with ageing, is likely to change fall risk status over time (Gillespie et al., 2012). Findings from this research (Chapter 5) have shown that in the GSAHS there were limited opportunities in some sites to re-assess risks or follow-up older people who had fallen. This issue was alluded to in Chapter 6, when a family member described how her mother could not be re-assessed for fall risk as she had already been assessed, albeit 10 years previously (see page 5). However, it should be noted that half the sites did have a formal process for reassessing an older person’s risk status over time and so were following best practice guidance. The systems employed by these sites constitute a foundation on which the broader health service could develop comprehensive system improvements.

Understanding this gap in follow-up is important. Possible explanations could include limited resources in regional and rural areas, as discussed in Chapter 5. As well, health professionals may be failing to appreciate the importance of follow up, or the behavioural influences and perceptions towards risk as described by participants (Chapter 6). Whatever the reasons, the lack of routine follow-up impacts on the currency of any fall intervention as over time an intervention may lose relevance or may not address emergent risk factors. This would leave older people vulnerable for subsequent falls with more severe outcomes. Failure to effectively manage fall risk factors over time may also explain why the rates for fall related hospitalisations were higher in GSAHS (Chapter 3), when compared to other regional Area Health Services in NSW.

Inconsistent follow-up presents several challenges. First, older people who do not perceive they are at risk are unlikely to engage with long-term interventions. Second, they may believe, for example, that at the conclusion of a fall related exercise program they are safe because they have done what the health professional recommended, (as seen in the example of Yvonne Chapter 6, page 228). Research suggests that falls are related to a number of contributing factors that occur at once involving an interplay between extrinsic or environmental factors and the intrinsic or physiological factors rather than a
single cause (Bueno-Cavanillias et al., 2000; Delbaere et al., 2010a; Faulkner, 2009; Gillespie et al. 2003; Lord, Menz & Tiedemann 2003; Lord et al., 2006). This research has also shown the criticality of behavioural risk factors and the influence they have on participants’ decisions, potentially raising their risk of fall. This is important, as people may believe that completing one intervention will future proof them from subsequent falls unless health professionals effectively articulate the complexity of fall risks emphasising that an individual has continued level of risk following intervention. Without this it is likely that older people will continue to undertake high-risk activities because they believe that the intervention has shielded them from risk. For example, Yvonne who used a stepladder in her kitchen because she believed that her leg weakness would be resolved by completing the prescribed exercises and prevent her from falling again, (Chapter 6). This also demonstrates the importance of addressing behavioural fall risk factors alongside an individual’s intrinsic and extrinsic risk factors.

Variability in access and availability of services
Access to and availability of services were also found to be a significant barrier to providing a comprehensive approach to fall related interventions and prevention strategies. Findings from Chapter 5 indicate that within GSAHS some older people experienced obstacles to accessing fall related services. Restrictions placed on services to support only older people at very high risk of falling are problematic because they limit opportunities to educate all older people who are still at risk. Such restrictions may perpetuate the myth that people with lower levels of fall risk who cannot access these services should not be concerned about falling.

There is need for alternative approaches to provide general awareness of fall risk factors and ways to prevent falls for low to medium risk individuals (Logan, 2010; Metcalf, 2006). Targeting older people at low to medium risk of falls and fall related injuries also enables strategies to be implemented before more significant disability occurs. This approach could have positive outcomes for individuals and the health sector by potentially reducing the number of older people presenting to emergency departments with major injuries that are costly to manage, (as reported in Chapter 3). It is also likely to enable
older people to remain confidently active in the community with a reduced risk of falls and fall injuries.

**Unclear communication by health professionals regarding fall related risks**

This research has highlighted the importance of health professionals’ effectively articulating the complexity of fall risks and an individual’s continued level of risk. Of concern were findings that suggest a lack of a coordinated approach to managing older people’s understandings of fall risk factors across the GSAHS (Chapter 5 & Chapter 6). In addition, health professional advice seemed, at times, to have missed the mark. Participants described focusing their fall risk attention on the area the health professional focused upon, and practices that showed that they were not transferring advice to other spaces. It is noteworthy that it appeared other health messages were interfering with fall risk advice. For example, some participants described doing high-risk activities (e.g., climbing ladders to clean gutters), in the belief that such activities kept them active, and that the more active one was, the safer one would be, (as seen in the comments from Alfred in Chapter 6, page209). The findings from Chapter 6 indicate that there were breakdowns in communication between some health professionals and older people with respect to keeping active to reduce their risk of falls and keeping safe while remaining active. We are unlikely to be able to curb fall rates in the future without a more holistic approach that not only addresses extrinsic and intrinsic risk factors but also the behavioural element of decisions to undertake fall risk activities.

**The influence independence has on behavioural decisions and the perception of risk**

Behavioural decisions of older people, linked to their understanding of fall risk and their desire to maintain independence, was an important finding (Chapter 6). These behavioural decisions towards fall risk were influenced by four elements:

- Risk taking activities were underpinned by the value the older person placed on independence and their willingness to cover up their personal struggles to maintain their independence.
- Decisions to undertake high risk activities related to the participant’s desire not to burden family or friends with tasks they thought they could undertake themselves, as well as financial influences.
- Fear of falling can significantly affect a person’s daily living activities.
- Older people were not translating knowledge of fall risks across the full range of contexts. This results in older people being cautious in certain areas of their home but not all.

This section will now discuss in detail the four key influences identified through this research that affected behavioural decisions of older people towards fall risk.

**Risk taking activities were underpinned by the value the older person placed on independence**

The findings reported in Chapter 6 revealed that there was an interdependent relationship between an older persons’ understanding of fall risk, their perception of their own risk status, and their willingness to accept support. Importantly, this research found that this interdependent relationship was underpinned by the value the older person placed on independence. The literature provides evidence that when older people are successfully referred into fall interventions it does not mean they will actively take on advice to minimise their risk or even attend such programs (Delbaere et al., 2010b; Hughes et al., 2008; Yardley et al., 2006a). One explanation uncovered by this research is that the behaviour may be driven by people valuing their independence more than actively being safe.

**Decisions to undertake high-risk activities related to the participant’s desire not to burden family or friends and financial influences**

This current research found that two elements drove decisions to undertake high-risk activities despite knowing they may result in a fall. The first was a desire not to burden family or friends with tasks they thought they could or should undertake themselves, especially if they perceived they were still capable to undertake the task. The second was financial constraint. A reluctance to ask for assistance from family or friends was
identified as a strong driver to undertake high-risk activities. Central to this behaviour was the desire not to be a burden, as can be seen by Gayle (Chapter 6, page 217). Financial constraints influencing decisions to undertake tasks that might risk a fall, while perhaps not unexpected, was an interesting and important finding from the current research. The essentially finite resources of some older community dwellers affected behavioural decisions. For example, Alana (Chapter 6, page 241) described how rising electricity costs were forcing her to reduce the time she had lights on in her home. This meant that she was navigating in a dark and dim environment, increasing her risk of falling through tripping on an unseen object. The impact of electricity costs on fall risk levels highlights the need for a more holistic approach towards managing fall risk that takes in to account the impact of seemingly unconnected elements. It is also important to consider alternative solutions for people reluctant or unable to rely on the support of family members or friends to assist with tasks. Finally, appreciating the financial constraints that older people face is critical to effectively dealing with the complexity of factors that can contribute to falling.

**Fear of falling can significantly affect a person’s activities of daily living**

Some participants in this research had experienced psychological trauma from a severe injurious fall. As shown in Chapter 6 this may result in ongoing fear of subsequent falling, which was reported to limit an older person’s daily living activities. This finding is consistent with the previous literature (Faulkner et al., 2009; Nevitt, Cummings, Kidd & Black, 1989; O’Loughlin, Robitaille, Boivin & Suissa, 1993). The psychological impacts of falling are well documented in the literature, (Cumming, Salkeld, Thomas & Szonyi, 2000; Friedman, Munoz, West, Rubin & Fried, 2002), and fear of falling is a known risk factor for future falls (Delbaere et al., 2010b). Of concern is that the participants in this current research reported very little focus by health professionals on managing this particular risk factor (Chapter 6). To ensure we are appropriately addressing the needs of older people who have fallen and key elements that may play a role in subsequent falls there is a need to ensure that suitable strategies are in place to support the management of the psychological impact associated with injurious falls. These might include, for example, structured programs that assist older people to increase confidence, through cognitive behavioural therapy (Finch, Bamford, Deary, Sabin & Parry, 2014; Peel, Bell & Smith, 2008) and adoption of an attitude of risk prevention (Huang, 2005).
Older people not translating knowledge of fall risks across the full range of contexts

The way some health professionals are approaching current fall intervention strategies may be contributing to older people’s misunderstanding of fall risk factors. Findings from Chapter 4 indicate that the most common place of a fall was the home; this is also supported by the previous literature (Berg et al., 1997; Northridge et al., 1995; Ruynan et al., 2005; Vu et al., 2011). Research indicates that home assessments are an effective way of managing fall risk in this environment (Gillespie et al., 2012). Health professionals undertaking home assessments often focus on known risk factors, such as poor lighting, slippery rugs, leaving clutter in high traffic areas and inappropriate footwear (Feldman & Chaudhury, 2008; Hornbrook et al, 1994; Johnson, Cusick & Chang, 2001; Lord et al., 2006). Extrinsic risk modification in perceived high-risk areas, such as using railings for the bathroom and toilet or stairs has been shown to be an effective intervention (Gillespie et al., 2012; Cumming et al., 1999). An important finding from this current research was that older people did not translate knowledge of safe practice across different contexts. For instance, if the focus of the health professional was on reducing falls in the bathroom, some participants only associated fall risk with the bathroom. That is, they did not appreciate similar risk factors existed in other areas of the house. This resulted in their being cautious in spaces that health professionals focused on as fall risk spaces, while continuing to undertake high-risk activities in other locations within the home. A good example of this can be seen in excerpts from Beryl (see page 215), who had hand rails installed in her bathroom to help her balance when stepping into the shower, but still used her step ladder in the kitchen. Failure to translate knowledge of risks across contexts may indicate deficiencies in the ability of health professionals to appropriately articulate risks associated with falling. It is reasonable to suggest that this issue leaves older people vulnerable to subsequent falls within the home environment.

Existing fall intervention strategies tend not to include strategies to address the influence of behavioural decisions associated with risk taking (Chapters 5 & 6). Failing to appreciate the impact of the behavioural aspect on fall risk, as identified in this current research, may mean that even individuals whom we assume have been appropriately managed may still be putting themselves at risk of falls.
In summary, the findings from this multisource data collection across one large regional area of Australia indicate that current approaches in falls management do not adequately encompass the complexity of fall related risk, including the influence of the behavioural aspect as a key risk factor. This current research provides additional support to the understanding that behavioural risk factors are just as important to consider, alongside the reported intrinsic and extrinsic fall related risk factors, and all should be a focus of fall related interventions. It is evident that the existing health model is failing to mitigate subsequent fall risks in the older high-risk population let alone prevent falls in individuals who are at risk but yet to sustain significant injury. The challenges associated with managing increasing fall related injury rates within a reactive health care context are likely to have a sizeable impact on future health budgets while lacking sustainability within an ageing Australian community.

Without a more holistic approach that not only addresses both intrinsic and extrinsic risk factors but also the behavioural influence of risk taking decisions, we are unlikely to be able to curb future fall rates. Alternative approaches need to be considered in order to provide a more collaborative and sustainable approach to managing fall related injury risks and risk factors in the older population across our communities. Without these we risk a fall epidemic, putting further strain on our struggling health system in an ageing society.

The following section will present a proposed alternative approach, the Safe Active Living model, for holistically managing fall related risk factors in older people living in the community.

**Addressing fall risk in regional Australia: a proposed new model**

Falls in the older population have been cited as a significant public health issue, both in Australia and internationally (ACSQHC, 2009; Kelsey, Procter-Grey, Hannan & Li, 2012; NPHP, 2005). The Safe Active Living model, now proposed in this thesis, provides an alternative approach to address the concerns highlighted by the current research. The
The proposed model builds on a social ecological framework which is commonly used in public health initiatives (Baral, Logie, Grosso, Wirtz & Beyrer, 2013; Baron et al., 2014; Mittler, Martsolf, Telenko & Scanlon, 2013; Nuss et al., 2016; Satariano et al., 2012). Central to the proposed model is a move towards a more transformative approach that encompasses and engages the older person within the community. The proposed approach also provides multiple resource and support mechanisms (Lieberman, Golden & Earp, 2013) to assist older people to take a more active role in managing their own risks, rather than being passive recipients of health interventions (Child et al., 2012).

This section will discuss the social ecological approach underpinning the proposed Safe Active Living model to demonstrate how such a framework could be adopted to manage fall related risk factors in older people living in regional community.

**Social ecological framework**

To combat fall related injury rates we need a population wide approach that embraces independence and empowers individuals to make appropriate safety decisions to manage their own risk. Evidence suggests that effective public health programs require a focus on behavioural change at many levels, including the individual, the community and relevant organisations (Glanz & Bishop, 2010). It is not feasible or sustainable for the health sector to manage fall related risk on its own.

The social ecological approach was founded on the work of Urie Bronfenbrenner (1977) and draws attention to both individual behaviour and interactions with the environment. Bronfenbrenner (1977) proposed that multiple levels of influence are required to facilitate behavioural change. He specifically viewed change in a holistic way that encompasses interactions with family and community groups as well as the larger social system such as health sectors and other government organisations in which the individual is embedded (Bronfenbrenner 1977). Building on Bronfenbrenner’s seminal work in this area was the framework suggested by McLeroy, Bibeau, Streckler & Glanz (1988), with five levels of influence that can affect behavioural change in health. To instigate partnership based community focused intervention strategies in health, they concentrated on the interplay
between the elements of five factors: intrapersonal (characteristics of the individual); interpersonal (social networks); institutional; community; and public policy (McLeroy, et al., 1988). Many have drawn on the work of Bronfenbrenner and McLeroy et al. (Golden & Earp, 2012), with the social ecological approach being widely used in public health for disease prevention and health promotion (Richard, Gauvin & Raine, 2011). Areas include physical activity (Bauman et al., 2012; Spence & Lee, 2003), mobility and ageing (Satariano et al., 2012), fruit and vegetable consumption (Graham, Pelletier, Neumark-Sztainer, Lust & Laska, 2013) and weight loss (Gorin et al., 2013). Its success is based on the ability of the framework to focus on the contextual determinants of health, such as socioeconomic factors, and on other social and cultural influences (Marmot, Friel, Bell, Houweling & Taylor, 2008) rather than just on the physical person. Supported by the World Health Organisation (Blas & Kurup, 2010) and the Center for Disease Control and Prevention (Golden & Earp, 2012), the social ecological approach recognises the complexity of the combined influences of the social, environmental and biological influences on health (Krieger, 2001) as well as the interaction of the person with organisational structures within society (Richard et al., 2011).

Within the falls prevention research conducted to date, there has been only one article, published in 2008 by Ganz, Alkema & Wu, which focused on the need to rethink how to implement population wide approaches to fall prevention. Based on an American population, Ganz et al. (2008) used the Health Organization Innovative Care for Chronic Conditions (ICCC) framework to argue that in order to manage fall prevention strategies successfully, greater coordination and collaboration across settings was required. Their proposed model incorporated greater linking between healthcare organisations and the community, facilitated by a positive policy environment to ensure sustainability through legislative change and structured partnerships (Ganz et al., 2008). In addition, the Western Australian Department of Health published a Falls Prevention Model of Care framework that incorporated four key areas in creating healthy populations, implementing falls prevention strategies, optimising care pathways and communication, and supporting the translation of research into practice (Department of Health, Western Australia 2014). Similarly, the Queensland Department of Health has developed the Stay On Your Feet® community good practice guidelines that provide prevention models focused on the whole community (Peel, Bell & Smith 2008). However, these models still strongly focus
prevention on physical and physiological risk factors associated with falling, without consideration of the behavioural influences identified in this current research.

. Other studies have mentioned the importance of population wide approaches (Day et al., 2010; Day et al., 2011; Sherrington, Tiedemann, Fairall, Close & Lord, 2011) but these studies have mainly focused on implementing exercise or physical activity within the community without discussing all of the interrelated elements of risk identified in this current research. Given the issues raised by this research program, the current medical model designed to address an individual’s physiological fall risk factors fails to appreciate all influencing elements, such as behavioural decisions, associated with falling in the older population. Failing to address interplaying influences affecting older people is likely to impede our capacity to attain successful and sustainable injury prevention in this area, even with increased collaboration and partnerships as proposed by Ganz et al. (2008). Adopting a social ecological approach to address fall related injury risks in our communities provides an opportunity to tackle this issue from a proactive population wide approach. Drawing on the models proposed by the key researchers in this field such as Bronfenbrenner (1977), McLeroy et al. (1988) and Golden, McLeroy, Green, Earp & Lieberman (2015), the Safe Active Living model proposed below addresses the complex processes associated with fall risk factors highlighted in this current research.

The following section will discuss in detail the proposed Safe Active Living model to assist in the management of fall related risks for older people living in regional Australia.

The Safe Active Living model to address the complexity of fall related risks for older people living in the community.

The Safe Active Living model embraces a population wide approach that will address the complexities associated with managing fall risk factors in diverse communities through greater collaboration and integration between the community, health sector and government organisations, all in partnership with the older person (Figure 7-1).
Embedded within the model are four interconnecting elements that are required to assist older people to manage their individual fall risk and to facilitate safe independence. The four interconnecting elements include the following:

1) **Community** – both the general community and family and friends of the older person
2) **Government organisations** – Federal, State and Local Government
3) **Environment** – the physical environment as well as the social environment
4) **Health Sector** – including both the public and private sector

Integral to the *Safe Active Living* model is the strong interconnection of elements that facilitate necessary behavioural change through engagement with older people while respecting their desire for independence. Importantly, the older person is pivotal to the management of their own fall risk and so is connected to each of the elements surrounding the centrepiece of the *Safe Active Living* model. Encircling the model is the population wide approach, signifying that fall related risk is just not an older person’s problem, but rather a community wide issue. Typically, models founded in a social ecological framework visually demonstrate the dynamic relationship between individuals, groups,
and their environment (Golden et al., 2015). The Safe Active Living model is depicted as a puzzle with all pieces required to be connected in order to be complete and effective. This highlights the multi-element collaboration required on multiple levels in order to manage the complexities associated with fall risk factors identified in this current research.

The following section will discuss in detail how each of the elements of the puzzle - community, government, environment and the health sector can contribute to older people engaging in safe active living and minimise their risk of falling.

Community
A significant finding of this current research was the lack of understanding demonstrated by older people, the general community, and family and friends, of the range of individual risk factors that can cause falls, including behavioural influences. To make informed choices about engaging in activities or programs aimed at preventing falls, people need to have basic information about the benefits (WHO, 2008). It is evident that increased awareness in this area is needed and, importantly, we cannot afford to wait until someone has sustained a fall related injury before we implement strategies to reduce their risk. The current research has shown clearly that existing practice does not consistently facilitate early identification of at risk individuals, in part because those at risk have reasons to downplay their level of risk and in part due to a lack of screening, access, routines and resources. Therefore, rather than increasing efforts to promote an approach that is fundamentally flawed, we need to take a grassroots approach that will increase general awareness of fall related risk factors across all facets of the community and promote safe participation in the community.

Mass media campaigns have the ability to influence community perceptions regarding considered norms (Randolph & Viswanath, 2004) and can effect behavioural change (Wakefield, Loken & Hornik, 2010). They have been used successfully in areas such as curbing smoking (Durkin, Brennan & Wakefield, 2012), increasing physical activity (Heath et al., 2012), preventing HIV infection (Melkote, Moore & Velu, 2014), reducing
drink driving (Ditsuwan, Veerman, Bertram & Vos, 2013), protecting against skin cancer (Iannacone & Green, 2014) and screening for breast cancer (Smith et al., 2009), to provide a few examples. In addition, the Stay on Your Feet® program (Milligan 2005), highlights the need for social marketing campaigns that provides awareness to older people that falling can be a problem and to consider the consequences and individual risk of falling (Peel, Bell & Smith 2008). On this basis, as one element of a multifaceted approach, mass media campaigns may help to reduce fall risk, particularly in those older people who identify with the risks they face. Mass media campaigns may also promote discussion of these issues among those who could potentially support older people in reducing their fall risk by assisting them with risky chores and maintenance. This latter mechanism may benefit not only on older people who identify with fall risk, but also those who do not yet identify with these risks. Importantly, mass media campaigns have the ability to increase discussion about a particular topic, such as falling or safe active living, within an individual’s social network (Wakefield et al., 2010). Such discussion may in turn have a positive impact on fall rates, despite the difficulties evident from the current research in detecting and targeting interventions to those at risk of falling within our communities.

Campaigns aimed at the broader community, including family members and those who provide health care to older people, are also important, as they can influence older people’s decisions (WHO, 2008). Prompting greater discussion between older people and family and friends on their mobility challenges can facilitate offers of assistance in completing high risk tasks, rather than relying on older people to ask for help, which this current research identified often does not happen. Growing community awareness of fall related risks and approaches to safe active living, through media campaigns supported by government funding is likely to promote such discussion within communities.

Increasing awareness of the influence of behavioural decisions in creating fall related risks is likely to raise general community understanding in this area, and may result in a reduction in the perception that falling is just an unavoidable occurrence that is part of ageing. Evidence suggests that traditional health messages focusing on falls prevention
are less effective than positive messages promoting healthy ageing\textsuperscript{11} and maintaining safe independence (Hughes et al., 2008). Positive health messaging on safe and active living, using mass media, may not only increase community conversation (Ganz et al., 2008), but also reduce the current stigma associated with falling, as perceived by older people. The use of peer education strategies to address the range of fall related risks and approaches to reducing this risk may also be useful (Peel & Warburton 2009; Allen 2004). Increasing discussion and awareness among older people and the community regarding fall related risks is one of many elements that needs to be addressed. Government policy direction, infrastructure and investment are also important elements.

**Government**

Population wide models based on the premise that preventive health programs are solely orientated towards modifying individual behaviour are of limited value (Glanz & Bishop, 2010). A more productive and sustainable approach is to have community partnerships and organisational structures in place to support older people in managing their own risks, enabling safe independence and greater control over their own health and wellbeing (South, 2014). This requires commitment from all levels of government and policy makers to provide sufficient funding and resource allocations to ensure that there are adequate levels of support to meet the individual needs of older people within the community (WHO, 2008). Without appropriate commitments and partnerships, it is unlikely that the necessary long-term changes in this area will be realised.

Successful community focused programs require a dedicated organisation or agency to facilitate them (McLeroy et al., 1988). As such, the proposed Safe Active Living model requires community based individuals, situated outside the health sector, to link older people with the local community support they require to maintain safe and active independence. One way to achieve this is through community champions, such as healthy ageing officers, who could foster capacity building and assist older people navigate the

\textsuperscript{11} A commonly cited definition for Healthy ageing is “optimising opportunities for improving and preserving health and physical, social and mental wellness, independence, quality of life and enhancing successful life-course transitions” (Health Canada, 2002).
services they require to help meet their individual needs. The available evidence supports the use of community based health champions for their ability to build relationships, disseminate knowledge and advocate for specific community groups (Dao, Otolorin, Gomez, Carr & Sanghvi, 2015; Woodall, White & South, 2012). A move towards appointing dedicated healthy ageing officers has occurred in some local government councils within Australia, but not in all. There are inconsistent approaches seen across local government councils. For example, Canterbury City Council, in the state of New South Wales, has a positive ageing program project officer dedicated to building capacity with community organisations in order to develop initiatives to support healthy ageing, and build general awareness of healthy ageing within the community. Some local governments, such as Bayside Council in the state of Victoria, have instigated a Healthy Ageing Reference Group to support healthy ageing initiatives in their community. Other councils simply have a focus on coordinating community support programs that may or may not be specific to healthy ageing initiatives. It is common for local government councils to have some form of strategic planning based on healthy ageing within their community. This indicates a commitment by local government to recognising the importance of healthy ageing for older people living in the community and provides an opportunity and potential platform for establishing a more holistic and consistent model across councils for healthy ageing. If sufficiently supported by both State and Federal funding, a pilot healthy ageing model could be trialled in a regional local government area, to evaluate the effectiveness and feasibility of the model to better integrate initiatives and create supportive environments for safe and active living especially within our regional and rural communities. This new approach, facilitated by community champions such as healthy ageing officers, may enable greater connectedness between older people and available support mechanisms within the proposed Safe Active Living model.

The appointment of a central person, (such as a healthy ageing officer), to coordinate local community level initiatives linked to mass media campaigns promoting safe and active living, will provide older people with direct pathways to access assistance. This approach has the potential to reduce the reluctance of older people to ask family members and others to assist them in undertaking high-risk activities (Chapter 6), as well as assisting older people who do not have any family support. Without having appropriate and timely pathways to access support within the community, media campaigns to
increase awareness are likely to be of little use in optimising the behavioural decisions that influence falls.

**Environment**

Extrinsic or environmental risk factors are well reported in the literature, (Ambrose et al., 2013; Li et al., 2006; Peel, 2011; Rubenstein, 2006), as discussed in Chapter 2. In the context of the proposed *Safe Active Living* model, environmental factors not only include the physical elements but also social environmental influences. Social ecological approaches are founded on the view that the social environment (McLeroy et al., 1988) influences behaviour. Consequently, both the physical and the social environments need to be addressed if we are to achieve behavioural change to reduce fall risk.

Physical risk factors within the home environment constitute a well-known issue for fall risk (WHO, 2008). The current research adds the influence of older people choosing to undertake high-risk activities around their home, which may be contributing to the high rates of home-related falls seen within the hospital admission data sets (Chapter 4). Evidence supports the home being the most common location for fall related injury (Vu, et al., 2011; Chapter 4) and the current research indicates risk-taking behaviour may contribute to this type of injury. Access to funding for low cost home and garden maintenance for older people, facilitated through local government healthy ageing officers, could reduce fall related injuries related to this type of activity. Local government funding to assist older people with the cost of house and garden maintenance may be a useful strategy. Alternatively, the ability to access local government employees or accredited volunteers to undertake this type of maintenance at a subsidised rate may also influence behavioural decisions of people that affect risk. Healthy ageing officers could also play a greater role in advocating for older people in different government organisations, such as departments of housing, to facilitate recommended home modifications. This was a challenge noted by Alice in Chapter 6 (see page 224).

The social environment focuses on the individual and their interactions within the wider social system or community (Golden & Earp, 2012; Kok, Gottlieb, Commers & Smerecnik, 2008. Key to successful health promotion strategies is collaboration between
the community and a health promoter to influence behavioural change (Kok et al., 2008; Stokols, 1996) by engaging older people to participate in community programs. Evidence suggests that community champions can have a positive effect through developing local networks and building relationships with community groups (Dao, Otolorin, Gomez, Carr & Sanghvi, 2015). If healthy ageing officers were in place across all local councils, they could encourage community service groups - for example, Rotary\textsuperscript{12}, Probus\textsuperscript{13} or Lions Clubs\textsuperscript{14} - to consider supporting healthy ageing initiatives and further engage older people to be actively involved in their community. Such community groups could also be involved in funding assistance or volunteering time to assist older people in need of support, either physical or social. Given the ageing Australian population there is likely to be a potentially larger pool of active older age people willing to undertake volunteering (Warburton, 2014). Older people bring a significant wealth of skills and experience that can be harnessed to assist in meaningful contributions to the community (National Office for Local Government, 2003). As well, they may be better placed to understand the contexts of older people’s situations. Volunteering has been shown to provide positive benefits to older people as it provides a pathway for productive and healthy ageing while enabling older people to remain active within their community post-retirement (Warburton, 2014). The development of initiatives involving older volunteers, facilitated through healthy ageing officers, to assist in the delivery of community driven programs to support healthy ageing may contribute to the sustainability of such programs. At the same time there is potential for reducing social isolation of some older people (Warburton, 2014). Opportunities also exist to develop capacity in community organisations such as Rotary, Probus or Lions Clubs to support initiatives, financially or

\textsuperscript{12} Rotary is a service club, which is an “international network of business, professional and community leaders who strive to make the world a better place through practice efforts. The reward of ‘paying it forward’ unites men and women from different backgrounds, cultures, religious and political beliefs, allowing ordinary people to do extraordinary things” (www.rotaryaustralia.org.au)

\textsuperscript{13} Probus is “an association for active members of the community, and for those no longer working full time, to join together for a new lease of life. It provides opportunities to progress healthy minds and active bodies through social interaction and activities” (www.probussouthpacific.org)

\textsuperscript{14} Lions is a service club with a mission that includes “… to fund and otherwise serve the civic, cultural, social and moral welfare of the community and assist financially, culturally, socially, and morally the disabled, disadvantaged and infirm of the community both directly and indirectly” (www.lionsclubs.org)
physically, that directly and indirectly focus on safe and active living within the community.

Research indicates that intervention strategies such as exercise programs, especially strength and balance programs, are effective in assisting with the reduction of fall risk (Delbarere et al., 2010a; Sherrington et al., 2011; Sherrington et al., 2008). However, these types of interventions are only effective if older people continue to incorporate them into their daily lives (Sherrington et al., 2011), and if they are adjusted to meet the changing needs of the individual over the long term. The current research identified that one area of concern was the perception by participants that once they had completed a specific fall intervention, such as an exercise program, run over a discrete period, they were safe from falling in the future. Previous evidence also suggests that there is a greater population level effect from fall related exercise programs offered to the general community rather than individual level programs focusing solely on high-risk groups (Sherrington et al., 2011). Population wide initiatives that focus on general exercise programs, alongside greater collaboration between the health sector and the community, are likely to result in fall related exercise programs becoming an accepted part of everyday life and an important part of healthy ageing for older people. This approach may also encourage older people who perceive they are not at risk of falling (Hughes et al., 2008), despite having a previous fall history (Chapter 6), to start to undertake such programs that they previously may not have considered necessary.

Developing a range of options and programs available in the local community to support healthy ageing enables older people to choose the most appropriate option for their individual circumstances. It may also foster social participation and encourage networking within the community, especially for older people who have sustained psychological trauma because of a fall, which is not a focus of current fall intervention strategies. Programs initiated and facilitated at a community level also provide pathways and support for older people who have completed specific falls interventions, such as the Stepping On Program (Clemson et al., 2004), so they can continue with ongoing falls prevention after the conclusion of the program. Without establishing the necessary skills and encouragement to instigate community-based exercise over the long term,
interventions such as strength and balance programs are an ineffective management option (Sherrington et al., 2011). Programs run over discrete periods not only fail to reduce the burden of fall related injury, but also consume finite funding resources without significant benefit. Older people equipped with the proper knowledge and support can be encouraged to maintain independence while actively being safe. Effective health messages and community programs need to focus positively on maintaining safe active living and healthy ageing, rather than on falls prevention. The use of a community wide approach to facilitate safe active living is an important strategy if we are going to engage all older people in this process, especially for older people who place a high value on independence, the particular group of older people this current research found were less likely to admit to falling (Chapter 6).

Addressing the environmental element within the Safe Active Living model, both from a physical and social perspective, is important given the findings of the current research. Behavioural change towards risk taking will only be achieved if appropriate strategies are in place to support older people within the community. Without appropriate support mechanisms, such as providing low cost home and garden maintenance within the home environment, older people are likely to continue to take risks. Additionally, without community programs that encourage older people to adopt a healthy ageing lifestyle that facilitates ongoing exercise and strength and balance activities over the long term, the benefits of current short-term fall intervention strategies are likely to be rapidly lost. Healthy ageing initiatives enhance social participation through safe and active living and are also likely to have a cumulative effect on the overall health of older people, creating more resilient and socially engaged communities.

Health sector
In the proposed Safe Active Living model, the health sector is still required to play an integral role in managing fall risk in older people. It is evident from the challenges identified in the current research that continuing to use current approaches means that the health sector alone will not be able to successfully tackle fall related risks and injuries. Given the complexities associated with fall risk factors it is impractical to expect that we have the ability to identify all older people who are potentially at risk of falling (Chapter
5) and even less likely that there are the resources to manage this risk via the health sector alone within diverse communities across Australia (Davis & Bartlett, 2008; Perkins, 2012).

Initiatives such as the healthy ageing officers within local government managing local programs and initiatives can enable referral pathways in and out of the health sector depending on the individual needs of the person. This approach would require greater collaboration and partnership between the local government agencies and health sector than currently exists in many communities. If achieved, this approach would allow the health sector to focus on managing individuals at high-risk of injury, and provide community driven models to assist older people who are at low to medium risk, potentially reducing the rates of fall related hospitalisations in these people. Population health resources from within the health sector may be usefully deployed in support of this approach.

As identified by this current research the health sector as a whole does need to evaluate its current ability to identify high-risk individuals and put appropriate strategies in place to reduce their risk of future significant injury. To achieve this improved communication with older people identified as high-risk is required so there is greater awareness of the issues associated with falling and the importance of reporting even minor fall events (Hill, 2004) in this particular group. By increasing effective communication in this area both public and private health professionals have the opportunity to work collaboratively with the older person and with each other to manage this risk before further serious injury occurs.

Instigating better processes to streamline and improve consistency of referral pathways for older people presenting to emergency departments as a result of a fall is imperative (Close et al., 2012), especially given the poor referral rate for this known high-risk group (Chapter 5). Older people presenting to emergency departments because of a fall should be given the opportunity to be referred into either a community or health pathway to assist in the management of their risk, given they are likely to be at high-risk. Without appropriate fall risk pathways it is likely that older people will continue to present to
hospital due to subsequent injurious falls, consuming health resources and requiring longer bed stays because of more serious injury (Close et al., 2012). There is a need for further research to understand relationships between the hospital discharge process and fall risk and address why referral rates have been inadequate. Without such knowledge it is unlikely that we can put the necessary strategies in place to enhance our management and outcomes for this known high-risk group of older people.

Falls education provided by health professionals should be explicit to ensure miscommunication is not occurring and older people understand that being active does not equal undertaking high-risk activities, as perceived by Alfred in Chapter 6 (see page 209). Health professionals also need to be mindful of how older people may interpret discussions of fall risk factors. Given the finding (Chapter 6) of the ways older people can contextualise risk to specific locations within the home, health professionals need to understand all of the competing factors that can influence individual risk taking behaviour in older people. Conversely, health professionals also need to be mindful of the group of older people that overestimate their level of risk and limit all activities due to psychological fear of falling. Adopting a more holistic task management approach facilitates a greater appreciation of these factors and enhances the older person’s ability to manage their own risk more effectively.

Of considerable concern, this research identified that even when individuals at high-risk of fall related injury had interventions implemented there was little to no follow up provided by health professionals. Health professionals need to instigate appropriate strategies to review implemented fall intervention strategies with older people, rather than assuming, as suggested by the current research, that once an older person has been referred, they have been appropriately managed. Appropriate structures to provide ongoing monitoring of interventions in high-risk individuals and provide continual communication about safe independence are imperative to ensure older people are well supported as they age or their health status changes (Skelton & Todd 2005).
Greater collaboration between the older person and health professionals through a person-centred approach within the *Safe Active Living* model could facilitate discussion of the individual goals or activities of the person (Reuben & Tinetti, 2012). It would allow older people to articulate what is important to them, while ensuring there is a common alignment with proposed interventions that will enable the older person to achieve their individual goals or activities based on their personal circumstances (Day et al., 2010; Reuben & Tinetti, 2012). A holistic approach that centres on safe and active living also enables the development of behavioural change through a greater understanding of the perspective and psychosocial context of the older person (Yardley, Morrison, Bradbury & Muller, 2015; Katz 2013).

The ability to develop innovative programs using partnership models involving the health sector, local government and the community to engage older people and encourage them to maintain adequate levels of safe physical activity may also be valuable in tackling fall related injury in our communities (Day et al., 2010). Examples of strategic collaboration between the health sector and the wider community have been seen in other areas in Australia such as heart health. The Heartmoves program is an evidence based, low to moderate intensity physical activity program delivered by trained fitness and exercise leaders within the community and is financially supported by the government in collaboration with The Heart Foundation of Australia and the YMCA (NSW Department of Health, 2004). The basis of programs such as Heartmoves is to encourage ongoing support for people to engage in positive health behaviours over the long term rather than focusing on a single intervention over a short period. One of the goals of the Heartmoves program is to encourage ongoing physical exercise across the healthy older population and those with a wide variety of health conditions, to reduce the risk of falling. Collaboration between the health sector, community groups, and government and non-government agencies strengthens the sustainability of such programs over the long term and provides for ongoing participation amongst community members.

In summary, given that rates of fall related hospitalisations are continuing to rise within Australia, an alternative approach to managing fall risk is required. It is evident that different approaches and initiatives already exist within our communities to support older
people as they age. What is missing from current regional practice is a more coordinated approach from within and across the different areas of society that are concerned with facilitating the health and wellbeing of older people. Community based programs are supported in the literature (Sherrington et al., 2011). A population wide approach, such as the proposed Safe Active Living model, would provide a more holistic basis for fall risk management as it addresses the challenges identified in this current research in managing fall related risks in older people living in regional communities. The older person is the centrepiece of the model highlighting how important it is that they are active participants in this process. Being the centrepiece also flags the required connection to all of the elements so that appropriate strategies and support are available and accessible to enable them to manage their own level of risk. Helping conceptualise the Safe Active Living model is the visual depiction of a completed puzzle with all pieces interconnected. The complex interplay between the range of intrinsic, extrinsic and behavioural risk factors means that if a piece of the puzzle is missing, the holistic management of this interplay is unlikely to be achieved. Unique to the Safe Active Living model is the consideration that managing fall related risks is a community wide problem rather than just an older person’s problem. The model also has a focus on utilising the ageing population, not as a public health catastrophe, but as a resource and a means to address actively the challenges posed to our communities by fall related injuries.

CONCLUSION

It is evident that some flaws exist in current practice impeding our ability to reduce successfully the risks and rates of fall related injury in community-dwelling older people, in this regional community. Noted in this research were limitations in the ability of existing approaches to identify all older people at heightened risk of fall related injury. Other challenges identified by this research were inconsistent approaches to referring, implementing and following up on fall risk management strategies to reduce risk in older people. Alongside these identified challenges was the finding that current approaches in falls management do not adequately address the complexity of fall related risk, including the influences of the behavioural decisions made by older people striving for independence. The combination of these identified deficiencies in current practice may help explain why efforts to curb fall related injuries in communities in this particular
region, and possibly in other regional areas, are not reducing rates of fall related injuries and hospitalisations in the older population.

To tackle the long-term issue of ageing in regional Australian populations and increasing rates of fall related injury there needs to be a high degree of coordination across the health sector, government organisations and the wider community alongside effective collaboration between health professionals and older people (Ganz et al., 2008). Such an approach would address all facets of risk, including individual behavioural decisions. New and innovative approaches are needed in order to successfully reduce the significant burden fall related injury creates for older people living in our regional communities and for the communities themselves. Government agencies supported by a positive policy environment integrating policy change with a firm commitment to resourcing need to work together and in partnership with our communities to achieve public health goals for reducing fall related injury rates (Ganz et al., 2008). The proposed innovative Safe Active Living model offers a vision congruent with current population health strategies that employ a holistic approach to modify health behaviour through addressing physical, social and cultural influences, while harnessing the power of community partnerships (Richard & Gauvin, 2012). A greater focus on empowering and supporting older people to maintain safe independence through a population wide approach should be the emphasis in health practice and policy directions on fall related injury in the future.

The final chapter in this thesis will conclude by summarising the findings and discussion presented in this research program. This final chapter will also provide key recommendations for the relevant stakeholders involved in fall risk management. The recommendations are designed to improve current practice by trialling and evaluating a more holistic, population wide approach consistent with the proposed Safe Active Living model, to effectively address fall related risks for older people living in regional areas of the Australian community.
CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

The body of research reported in this thesis was designed to answer two overarching questions:

- What factors influence the risks and rates of fall related injury in older people living in regional Australian communities?
- What are the implications of these factors for fall risk management in regional Australia?

The findings from this body of research, summarised below and reported in preceding chapters, have led to the development of a proposed model for a new population wide approach for addressing fall related risks for older people living in the community. In contrast to traditional approaches, the Safe Active Living model is a holistic approach to fall risk management that aims to address the challenges associated with the complex interplay of fall risk factors identified in the current research. The purpose of this chapter is to provide a summary of the key findings of the current research and specific recommendations that arose from the research for key stakeholders in keeping with the Safe Active Living model. Additionally, the chapter includes discussion of the unique contributions of the current research, with consideration also of its strengths and limitations.

Until now no comprehensive investigation has been undertaken of the factors contributing to falling in older people residing in regional Australia. There has been a significant need to undertake further exploration in this area. Furthermore, the focus of this study on southern regional New South Wales (NSW) was warranted as standardised rates of fall related hospitalisations observed in this region were higher than other regional areas in NSW (Chapter 3). Synthesis of the findings from the different studies that formed the current program of research (Chapter 7) identified three overarching themes. These were:

- we are not currently able to identify all or even the majority of older people at risk of falls;
- we have an inconsistent approach to managing fall risk in older populations; and
- we are yet to realise the influence that the desire of older people for independence has on their behavioural decisions and their perceptions of risk.

Within these three themes, there were a number of key findings. Identification of older people at risk of falling and fall related injuries was hampered by poor data quality, an inability to systematically capture details or rates of fall incidents other than those recorded on the hospital or ambulance databases, and older people not disclosing they had fallen – to family members or health professionals. Appropriate fall risk management was inconsistently applied, with issues noted in referral pathways, screening and following up older people, and coupled with an incomplete, narrow approach to managing fall risk. A strong desire to retain independence influenced risk taking behaviours in older people. Psychosocial issues associated with fear of falling also drove decisions which potentially increased the risk of falling in the longer term. Finally, older people did not translate knowledge of fall risks and risk mitigation strategies across the range of settings they encountered, leading to heightened risks in some contexts.

These key findings may help to explain why southern regional NSW has had the highest standardised hospitalisation rates for fall related injury within regional NSW, and why standardised rates of fall related hospital admissions have continued to rise across Australia in recent years. Additionally, these key findings demonstrate the complexity associated with falling in older people and indicate potential reasons why traditional approaches to fall risk management are failing to have the desired effect in reducing rates of falls and fall related injuries. While fall related injuries are treated within the health system, the risk factors associated with falling largely lie outside the health sector (Mitchell & McClure, 2006; Chapter 6). As such, persisting with the current trend of managing falls primarily within a reactive, rather than proactive, health service model is unlikely to result in the desired long term benefits or sustainability in fall related injury prevention. New approaches are needed that embrace collaboration and partnership with older people and move beyond current approaches of the health sector. The proposed Safe Active Living model (Chapter 7), informed by a social ecological approach and the results of the current program of research, provides an alternate holistic means of managing falls.
within a regional community setting. The model involves the provision of multiple resources and support pathways to encourage and support older, community dwelling people to adapt their behaviours so they can manage their own individual fall risk through safe independence while remaining active and healthy members of the community.

STRENGTHS AND LIMITATIONS
The research presented in this thesis is the first to comprehensively explore risk factors associated with falls in the older population across a large and diverse regional area of NSW, Australia. Researching fall risks within a community setting is complex, with interdependent risk factors associated with physical, environmental, social and behavioural elements creating situations that pose a threat to the safety and independence of older people. These threats affect the openness of older people in discussing these issues, even with close family and friends, and certainly with health professionals.

STRENGTHS OF THE RESEARCH
The key strength of the current research was the use of a mixed method design. The research involved four different studies that collectively provided depth and scope to inform a comprehensive understanding of the factors associated with fall risk. This is important because the complexity associated with fall risk factors across the intrinsic, extrinsic and behavioural domains (Chapter 2), means that using only one research approach is likely to result in an incomplete picture of this complex interplay. Within the available Australian literature which has reported on fall risk factors (Chapter 2), all identified papers used a quantitative approach. The use of this single approach, alone, has limited our ability to fully understand the fall risk problem in older populations. The use of both quantitative and qualitative approaches in this current research provided the means to both assess the influence of known risk factors within the specific regional setting and uncover new insights which add to our current knowledge of factors that affect fall risk.

A second strength of the current research was the use of a risk management framework to inform the design phase of the current research. The risk management framework
(Standards Australia/Standards New Zealand, 2009) informed decisions regarding the data sets needed in order to gather comprehensive information on fall related risks and risk factors within a large regional population. In this way it provided a structure that ensured the full range of contextual and other factors associated with fall related risks were examined in a holistic manner.

The third strength of this current research was a design that scheduled each of the studies in a way that ensured that appropriate focus and immersion were achieved. The three quantitative studies were conducted and analysed first. Having the quantitative research elements completed prior to commencement of the qualitative element enabled the necessary immersion required to produce rigorous and trustworthy qualitative research within the fourth study (see Chapter 6) in this current research.

Finally, the research setting involved a large regional area that encompassed both very small rural communities and medium to large regional communities, adding further strength to the current research. This setting for the research enabled data to be collected and analysed from communities with different population sizes, so that differences in fall risk factors could be examined across the communities of varying size, thus adding to our overall understanding of fall risks and risk factors in regional communities.

**LIMITATIONS OF THE RESEARCH**

It should be acknowledged that the collection of data for this research reflects a specific point in time. This is especially true for the GSAHS Falls Baseline Surveys (Chapter 5), which captured data on the services and programs available to assist older people at risk of falling. As health service delivery is ever-changing this may mean that some of the findings in relation to healthcare may no longer apply. However, in-depth semi-structured interviews and focus groups (Chapter 6) that were undertaken later in the research identified similar issues to those identified in the Falls Baseline Surveys. This supports the likelihood of stability of the understanding gleaned from the Surveys reported in Chapter 5, and it is likely that key issues identified in the Surveys are persistent, in respect to services and referral pathways. Therefore, the findings related to services and programs
are likely to remain relevant in consideration of the broader picture of falls and falls prevention and it is quite possible they represent issues that are widespread, though possibly to varying degrees, both within Australia and internationally, since the burden of falls in older people is not reducing.

As discussed, factors associated with falling are complex, multifaceted and potentially different for each individual older person. Therefore, it was not practical for this current research to investigate all possible factors associated with falling within a regional context. The literature review for this thesis (Chapter 2) demonstrated that fall risk factors can be categorised into three broad domains, *intrinsic, extrinsic, and behavioural*. Intrinsic factors have been extensively discussed within the literature both in Australia and internationally (Chapter 2). In the design of the current research there was a deliberate decision made to focus particularly on the individual, that is, on the intrinsic and behavioural risk factors associated with the person *at risk* of falls, from a regional perspective. Therefore, it was beyond the scope of this research to comprehensively address extrinsic risk factors, though they were considered in Chapter 4 based on hospital admission data sets (which provided little useful information) and noted where discussed by individuals in the qualitative research reported in Chapter 6. However, it has been noted in the Australian literature that regional and rural areas are less likely to have appropriate or well-maintained infrastructure (Beard, Tomaska, Earnest, Summerhayes & Morgan, 2009; Beck, 2015; Boehm et al., 2013; Veitch, Salmon, Ball, Crawford & Timperio, 2012). Poor environmental conditions such as uneven ground surfaces and poor lighting have been cited in the literature as a common cause of falling for older people (Curl et al., 2015; Boehm et al., 2014; Chippendale & Boltz, 2014; Lai et al., 2009; Nyman, Ballinger, Phillips & Newton, 2013). There is limited current knowledge on how extrinsic or environmental risk factors in rural and regional areas of Australia interact with intrinsic and behavioural risk factors to contribute to an older person’s risk of falling when living in these communities. This interplay warrants investigation in future research.

Finally, given there were significantly lower rates of standardised fall related hospitalisations observed in two of the other regional Area Health Services (Chapter 3),
this may mean that there are differences in the types or levels of risk factors encountered by older people depending on where they reside in NSW. Therefore, caution should be applied in generalising the findings of the current research across the entire population of older people living within regional NSW or regional Australia. It is worth noting however that overall hospitalisation rates for fall related injury in NSW have continued to rise by 2.5% per year (Harvey & Close, 2013). Thus, consideration of the types of factors associated with falls identified by this current research, especially behavioural risk factors, is warranted. The holistic approaches recommended in this thesis to address these factors are likely to have application across the broader older population of Australia.

IMPLICATIONS OF THE RESEARCH AND RECOMMENDATIONS

The findings of this research led to the development of the Safe Active Living model, a model that provides an alternative, holistic approach to working with older people to encourage them to engage in safe active living and support them in maintaining their independence and quality of life. This model arose from identification of important issues that impact on our ability to effectively manage fall risks through our current approach. The recommendations provided below aim to guide practice and are consistent with the Safe Active Living model, which if successfully trialled in a regional setting could be subsequently trialled at a national level, possibly leading to a reduction in falls and fall related adverse outcomes.

The recommendations have been developed with five key audiences in mind: older people; the general community including family and friends; health professionals working with older people; the health sector; and government at all levels, federal, state and local. In keeping with the person centred model identified in this research, these recommendations will start with those for older people first.

The recommendations for these five audiences are provided in Tables 8-1 to 8-5 respectively alongside the desired outcomes to which they relate. Each table summarises
key recommendations relevant to the specific target audience, providing examples of strategies that could be employed to assist with achieving the recommendations.

Table 8-1 - Recommendations for older people

<table>
<thead>
<tr>
<th>Desired outcome</th>
<th>Recommended Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engagement in safe and active living</td>
<td>• Engage with initiatives, such as safety checklists to identify potential risk factors or hazards and instigate appropriate strategies to reduce these risks. This can be supported by awareness programs targeting safe and active living, as discussed below, and accessing community based resources, such as a national website, that focuses on providing information and useful strategies to assist older people in managing their own risk.</td>
</tr>
<tr>
<td></td>
<td>• Take responsibility to seek assistance rather than undertaking known high-risk activities, such as cleaning roof gutters.</td>
</tr>
<tr>
<td></td>
<td>• Support and encourage each other to engage in healthy ageing initiatives, minimise risk taking behaviour and undertake safe independence.</td>
</tr>
<tr>
<td></td>
<td>• Seek help to manage the psychological impacts of falling to improve quality of life.</td>
</tr>
<tr>
<td>Older people who are afraid of falling have access to resources to support their return to active safe living.</td>
<td></td>
</tr>
<tr>
<td>Increase communication by older people on their history of falls no matter how minor</td>
<td>• Disclose any history of falls to health professionals and support people.</td>
</tr>
<tr>
<td>Targeted education strategies that positively reinforce to older people that disclosing a fall history, even minor falls, provides opportunities to access services to assist in safe independence and can have positive health benefits by reducing the risk of serious injury in the future.</td>
<td></td>
</tr>
<tr>
<td>Desired outcome</td>
<td>Recommended Strategies</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Engage in safe independence over the lifespan</td>
<td>▪ Engage middle age and older aged volunteers to be safe and active living champions within the community who can deliver health promotion messages to community groups to increase awareness and safety programs targeted across the lifespan (Peel, Bell &amp; Smith 2008).</td>
</tr>
<tr>
<td>Recognition that safe and active living is good for all members of the community and is everyone’s responsibility.</td>
<td></td>
</tr>
<tr>
<td>Engage community volunteers to support safe independence programs</td>
<td>▪ Engage recently retired community members or community organisations such as Rotary, Probus and Lions groups to participate in volunteering in healthy ageing programs or initiatives (or undertake fundraising to financially support local programs) to assist older community members.</td>
</tr>
<tr>
<td>Utilise volunteering capacity of community members to support healthy ageing initiatives.</td>
<td>▪ Develop community based safe independence programs or initiatives that provide community members the opportunity to volunteer in initiatives such as peer education (Peel, Bell &amp; Smith 2008). Engaging with community organisations to assist with programs in a volunteering capacity not only assists with cost and sustainability of such programs, but also enables greater collaboration across community members.</td>
</tr>
<tr>
<td>Community awareness on the importance of independence and autonomy in ageing</td>
<td>▪ Engourage family and friends to access community based information for supporting older people to maintain safe independence and autonomy. This could be achieved through initiatives such as a NSW state website, as exampled by Western Australian and Queensland Health Departments (as discussed below).</td>
</tr>
<tr>
<td>Appreciation that older people need support but also need independence and autonomy.</td>
<td>▪ Engage older volunteers to deliver health messages to community groups that target middle aged individuals, who are likely to be involved in supporting older parents and friends, to appreciate the importance of independence and autonomy and provide useful strategies to assist</td>
</tr>
</tbody>
</table>
Desired outcome | Recommended Strategies
---|---
when working with older community members (Peel, Bell & Smith 2008).
- Encourage family and friends to engage in greater discussion with their older family members on individual fall risks and collaboratively develop potential strategies to assist in avoiding fall related injury while enabling safe independence. This could be achieved through the use of virtual interactive apps for mobile devices that family members could work through with older people (as discussed below).

<table>
<thead>
<tr>
<th>Desired outcome</th>
<th>Recommended Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effective communication with older people about managing fall risk</td>
<td>Health professionals are clear in their health promotion to older people to limit misinterpretation i.e. being active does not mean taking high-risk activities or focusing on a particular room in the home does not mean falls cannot happen in other areas.</td>
</tr>
</tbody>
</table>
- Engage in discussions with older people and ensure assessments focus on the range of risks that contribute to fall injury within all three risk domains; *intrinsic*, *extrinsic* and *behavioural*. |
- Develop appropriate and clear health promotion literature to support the delivery of the *healthy ageing with safe independence* messaging. |
- Recognise the importance of instigating discussion with older people about their individual needs and specific challenges associated with everyday tasks that pose a risk so that safer options can be considered. |
- Instigate cross referral, in collaboration with the older person, to ensure older people are linked to the right services for their individual needs. |
- Ensure current healthy ageing messaging includes a focus on all risk domains including the extrinsic and behavioural risks rather than just a focus on intrinsic or physical risks. |

Table 8-3 - Recommendations for health professionals
<table>
<thead>
<tr>
<th>Desired outcome</th>
<th>Recommended Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health professionals engage in positive health messaging when discussing intervention strategies i.e. healthy ageing rather than falls prevention.</td>
<td>• Change language from falls prevention programs to positive messaging (Peel, Bell &amp; Smith 2008) such as safe active living initiatives to encourage older people to engage with programs over the long term</td>
</tr>
<tr>
<td>Greater collaboration with older people in the management of fall risk</td>
<td>• Facilitate older people’s awareness of the range of individual fall risk factors to ensure older people do not perceive that they only need to complete one-off intervention strategies to manage risk.</td>
</tr>
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<td></td>
<td>• Engage in greater discussion with older people to identify their concerns around falling (fear of falling) and tasks they are not confident in completing but still undertake due to behavioural perceptions or necessity, through the use of cognitive behavioural therapy (Peel, Bell &amp; Smith).</td>
</tr>
<tr>
<td></td>
<td>• Ensure current home assessment processes for high-risk older people encompasses risk factors in all three risk domains. This will enable areas of concern to be highlighted and discussed collaboratively with older people and appropriate strategies implemented.</td>
</tr>
<tr>
<td>Greater collaboration between health professionals and the community to support healthy ageing initiatives</td>
<td>• Work collaboratively with local government to provide effective referral pathways between health services and community based programs to facilitate ongoing support of safe independence for older people.</td>
</tr>
<tr>
<td></td>
<td>• Engage with government initiatives such as the development of a home safety checklist for low to medium fall risk individuals (as discussed below).</td>
</tr>
<tr>
<td>Effective management strategies implemented for older people who have a fear of falling</td>
<td>• Ensure that older people who have a fear of falling are identified and appropriately referred for interventions that will assist in the management of this fear to assist in improving</td>
</tr>
<tr>
<td>Desired outcome</td>
<td>Recommended Strategies</td>
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<tr>
<td>-----------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>of a fall and this should be managed.</td>
<td>quality of life, through cognitive behavioural programs (Peel, Bell &amp; Smith 2008)</td>
</tr>
</tbody>
</table>

Table 8-4 - Recommendations for the health sector

<table>
<thead>
<tr>
<th>Desired outcome</th>
<th>Recommended Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner with older people to develop approaches that are able to effect change</td>
<td>Engage with older people, health professionals and community members as key stakeholders and collaboratively develop policy direction and initiatives that are holistic and meet the needs of older people in undertaking active safe living.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Desired outcome</th>
<th>Recommended Strategies</th>
</tr>
</thead>
</table>
| Active partnership with older people within the community to ensure that health sector policy design is congruent with their needs. | Review policy to ensure consistent practice for all at risk older people admitted to NSW hospital as a result of a fall:  
  o Detailed information captured on the circumstances surrounding the fall event.  
  o Appropriate fall assessments undertaken to determine necessary referral pathways.  
  o Referral pathways are consistently implemented during discharge process.  
  o Enhanced communication practices to ensure primary health care professionals are made aware of the fall event.  
  o Greater collaboration between ambulance services and primary health care providers for older people who have fallen but are not transported to hospital.  
  Evaluate current education given to discharge planners on fall related programs and services available to older people within the community to support the older person to reduce the risk of subsequent falls.  
  Evaluate existing communication strategies implemented across the health sector on current policy directives on managing fall risk in older people. |
<table>
<thead>
<tr>
<th>Desired outcome</th>
<th>Recommended Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardised practice for identifying and assessing fall risk</td>
<td>• Ensure standardised practice is instigated across the health sector including consistency between acute, sub-acute and community settings.</td>
</tr>
<tr>
<td></td>
<td>• Evaluate current training provided to all staff on the local implementation of fall risk management policy, including the use of standardised fall risk identification and assessment in older people. Consider training being provided in a range of different channels, for example communiques, webinars, face to face, depending on the needs at a local health site level.</td>
</tr>
<tr>
<td></td>
<td>• Development of virtual interactive programs to enable training and education to be accessed at any time when new staff members are employed or for sites located within rural or remote areas (Ghanbarzadeh, Ghapanchi, Blumenstein &amp; Talaei-Khoei, 2014).</td>
</tr>
<tr>
<td>Review of fall assessment documentation used within the health sector</td>
<td>• Evaluate current fall assessment documentation to ensure that it addresses all three risk domains and modify where appropriate.</td>
</tr>
<tr>
<td>Standardised fall assessment documentation that includes evaluating risks within all three risk domains.</td>
<td></td>
</tr>
<tr>
<td>Greater awareness by health professionals of the range of risks associated with fall injury for older people</td>
<td>• Evaluate current professional development programs or develop new programs for all health professionals working with older people with an emphasis on:</td>
</tr>
<tr>
<td>Health professionals have a greater understanding of risk factors causing fall injury within all three risk domains; <em>intrinsic</em>, <em>extrinsic</em> and <em>behavioural</em>, and appreciate that the independent factors are influenced by individual choices and decisions.</td>
<td>o Understanding risks attributed in all three risk domains and that falling is usually the result of multiple factors rather than a single physical cause. Therefore, addressing all contributing factors is important.</td>
</tr>
<tr>
<td></td>
<td>o The role independence plays on risk taking behaviour and decision making for older people.</td>
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<tr>
<td>Desired outcome</td>
<td>Recommended Strategies</td>
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</tr>
<tr>
<td>o Awareness that older people have a reluctance to admit to falling.</td>
<td>o Awareness of how fear of falling impacts on quality of life and social participation.</td>
</tr>
<tr>
<td></td>
<td>• The above key points are included in undergraduate or postgraduate health degree curricula to better prepare new health professionals to assist in reducing fall risks for older populations.</td>
</tr>
<tr>
<td>Development of greater partnership with the community to manage fall risk</td>
<td>• Trial a ‘Wellness Pathway’ approach (Han et al., 2015), that enables older people to be assisted beyond the health sector, through community partnerships and organisational structures that support community initiatives for older people living in the community.</td>
</tr>
<tr>
<td>Recognition that effective fall risk management cannot be exclusively achieved through the health sector.</td>
<td>• Commitment and resourcing to assist local government and community groups to establish effective programs within the community to assist and encourage older people to remain active and undertake safe independence.</td>
</tr>
<tr>
<td>Fall risk management is recognised to be everyone’s responsibility and requires collaboration and partnership in and outside of the health sector in order to be truly effective.</td>
<td>• Targeting health promotion on the importance of proactive reporting of potential hazards within the community which may lead to older people falling such as trip hazards or poor access, using a community based ‘Knowledge Discovery and Management’ approach as described by Brabham, Ribisl, Kirchner &amp; Bernhardt (2014).</td>
</tr>
<tr>
<td>Health sector actively involved in building capacity for community programs to be instigated to assist older people in healthy ageing and safe independence through guidance and mentorship.</td>
<td>• Use health sector expertise on fall related prevention to engage with community members and local service groups and assist in the facilitation of healthy ageing programs that are run for the community by the community and are self-reliant outside of the health sector.</td>
</tr>
<tr>
<td>Development of holistic community based falls prevention community programs</td>
<td>• Use collaborative partnerships to develop and trial embedded falls awareness and intervention</td>
</tr>
<tr>
<td>Desired outcome</td>
<td>Recommended Strategies</td>
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<tr>
<td>a range of community programs that older people regularly access or can regularly access.</td>
<td>strategies in a variety of community programs and services to reduce the perception that once an older person has completed one particular intervention they are then safe from falling for the long term (Clemson et al., 2012). If safe and active living programs are able to be accessed through a range of different groups this is likely to enhance safety messages across all members of the community, regardless of whether they believe they are at risk of falling or not.</td>
</tr>
<tr>
<td>Resources available to engage older people in the management of their own level of risk and safety.</td>
<td>- Develop or modify existing home safety checklist, such as the HomeFAST tool (Mackenzie, Byles &amp; Higgingbotham 2000), that incorporates identification of risk factors in all three domains. In collaboration with health professionals, older people are encouraged to be proactive in self-identification of potential risks factors within their home environment, and to identify or develop strategies to minimise the risk of falling. Safety checklists could be designed in paper based or virtual interactive apps for personal mobile devices (Gschwind et al., 2014).</td>
</tr>
<tr>
<td>- Develop and implement virtual interactive programs or modify existing programs, in collaboration with the government sector, to focus on risk factors in all three domains and safe active living, as discussed below (Gschwind et al., 2014; Zuckerman &amp; Gal-Oz, 2014; Bandura, 2004).</td>
<td></td>
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<tr>
<td>Development of programs that specifically target the psychological impacts of falling</td>
<td>- Targeted initiatives are available to assist older people who are afraid of falling.</td>
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<tr>
<td>- Evaluate existing programs or develop new initiatives that empower older people to seek help to manage the psychological impacts of falling to improve quality of life.</td>
<td></td>
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<tr>
<td>- Evaluate current referral pathways or develop initiatives to ensure targeted strategies are available to assist older people with the negative psychological consequences of falling.</td>
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<tr>
<td>Desired outcome</td>
<td>Recommended Strategies</td>
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</table>
| Policy direction to support healthy ageing initiatives                           | - Evaluate current NSW policy directives or guidelines and modify as appropriate so that they encompass holistic approaches to fall risk management. This would include focusing on all three risk domains and ensuring policy guidelines are designed to work with older people to help them manage their own individual risk of falling through innovative community programs (ACSQHC, 2009).  
- Instigate better collaboration of services between government departments (Mitchell & McClure, 2006). For example, department of housing with health departments so that there is improved integration of prevention strategies (Department of Health, Western Australia 2014). Or to provide financial support initiatives that offset costs such as electricity, or help to clean roof gutters, for older people trying to actively be safe. |
| Enhanced and coherent approach to fall risk factor data collection              | - Development of a NSW state based database that can be linked to hospital admission and ambulance data sets for injurious falls and accessed by health professionals in the community for falls that do not require hospitalisation. This may enhance research capabilities to identify fall related risk factors and circumstances, so that targeted interventions can be developed.  
- Develop accessible and easy reporting mechanisms within local government to facilitate the use of a community based ‘Knowledge Discovery and Management’ approach as described by Brabham, Ribisl, Kirchner & Bernhardt (2014). Examples could include development of a safety app for mobile phones (Gschwind et al., 2014), such as the snap send solve app (www.snapsendsolve.com) where any member of the community could report a potential hazard (including location and |
<table>
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<th>Desired outcome</th>
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<td>photographic evidence) to local government for further and timely investigation.</td>
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</table>

**Increased collaboration in falls prevention and falls management**

Integrated NSW State and Local government approach to policy design to facilitate coherent strategies in falls prevention (National Public Health Partnership, 2005).

- Review and align NSW State and Local government policies and programs of relevance to falls prevention, to replicate approaches seen in Western Australia and Queensland.
- Establish leadership responsible for healthy ageing that coordinates holistic programs and services that, in addition, help to prevent falls.

**Increased awareness of fall risk factors across the community**

Improved general awareness of fall risk factors, including the range of risk factors in the different domains; *intrinsic*, *extrinsic* and *behavioural* risk factors that contribute to falling.

- Develop community based media strategies to increase knowledge and awareness of fall risk factors and the importance of safe independence. This could be facilitated for maximum impact through a range of different approaches such as television, newspaper, magazines, and social media. In addition to targeting older people, community based media campaigns are also likely to increase awareness across the general population (Department of Health, Western Australia 2014; Wakefield et al., 2010).
- Instigate a life course approach (WHO, 2000) that targets education for middle aged individuals to encourage safe and active choices over the longer term and limits the perception that only older people need to make safe choices.
- Develop and fund, in collaboration, with the health sector, community based programs that increase awareness of fall related risks factors and strategies to minimise risks (Bandura, 2004). Targeted resources need to acknowledge the interplay between *intrinsic*, *extrinsic* and *behavioural* risks that can impact on safe independence in a range of locations and environments.
- Develop and implement virtual interactive programs or modify existing programs, in collaboration with the health sector, to focus on risk factors in all three domains and safe active living. This may engage older people who do not want to be involved in community-based programs and enable access for older people and
<table>
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<th>Desired outcome</th>
<th>Recommended Strategies</th>
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<tr>
<td>their families who live in rural or remote areas as well as older people who have limited physical access to social networks (Gschwind et al., 2014; Zuckerman &amp; Gal-Oz, 2014; Bandura, 2004). In addition, information resources and person-to-person advice may be disseminated via networks that already provide services to those with limited access, for example ‘Meals on Wheels’, community transport, and community nursing services.</td>
<td></td>
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</tbody>
</table>

### Increased understanding of the importance of safety across the community

**Proactive strategies implemented to reduce the risk before a fall occurs, with an emphasis on anyone can fall, not just older people, who perceive themselves to be at risk.**

- Develop targeted health promotion strategies that focus on wise decisions related to high-risk activities. Media campaigns similar to WorkSafe Victoria ([www.worksafe.vic.gov.au](http://www.worksafe.vic.gov.au)) that target awareness on the importance of safety across the community could be modified to change perceptions that only frail aged individual’s fall. This approach also supports greater awareness and thinking about safety before a fall event occurs.

### Access to information on fall risk factors and safe and active living strategies

**A dedicated single point for falls prevention information designed for different audiences, older people, community members and health professionals.**

- Trial a website that provides a range of resources including those that address: fall risk factors, older people’s experiences of falls and forums to discuss issues, safe and active living strategies and where people can access support (Maher et al., 2014).

### Commitment of funding to support policy direction

**Initial and ongoing resource allocation and financial commitment to proactive healthy ageing initiatives to support older people within the community.**

- Understand the need for new innovative models of risk management, and undertake a pilot program such as the *Safe Active Living* model, within a regional community setting to assist older people to engage in safe active living.
- If approaches such as the *Safe Active Living* model demonstrate reductions in rates of fall injury, provide dedicated ongoing financial support for infrastructure and initiatives, such as healthy ageing officers based within local government, to facilitate sustainable healthy ageing programs and initiatives to link older people with appropriate referral pathways in and.
Desired outcome

out of the health sector based on individual needs.

- Provide financial support for media campaigns to raise awareness (as discussed above) within the community about the fall related risk factors and the need to instigate ongoing healthy ageing strategies through safe independence.
- Investigate the feasibility of providing subsidised assistance to older people on age or disability pensions to access support to undertake general home and garden maintenance through local council employees or local providers.

RECOMMENDATIONS FOR FUTURE RESEARCH

The research presented here has contributed substantially to current understanding of the risk factors associated with falls and fall related injuries in regional Australia. Findings from the current research have informed development of an alternative model, the Safe Active Living model, to assist older people to manage their own risk of falling and maintain healthy and active participation within society. It is evident that this research has also generated a range of additional questions related to fall risk management within regional Australia, including:

- Can the findings of this research be replicated in other regional and non-regional areas of Australia and other countries, or are they specific to southern NSW?
- Are there fall risk factors unique to older people residing in regional areas when compared to those in metropolitan areas or are older people faced with similar risk factors, no matter where they live?
- Does greater awareness among older people of the need to report all fall events enable health professionals to instigate timely and effective injury prevention strategies before more serious injury occurs?
Can we reduce the rate of fall related hospitalisations within southern NSW and elsewhere by trialling a proactive approach to healthy ageing such as the Safe Active Living model?

CONCLUSION AND FINAL REFLECTION

I began this research journey with a thirst for new knowledge, thinking there was already a reasonable understanding of the types of factors that influenced risks of falling in older people. This prior understanding arose from both education as a podiatrist and from years of experience working with older people. Findings from this research have led to a transformational shift in my thinking, resulting in a new understanding of the multifaceted complexity of factors associated with falling. Talking to people who have fallen from a naïve (non-health professional) perspective helped highlight the profound physical and psychological impacts falling can have and the day-to-day struggles some older people face to remain independent.

A simplistic approach leads health professionals to focus on an older person’s presenting problem, rather than seeking a more holistic understanding of all of the contributing and interrelating factors. This current research has identified a critical deficiency in current practice models related to falls in older people, in that they tend not to encompass the broader context including choices and decisions people make that are influential to their safety and their independence. There is no doubt that unless there is a fundamental shift in the way we view and manage falling in older populations, fall related injury in older people will continue to be a significant problem for Australian society, the health sector and the government. Effective risk management is likely to require a greater emphasis on collaboration through holistic, person centred health initiatives. This is necessary if we are going to appreciate all the competing interests older people face when trying to retain independence and maintain control as they age while also managing their risk of falling.

Alongside this transformational shift in my own understanding of falls has been my development as a researcher. Moving through the different studies within this program of research has enabled me to evolve my own comprehension of and skills in research.
Engaging in this mixed method body of research has provided me with new skills and understandings across different approaches strengthening my confidence and abilities as a researcher.

I would like to finish this thesis with two quotes that encapsulate the essence of the complexity of managing fall risk. The first excerpt is from one of my participants as she described trying to balance the frailty of an ageing body against her desire to retain independence.

* * *

*I like doing things for myself. I mean I was never going to be a person that had to have help (...) You don’t think about being old. You don’t think of getting older. You just want to do the things you have always done. (Gayle - faller)*

This excerpt from Gayle highlights the personal experience of ageing in that it seems obvious when it is occurring to others, but is insidious when experienced personally and people suddenly find that they themselves have grown old. The nature of this experience coupled with an innate desire to be independent is at the heart of the complexity of falls management. The final quote from Dr Seuss seemed a fitting way to end this thesis.

* * *

So be sure when you step
Step with care and great tact
and remember that Life’s
A Great Balancing Act.

*(Oh, the places you’ll go! Dr Seuss, 1990)*

Taken literally this quote reflects the importance of considering fall related risks within the context of safe and active living. Taken figuratively, it reflects the notion that human interaction is not as simple as cause and effect - it is complicated with many competing
influences and, as such, a more balanced and holistic approach to managing fall risk for older people living in Australian communities is required if we are to have the desired impact in this area.
Reference List


groups: a comparison with the FARE (Falls risk by Exposure). Age and Ageing, 41(2), 190-195.


Appendices
28 June 2011

Ms Kristy Robson
PO Box 789
ALBURY NSW 2640

Dear Ms Robson,

Thank you for the additional information forwarded in response to a request from the Human Research Ethics Committee (HREC).

The CSU HREC reviews projects in accordance with the National Health and Medical Research Council’s National Statement on Ethical Conduct in Research Involving Humans.

I am pleased to advise that your project entitled “Hospital Falls Admission Data Project” meets the requirements of the National Statement; and ethical approval for this research is granted for a twelve month period from 28/06/2011.

The protocol number issued with respect to this project is 2011/082. Please be sure to quote this number when responding to any request made by the Committee.

Please note the following conditions of approval:

- all Consent Forms and Information Sheets are to be printed on Charles Sturt University letterhead. Students should liaise with their Supervisor to arrange to have these documents printed;
- you must notify the Committee immediately in writing should your research differ in any way from that proposed. Forms are available at www.csu.edu.au/research/forms/chrc_anrep.doc;
- you must notify the Committee immediately if any serious or unexpected adverse events or outcomes occur associated with your research, that might affect the participants and therefore ethical acceptability of the project. An Adverse Incident form is available from the website; as above;
- amendments to the research design must be reviewed and approved by the Human Research Ethics Committee before commencement. Forms are available at the website above;
- if an extension of the approval period is required, a request must be submitted to the Human Research Ethics Committee. Forms are available at the website above;

Version 2

FIA

www.csu.edu.au

The Commonwealth Register of Institutions and Courses for Overseas Students (CRICOS) Provider Numbers for Charles Sturt University are 00009F (WA), 011445V (VIC) and 009906 (ACT).
you are required to complete a Progress Report form, which can be downloaded as above, by 28/06/2012 if your research has not been completed by that date;

you are required to submit a final report, the form is available from the website above.

You are reminded that an approval letter from the CSU HREC constitutes ethical approval only.

If your research involves the use of radiation, biological materials, chemicals or animals a separate approval is required from the appropriate University Committee.

The Committee wishes you well in your research and please do not hesitate to contact the Executive Officer on telephone (02) 6338 4628 or email ethics@csu.edu.au if you have any enquiries.

Yours sincerely

[Signature]

Julie Hicks
Executive Officer
Human Research Ethics Committee
Direct Telephone: (02) 6338 4628
Email: ethics@csu.edu.au
Cc: Associate Professor Rod Page Associate Professor Julia Copley

Version 2

FIA
Ethics Letter Number 2

02 June 2008

Ms Kristy Robson
P.O. Box 789
Albury
NSW
2640

Dear Ms Robson

HREC reference number: 06/gsaahs/7
SSA reference number: 06/GSAHS/27
Project title: Greater Southern Area Health Service and Charles Sturt University Falls Program Baseline Survey

Thank you for submitting an application for authorisation of this project. I am pleased to inform you that authorisation has been granted for this study to take place at the following sites:

GSAS: community health and hospital sites.

The following conditions apply to this research project. These are additional to those conditions imposed by the Human Research Ethics Committee that granted ethical approval:

1. Original signatures relating to your SSA not yet submitted should be forwarded to us;
2. Proposed amendments to the research protocol or conduct of the research which may affect the ethical acceptability of the project, and which are submitted to the lead HREC for review, are copied to the research governance officer;
3. Proposed amendments to the research protocol or conduct of the research which may affect the ongoing site acceptability of the project, are to be submitted to the research governance officer.

You are also reminded that progress summaries should be submitted to the HREC yearly and on completion of the project. A template for these summaries is available on request to the HREC Executive Officer.

Wishing you every success with your research.

Yours sincerely,

Sally Josh
Research Governance Officer, GSAHS

Greater Southern Area Health Service
PO Box 1845 (54 Lower Street) Queanbeyan NSW 2620
Tel 02 6209 9777 Fax 02 6209 6363
Email corporate@gsah.health.nsw.gov.au
Website www.gsah.health.nsw.gov.au
ABN 15 156 642 397

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Tel 02 6209 9777 Fax 02 6209 6363
Email corporate@gsah.health.nsw.gov.au
Website www.gsah.health.nsw.gov.au
ABN 15 156 642 397

Beiler Health for Rural Australia
(f) Authorisation by Chief Executive (or delegate)

HREC Reference number:
Project Title (in full): Greater Southern Area Health Service and Charles Sturt University Falls Program Baseline Survey
Principal Investigator: Ms Kristy Robson

This research is: ☐ authorised ☐ not authorised

Specify, conditions applying to authorisation or reasons for not authorising.

My signature indicates that I authorise/d do not authorise this research project to commence at this site.

Name of Chief Executive (or delegate):
Name of Organisation:
Date: 25/4/08
Signature: 

Version 1.0
### Table B-1 – Identified Australian Papers on intrinsic fall related risk factors

<table>
<thead>
<tr>
<th>AUTHORS</th>
<th>STUDY TYPE</th>
<th>SETTING</th>
<th>POPULATION</th>
<th>STUDY OUTCOMES</th>
<th>INTRINSIC FALL RISK FACTORS EVALUATED</th>
</tr>
</thead>
</table>
| Clemson et al (2015)| Prospective cohort | Metro       | 1000 adults 65-94 years | ✓ (1,2,3) ✓ (1,2,4,6) ✓ (2) ✓ (1) ✓ (1) ✓ (1,2,3,6,7) ✓ | Socio-Demographic 1. Age 2. Gender 3. Ethnicity  
Fall Risk Screening 1. PPA ° 2. TUG ^ 3. FallScreen # 4. FROP-Com ■  
Cognition 1. Impairment 2. Executive Function 3. Memory  
Previous history of Falls Increasing age, slower gait (assessed by TUG) and depression were predictors of injurious falls |
| Carty et al (2015)   | Prospective cohort | Metro       | 201 adults 65-90 years | ✓ (1,2) ✓ (3,6) ✓ (1,2) ✓ (1) | Socio-Demographic 1. Age 2. Gender 3. Ethnicity  
Fall Risk Screening 1. PPA ° 2. TUG ^ 3. FallScreen # 4. FROP-Com ■  
Cognition 1. Impairment 2. Executive Function 3. Memory  
Previous history of Falls PPA & multiple steps versus single steps when forward balance was challenged was predictive of future falls. Age, gender, postural sway and TUG were not. |
<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Region</th>
<th>Sample Size</th>
<th>Falls Risk Factors</th>
<th>Fall Mediators</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kvelde et al (2015)</td>
<td>Prospective cohort</td>
<td>Metro</td>
<td>488 adults 70-90 years</td>
<td>✓ (1)</td>
<td>✓ (1,2,7)</td>
<td>Higher depressive symptoms and the use of antidepressants are risk factors for falls independent of reduced executive function and physical function tests.</td>
</tr>
<tr>
<td>Mitchell et al (2015)</td>
<td>Survey design</td>
<td>Metro &amp; Regional</td>
<td>5681 adults 65 years +</td>
<td>✓ (1,2)</td>
<td>✓ (1,4,7)</td>
<td>Sendentary behaviour, chronic health conditions and medication use were identified as mediators between obesity and falls.</td>
</tr>
<tr>
<td>Scott et al (2015)</td>
<td>Prospective cohort</td>
<td>Regional</td>
<td>135 women 70 years + at high risk of fracture</td>
<td>✓ (7)</td>
<td>✓ (2,4)</td>
<td>Changes in gait parameters including decreases in swing phase and increases in double support phase were associated with increased likelihood of recurrent falls.</td>
</tr>
<tr>
<td>Mitchell et al (2014)</td>
<td>Survey design</td>
<td>Metro &amp; Regional</td>
<td>5681 adults 65 years +</td>
<td>✓ (1,2)</td>
<td>✓ (1,7)</td>
<td>Older obese individuals had an increased risk of having a fall but not fall related injury compared to older people in a healthy weight range.</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Location</td>
<td>Number</td>
<td>Key Findings</td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Scott et al (2014)</td>
<td>Prospective cohort</td>
<td>Regional</td>
<td>135 women 70 years + at high risk of fracture</td>
<td>Low quadriceps strength but not gait speed was a significant predictor of multiple falls and time to the first fall over the 3 year study period amongst the population under study.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isenring et al (2013)</td>
<td>Prospective cohort</td>
<td>Metro</td>
<td>254 adults 65-90 years</td>
<td>There was no associations between malnutrition risk, the risk of falls, or actual falls found in the study.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menant et al (2013)</td>
<td>Prospective cohort</td>
<td>Metro</td>
<td>516 adults 73-92 years</td>
<td>Older people who report dizziness or light-headedness are at a greater risk of recurrent falls, regardless of their sensorimotor and balance functional level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Survey design</td>
<td>Metro &amp; Regional</td>
<td>Sample Size</td>
<td>Exclusion criteria</td>
<td>Findings</td>
<td>Notes</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>Mitchell et al (2013)</td>
<td>Survey design</td>
<td>Metro &amp; Regional</td>
<td>5681 adults 65 years +</td>
<td>✓ (1,2) ✓ (1,7) ✓ (5)</td>
<td>People who had fallen were more likely to be aged 85 years +, have a range of medical conditions, use 4 or more medications, use a mobility aid and be overweight.</td>
<td>✓ (1,2,4,5) ✓</td>
</tr>
<tr>
<td>Wong et al (2013)</td>
<td>Prospective cohort</td>
<td>Metro</td>
<td>520 adults 73 - 92 years</td>
<td>✓ (1,2) ✓ (1,7) ✓ (1)</td>
<td>The use of cardiovascular medication did not increase the risk of falls. The use of angiotension system-blocking medications was associated with lower fall risk.</td>
<td>✓ (1) ✓</td>
</tr>
<tr>
<td>Boersma et al (2012)</td>
<td>Cross-sectional study</td>
<td>Metro</td>
<td>145 adults 65 years + who had at least 1 fall episode in the previous 6 months</td>
<td>✓ (1,2) ✓ (1,3,6) ✓ (2,6)</td>
<td>Low levels of Vitamin D were associated with postural instability increasing fall risk.</td>
<td>✓ (1) ✓ (1,7) ✓</td>
</tr>
<tr>
<td>Study</td>
<td>Study Type</td>
<td>Population</td>
<td>Falls Associated</td>
<td>Executive Function</td>
<td>Functional Ability</td>
<td>Memory</td>
</tr>
<tr>
<td>-------------------------------</td>
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</tr>
<tr>
<td>Delbaere et al (2012a)</td>
<td>Prospective cohort</td>
<td>500 adults 70-90 years</td>
<td>✓ (1,2)</td>
<td>✓ (1,2)</td>
<td>✓ (1)</td>
<td>✓ (1,2,3)</td>
</tr>
<tr>
<td>Delbaere et al (2012b)</td>
<td>Prospective cohort</td>
<td>419 non-demented adults 70-90 years</td>
<td>✓ (1,2,7)</td>
<td>✓ (1)</td>
<td>✓ (1,2,3)</td>
<td>✓ (9)</td>
</tr>
<tr>
<td>Haere et al (2012)</td>
<td>Prospective cohort</td>
<td>500 adults 70-90 years</td>
<td>✓ (1,2)</td>
<td>✓ (1,7)</td>
<td>✓ (2,3)</td>
<td>✓ (1)</td>
</tr>
<tr>
<td>Study</td>
<td>Design Type</td>
<td>Metro</td>
<td>Participants</td>
<td>Scales</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
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<td>------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Menant et al (2012)</td>
<td>Prospective cohort</td>
<td>463 adults 70-90 years</td>
<td>✓ (1,2) ✓ (1,3,7) ✓ (2,3,6) ✓ (1) ✓ (1,2) ✓ (2)</td>
<td>In men only, Vitamin D insufficiency was significantly associated with falls.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smeee et al (2012)</td>
<td>Observational cohort</td>
<td>32 adults 65 - 92 years</td>
<td>✓ (1,2) ✓ (5,7) ✓ (7) ✓ (3) ✓ (1) ✓ (2) ✓ (5,7) ✓ (7) ✓ (3) ✓ (1) ✓ (2)</td>
<td>Age was the strongest predictor of increased fall risk and poor physical functionality was a strong independent risk factor for falls.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suttanon et al (2012)</td>
<td>Experimental design</td>
<td>50 adults (25 with mild to moderate Alzheimer disease &amp; 25 cognitively intact age and sex matched)</td>
<td>✓ (1,2) ✓ (1) ✓ (3) ✓ (1,2,4) ✓ (1,2) ✓ (2) ✓ (2) ✓ (2) ✓ (2)</td>
<td>People with Alzheimers disease had increased fall risk based on balance, mobility and screening tools but no significant difference in reported history of falls.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zheng et al (2012)</td>
<td>Prospective cohort</td>
<td>287 adults 70-90 years</td>
<td>✓ (1,2) ✓ (1,2,7) ✓ (1) ✓ (1,2) ✓ (1,2) ✓ (1,2) ✓ (1,2)</td>
<td>Greater volumes of cerebral white matter hyperintensities is associated with fall risk independent of reduced executive function and physiological function.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Study (Year)</td>
<td>Study Design</td>
<td>Location</td>
<td>Sample Description</td>
<td>Risk Factors</td>
<td>Findings</td>
<td></td>
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<tr>
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</tr>
<tr>
<td>Stanway et al (2011)</td>
<td>Prospective cohort</td>
<td>Metro</td>
<td>1183 men aged 70 years + (335 Italian born, 848 Australian born)</td>
<td>✓ (1,3) ✓ (1,2,6,7) ✓ (1,2,3) ✓ (1) ✓ (1,2,5)</td>
<td>Older Australian born men are more likely to fall compared to older Italian born immigrants.</td>
<td></td>
</tr>
<tr>
<td>Vu et al (2011)</td>
<td>Retrospective cluster analysis</td>
<td>Metro &amp; Regional</td>
<td>45000 adults hospitalised as a result of fall injury</td>
<td>✓ (1,2,3) ✓ (1)</td>
<td>Five specific co-morbid clusters were found in older people who were hospitalised for fall related injury; cardiopulmonary/metabolic, neurological, sensory, stroke and cancer.</td>
<td></td>
</tr>
<tr>
<td>Delbaere et al (2010a)</td>
<td>Prospective cohort</td>
<td>Metro</td>
<td>500 adults 70-90 years</td>
<td>✓ (1,2) ✓ (1,2,7) ✓ (1,2,3) ✓ (1) ✓ (1,2,3) ✓ (1) ✓ (9) ✓</td>
<td>Risk of falling was associated with disability, poor functional status, depression, poor executive function and a history of falls.</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Setting</td>
<td>Participants</td>
<td>Number</td>
<td>Risk Factors</td>
<td>Interventions</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------</td>
<td>-------------</td>
<td>-------------------------------------------------</td>
<td>--------</td>
<td>--------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Delbaere et al (2009)</td>
<td>Experimental</td>
<td>Metro</td>
<td>44 adults aged 70 years +</td>
<td>(1,2,3)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sanders et al (2010)</td>
<td>RCT</td>
<td>Regional</td>
<td>2256 women aged 70 years + at high risk of fracture</td>
<td>(1,2,3)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Prince et al (2008)</td>
<td>RCT</td>
<td>Metro</td>
<td>302 women aged 70-90 years</td>
<td>(1,7,4)</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>
Key

Rows shaded grey indication that the study investigated both intrinsic and behavioural risk factors

| SF-12 * | 12-Item Short-Form Health Survey (Ware, Kosinski & Keller 1996) |
| CS-PFP Δ | Continuous-Scale Physical Functional Performance 10 (Cress, Buchner, Questad, Esselman & Schwartz 1999) |
| PPA ° | The Physiological Profile Assessment (Lord, Menz & Tiedemann 2003) |
| TUG ^ | Timed Up & Go Test (Podsiadlo & Richardson 1991) |
| FallScreen # | Short form of the PPA (Lord, Menz & Tiedemann 2003) |
| FROP-Com ■ | The Fall Risk for Older People, community version (Russell, Hill, Blackberry, Day & Dharmage (2008)). |
Table B-2 – Identified Australian papers on extrinsic fall related risk factors

<table>
<thead>
<tr>
<th>AUTHORS</th>
<th>STUDY TYPE</th>
<th>SETTING</th>
<th>POPULATION</th>
<th>EXTRANSC FALL RISK FACTORS EVALUATED</th>
<th>STUDY OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mackenzie et al (2009)</td>
<td>Prospective cohort</td>
<td>Metro &amp; Regional</td>
<td>727 adults 70 years +</td>
<td>✓ (1,2) ✓ (1,7) ✓ (1,2) ✓ (1,2) ✓ (1,2) ✓ (1,2,3) ✓ (1)</td>
<td>Environmental risk factors alone have a weak association with falling but a stronger association in the presence of other fall related intrinsic risk factors.</td>
</tr>
</tbody>
</table>

Key

**Home Fast ^** The Home Falls and Accidents Screening Tool (Mackenzie, Byles & Higginbotham 2000)
Table B-3 – Identified Australian papers on behavioural fall related risk factors

<table>
<thead>
<tr>
<th>AUTHORS</th>
<th>STUDY TYPE</th>
<th>SETTING</th>
<th>POPULATION</th>
<th>BEHAVIOURAL FALL RISK FACTORS EVALUATED</th>
<th>STUDY OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clemson et al (2015)</td>
<td>Prospective cohort</td>
<td>Metro</td>
<td>1000 adults 65 - 94 years</td>
<td>✓ (1,2,3) ✓ (1,2,3,5) ✓ (2) ✓ (1) ✓ (1,5) ✓ (1) ✓ (1,2,3) ✓</td>
<td>Fear of falling was associated with increasing age, cognitive impairment, reduced social activity &amp; being female</td>
</tr>
<tr>
<td>Mitchell et al (2014)</td>
<td>Survey design</td>
<td>Metro &amp; Regional</td>
<td>5681 adults 65 years +</td>
<td>✓ (1,2) ✓ (1,3,4,6) ✓ (5) ✓ (1,2,4,5) ✓ ✓ ✓ (1)</td>
<td>Older adults who were obese had a higher risk of believing that falls were not preventable</td>
</tr>
</tbody>
</table>
**Key**

Rows shaded grey indication that the study investigated both intrinsic and behavioural risk factors

<table>
<thead>
<tr>
<th>PPA °</th>
<th>The Physiological Profile Assessment (Lord, Menz &amp; Tiedemann 2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUG ^</td>
<td>Timed Up &amp; Go Test (Podsiadlo &amp; Richardson 1991)</td>
</tr>
<tr>
<td>DCM *</td>
<td>Desired Control Measure (Reid &amp; Ziegler, 1980)</td>
</tr>
</tbody>
</table>
ICD-10-AM diagnosis codes relating to femoral or pelvic fractures

Table C-1 - ICD-10-AM diagnosis codes relating to femoral or pelvic fractures

<table>
<thead>
<tr>
<th>ICD-AM-10 Code</th>
<th>Diagnosis</th>
<th>Fracture definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>S72</td>
<td>Fracture of femur</td>
<td></td>
</tr>
<tr>
<td>S72.0</td>
<td>Fracture of neck of femur</td>
<td></td>
</tr>
<tr>
<td>S72.00</td>
<td>Fracture of neck of femur, unspecified</td>
<td></td>
</tr>
<tr>
<td>S72.01</td>
<td>Fracture of intracapsular section of femur</td>
<td></td>
</tr>
<tr>
<td>S72.02</td>
<td>Fracture of epiphysis (separation) (upper) of femur</td>
<td></td>
</tr>
<tr>
<td>S72.03</td>
<td>Fracture of subcapital section of femur</td>
<td></td>
</tr>
<tr>
<td>S72.04</td>
<td>Fracture of midcervical section of femur</td>
<td></td>
</tr>
<tr>
<td>S72.05</td>
<td>Fracture of base of neck of femur</td>
<td></td>
</tr>
<tr>
<td>S72.08</td>
<td>Fracture of other parts of neck of femur</td>
<td></td>
</tr>
<tr>
<td>S72.1</td>
<td>Pertrochanteric fracture</td>
<td></td>
</tr>
<tr>
<td>S72.10</td>
<td>Fracture of trochanteric section of femur, unspecified</td>
<td></td>
</tr>
<tr>
<td>S72.11</td>
<td>Fracture of intertrochanteric section of femur</td>
<td></td>
</tr>
<tr>
<td>S72.2</td>
<td>Subtrochanteric fracture</td>
<td></td>
</tr>
<tr>
<td>S72.3</td>
<td>Fracture of shaft of femur</td>
<td></td>
</tr>
<tr>
<td>S72.4</td>
<td>Fracture of lower end of femur</td>
<td></td>
</tr>
<tr>
<td>S72.40</td>
<td>Fracture of lower end of femur, unspecified</td>
<td></td>
</tr>
<tr>
<td>S72.41</td>
<td>Fracture of femoral condyle</td>
<td></td>
</tr>
<tr>
<td>S72.42</td>
<td>Fracture of epiphysis of femur, lower (separation)</td>
<td></td>
</tr>
<tr>
<td>S72.43</td>
<td>Supracondylar fracture of femur</td>
<td></td>
</tr>
<tr>
<td>S72.44</td>
<td>Intercondylar fracture of femur</td>
<td></td>
</tr>
<tr>
<td>S72.7</td>
<td>Multiple fractures of femur</td>
<td></td>
</tr>
<tr>
<td>S72.8</td>
<td>Fractures of other parts of femur</td>
<td></td>
</tr>
<tr>
<td>S72.9</td>
<td>Fracture of femur, part unspecified</td>
<td></td>
</tr>
<tr>
<td>S32.83</td>
<td>Fracture of pelvis NOS</td>
<td></td>
</tr>
<tr>
<td>S32.89</td>
<td>Other and multiple pelvic fractures</td>
<td></td>
</tr>
<tr>
<td>S32.1</td>
<td>Fracture of sacrum</td>
<td></td>
</tr>
<tr>
<td>ICD-AM-10 code</td>
<td>Diagnosis</td>
<td>Fracture definition</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td>S32.3</td>
<td>Fracture of ilium</td>
<td></td>
</tr>
<tr>
<td>S32.4</td>
<td>Fracture of acetabulum</td>
<td></td>
</tr>
<tr>
<td>S32.5</td>
<td>Fracture of pubis</td>
<td></td>
</tr>
<tr>
<td>S32.7</td>
<td>Multiple fractures of lumbar spine and pelvis</td>
<td></td>
</tr>
<tr>
<td>S32.8</td>
<td>Fracture of other and unspecified parts of lumbar spine and pelvis</td>
<td></td>
</tr>
<tr>
<td>S32.81</td>
<td>Fracture of ischium</td>
<td></td>
</tr>
</tbody>
</table>
Table D-1 - Rates of fall related hospitalisations for individuals 65 years and over living in NSW by Area Health Service

<table>
<thead>
<tr>
<th>All Fall Injuries</th>
<th>Directly Std Event Rate per 100000</th>
<th>Lower 95% CI Dire Std Rate</th>
<th>Upper 95% CI Dire Std Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>All</td>
<td>All</td>
</tr>
<tr>
<td>All NSW</td>
<td>2637.22</td>
<td>2626.6</td>
<td>2647.86</td>
</tr>
<tr>
<td>Greater Southern AHS</td>
<td>2811.81</td>
<td>2771.5</td>
<td>2852.55</td>
</tr>
<tr>
<td>Greater Western AHS</td>
<td>2531.31</td>
<td>2483.13</td>
<td>2580.18</td>
</tr>
<tr>
<td>Hunter &amp; New England AHS</td>
<td>1959.37</td>
<td>1935.01</td>
<td>1983.96</td>
</tr>
<tr>
<td>North Coast AHS</td>
<td>2101.24</td>
<td>2070.32</td>
<td>2132.51</td>
</tr>
<tr>
<td>Sydney South West AHS</td>
<td>2576</td>
<td>2549.11</td>
<td>2603.1</td>
</tr>
<tr>
<td>South Eastern Sydney &amp; Illawarra AHS</td>
<td>2883.45</td>
<td>2857.7</td>
<td>2909.36</td>
</tr>
<tr>
<td>Sydney West AHS</td>
<td>2905.73</td>
<td>2871.92</td>
<td>2939.84</td>
</tr>
<tr>
<td>Northern Sydney &amp; Central Coast AHS</td>
<td>2963.75</td>
<td>2938.51</td>
<td>2989.15</td>
</tr>
</tbody>
</table>

Table D-2 - Rates of fall related hospitalisations for individuals 65 years and over living in NSW by sex and Area Health Service

<table>
<thead>
<tr>
<th>All Fall Injuries</th>
<th>Directly Std Event Rate per 100000</th>
<th>Directly Std Event Rate per 1000002</th>
<th>Lower 95% CI Dire Std Rate</th>
<th>Upper 95% CI Dire Std Rate</th>
<th>Lower 95% CI Dire Std Rate</th>
<th>Upper 95% CI Dire Std Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td>All NSW</td>
<td>1983.39</td>
<td>3079.24</td>
<td>1968.57</td>
<td>1998.29</td>
<td>3064.34</td>
<td>3094.2</td>
</tr>
<tr>
<td>Greater Southern AHS</td>
<td>2104.34</td>
<td>3302.96</td>
<td>2049.12</td>
<td>2160.64</td>
<td>3245.74</td>
<td>3360.93</td>
</tr>
<tr>
<td>Greater Western AHS</td>
<td>1849.61</td>
<td>2984.99</td>
<td>1783.62</td>
<td>1917.39</td>
<td>2916.82</td>
<td>3054.34</td>
</tr>
<tr>
<td>Hunter &amp; New England AHS</td>
<td>1459.78</td>
<td>2308.01</td>
<td>1425.89</td>
<td>1494.27</td>
<td>2273.62</td>
<td>2342.79</td>
</tr>
<tr>
<td>North Coast AHS</td>
<td>1575.18</td>
<td>2492.86</td>
<td>1533.61</td>
<td>1617.58</td>
<td>2448.31</td>
<td>2538.01</td>
</tr>
<tr>
<td>Sydney South West AHS</td>
<td>2009.83</td>
<td>2962.06</td>
<td>1971.29</td>
<td>2048.92</td>
<td>2924.79</td>
<td>2999.68</td>
</tr>
<tr>
<td>South Eastern Sydney &amp; Illawarra AHS</td>
<td>2158.27</td>
<td>3382.16</td>
<td>2122.52</td>
<td>2194.47</td>
<td>3345.88</td>
<td>3418.73</td>
</tr>
<tr>
<td>Sydney West AHS</td>
<td>2132.52</td>
<td>3399.7</td>
<td>2085.31</td>
<td>2180.51</td>
<td>3352.74</td>
<td>3447.15</td>
</tr>
<tr>
<td>Northern Sydney &amp; Central Coast AHS</td>
<td>2255.74</td>
<td>3415.37</td>
<td>2220.07</td>
<td>2291.84</td>
<td>3380.32</td>
<td>3450.68</td>
</tr>
</tbody>
</table>
Table D-3 - Rates of hospital admissions due to fall related femoral or pelvic fractures for individuals 65 years and over living in NSW by Area Health Service

<table>
<thead>
<tr>
<th>Fall related femoral &amp; pelvic fractures</th>
<th>Directly Std Event Rate per 100000 All</th>
<th>Lower 95% CI Dir Std Rate All</th>
<th>Upper 95% CI Dir Std Rate All</th>
</tr>
</thead>
<tbody>
<tr>
<td>All NSW</td>
<td>878.33</td>
<td>872.23</td>
<td>884.47</td>
</tr>
<tr>
<td>Greater Southern AHS</td>
<td>883.3</td>
<td>860.71</td>
<td>906.32</td>
</tr>
<tr>
<td>Greater Western AHS</td>
<td>846.29</td>
<td>818.5</td>
<td>874.79</td>
</tr>
<tr>
<td>Hunter &amp; New England AHS</td>
<td>715.99</td>
<td>701.31</td>
<td>730.91</td>
</tr>
<tr>
<td>North Coast AHS</td>
<td>629.39</td>
<td>612.55</td>
<td>646.59</td>
</tr>
<tr>
<td>Sydney South West AHS</td>
<td>911.76</td>
<td>895.74</td>
<td>927.99</td>
</tr>
<tr>
<td>South Eastern Sydney &amp; Illawarra AHS</td>
<td>1020.6</td>
<td>1005.37</td>
<td>1036.01</td>
</tr>
<tr>
<td>Sydney West AHS</td>
<td>917.59</td>
<td>898.56</td>
<td>936.91</td>
</tr>
<tr>
<td>Northern Sydney &amp; Central Coast AHS</td>
<td>924.61</td>
<td>910.74</td>
<td>938.64</td>
</tr>
</tbody>
</table>

Table D-4 - Rates of hospital admissions due to fall related femoral or pelvic fractures in individuals 65 years and over living in NSW, by sex and Area Health Service

<table>
<thead>
<tr>
<th>Fall related femoral &amp; pelvic fractures</th>
<th>Directly Std Event Rate per 100000 Males</th>
<th>Directly Std Event Rate per 100000 Females</th>
<th>Lower 95% CI Dir Std Rate Males</th>
<th>Upper 95% CI Dir Std Rate Males</th>
<th>Lower 95% CI Dir Std Rate Females</th>
<th>Upper 95% CI Dir Std Rate Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>All NSW</td>
<td>565.19</td>
<td>1078.86</td>
<td>557.18</td>
<td>573.28</td>
<td>1070.18</td>
<td>1087.64</td>
</tr>
<tr>
<td>Greater Southern AHS</td>
<td>562.63</td>
<td>1097.11</td>
<td>533.63</td>
<td>592.78</td>
<td>1064.53</td>
<td>1130.42</td>
</tr>
<tr>
<td>Greater Western AHS</td>
<td>494.32</td>
<td>1069.57</td>
<td>459.72</td>
<td>530.79</td>
<td>1029.36</td>
<td>1110.93</td>
</tr>
<tr>
<td>Hunter &amp; New England AHS</td>
<td>466.15</td>
<td>882.37</td>
<td>446.74</td>
<td>486.19</td>
<td>861.38</td>
<td>903.75</td>
</tr>
<tr>
<td>North Coast AHS</td>
<td>389.08</td>
<td>801.33</td>
<td>368.25</td>
<td>410.76</td>
<td>776.44</td>
<td>826.81</td>
</tr>
<tr>
<td>Sydney South West AHS</td>
<td>613.37</td>
<td>1103.60</td>
<td>591.76</td>
<td>635.54</td>
<td>1081.06</td>
<td>1126.49</td>
</tr>
<tr>
<td>South Eastern Sydney &amp; Illawarra AHS</td>
<td>657.63</td>
<td>1252.97</td>
<td>637.75</td>
<td>677.96</td>
<td>1231.26</td>
<td>1274.96</td>
</tr>
<tr>
<td>Sydney West AHS</td>
<td>566.67</td>
<td>1133.99</td>
<td>541.91</td>
<td>592.25</td>
<td>1107.12</td>
<td>1161.36</td>
</tr>
<tr>
<td>Northern Sydney &amp; Central Coast AHS</td>
<td>612.80</td>
<td>1110.32</td>
<td>594.22</td>
<td>631.82</td>
<td>1090.88</td>
<td>1130.00</td>
</tr>
</tbody>
</table>
Table D-5 - Rates of fall related femoral or pelvic fractures resulting in hospital admissions for individuals 65 years and over within the Greater Southern AHS catchment area, by community population size

<table>
<thead>
<tr>
<th>Fall related femoral &amp; pelvic fractures in GSAHS</th>
<th>Directly Std Event Rate per 100000</th>
<th>Lower 95% CI Dir Std Rate</th>
<th>Upper 95% CI Dir Std Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>All NSW</td>
<td>878.33</td>
<td>872.23</td>
<td>884.47</td>
</tr>
<tr>
<td>ALL GSAHS</td>
<td>883.3</td>
<td>860.71</td>
<td>906.32</td>
</tr>
<tr>
<td>48,000 plus</td>
<td>756.57</td>
<td>693.49</td>
<td>823.84</td>
</tr>
<tr>
<td>18,000 to 47,999</td>
<td>906.37</td>
<td>871.82</td>
<td>941.94</td>
</tr>
<tr>
<td>5,000 to 17,999</td>
<td>964.95</td>
<td>926.39</td>
<td>1004.7</td>
</tr>
<tr>
<td>Less than 5,000</td>
<td>941.1</td>
<td>862.61</td>
<td>1024.8</td>
</tr>
</tbody>
</table>

Table D-6 - Rates of hospital admissions due to fall related femoral or pelvic fractures for individuals aged 65 years and over and residing within the Greater Southern AHS catchment area, by sex and community population size

<table>
<thead>
<tr>
<th>Fall related femoral &amp; pelvic fractures in GSAHS</th>
<th>Directly Std Event Rate per 100000</th>
<th>Directly Std Event Rate per 100000</th>
<th>Lower 95% CI Dir Std Rate</th>
<th>Upper 95% CI Dir Std Rate</th>
<th>Lower 95% CI Dir Std Rate</th>
<th>Upper 95% CI Dir Std Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>All NSW</td>
<td>565.19</td>
<td>1078.88</td>
<td>557.18</td>
<td>1070.18</td>
<td>1087.64</td>
<td></td>
</tr>
<tr>
<td>ALL GSAHS</td>
<td>562.63</td>
<td>1097.11</td>
<td>533.63</td>
<td>1064.53</td>
<td>1130.42</td>
<td></td>
</tr>
<tr>
<td>48,000 plus</td>
<td>529.25</td>
<td>888.85</td>
<td>440.84</td>
<td>802.9</td>
<td>981.4</td>
<td></td>
</tr>
<tr>
<td>18,000 to 47,999</td>
<td>568.2</td>
<td>1133.59</td>
<td>524.56</td>
<td>1083.61</td>
<td>1185.28</td>
<td></td>
</tr>
<tr>
<td>5,000 to 17,999</td>
<td>630.14</td>
<td>1193.69</td>
<td>580.58</td>
<td>1137.87</td>
<td>1251.53</td>
<td></td>
</tr>
<tr>
<td>Less than 5,000</td>
<td>564.49</td>
<td>1197.51</td>
<td>469.01</td>
<td>1082.12</td>
<td>1321.78</td>
<td></td>
</tr>
</tbody>
</table>
Table E-1 - External causes for fall related injury resulting in hospital admission in the GSAHS catchment area.

<table>
<thead>
<tr>
<th>External Cause for fall related injury</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other fall on same level</td>
<td>3586</td>
<td>55.3</td>
<td>54.08</td>
<td>56.5</td>
</tr>
<tr>
<td>Fall involving bed, chair or other furniture</td>
<td>388</td>
<td>5.98</td>
<td>5.43</td>
<td>6.59</td>
</tr>
<tr>
<td>Fall on and from steps or stairs</td>
<td>384</td>
<td>5.92</td>
<td>5.37</td>
<td>6.52</td>
</tr>
<tr>
<td>Fall on and from ladder</td>
<td>136</td>
<td>2.1</td>
<td>1.78</td>
<td>2.48</td>
</tr>
<tr>
<td>Other specified external cause</td>
<td>124</td>
<td>1.91</td>
<td>1.61</td>
<td>2.28</td>
</tr>
<tr>
<td>Other fall from one level to another</td>
<td>123</td>
<td>1.9</td>
<td>1.59</td>
<td>2.26</td>
</tr>
<tr>
<td>Unspecified external cause</td>
<td>1744</td>
<td>26.89</td>
<td>25.83</td>
<td>27.99</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6485</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table E-2 - Places of occurrence for fall related injury resulting in hospital admission in the GSAHS catchment area

<table>
<thead>
<tr>
<th>Place of occurrence for fall related injury</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>4417</td>
<td>68.11</td>
<td>66.97</td>
<td>69.23</td>
</tr>
<tr>
<td>Other specified place of occurrence</td>
<td>310</td>
<td>4.78</td>
<td>4.29</td>
<td>5.33</td>
</tr>
<tr>
<td>Street and Highway</td>
<td>309</td>
<td>4.76</td>
<td>4.27</td>
<td>5.31</td>
</tr>
<tr>
<td>Trade and service area</td>
<td>178</td>
<td>2.74</td>
<td>2.37</td>
<td>3.17</td>
</tr>
<tr>
<td>Unspecified place of occurrence</td>
<td>1141</td>
<td>17.59</td>
<td>16.69</td>
<td>18.54</td>
</tr>
<tr>
<td>Missing</td>
<td>130</td>
<td>2</td>
<td>1.69</td>
<td>2.38</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6485</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table E-3 - Activities reported as associated with fall related injuries resulting in hospital admission in the GSAHS catchment area

<table>
<thead>
<tr>
<th>Activity for fall related injury</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>While resting, sleeping, eating or engaged in other activities</td>
<td>1055</td>
<td>16.27</td>
<td>15.39</td>
<td>17.19</td>
</tr>
<tr>
<td>Other specified activity</td>
<td>740</td>
<td>11.41</td>
<td>10.66</td>
<td>12.21</td>
</tr>
<tr>
<td>While engaged in other types of work</td>
<td>478</td>
<td>7.37</td>
<td>6.76</td>
<td>8.03</td>
</tr>
<tr>
<td>While engaged in sport or leisure</td>
<td>159</td>
<td>2.45</td>
<td>2.1</td>
<td>2.86</td>
</tr>
<tr>
<td>Unspecified activity</td>
<td>3762</td>
<td>58.01</td>
<td>56.81</td>
<td>59.21</td>
</tr>
<tr>
<td>Missing</td>
<td>291</td>
<td>4.49</td>
<td>4.01</td>
<td>5.02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6485</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table E-4 - Unspecified external cause, place of occurrence and activity associated with fall related injuries resulting in hospital admission in the GSAHS catchment area

<table>
<thead>
<tr>
<th>All Fall Injuries</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Cause</td>
<td>1744</td>
<td>26.89</td>
<td>25.83</td>
<td>27.99</td>
</tr>
<tr>
<td>Place Of Occurrence</td>
<td>1141</td>
<td>17.59</td>
<td>16.69</td>
<td>18.54</td>
</tr>
<tr>
<td>Activity</td>
<td>3762</td>
<td>58.01</td>
<td>56.81</td>
<td>59.21</td>
</tr>
</tbody>
</table>

362
<table>
<thead>
<tr>
<th>External Cause for fall related injury by population size</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population &lt;4999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fall on same level</td>
<td>424</td>
<td>56.99</td>
<td>53.4</td>
<td>60.5</td>
</tr>
<tr>
<td>Fall on and from stairs and steps</td>
<td>45</td>
<td>6.05</td>
<td>4.55</td>
<td>8</td>
</tr>
<tr>
<td>Fall involving bed, chair or other furniture</td>
<td>34</td>
<td>4.57</td>
<td>3.29</td>
<td>6.32</td>
</tr>
<tr>
<td>Other fall from one level to another</td>
<td>19</td>
<td>2.55</td>
<td>1.64</td>
<td>3.95</td>
</tr>
<tr>
<td>Fall on and from ladder</td>
<td>14</td>
<td>1.88</td>
<td>1.12</td>
<td>3.13</td>
</tr>
<tr>
<td>Other specified external cause</td>
<td>7</td>
<td>0.94</td>
<td>0.46</td>
<td>1.93</td>
</tr>
<tr>
<td><strong>Unspecified external cause</strong></td>
<td><strong>201</strong></td>
<td><strong>27.02</strong></td>
<td><strong>23.95</strong></td>
<td><strong>30.32</strong></td>
</tr>
<tr>
<td><strong>Population &lt;4999 Total</strong></td>
<td><strong>744</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population 5000 - &lt;17999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fall on same level</td>
<td>1338</td>
<td>53.05</td>
<td>51.1</td>
<td>54.99</td>
</tr>
<tr>
<td>Fall on and from stairs and steps</td>
<td>119</td>
<td>4.72</td>
<td>3.96</td>
<td>5.62</td>
</tr>
<tr>
<td>Fall involving bed, chair or other furniture</td>
<td>132</td>
<td>5.23</td>
<td>4.43</td>
<td>6.17</td>
</tr>
<tr>
<td>Other fall from one level to another</td>
<td>48</td>
<td>1.9</td>
<td>1.44</td>
<td>2.51</td>
</tr>
<tr>
<td>Fall on and from ladder</td>
<td>58</td>
<td>2.3</td>
<td>1.78</td>
<td>2.96</td>
</tr>
<tr>
<td>Other specified external cause</td>
<td>37</td>
<td>1.47</td>
<td>1.07</td>
<td>2.02</td>
</tr>
<tr>
<td><strong>Unspecified external cause</strong></td>
<td><strong>790</strong></td>
<td><strong>31.32</strong></td>
<td><strong>29.54</strong></td>
<td><strong>33.16</strong></td>
</tr>
<tr>
<td><strong>Population 5000 - &lt;17999 Total</strong></td>
<td><strong>2522</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population 18000 - &lt;47999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fall on same level</td>
<td>1362</td>
<td>55.59</td>
<td>53.62</td>
<td>57.55</td>
</tr>
<tr>
<td>Fall on and from stairs and steps</td>
<td>165</td>
<td>6.73</td>
<td>5.81</td>
<td>7.8</td>
</tr>
<tr>
<td>Fall involving bed, chair or other furniture</td>
<td>168</td>
<td>6.86</td>
<td>5.92</td>
<td>7.93</td>
</tr>
<tr>
<td>Other fall from one level to another</td>
<td>49</td>
<td>2</td>
<td>1.52</td>
<td>2.63</td>
</tr>
<tr>
<td>Fall on and from ladder</td>
<td>23</td>
<td>0.94</td>
<td>0.63</td>
<td>1.4</td>
</tr>
<tr>
<td>Other specified external cause</td>
<td>32</td>
<td>1.31</td>
<td>0.93</td>
<td>1.84</td>
</tr>
<tr>
<td><strong>Unspecified external cause</strong></td>
<td><strong>665</strong></td>
<td><strong>26.99</strong></td>
<td><strong>25.27</strong></td>
<td><strong>28.78</strong></td>
</tr>
<tr>
<td><strong>Population 18000 - &lt;47999 Total</strong></td>
<td><strong>2464</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population 48000 - &lt;249999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fall on same level</td>
<td>458</td>
<td>62.06</td>
<td>58.5</td>
<td>65.49</td>
</tr>
<tr>
<td>Fall on and from stairs and steps</td>
<td>55</td>
<td>7.45</td>
<td>5.77</td>
<td>9.58</td>
</tr>
<tr>
<td>Fall involving bed, chair or other furniture</td>
<td>53</td>
<td>7.18</td>
<td>5.53</td>
<td>9.27</td>
</tr>
<tr>
<td>Other fall from one level to another</td>
<td>7</td>
<td>0.95</td>
<td>0.46</td>
<td>1.94</td>
</tr>
<tr>
<td>Fall on and from ladder</td>
<td>16</td>
<td>2.17</td>
<td>1.34</td>
<td>3.49</td>
</tr>
<tr>
<td>Other specified external cause</td>
<td>17</td>
<td>2.3</td>
<td>1.44</td>
<td>3.66</td>
</tr>
<tr>
<td><strong>Unspecified external cause</strong></td>
<td><strong>132</strong></td>
<td><strong>17.89</strong></td>
<td><strong>15.29</strong></td>
<td><strong>20.82</strong></td>
</tr>
<tr>
<td><strong>Population 48000 - &lt;249999 Total</strong></td>
<td><strong>738</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table E-6 - Places of occurrence for fall related injuries resulting in hospital admission within the GSAHS catchment area, separated by community population size

<table>
<thead>
<tr>
<th>Place of occurrence for fall related injury by population size</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population &lt;4999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Farm</td>
<td>8</td>
<td>1.08%</td>
<td>0.33</td>
<td>1.82</td>
</tr>
<tr>
<td>Home</td>
<td>489</td>
<td>65.73%</td>
<td>62.31</td>
<td>69.13</td>
</tr>
<tr>
<td>Other specified place of occurrence</td>
<td>20</td>
<td>2.69%</td>
<td>1.53</td>
<td>3.85</td>
</tr>
<tr>
<td>Street and highway</td>
<td>28</td>
<td>3.76%</td>
<td>2.4</td>
<td>5.13</td>
</tr>
<tr>
<td>Trade and service area</td>
<td>16</td>
<td>2.15%</td>
<td>1.33</td>
<td>3.46</td>
</tr>
<tr>
<td><strong>Unspecified place of occurrence</strong></td>
<td>135</td>
<td>18.14%</td>
<td>15.38</td>
<td>20.91</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>48</td>
<td>6.45%</td>
<td>4.69</td>
<td>8.22</td>
</tr>
<tr>
<td><strong>Population &lt;4999 Total</strong></td>
<td>744</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population 5000 - &lt;17999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>1904</td>
<td>75.50%</td>
<td>73.82</td>
<td>77.17</td>
</tr>
<tr>
<td>Other specified place of occurrence</td>
<td>77</td>
<td>3.05%</td>
<td>2.38</td>
<td>2.72</td>
</tr>
<tr>
<td>Street and highway</td>
<td>118</td>
<td>4.68%</td>
<td>3.85</td>
<td>5.5</td>
</tr>
<tr>
<td>Trade and service area</td>
<td>64</td>
<td>2.54%</td>
<td>1.92</td>
<td>3.15</td>
</tr>
<tr>
<td><strong>Unspecified place of occurrence</strong></td>
<td>290</td>
<td>11.50%</td>
<td>10.25</td>
<td>12.74</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>69</td>
<td>2.74%</td>
<td>2.1</td>
<td>3.37</td>
</tr>
<tr>
<td><strong>Population 5000 - &lt;17999 Total</strong></td>
<td>2522</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population 18000 - &lt;47999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>1652</td>
<td>66.75%</td>
<td>64.89</td>
<td>68.6</td>
</tr>
<tr>
<td>Other specified place of occurrence</td>
<td>127</td>
<td>5.13%</td>
<td>4.26</td>
<td>6</td>
</tr>
<tr>
<td>School, other institution and public administration area</td>
<td>29</td>
<td>1.17%</td>
<td>0.75</td>
<td>1.6</td>
</tr>
<tr>
<td>Street and highway</td>
<td>116</td>
<td>4.69%</td>
<td>3.85</td>
<td>5.52</td>
</tr>
<tr>
<td>Trade and service area</td>
<td>71</td>
<td>2.87%</td>
<td>2.21</td>
<td>3.53</td>
</tr>
<tr>
<td><strong>Unspecified place of occurrence</strong></td>
<td>469</td>
<td>18.95%</td>
<td>17.41</td>
<td>20.49</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>11</td>
<td>0.44%</td>
<td>0.18</td>
<td>0.71</td>
</tr>
<tr>
<td><strong>Population 18000 - &lt;47999 Total</strong></td>
<td>2475</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population 48000 - &lt;249999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>540</td>
<td>72.97%</td>
<td>69.77</td>
<td>76.17</td>
</tr>
<tr>
<td>Other specified place of occurrence</td>
<td>32</td>
<td>4.32%</td>
<td>2.86</td>
<td>5.79</td>
</tr>
<tr>
<td>School, other institution and public administration area</td>
<td>8</td>
<td>1.08%</td>
<td>0.34</td>
<td>1.83</td>
</tr>
<tr>
<td>Street and highway</td>
<td>46</td>
<td>6.22%</td>
<td>4.48</td>
<td>7.96</td>
</tr>
<tr>
<td>Trade and service area</td>
<td>27</td>
<td>3.65%</td>
<td>2.3</td>
<td>5</td>
</tr>
<tr>
<td><strong>Unspecified place of occurrence</strong></td>
<td>85</td>
<td>11.49%</td>
<td>9.19</td>
<td>13.78</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>2</td>
<td>0.27%</td>
<td>-0.1</td>
<td>0.64</td>
</tr>
<tr>
<td><strong>Population 48000 - &lt;249999 Total</strong></td>
<td>740</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table E-7 - Fall related activities resulting in hospital admission within the GSAHS catchment area, separated by community population size

<table>
<thead>
<tr>
<th>Activity for fall related injury by population size</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population &lt;4999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>While resting, sleeping, eating or engaged in other vital activities</td>
<td>164</td>
<td>22.19</td>
<td>19.34</td>
<td>25.33</td>
</tr>
<tr>
<td>Other specified activity</td>
<td>67</td>
<td>9.07</td>
<td>7.2</td>
<td>11.35</td>
</tr>
<tr>
<td>While engaged in other types of work</td>
<td>40</td>
<td>5.41</td>
<td>4</td>
<td>7.29</td>
</tr>
<tr>
<td>While engaged in sport or leisure</td>
<td>12</td>
<td>1.62</td>
<td>0.93</td>
<td>2.82</td>
</tr>
<tr>
<td>Unspecified activity</td>
<td>389</td>
<td>52.28</td>
<td>48.69</td>
<td>55.85</td>
</tr>
<tr>
<td>Missing</td>
<td>72</td>
<td>9.74</td>
<td>7.81</td>
<td>12.09</td>
</tr>
<tr>
<td>Population &lt;4999 Total</td>
<td>744</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population 5000 - &lt;17999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>While resting, sleeping, eating or engaged in other vital activities</td>
<td>430</td>
<td>17.06</td>
<td>15.64</td>
<td>18.57</td>
</tr>
<tr>
<td>Other specified activity</td>
<td>295</td>
<td>11.7</td>
<td>10.5</td>
<td>13.02</td>
</tr>
<tr>
<td>While engaged in other types of work</td>
<td>195</td>
<td>7.74</td>
<td>6.76</td>
<td>8.84</td>
</tr>
<tr>
<td>While engaged in sport or leisure</td>
<td>41</td>
<td>1.63</td>
<td>1.2</td>
<td>2.2</td>
</tr>
<tr>
<td>Unspecified activity</td>
<td>1440</td>
<td>57.1</td>
<td>55.16</td>
<td>59.02</td>
</tr>
<tr>
<td>Missing</td>
<td>121</td>
<td>4.8</td>
<td>4.03</td>
<td>5.71</td>
</tr>
<tr>
<td>Population 5000 - &lt;17999 Total</td>
<td>2522</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population 18000 - &lt;47999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>While resting, sleeping, eating or engaged in other vital activities</td>
<td>347</td>
<td>14.1</td>
<td>12.78</td>
<td>15.53</td>
</tr>
<tr>
<td>Other specified activity</td>
<td>320</td>
<td>13</td>
<td>11.73</td>
<td>14.39</td>
</tr>
<tr>
<td>While engaged in other types of work</td>
<td>180</td>
<td>7.31</td>
<td>6.35</td>
<td>8.41</td>
</tr>
<tr>
<td>While engaged in sport or leisure</td>
<td>92</td>
<td>3.74</td>
<td>3.06</td>
<td>4.56</td>
</tr>
<tr>
<td>Unspecified activity</td>
<td>1493</td>
<td>60.59</td>
<td>58.65</td>
<td>62.5</td>
</tr>
<tr>
<td>Missing</td>
<td>32</td>
<td>1.3</td>
<td>0.92</td>
<td>1.83</td>
</tr>
<tr>
<td>Population 18000 - &lt;47999 Total</td>
<td>2464</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population 48000 - &lt;249999</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>While resting, sleeping, eating or engaged in other vital activities</td>
<td>112</td>
<td>15.18</td>
<td>12.77</td>
<td>17.94</td>
</tr>
<tr>
<td>Other specified activity</td>
<td>48</td>
<td>6.5</td>
<td>4.94</td>
<td>8.52</td>
</tr>
<tr>
<td>While engaged in other types of work</td>
<td>63</td>
<td>8.54</td>
<td>6.73</td>
<td>10.77</td>
</tr>
<tr>
<td>While engaged in sport or leisure</td>
<td>13</td>
<td>1.76</td>
<td>1.03</td>
<td>2.99</td>
</tr>
<tr>
<td>Unspecified activity</td>
<td>436</td>
<td>59.08</td>
<td>55.49</td>
<td>62.57</td>
</tr>
<tr>
<td>Missing</td>
<td>66</td>
<td>8.94</td>
<td>7.09</td>
<td>11.22</td>
</tr>
<tr>
<td>Population 48000 - &lt;249999 Total</td>
<td>738</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table E-8 - Unspecified external cause, place of occurrence and activity associated with fall related injuries resulting in hospital admission in the GSAHS catchment area, separated by community population size.

<table>
<thead>
<tr>
<th>All Falls Injuries</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population &lt;4999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified External cause</td>
<td>201</td>
<td>27.02</td>
<td>23.95</td>
<td>30.32</td>
</tr>
<tr>
<td>Unspecified Place of occurrence</td>
<td>135</td>
<td>18.14</td>
<td>15.38</td>
<td>20.91</td>
</tr>
<tr>
<td>Unspecified Activity</td>
<td>389</td>
<td>52.28</td>
<td>48.69</td>
<td>55.85</td>
</tr>
<tr>
<td><strong>Population &lt;4999 Total</strong></td>
<td>725</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population 5000 - &lt;17999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified External cause</td>
<td>790</td>
<td>31.32</td>
<td>29.54</td>
<td>33.16</td>
</tr>
<tr>
<td>Unspecified Place of occurrence</td>
<td>230</td>
<td>11.5</td>
<td>10.25</td>
<td>12.74</td>
</tr>
<tr>
<td>Unspecified Activity</td>
<td>1440</td>
<td>57.1</td>
<td>55.16</td>
<td>59.02</td>
</tr>
<tr>
<td><strong>Population 5000 - &lt;17999 Total</strong></td>
<td>2460</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population 18000 - &lt;47999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified External cause</td>
<td>665</td>
<td>26.99</td>
<td>25.27</td>
<td>28.78</td>
</tr>
<tr>
<td>Unspecified Place of occurrence</td>
<td>469</td>
<td>18.95</td>
<td>17.41</td>
<td>20.49</td>
</tr>
<tr>
<td>Unspecified Activity</td>
<td>1493</td>
<td>57.1</td>
<td>55.16</td>
<td>59.02</td>
</tr>
<tr>
<td><strong>Population 18000 - &lt;47999 Total</strong></td>
<td>2627</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Population 48000 - &lt;249999</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unspecified External cause</td>
<td>132</td>
<td>17.89</td>
<td>15.29</td>
<td>20.82</td>
</tr>
<tr>
<td>Unspecified Place of occurrence</td>
<td>85</td>
<td>11.49</td>
<td>9.19</td>
<td>13.78</td>
</tr>
<tr>
<td>Unspecified Activity</td>
<td>436</td>
<td>59.08</td>
<td>55.49</td>
<td>62.57</td>
</tr>
<tr>
<td><strong>Population 48000 - &lt;249999 Total</strong></td>
<td>653</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table E-9 - External causes for fall related femoral or pelvic fractures resulting in hospital admission within the GSAHS catchment area

<table>
<thead>
<tr>
<th>External Cause for falls related femoral or pelvic fractures</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other fall on same level</td>
<td>815</td>
<td>54.48</td>
<td>51.95</td>
<td>56.99</td>
</tr>
<tr>
<td>Fall involving bed, chair or other furniture</td>
<td>78</td>
<td>5.21</td>
<td>4.2</td>
<td>6.46</td>
</tr>
<tr>
<td>Fall on and from steps or stairs</td>
<td>76</td>
<td>5.08</td>
<td>4.08</td>
<td>6.11</td>
</tr>
<tr>
<td>Other specified external cause</td>
<td>22</td>
<td>1.47</td>
<td>0.97</td>
<td>2.22</td>
</tr>
<tr>
<td>Other fall from one level to another</td>
<td>20</td>
<td>1.34</td>
<td>0.87</td>
<td>2.06</td>
</tr>
<tr>
<td>Fall on and from ladder</td>
<td>18</td>
<td>1.2</td>
<td>0.76</td>
<td>1.89</td>
</tr>
<tr>
<td><strong>Unspecified external cause</strong></td>
<td>467</td>
<td>31.22</td>
<td>28.92</td>
<td>33.61</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1496</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table E-10 - Places of occurrence for fall related femoral or pelvic fractures resulting in hospital admission within the GSAHS catchment area

<table>
<thead>
<tr>
<th>Place of occurrence for falls related femoral and pelvic fractures</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>1061</td>
<td>70.92</td>
<td>68.57</td>
<td>73.17</td>
</tr>
<tr>
<td>Other specified place of occurrence</td>
<td>46</td>
<td>3.07</td>
<td>2.31</td>
<td>4.08</td>
</tr>
<tr>
<td>Street and highway</td>
<td>40</td>
<td>2.67</td>
<td>1.97</td>
<td>3.62</td>
</tr>
<tr>
<td>Trade and service area</td>
<td>30</td>
<td>2.01</td>
<td>1.41</td>
<td>2.85</td>
</tr>
<tr>
<td><strong>Unspecified place of occurrence</strong></td>
<td>301</td>
<td>20.12</td>
<td>18.17</td>
<td>22.23</td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>18</td>
<td>1.2</td>
<td>0.76</td>
<td>1.89</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1496</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table E-11 - Fall related activities associated with femoral or pelvic fractures resulting in hospital admission in the GSAHS catchment area.

<table>
<thead>
<tr>
<th>Activity for fall related femoral and pelvic fractures</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>While resting, sleeping, eating or engaged in other vital activities</td>
<td>211</td>
<td>14.1</td>
<td>12.43</td>
<td>15.96</td>
</tr>
<tr>
<td>Other specified activity</td>
<td>149</td>
<td>9.96</td>
<td>8.54</td>
<td>11.58</td>
</tr>
<tr>
<td>While engaged in other types of work</td>
<td>100</td>
<td>6.68</td>
<td>5.53</td>
<td>8.06</td>
</tr>
<tr>
<td>While engaged in sport or leisure</td>
<td>21</td>
<td>1.4</td>
<td>0.92</td>
<td>2.14</td>
</tr>
<tr>
<td>Unspecified activity</td>
<td>946</td>
<td>63.24</td>
<td>60.76</td>
<td>65.64</td>
</tr>
<tr>
<td>Missing</td>
<td>69</td>
<td>4.61</td>
<td>3.66</td>
<td>5.8</td>
</tr>
</tbody>
</table>

Population <4999 Total 1496

Table E-12 - Unspecified external cause, place of occurrence and activity associated with fall related femoral or pelvic fractures resulting in hospital admission in the GSAHS catchment area.

<table>
<thead>
<tr>
<th>All Fall Injuries</th>
<th>Number of cases</th>
<th>Percentage of cases</th>
<th>Lower 95% CI proportion</th>
<th>Upper 95% CI proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Cause</td>
<td>467</td>
<td>31.22</td>
<td>28.92</td>
<td>33.61</td>
</tr>
<tr>
<td>Place Of Occurrence</td>
<td>301</td>
<td>20.12</td>
<td>18.17</td>
<td>22.23</td>
</tr>
<tr>
<td>Activity</td>
<td>946</td>
<td>63.24</td>
<td>60.67</td>
<td>65.64</td>
</tr>
</tbody>
</table>
Greater Southern Area Health Service and Charles Sturt University
Community Falls Program Baseline Survey Information Sheet

The Greater Southern Area Health Service is situated over a large geographical area that encompasses large regional cities and small rural towns, each with unique skills and resources. Falls and fall related injury among older people have a considerable impact, principally in the quality of life for older people as well as the cost to the health system and the community. For this reason a collaborative project between GSAHS and Charles Sturt University is being undertaken, focusing on falls in older people in an inland rural/regional context.

This Community Falls Program Baseline Survey will form part of the larger collaborative project.

AIM

The aim of this survey is to identify baseline information on community programs, skills, resources, tools or instruments in your local service to support older people living in the community independently. The survey will also inform the implementation of the NSW Health Management Policy on reducing fall injury among older people.

OBJECTIVES

1) To identify community programs and resources that currently exists across Greater Southern Area Health Service.
2) To identify unique falls programs or areas of expertise within the Greater Southern Area Health Service.
3) To identify any innovative solutions that are being employed by service providers or communities to overcome rural/regional barriers to falls injury prevention.
4) To identify falls risk screening and assessment tools that are being utilised across the Greater Southern Area Health Service.
5) To identify the level of staff training and education on falls prevention and management across the Greater Southern Area Health Service.

TARGET GROUP

The GSAHS community falls program baseline survey will be sent to all sites within GSAHS.

All staff involved in the management and/or prevention of falls at each site will be invited by the nominated site or facility manager to attend a meeting to collectively complete this survey. Individuals who attend this meeting will be asked to identify all programs and resources in falls management and prevention that are in place within their site. No individual participants will be identified on the survey. This survey, once received by the research associate, Susan Weston, will be coded and the site de-identified before submission to the principal researcher for analysis.

The survey will be administered and collected by the research associate, Sue Weston, Coordinator, GSAHS Falls Prevention Program. A detailed analysis of the survey results will be completed by Kristy Robson, PhD candidate, Charles Sturt University. Results of the analysis will be presented to the Area Falls Management Group and to all Sector General Managers for dissemination to Senior Managers.
GSAHS Community Falls Baseline Survey
Site information

Survey completed by: ____________________________ (For administration purposes only)

Contact details (phone/email): ____________________________ (For administration purposes only)

Sector: ____________________________

Service Facility: ____________________________

Staff consulted (roles): ____________________________

This information will be coded and de-identified before submission to the Principal researcher Kristy Robson for analysis.

Any questions pertaining to this survey please contact:

Susan Weston
Area Falls Prevention Coordinator
Greater Southern Area Health Service
PO Box 3395
Albury 2640
Ph: 60237169 Fax: 60237152
Email: susan.weston@gsahealth.nsw.gov.au

Please print this survey and complete all questions and return the completed surveys to Susan Weston by Friday 17th October 2008. Surveys can be returned by fax, internal mail or scanned and emailed.
GSAHS Community Falls Baseline Survey

**GENERAL OVERVIEW**

What are the key issues in falls injury and falls prevention for older people accessing your facility?

- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]
- [ ]

**FALLS PROGRAMS**

1) What activities/programs exist in your local catchment that support fall’s prevention? (please tick all appropriate boxes including all internal and external programs)

- [ ] Exercise program run specifically for falls incorporating strength and balance components
- [ ] Activity groups that incorporate exercise eg Age Concern, Seniors groups
- [ ] Falls/Balance Clinic
- [ ] General exercise program
- [ ] Falls risk screening
- [ ] Community Education programs
- [ ] No specific falls programs that I know of (please go to Question 4)
- [ ] Other (please specify) ____________________________
2) Are there specific criteria and/or mechanisms in order to be referred into an organised falls program or activity?
   - No
   - Yes (please specify) ________________________________

3) Is there a waiting period for clients to access appropriate falls programs?
   - No
   - Yes (please provide details) ____________________________

4) Do you identify people 65 years and older who have a history of recurrent falls who present to/ or managed by your local facility?
   - No
   - Yes (please specify) ________________________________

5) Is information about their previous falls documented, such as location, time, and activity at the time of fall?
   - Always
   - Mostly
   - Occasionally
   - Never

6) How is an individual's falls risk status documented in your local facility case notes?

   ____________________________
   ____________________________
   ____________________________

7) Who is involved in managing and preventing falls in your local area? (please tick all appropriate boxes)
   - Geriatrician
   - GP
   - Physiotherapist
   - Occupational Therapist
   - Nursing Unit Manager
   - Allied Health Assistants
   - Nurse/EN/EN's
   - PCA/V/AIN’s
   - Falls clinic manager
   - Other (please specify) ________________________________

GSAHS Community Falls Program Baseline Survey – Version 5.0
Developed by Kristy Robson (CSU) & Susan Weston (GSAHS) © Charles Sturt University 2008
8) Are there any private health practitioners/providers in your local area that are involved in falls management and/or prevention in older people?
   □ No
   □ Yes (please specify) ________________________________

9) If yes, have you referred individuals to these private health practitioners/providers?
   □ No
   □ Yes (please specify) ________________________________

10) Does your local facility provide outreach services that incorporate falls management/prevention?
    □ No
    □ Yes (where to) ________________________________

11) If answered yes to question 10, please outline the outreach programs and activities.
    ________________________________
    ________________________________
    ________________________________
    ________________________________

12) Please describe any innovative approaches employed by your service or community to overcome rural/regional barriers to falls injury prevention (attach an additional page, if required)
    ________________________________
    ________________________________
    ________________________________
    ________________________________
    ________________________________
    ________________________________

13) Are older clients/patients routinely asked whether they have fallen in the past year?
   - Yes (Please comment)________________________
   - No (Please comment)________________________
   - Don’t know

14) Is there a specific screening tool used to identify clients at risk of falls in your service/area?
   - Yes
   - No → How are individuals ‘at risk’ identified? __________________________

15) If you answered yes to question 12, what screening tool/s is used?
   - Quickscreen
   - Locally developed tool (please provide a copy as an attachment)
   - Functional assessments
   - Please specify __________________________________________
   - Other (please specify) _______________________________________

16) What benefits have you found by using a screening tool/or assessment tool?

   ___________________________________________
   ___________________________________________
   ___________________________________________
   ___________________________________________

17) Have you found any limitations in the use of these screening tool /or assessment tool/s?

   ___________________________________________
   ___________________________________________
   ___________________________________________
   ___________________________________________

18) Who does the screening program target?

   ___________________________________________
   ___________________________________________
   ___________________________________________
   ___________________________________________
19) How is the screening program administered?


20) Is there a mechanism to reassess clients/patients that have been screened on a regular basis to see if their risk status has changed?
   - No
   - Don’t know
   - Yes (please specify)

STAFF TRAINING AND EDUCATION

21) Are staff dealing with individuals 65 years and over in your local facility trained specifically on falls prevention and management?
   - No
   - Don’t know
   - Yes → What training have they had?


22) What percentage of staff who are directly involved in falls prevention/management have received any falls related training/education in the last 3 years?
   - 0-20%
   - 21-40%
   - 41-60%
   - 61-80%
   - 81-100%
   - Don’t know
23) Please describe below any further issues, obstacles or information you think GSAHS should know about, (including aspects where your facility is managing well), in relation to falls injury prevention, falls program implementation, screening for falls risk, or staff and community education and the capacity for falls injury prevention in your area.

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

______________________________________________________________________________

THANK YOU FOR COMPLETING THIS SURVEY.
Questionnaire 2

GREATER SOUTHERN
AREA HEALTH SERVICE
NSW@HEALTH

Greater Southern Area Health Service and Charles Sturt University Falls
Referral Baseline Survey Information Sheet

The Greater Southern Area Health Service is situated over a large geographical area that encompasses large regional cities and small rural towns, each with unique skills and resources. Falls and fall related injury among older people have a considerable impact, principally in the quality of life for older people as well as the cost to the health system and the community. For this reason a collaborative project between GSAHS and Charles Sturt University is being undertaken, focusing on falls in older people in an inland rural/regional context.

This Falls Referal Baseline Survey will form part of the larger collaborative project looking at community based falls management and prevention.

AIM

The aim of this survey is to identify baseline information on falls referral pathways for patients upon discharge from hospital or when they present to a hospital facility with injury as a result of a fall but do not require admission. The survey will also inform the implementation of the NSW Health Management Policy on reducing fall injury among older people living in the community.

OBJECTIVES

1. To establish current practices in identifying individuals at risk of falls who present to hospital facilities across the Greater Southern Area Health Service.
2. To identify the current referral process for individuals identified as ‘at risk’ who present but do not require admission to hospital facilities within the Greater Southern Area Health Service.
3. To identify the programs and resources available for referral of patients identified as ‘at risk’, once they are discharged from hospital facilities within Greater Southern Area Health Service.

TARGET GROUP

The GSAHS falls referral baseline survey will be sent to all Facility Managers and Team Leaders within GSAHS to be completed in consultation with their staff.

All staff involved in the management and/or prevention of falls at each site will be invited by the Facility Manager to attend a meeting to collectively complete this survey. Individuals who attend this meeting will be asked to identify all processes and procedures in place to identify individuals at risk of falls and to identify the referral pathways for ‘at risk’ patients once they leave the hospital facility. No individual participants will be identified on the survey - only the site or facility name will be noted. This survey, once received by the research associate, will be coded and the site de-identified before submission to the principal researcher for analysis.

The survey will be administered and collected by Sue Weston, Coordinator, GSAHS Falls Prevention Program. Kristy Robson, PhD candidate, Charles Sturt University, will complete a detailed analysis of the survey results. Results of the analysis will be presented to the Area Falls Management Group and to all Sector Managers for dissemination to the Facility Managers.
GSAHS Falls Referral Baseline Survey

Site information

Survey completed by: ____________________________ (For administration purposes only)

Contact details (phone/email): ____________________________ (For administration purposes only)

Sector: __________________________________________

Service Facility: _____________________________________

Staff consulted (roles): __________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

This information will be coded and de-identified before submission to the Principal researcher, Kristy Robson for analysis.

Any questions pertaining to this survey please contact:

Susan Weston
Area Falls Prevention Coordinator
Greater Southern Area Health Service
PO Box 3395
Albury 2640
Ph: 60237109 Fax: 60237152
Email: susan.weston@gsha.health.nsw.gov.au
GSAHS Falls Referral Baseline Survey

EMERGENCY DEPARTMENT INFORMATION

1) What are the key issues for older people who present to your facility with an injury as a result of a fall?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

2) Are all individuals 65 years and over questioned if a fall played a role in their presenting injuries?
   □ Always
   □ Most patients
   □ Some patients
   □ Not usually

3) If a fall caused the individual’s presenting injuries, is detailed information about the fall documented in
   the patient’s case notes?
   □ Most of the time
   □ Some of the time
   □ Always
   □ Not usually
   □ Don’t know

4) If the patient is not admitted, is there a referral process so that an individual’s falls risk status can be
   identified?
   □ No
   □ Yes→ Who are they referred to? ____________________________________________

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

GSAHS Falls Referral Baseline Survey – Version 5.4
Developed by Kristy Robson (CSU) & Susan Weston (GSAHS)
5) Is there a fracture clinic situated in your facility

☐ No

Who manages the fractures that don’t require hospitalisation?

☐ Emergency department

☐ Local GP

☐ Other (please specify)

Are individuals who are managing patients with fractures outside of the emergency department made aware that the injury was sustained as a result of a fall?

☐ All of the time

☐ Some of the time

☐ Not usually

☐ Yes

For patients who present as a result of a fall, is there a referral process so that their falls risk status can be identified?

☐ No

☐ Yes

Who are they referred to?

Are all patients who present as a result of a fall referred?

☐ Yes

☐ No (comment why)

DISCHARGE PLANNING INFORMATION

6) What are the key issues for older people who are discharged from your facility and who are identified as ‘at risk’ of falls?

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

7) Please describe the referral process for individuals identified as ‘at risk’ of falls when discharged from the hospital facility? (For both admitted and non-admitted patients)

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________
ADDITIONAL INFORMATION

Please describe below any further issues, obstacles or information you think GSAHS should know about, (including aspects where your facility is managing well), in relation to patients presenting with a falls injury or individuals ‘at risk’ of falls being discharged from the hospital facility.

THANK YOU FOR COMPLETING THIS SURVEY.
Table H-1 - Identifying people 65 years and older who have had a history of recurrent falls within GSAHS.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>40</td>
<td>74.07%</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>18.52%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>4</td>
<td>7.41%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>54</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-2 - Identifying people 65 years and older attending Community Health Centres within each of the different community sizes who have a history of recurrent falls

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing Response</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>54</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-3 - Information about previous falls, such as location, time and activity at the time of fall documented in Community Health Centre case notes.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>16</td>
<td>29.63%</td>
</tr>
<tr>
<td>Mostly</td>
<td>17</td>
<td>31.48%</td>
</tr>
<tr>
<td>Occasionally</td>
<td>17</td>
<td>31.48%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>4</td>
<td>7.41%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>54</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-4 - Information about previous falls, such as location, time and activity at the time of fall documented in Community Health Centres case notes within the different community sizes.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th>5000 to &lt; 17999</th>
<th>18000 to &lt; 47999</th>
<th>48000 to &lt; 249999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
</tr>
<tr>
<td>Yes</td>
<td>14</td>
<td>73.08%</td>
<td>16</td>
<td>66.67%</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>26.32%</td>
<td>4</td>
<td>16.67%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>0</td>
<td>0.00%</td>
<td>4</td>
<td>16.67%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>24</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

384
Table H-5 - The use of specific screening tools to determine the fall risk status for older people, in Community Health Centres.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Response Rate Percentage</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>35</td>
<td>64.81%</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>33.33%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>1</td>
<td>1.85%</td>
</tr>
</tbody>
</table>

Table H-6 - The use of specific screening tools to determine the fall risk status for older people in Community Health Centres within the different community sizes.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th>5000 to &lt; 17999</th>
<th>18000 to &lt; 47999</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
</tr>
<tr>
<td>Yes</td>
<td>13</td>
<td>68.42%</td>
<td>16</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>26.32%</td>
<td>8</td>
</tr>
<tr>
<td>Missing Response</td>
<td>1</td>
<td>5.26%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>100.00%</td>
<td>24</td>
</tr>
</tbody>
</table>

Table H-7 - The types of fall risk screening tools used at Community Health Centres within the GSAHS.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quickscreen</td>
<td>10</td>
<td>18.52%</td>
</tr>
<tr>
<td>Functional Assessments</td>
<td>6</td>
<td>11.11%</td>
</tr>
<tr>
<td>Multiple Tools Used</td>
<td>10</td>
<td>18.52%</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>16.67%</td>
</tr>
<tr>
<td>No Tools Used</td>
<td>15</td>
<td>27.78%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>4</td>
<td>7.41%</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-8 - The types of fall risk screening tools used at Community Health Centres within the GSAHS within the different community sizes.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th>5000 to &lt; 17999</th>
<th>18000 to &lt; 47999</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
</tr>
<tr>
<td>Quickscreen</td>
<td>4</td>
<td>21.05%</td>
<td>4</td>
</tr>
<tr>
<td>Functional Assessments</td>
<td>3</td>
<td>15.79%</td>
<td>3</td>
</tr>
<tr>
<td>Multiple Tools Used</td>
<td>3</td>
<td>15.79%</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>5.26%</td>
<td>4</td>
</tr>
<tr>
<td>No Tools Used</td>
<td>6</td>
<td>31.58%</td>
<td>8</td>
</tr>
<tr>
<td>Missing Response</td>
<td>2</td>
<td>10.53%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td><strong>100.00%</strong></td>
<td>24</td>
</tr>
</tbody>
</table>
Table H-9 - Reassessment of an older person’s fall risk status at Community Health Centres.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>19</td>
<td>35.19%</td>
</tr>
<tr>
<td>No</td>
<td>25</td>
<td>46.30%</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>3</td>
<td>5.56%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>7</td>
<td>12.96%</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table H-10 - Ability to reassess an older person’s fall risk status within the GSAHS, reported by community size.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th>5000 to &lt; 17999</th>
<th>18000 to &lt; 47999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
</tr>
<tr>
<td>Yes</td>
<td>7</td>
<td>36.84%</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>42.11%</td>
<td>13</td>
</tr>
<tr>
<td>Don't Know</td>
<td>0</td>
<td>0.00%</td>
<td>1</td>
</tr>
<tr>
<td>Missing Response</td>
<td>4</td>
<td>21.05%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>100.00%</td>
<td>24</td>
</tr>
</tbody>
</table>

Table H-11 - Are older people, presenting to hospital emergency departments, questioned in relation to whether their injuries were a result of a fall?

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>24</td>
<td>55.81%</td>
</tr>
<tr>
<td>Most Patients</td>
<td>16</td>
<td>37.21%</td>
</tr>
<tr>
<td>Some Patients</td>
<td>2</td>
<td>4.65%</td>
</tr>
<tr>
<td>Not Usually</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table H-12 - Are older people who present to hospital emergency departments questioned in relation to whether their injuries are a result of a fall, within different community sizes?

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th>5000 to &lt; 17999</th>
<th>18000 to &lt; 47999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
</tr>
<tr>
<td>Always</td>
<td>9</td>
<td>60.00%</td>
<td>12</td>
</tr>
<tr>
<td>Most Patients</td>
<td>6</td>
<td>40.00%</td>
<td>5</td>
</tr>
<tr>
<td>Some Patients</td>
<td>0</td>
<td>0.00%</td>
<td>1</td>
</tr>
<tr>
<td>Not Usually</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td>Missing Response</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100.00%</td>
<td>18</td>
</tr>
</tbody>
</table>
Table H-13 - Is detailed information about the fall recorded in the older person’s case notes when they present to emergency departments?

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always</td>
<td>7</td>
<td>16.28%</td>
</tr>
<tr>
<td>Most of the time</td>
<td>20</td>
<td>46.51%</td>
</tr>
<tr>
<td>Some of the time</td>
<td>13</td>
<td>30.23%</td>
</tr>
<tr>
<td>Not Usually</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>1</td>
<td>2.33%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>43</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-14 - Is detailed information about the fall recorded in the older person’s case notes when they present to emergency departments, within the different community sizes?

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th></th>
<th>5000 to &lt; 17999</th>
<th></th>
<th>18000 to &lt; 47999</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
</tr>
<tr>
<td>Always</td>
<td>3</td>
<td>20.00%</td>
<td>4</td>
<td>22.22%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Most of the time</td>
<td>10</td>
<td>66.67%</td>
<td>7</td>
<td>38.89%</td>
<td>2</td>
<td>22.22%</td>
</tr>
<tr>
<td>Some of the time</td>
<td>2</td>
<td>13.33%</td>
<td>5</td>
<td>27.78%</td>
<td>6</td>
<td>66.67%</td>
</tr>
<tr>
<td>Not Usually</td>
<td>0</td>
<td>0.00%</td>
<td>1</td>
<td>5.56%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>0</td>
<td>0.00%</td>
<td>1</td>
<td>5.56%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0.00%</td>
<td>1</td>
<td>11.11%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>18</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>9</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-15 - Is there a process for referring older people who may be at risk of falls who present to the emergency department?

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>23</td>
<td>53.49%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>44.19%</td>
<td></td>
</tr>
<tr>
<td>Missing Response</td>
<td>1</td>
<td>2.33%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>43</strong></td>
<td><strong>100.00%</strong></td>
<td></td>
</tr>
</tbody>
</table>

Table H-16 - Is there a process for referring older people who present to the emergency department who may be at risk of falls, within the different community sizes?

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th></th>
<th>5000 to &lt; 17999</th>
<th></th>
<th>18000 to &lt; 47999</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
<td>Number of Responses</td>
<td>Response Rate Percentage</td>
</tr>
<tr>
<td>Yes</td>
<td>6</td>
<td>40.00%</td>
<td>9</td>
<td>50.00%</td>
<td>7</td>
<td>77.78%</td>
</tr>
<tr>
<td>No</td>
<td>9</td>
<td>60.00%</td>
<td>9</td>
<td>50.00%</td>
<td>1</td>
<td>11.11%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>0</td>
<td>0.00%</td>
<td>0</td>
<td>0.00%</td>
<td>1</td>
<td>11.11%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>18</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>9</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
Table H-17 - Activities and programs available to support falls prevention run through Community Health Centres within the GSAHS.

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Programs Targeting Fall Related Exercise &amp; Activities</td>
<td>33</td>
<td>61.11%</td>
</tr>
<tr>
<td>Falls Specific Exercise Program</td>
<td>6</td>
<td>11.11%</td>
</tr>
<tr>
<td>Non Specific Activity Groups</td>
<td>10</td>
<td>18.52%</td>
</tr>
<tr>
<td>Non Specific Exercise Programs</td>
<td>3</td>
<td>5.56%</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>3.70%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-18 - Activities and programs available to support falls prevention run through Community Health Centres within the GSAHS, within the different community sizes

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th>5000 to &lt; 17999</th>
<th>18000 to &lt; 47999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Programs Targeting Fall Related Exercise &amp; Activities</td>
<td>9</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>Falls Specific Exercise Program</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Non Specific Activity Groups</td>
<td>3</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Non Specific Exercise Programs</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>24</strong></td>
<td><strong>1</strong></td>
</tr>
</tbody>
</table>

Table H-19 - Private health professionals/providers in the community involved in falls management and/or prevention in older people

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>18</td>
<td>33.33%</td>
</tr>
<tr>
<td>No</td>
<td>33</td>
<td>61.11%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>3</td>
<td>5.56%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-20 - Private health professionals/providers in the community involved in falls management and/or prevention in older people, within the different community sizes

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>0 to &lt; 4999</th>
<th>5000 to &lt; 17999</th>
<th>18000 to &lt; 47999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Missing Response</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>24</strong></td>
<td><strong>10</strong></td>
</tr>
</tbody>
</table>
Table H-21 - Eligibility criteria for older people to access Community Health Centre organised falls programs or activities

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>14</td>
<td>25.93%</td>
</tr>
<tr>
<td>No</td>
<td>32</td>
<td>59.26%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>8</td>
<td>14.81%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-22 - Eligibility criteria for older people to access falls programs or activities organised by Community Health Centres, within the different community sizes

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1</td>
<td>5.26%</td>
<td>5</td>
<td>20.83%</td>
<td>7</td>
<td>70.00%</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>78.95%</td>
<td>14</td>
<td>58.33%</td>
<td>3</td>
<td>30.00%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>3</td>
<td>15.79%</td>
<td>5</td>
<td>20.83%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>24</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>10</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-23 - Waiting periods for older people to access appropriate fall related programs conducted by Community Health Centre sites

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>11</td>
<td>20.37%</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>51.85%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>15</td>
<td>27.78%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Table H-24 - Waiting periods for older people to access appropriate falls programs conducted by Community Health Centres, within the different community sizes

<table>
<thead>
<tr>
<th>Coded Responses</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
<th>Number of Responses</th>
<th>Response Rate Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>0.00%</td>
<td>3</td>
<td>12.50%</td>
<td>7</td>
<td>70.00%</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>68.42%</td>
<td>12</td>
<td>50.00%</td>
<td>3</td>
<td>30.00%</td>
</tr>
<tr>
<td>Missing Response</td>
<td>6</td>
<td>31.58%</td>
<td>9</td>
<td>37.50%</td>
<td>0</td>
<td>0.00%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>24</strong></td>
<td><strong>100.00%</strong></td>
<td><strong>10</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>
An invitation to...

participate in a research project exploring recent falls in older people in inland Australia.

If you are 65 years or over, live in Albury, Boorowa, Coleambally, Corowa, Griffith, Moama, Wagga Wagga or Young and have had a fall in the past 12 months...

OR

If you are the friend or family of someone 65 years or over, who lives in Albury, Boorowa, Coleambally, Corowa, Griffith, Moama, Wagga Wagga or Young and who has had a fall in the past 12 months

We would like to hear from you.

Experiences and perceptions of falls for individuals living in inland Australia

Information about the project

Although falls research has been undertaken in both Australia, and internationally, very little research has investigated the characteristics or issues surrounding falls for rural inland communities. In addition, most research to date has concentrated on the expert opinion of health professionals. Few, if any, publications have explored falls from the perspective of the people who have fallen.

Inland communities are diverse and have widely dispersed populations and health services. Falls prevention programs designed for metropolitan communities may not work for people living in rural communities. This research aims to identify causes and risk factors specific to the people who have experienced this in rural inland communities.

This research is being conducted by Kristy Robin, PhD candidate, School of Community Health, Charles Sturt University, Albury-Wodonga Campus.

INTERESTED?

for further information contact:

Wendy Rose Davison
Research Assistant
Phone: 02 6051 9232
Email: wddavison@csu.edu.au

www.csu.edu.au
PARTICIPANT INFORMATION SHEET

Focus Group Sessions

Research Title: *Experiences and perceptions of falls for individuals living in inland communities project.*

This research project is being undertaken by Kristy Robson, a PhD student at Charles Sturt University. Kristy’s contact details are phone: 02-6051-6243; email: krobson@csu.edu.au

What is the purpose of the study?

This study will be completed by the end of 2012 and forms the basis of my doctoral research. My research aims to explore the factors that influence falls and fall related injury within inland Australian communities. This will help to inform decisions on feasible and sustainable preventive strategies. Inland communities, incorporating rural and remote areas of Australia, are diverse in nature. This creates practical challenges for injury prevention, especially when addressing falls in the older person, mainly due to relatively small populations spread across large geographic areas.

There has been a significant amount of research undertaken in both Australia and internationally in understanding the causes and risk factors of falls and fall related injury in older people. However, to date, very little research has investigated the characteristics or issues surrounding falls from the older person’s perspective living in inland rural and regional Australian.

Who can be included in this study?

During 2011, I will carry out two separate focus groups:

a) One with people aged 65 years and over who have had a fall, in their local area, in the last 12 months; and

b) The other with family members or friends of older people that have fallen, in their local area, in the last 12 months.

Participants involved in either focus group must be able to speak English. Discussion in these focus groups will be centred on the key issues or risks that contributed to the fall as well as individual’s experiences and perceptions surrounding falls in older people within the local community.

What does this study involve?

If you decide to take part in my research, you will be involved in a 60 minute focus group discussion with up to 5 other community members. These sessions will be undertaken in a private meeting room within a public facility, such as local club or in the local council building.

The focus group sessions will be recorded, with the permission of all participants. All recordings and notes will be securely stored in a locked office. I will not use your name when I write up the research and publications arising from this research will not identify any individual by name.
What if I don’t want to take part in this study, or if I want to withdraw later?

Participation in this study is voluntary. It is completely up to you whether or not you would like to be involved. If you wish to withdraw from the study once it has started, you can do so at any time without having to provide a reason, without prejudice. However, it may not be possible to remove your data from the study results if your identifying details have been removed.

What are the benefits of this study?

Much of the current falls research is centred on the understanding of health professionals being the expert rather than the individual who has fallen. The benefit of this project is that it provides the participants, who have fallen or who care for someone who has fallen, an opportunity to tell their story and experiences related to the fall, as well as allowing them to voice an opinion on their own perceptions of what they believe the associated risk factors are for falls within their specific community. This may provide further understanding of the risks associated with falls in specific communities and be of benefit to other community members.

This project will also provide a deeper understanding of the causal factors specific to inpatient communities, which can inform identification of feasible, cost effective and sustainable prevention strategies to be implemented to further reduce the social and economic burden of falls on our health care system.

Are there any risks associated with my participation in this study?

Due to the nature of focus group session, you will be discussing personal information related to your experiences of falls with other members of the focus group. As such, your confidentiality and/or privacy cannot be assured regarding the information exchanged. If you are concerned about this, you may decide not to participate in the study or you can withdraw yourself at any time during the course of the focus group session.

Due to this research investigating the experiences and perceptions of the issues surrounding falls in older people, recollection of traumatic events, such as a fall, may negatively impact on some participants. If this should arise, you will be provided with the opportunity to be referred for counselling. Attached with this information sheet is a range of services that you can access in your local community, which you can access if the need arises, during and/or after the focus group sessions are undertaken. Some of these services are free of charge, however, if there are costs associated with a particular service, this will be at your own cost. You will be free to withdraw from the study at any time if you choose not to continue. Extra copies of this local service list will also be available at the focus group session.

How will my confidentiality be protected after the focus group session?

Focus groups sessions will be recorded, with the permission of all participants. All recordings and notes will be securely stored in a locked office or on a password protected computer at Charles Sturt University. I will not use your name when I write up the research and the raw data obtained within focus groups will remain confidential. Publications arising from this research will not identify any individual by name.

What happens with the results?

As this project forms part of a PhD, de-identified results arising from this project will be published in my final thesis. I will also aim to publish de-identified results in peer-reviewed journals and possibly presentations at conferences or other forums. It is important to note that I will not release your name or provide any identifying information about you in any of these publications.

If you are interested in the study results I will be pleased to provide you with a final summary document.

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CRICOS Provider Numbers for Charles Sturt University are 00005F (NSW), 010970 (VIC) and 02669B (ACT), ABN: 83 087 789 581

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How do I become involved in the project?

If you are interested in participating in this research project or have any further questions regarding the project please contact Wendy Rose Davison (Research Assistant) by phoning:

- Ph 02 60519232, or
- emailing wrdavison@csu.edu.au

Your contact details will be collected so that consent forms can be sent to you as well as information regarding the time and location of the focus group session in your area. You will be required to bring your signed consent form with you to the focus group session. There will be spare copies of consent forms available on the day.

You will be contacted 1 week prior to the focus group session to confirm your availability to attend this session and to answer any further questions you may have regarding the consent form.

If at this stage you are unable to or choose not to participate in the focus group your contact details will be removed from my list.

Who should I contact if I have concerns about the conduct of this study?

Charles Sturt University’s Human Research and Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the Committee through the Executive Officer:

The Executive Officer
Ethics in Human Research Committee
The Secretariat
Charles Sturt University
Bathurst NSW 2795
Tel: (02) 6338 4628
Fax: (02) 6338 4184

Any issues you raise will be treated in confidence and investigated fully and you will be informed of the outcome.

Thank you for taking the time to consider this study.

This information sheet is for you to keep.
In-depth interviews

Research Title: Exploration of falls in Inland Australia

This research project is being undertaken by Kristy Robson, a PhD student at Charles Sturt University. Kristy’s contact details are phone: 02-6051-9243; email: krobson@csu.edu.au

What is the purpose of the study?

This study will be completed by the end of 2012 and forms the basis of my doctoral research. My research aims to explore the factors that influence falls and fall related injury within inland Australian communities. This will help to inform decisions on feasible and sustainable preventive strategies. Inland communities, incorporating rural and remote areas of Australia, are diverse in nature. This creates practical challenges for injury prevention, especially when addressing falls in the older person, mainly due to relatively small populations spread across large geographic areas.

There has been a significant amount of research undertaken in both Australia and internationally in understanding the causes and risk factors of falls and fall related injury in older people. However, to date, very little research has investigated the characteristics or issues surrounding falls from the older person’s perspective living in inland rural and regional Australian.

Who can be included in this study?

During 2011, I will carry out in-depth interviews with older people aged 65 years and older who have experienced a fall in the last 12 months in their local area, resulting in an injury requiring medical intervention.

Discussion in these interviews will be centred on your experiences and perceptions related to your fall.

If you have English as a second language and require the use of an interpreter, you may bring someone along to the interview, who can interpret for you. This person will be asked to interpret all discussions verbatim without providing their own interpretation of what has been said.

What does this study involve?

If you decide to take part in my research, you will be involved in a 60 minute interview discussion with me. Interviews will be scheduled for a time that suits you. These sessions will be undertaken in a private meeting room within a public facility, such as local club or in the local council building.

The interview sessions will be recorded, with your permission. All recordings and notes will be securely stored in a locked office at Charles Sturt University. I will not use your name when I write up the research and publications arising from this research will not identify any individual by name.

You will be provided with an opportunity to read and comment on the findings from your interview transcripts, to ensure I have captured your personal experience and perceptions appropriately.

www.csu.edu.au
CRICOS Provider Numbers for Charles Sturt University are 00059F (NSW), 01947G (VIC) and 02890B (ACT). ABN: 83 878 708 551
What if I don’t want to take part in this study, or if I want to withdraw later?

Participation in this study is voluntary. It is completely up to you whether or not you would like to be involved. If you wish to withdraw from the study once it has started, you can do so at any time without having to provide a reason, without prejudice.

What are the benefits of this study?

Much of the current falls research is centred on the understanding of health professionals being the expert rather than the individual who has fallen. The benefit of this project is that it provides the participants, who have fallen or who care for someone who has fallen, an opportunity to tell their story and experiences related to the fall, as well as allowing them to voice an opinion on their own perceptions of what they believe the associated risk factors are for falls within their specific community. This may provide further understanding of the risks associated with falls in specific communities and be of benefit to other community members.

This project will also provide a deeper understanding of the causal factors specific to inland communities, which can inform identification of feasible, cost effective and sustainable prevention strategies to be implemented to further reduce the social and economic burden of falls on our health care system.

Are there any risks associated with my participation in this study?

Due to the research investigating the experiences and perceptions of the issues surrounding falls in older people, recollection of traumatic events, such as a fall, may negatively impact on some participants. If this should arise, you will be provided with the opportunity to be referred for counselling. If there are costs associated with this counselling, this will be at your own cost. All participants will be provided with an information sheet at the beginning of the interview session that outlines the range of counselling service available in your local area, which you can access if the need arises, during and/or after the interview sessions are undertaken. You will be free to withdraw from the study at any time if you choose not to continue.

How will my confidentiality be protected after the focus group session?

Interviews will be recorded, with your permission. All recordings and notes will be securely stored in a locked office or on a password protected computer at Charles Sturt University. I will not use your name when I write up the research and the raw data obtained within interview will remain confidential. Publications arising from this research will not identify any individual by name.

What happens with the results?

As this project forms part of a PhD, de-identified results arising from this project will be published in my final thesis. I will also aim to publish de-identified results in peer-reviewed journals and possibly presentations at conferences or other forums. It is important to note that I will not release your name or provide any identifying information about you in any of these publications.

If you are interested in the study results I will be pleased to provide you with a final summary document.

How do I become involved in the project?

If you are interested in participating in this research project or you have any further questions regarding the project please contact Kristy Robson by phoning:

- Ph 02 605 19243, or
- emailing krobson@csu.edu.au

www.csu.edu.au

CRICOS Provider Numbers for Charles Sturt University are 00057G (NSW), 01547G (Qld) and 02596G (ACT). ABN: 83 078 708 581
Your contact details will be collected so that consent forms can be sent to you as well as information regarding the time and location of the interview in your area. You will be required to bring your signed consent form with you to the focus group session. There will be spare copies of consent forms available on the day.

You will be contacted 1 week prior to the interview to confirm your availability to attend this session and to answer any further questions you may have regarding the consent form.

If at this stage you are unable to or you choose not to participate in the interview your contact details will be removed from my list.

Who should I contact if I have concerns about the conduct of this study?

| Charles Sturt University’s Human Research and Ethics Committee has approved this project. If you have any complaints or reservations about the ethical conduct of this project, you may contact the Committee through the Executive Officer: |
| The Executive Officer |
| Ethics in Human Research Committee |
| The Secretariat |
| Charles Sturt University |
| Bathurst NSW 2795 |
| Tel: (02) 6338 4628 |
| Fax: (02) 6338 4194 |

Any issues you raise will be treated in confidence and investigated fully and you will be informed of the outcome.

Thank you for taking the time to consider this study.

This information sheet is for you to keep.

www.csu.edu.au
CRICOS Provider Numbers for Charles Sturt University are 00090F (NSW), 019470 (VIC) and 02690B (ACT), ABN: 83 076 706 551
CONSENT FORM - Focus Group Sessions

CONSENT FORM

Focus Group Sessions

Research Title: *Exploration of falls in Inland Australia*

This research project is being undertaken by Kristy Robson, a PhD student at Charles Sturt University. Kristy’s contact details are phone: 02-6051-9243; email: krobson@csu.edu.au

Please remember that your decision to participate in this study is voluntary; you do not have to consent if you do not wish to participate. If you decide not to participate you do not have to give a reason.

CONSENT

As a participant in the above-named study:

- I have had the purpose of the research and any related benefits and risks explained to me.
- I understand that if I require counselling due to distress as a result of my participation in the focus groups, this will be at my own cost.
- I am aware that the research will involve attending a 60 minute focus group session with up to 5 other participants and due to the nature of focus group session, my confidentiality and/or privacy cannot be assured regarding the information exchanged within the focus group session.
- I understand that as part of the study, any information collected about me, as well as my personal details, is confidential, and that neither my name nor any other identifying information will be published.
- I understand that I am free to withdraw from the study at any time before or during the interview, without having to provide a reason or without prejudice.
- I have read and understood the written explanation provided to me on the participant information sheet and have been given this sheet to keep.
- I understand that if I have any complaints or concerns about this research I can contact:
  
  Executive Officer
  Human Research Ethics Committee
  Office of Academic Governance
  Charles Sturt University
  Panorama Avenue
  Bathurst NSW 2795

  Phone: (02) 6338 4628
  Fax: (02) 6338 4104

  I agree to participate in the above-named study.

  (Print) NAME: __________________________________________

  Signature: ____________________________ Date: ________________

  Contact: Postal and/or email address: ____________________________________

www.csu.edu.au

CRICOS Provider Numbers for Charles Sturt University are 00005F (NSW), 019473 (VIC) and 02860B (ACT). ABN: 83 876 708 551
CONSENT FORM

In-depth interviews

Research Title: *Exploration of fails in Inland Australia*

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- I am aware that the research will involve attending a 60 minute interview session and I may be asked to review comment on the findings from the interview transcripts, to ensure my personal experience and perceptions have been captured appropriately.
- I understand that as part of the study any information collected about me, as well as my personal details, is confidential, and that neither my name nor any other identifying information will be published.
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  Charles Sturt University
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  Bathurst NSW 2795
  Phone: (02) 6338-8638
  Fax: (02) 6338-4194

- I agree to participate in the above-named study.
- (Print) NAME:________________________
- Signature:_________________________ Date:_________________________
- Contact: Postal and/or email address:_________________________

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CRICOS Provider Numbers for Charles Sturt University are 00009F (NSW), 01947G (VIC) and 029068 (ACT). ABN: 63 878 708 551
Semi-Structured Focus Group Themes – Group 1

Semi-Structured Focus Group Themes

Participant group – Older people who have experienced a fall in the last 12 months

Theme 1
- Factors that increase risk of falls within the specific community setting.

Examples of types of questions:
- What type of places were you when you had your fall?
- Describe any factors around your home that you believe increase your potential to fall?
- Describe any factors around your town that you believe increase your potential to fall?

Theme 2
- Factors that decrease the risk of falls within the specific community setting.

Examples of types of questions:
- Describe any specific areas you avoid (such as a particular footpath or street) to reduce the risk of you having a fall?
- Describe any other actions you take to reduce your risk of falls?
- How would you reduce the risks of falls in your community e.g. provide better pathways, better access to health services/public transport etc.

Theme 3
- Activities local community members’ participant in.

Examples of types of questions:
- What types of physical activities do you currently participate in? e.g. sport such as lawn bowls, walking regularly, gardening etc
- What types of social activities do you participate in? e.g. volunteering, local community run groups etc.
- What type of activities were you doing when you had your fall?

Semi-Structured Focus Group Questions – Group 2
Semi-Structured Focus Group Questions

Participant group – Family members or friends of older people who have experience a fall in the last 12 months and/or interested health professionals who deal with the management and prevention of falls in the older population.

Theme 1
- Factors that increase risk of falls within the specific community setting.

Examples of types of questions:
  - What do you believe are some of the falls risk factors for older people living in this community?
  - For people who have known an older person who has fallen in the last 12 months, where did the fall take place and what type of activities were they doing at the time?
  - What factors do you believe contributed to the fall?

Theme 2
- Factors that decrease the risk of falls within the specific community setting.

Examples of types of questions:
  - How could we reduce some of these falls risk factors in this community?
  - What are some of the barriers to reducing these falls risk factors in this community?

Theme 3
- Resources to manage or support falls risks within the specific community setting.

Examples of types of questions:
  - What current support/resources are available in this community that you know about, which help to reduce the risk of falls for older people?
Semi-Structured Interview Themes

Theme 1
• The fall experience

Examples of types of questions:
  o Describe what happened when you had your fall?
    • What were you doing at the time of the fall?
    • Where were you when you had the fall?
    • What time of day did you have the fall?
  o Tell me what happened to you after the fall?
  o What sort of medical treatment did you receive?

Theme 2
• The consequences as a result of the fall

Examples of types of questions:
  o Describe any follow up from anyone after the fall?
  o How has this fall impacted on you and your daily life?
  o Discuss any changes to you have made to your daily routine, activities or leisurely pursuits as a result of the fall?

Theme 3
• Strategies to reduce the risk of another the fall

Examples of types of questions:
  o Describe if you have made any changes to your environment as a result of the fall e.g. had hand rails installed etc?
  o Tell me about any falls prevention programs you undertaken any as a result of the fall?
  o Describe any other strategies you have put in place to reduce your risk of further falls?
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<tr>
<th>INITIAL CODED NODES</th>
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<td>Family concern</td>
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<td>Follow up</td>
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</table>
Example of mind map

Diagnosis planning for hospital after a fall did not always provide the person with any assurance regarding fall prevention strategies (I was linked to whether the person is in hospital directly related to a fall or not?!)?

If people were referred to have other services, (i.e., these were’s followed up long-term even through circumstances had changed. For example a home assessment may have been done, but this may have occurred years previously.)

Falls prevention strategies were really discussed at the GP level, neither was further referred to other services to assist with this problem. However, falls was not part of the history taking when the patient initially came into the GP surgery. For example, you know what I mean? But we don’t support it for falls, and that I know about.

Health Care

Discharge planning from hospital after a fall did not always provide the person with any assurance regarding fall prevention strategies (I was linked to whether the person is in hospital directly related to a fall or not?)

Access to services, both hospital and other community

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Very few General Practitioners asked whether they had had a fall since the last time they were there.

Some believed that would be the up to the patient to see their doctor and the prescribed was that 80% of patients would fall in the future.

Some participants perceived that because the GP weren’t really asking them about falls, they didn’t need to talk about it.

The GP’s are the last avenue when they really need to be in touch with them if the patient really does have a problem, but we are not representative in talking long-term because they don’t think its that important.

This was especially written in smaller towns.

Even with access to services, larger towns, change in health status and environment factors, there may be no checks or follow-ups, being a worrying symptom.

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### Refinement of the themes

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<thead>
<tr>
<th>Domain</th>
<th>Theme</th>
<th>Category</th>
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<tbody>
<tr>
<td><strong>Risking a fall</strong></td>
<td>Awareness of the risk but do it anyway</td>
<td>Wanting to maintain independence</td>
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<td>Catherine, Beryl, Yvonne, Catherine, Andrew, Gabrielle</td>
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<td>Not wanting to burden family or friends</td>
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<td>Due to financial restraints</td>
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<td>Unaware of the risks so continue to undertake risky activities</td>
<td>Life experience – always done it</td>
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<td>Compartmentalising where the risks are</td>
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<td>Mixed messages about safety</td>
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<td>Family dynamics and impact on relationships</td>
<td>Yvonne, Colleen, Coral, Gabrielle</td>
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<td>Avoidance of the truth</td>
<td>Yvonne, Gabrielle</td>
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<td>Community stigma</td>
<td>Perceptions around ageing</td>
<td>Colleen, Yvonne, Mitch, Beryl, Coral, Catherine, Gabrielle</td>
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<tr>
<td></td>
<td>Not openly discussing falls</td>
<td>Catherine, Colleen, Gabrielle</td>
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<tr>
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<td>Social engagement</td>
<td>Colleen, Beryl, Andrew</td>
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