



Evaluation of a Minimum Data Set for Victorian Falls Clinics

FINAL REPORT

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Services

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List of Abbreviations

ACAS	Aged Care Assessment Service
ADL	Activity of Daily Living
AMTS	Abbreviated Mental Test Score
BMI	Body Mass Index
BP	Blood Pressure
BPPV	Benign Paroxysmal Positional Vertigo
CACP	Community Aged Care Package
CHC	Community Health Centre
CHS	Community Health Service
CRC	Community Rehabilitation Centre
DHS	Department of Human Services
ED	Emergency Department
FIM	Functional Independence Measure
GP	General Practitioner
HACC	Home and Community Care
HREC	Human Research and Ethics Committee
MDS	Minimum Data Set
MFES	Modified Falls Efficacy Scale
MMSE	Mini Mental State Examination
NARI	National Ageing Research Institute
SACS	Sub-acute Ambulatory Care Services

Executive Summary

Falls among older Australians represent the greatest cause of injury-related hospitalisation and death for people aged over 65. Health care costs associated with falls related injuries in Australia are projected to triple by 2051 unless substantial in-roads are made in the effective translation of promising research results into practice. Falls Clinics form one aspect of a broad community wide approach to falls prevention. At one end of the spectrum of falls prevention activities are health promotion and population level approaches such as education and exercise. For people with mild to moderate risk of falling, there is a need for early identification of risk and implementation of appropriate interventions. At the other end of the spectrum are those with established high level risk of recurrent falls and falls injuries, particularly those for whom a clear diagnosis and management plan has not been able to be developed. This latter group is often the target of Falls Clinic referral and assessment.

Falls Clinics are a relatively recent development, and have tended to evolve with considerable diversity in terms of staffing, assessments, resources, and model of service delivery. In addition, there has been relatively little published research about Falls Clinics that can be used to guide practice. The purpose of this project was to develop and trial the implementation of a Minimum Data Set for Victorian Falls Clinics, which could be used as the basis for an evaluation of outcomes for Victorian Falls Clinics.

Method

The Minimum Data Set (MDS) for use in this project was developed based on data from a previous project (Hill et al, 2002). The majority of the measures in the MDS were used by at least half of Victorian Falls Clinics prior to commencement of this project. All Clinics, however, needed to modify their assessments in some way to accommodate the MDS, and needed to develop systems to enable electronic data submission for the project duration.

Fourteen of the 16 Victorian Falls Clinics participated in the project. MDS data for all initial assessments in the participating Clinics were collected from May 2003 – October 2003, and 6-month follow-up data was collected for the same clients from November 2003 – April 2004. All participating Clinics were surveyed towards the end of the project regarding their perceptions of the usefulness and importance of each component of the MDS.

Results

A total of 526 initial assessments were completed and submitted electronically. Falls Clinic clients had an average age of 76.9 years (SD 10.0). Seventy three percent of clients were female, and 43% were living at home alone. At the time of the initial Falls Clinic assessment, clients had a relatively low level of community service use, with a median of one service in place, most commonly home help. Sixty percent of clients were referred by General Practitioners. The most common reason for referral was falls (75%), although other common reasons for referral included gait disorder (21%) and dizziness (18%), with or without a history of falls. Seventy nine percent of clients reported one or more falls in the six months preceding Clinic assessment, with 79% percent of these reporting multiple falls in the 6-month period. Clients reported a median of two falls in the six months preceding Clinic assessment, with 54% reporting injuries associated with one or more of these falls. Twelve percent of the sample had suffered a fracture as a result of one or more of their falls in the preceding 6 months. This data highlights the high risk of falls and falls injury of the Falls Clinic sample.

At the initial assessment, an average of seven risk factors were identified per client, with the most common being impaired balance (76%), muscle weakness (67%), chronic medical conditions (64%), unsteady gait (53%) and polypharmacy (53%). Following assessment, individualised management plans were introduced for clients. On average, 5.6 recommendations were made per client. The most commonly recommended interventions were home exercise programs (46%), home visits (46%) and home aids and modifications (31%), referral to a Community Rehabilitation Centre (40%), education (41%), investigations/treatment of health problems (31%) and group exercise (26%).

Sixty two percent of the 413 clients provided with a 6-month follow-up appointment returned for this review (n=254). On the majority of profile and baseline assessment measures, there was no significant difference between those who did and those who did not return for the follow-up assessment. However, on a small number of these measures, those who did not attend the follow-up appeared to have greater levels of falls risk. The Clinic outcomes from this analysis are therefore primarily generalisable to clients who return for the 6-month follow-up assessment.

There was a significant reduction in the number of falls (64% reduction), multiple fallers, and falls causing injuries (75% reduction). In addition, there were small but significant improvements in most of the secondary outcome measures, including balance, gait and

mobility, leg strength, fear of falling, and reduced number of medications taken. In the context of a frail older group with high falls risk and many with chronic progressive disease, these outcomes are substantial.

An important factor that is likely to influence outcomes in any falls prevention program is compliance with recommended interventions. A quarter of clients fully complied with all interventions recommended by the Falls Clinic. Medical interventions were more frequently fully complied with. Of the more commonly recommended interventions, hip protectors, group exercise and behaviour modification had the lowest level of full compliance. Compliance levels were lower for people aged 65 years and over compared to those under 65, for females compared to males, people living alone compared to those living with others and for those without a carer compared to those with. This suggests that older and more isolated clients may need more support in undertaking Clinic recommendations. Poor compliance was associated with poorer outcomes in relation to injurious falls, fear of falling (MFES), balance (Step Test) and gait velocity.

Items on the MDS were reviewed in the context of:

- survey information from Falls Clinic staff about the utility and usefulness of items on the MDS,
- missing data on the individual MDS items (which may indicate limited ease of use, or limited perception of usefulness of specific measures), and
- data on the sensitivity of individual measures in identifying change in the Falls Clinic sample.

The Clinic staff were generally very supportive of the MDS and for most of the individual items, although both feedback and missing data information indicated limited support for several of the individual outcome measures. Based on this information, recommendations have been made for a refined MDS for Falls Clinics.

Clinical implications and the future of the MDS

Establishing a standardised MDS for Falls Clinics has potential benefit for clients, individual services, Falls Clinics collectively, and for the funders. The outcomes of this project reflect the general acceptability of the MDS used in this project by Falls Clinic staff, and its usefulness in identifying effectiveness associated with interventions.

It is recommended that Falls Clinics consider ongoing use of the MDS as a basis for their assessment procedures. It is recognised that individual Clinics will use additional measures for their own purposes, but that this should be in addition to the MDS.

Beyond the scope of the current project, there is no long-term capacity for centralisation, analysis and interpretation of the MDS data. However, having this evidence based set of measures as the basis for data collected within each Clinic, there may be the opportunity to review individual Clinic data intermittently, or even to undertake a subsequent multi-Clinic analysis at some time in the future. Intermittent review of collective Falls Clinic data, together with specific measures related to aspects of practice (e.g. improved compliance) could continue to be used as a basis for ongoing quality improvement within Falls Clinics individually and collectively.

There are currently substantial changes occurring with the Sub-acute Ambulatory Care Service (SACS) programs in Victoria, of which Falls Clinics are part. These changes are likely to see modification to the mandatory data required from Falls Clinics by the Department of Human Services. It is likely that there will be:

- a reduction in the number and type of process measures currently reported,
- standardisation of most of the mandatory data submitted by the various services forming SACS, and
- capacity to include a small number of service / Clinic specific outcome measures (currently no outcome measures form part of the mandatory MDS for Falls Clinics).

The outcomes of the current project will help to inform any decision about Falls Clinic specific outcome measures to be used in the new mandatory data set for SACS.

The Victorian Falls Clinic Coalition has provided an effective forum to support the implementation of this project, and for reviewing the project outcomes in the context of individual Clinics as well as Clinics collectively. Opportunities to support the activity of the Falls Clinic Coalition, as well as options for future project activity to provide further basis for improved practice by Falls Clinics should be explored.

Summary

The results of this project indicate:

- that a Minimum Data Set of outcome measures can be incorporated into practice across Falls Clinics,

- that the Minimum Data Set provides evidence of substantial benefits of Falls Clinic interventions in a group with high risk of recurrent falls and falls injuries. In particular significant reductions were observed in falls, multiple falls, and injuries associated with falls, and improvements were identified for most of the secondary outcomes of balance, mobility, fear of falling, leg strength, and medication number.
- that the Minimum Data Set was generally considered useful and able to be implemented on at least a short term basis in the majority of participating Clinics.

1. Background

Falls and associated injuries remain a common and costly public health problem in Australia, for both older people themselves, and the community generally, despite considerable developments in research and clinical practice in recent years. Approximately one in three people aged over 65 years living in the community fall each year (Lord et al, 1993; Dolinis et al, 1997), and the rate of falls increases with age (Campbell et al, 1981). In Australia in 1998, there were one thousand and fourteen deaths from fall related incidents for people aged over 65 (Cripps and Jarman, 2001). Forty five thousand people in this age group were hospitalised for falls related injuries, averaging 11 days of hospital care each. This resulted in a total of 486,484 hospital bed days related to falls by older people during this 12 month period (Cripps and Jarman, 2001). The direct costs to the health sector for falls in people aged over 65 has been estimated to be \$AUD498 million (Moller, 2003). Furthermore, costs in Australia associated with falls related injuries such as hip fractures have been projected to escalate in coming years (Sanders et al, 1999; Moller, 2003).

Research evidence indicates that multi-factorial interventions can result in significant reduction in falls among older people (Hill et al, 2004; Feder et al, 2000, American Geriatrics Society, 2001; Tinetti, 2003), even in those at high risk of recurrent falls such as those presenting to Emergency Departments after a fall (Close et al, 1999; Lightbody et al, 2002). The approach of utilising comprehensive falls risk assessment and implementation of a multi-factorial intervention program for older people at high risk of recurrent falls is the basis of Falls Clinic operations.

Since the first Australian Falls Clinic began operation in 1988, there has been considerable growth in the number of Falls Clinics across Australia. This growth has mainly occurred in Victoria where the majority of Australian Clinics are located (Hill et al. 2001 & 2002). Currently there is considerable diversity in the range of outcome measures used by Victorian Falls Clinics (Hill et al. 2001 & 2002). Although there are benefits to having diversity across Falls Clinics, there are also benefits in having at least a small number of common assessments – a Minimum Data Set (MDS). A MDS can be used to share information between Clinics, to use as a basis for ensuring best practice, and to have potential for use in multi-Clinic research. Important elements of a MDS for Falls Clinics include:

- that it should incorporate a minimum number of measures to usefully reflect outcomes for Falls Clinics;

- that it should not be considered restrictive, and that Clinics can use additional measures to meet their local needs / interests; and
- that Clinics have the capacity to conduct the measures in the Minimum Data Set without requiring additional time or equipment.

In future, a MDS may also be useful to use as a basis for quality improvement activities investigating relevant issues such as client compliance with Clinic recommendations.

In 2002, the National Ageing Research Institute (NARI) completed the report; “Evaluation of Falls Clinics and development of a measurement and outcomes framework” (Hill et al, 2002). This report included an analysis of existing literature on outcomes for clients attending Falls Clinics and included ‘grey’ literature, such as unpublished reports completed by Clinics in Australia. The evaluation included data collection from three Victorian Clinics that all collected a set of key outcome measures relevant to Falls Clinics such as number of falls and functional measures including the Timed Up and Go and Step Test. In addition to data collected from three Clinics, a survey was sent to all 16 Clinics in Victoria to audit the outcome measures currently in use in Falls Clinics and to identify a set of core outcome measures that Clinics indicated should be included in a Minimum Data Set.

The findings were presented to a Victorian Falls Clinic Coalition meeting, attended by representatives of Victorian Falls Clinics. Feedback from the Falls Clinic Coalition resulted in some modifications to the series of key domains and measures being recommended to be included in the Minimum Data Set. There was a lack of consensus on specific measures to be used for a small number of domains. In these instances, ongoing dialogue occurred through the Falls Clinic Coalition executive, and individual Falls Clinic teams to finalise the recommended Minimum Data Set that was trialled in this follow-up project (Table 1).

The process used to develop the Minimum Data Set for Victorian Falls Clinics evolved through a consensus approach, and as such it should be acceptable to most, if not all, Victorian Falls Clinics. There remained a need for the MDS to undergo field-testing by Falls Clinics to ensure that it was practical and workable in the clinical context and provided useful data to practitioners and for outcome evaluation.

Table 1: Information collected for the Minimum Data Set

<i>Domain</i>	<i>Measure</i>	<i>Baseline</i>	<i>Follow-up</i>
Assessment Information			
Question 1 Health service		✓	✓
Question 2: Patient Code		✓	✓
Question 3: Assessment		✓	✓
Question 4: Referred by		✓	
Question 5: Reason for referral		✓	
Demographic Information			
Question 6: Age		✓	
Question 7: Gender		✓	
Question 8: Living arrangements		✓	
Question 9: Informal Carer Availability		✓	
Question 10: Community services		✓	
Question 11: Risk factors		✓	
Question 12: Diagnosis		✓	
Question 13: Cognition		✓	
Question 14: Body Mass Index		✓	
Question 15: Interventions recommended		✓	
Outcome measures			
Question 16: Falls and Falls Injuries	16.1: Number of falls	✓	✓
	16.2 Number of injurious falls	✓	✓
	16.3 Medical attention	✓	✓
	16.4 Nature of injuries	✓	✓
Question 17: Functional Measures	17.1: Modified Barthel	✓	✓
	17.2: Frenchay	✓	✓
Question 18: Balance	18.1: Timed Up and Go	✓	✓
	18.2: Step Test	✓	✓
Question 19: Leg muscle strength		✓	✓
Question 20: Gait (walking speed/velocity)		✓	✓
Question 21: Fear of falling	Modified Falls Efficacy Scale	✓	✓
Question 22: Number of medications		✓	✓
Question 23: Postural Blood Pressure		✓	✓
Service Measures			
Question 24: Compliance			✓

Aim:

The aim of this project was to evaluate the utility of the Falls Clinic Minimum Data Set in identifying key outcomes for Falls Clinics.

Objectives:

- to trial the introduction of the Falls Clinic Minimum Data Set as an adjunct to the mandatory DHS process indicator MDS;
- to establish data retrieval systems to facilitate effective and efficient data transfer from participating Clinics to the project team;
- to collate, enter, analyse and interpret the Minimum Data Set data;
- to survey participating Falls Clinic staff to investigate strengths and weaknesses associated with the Minimum Data Set and the data collection processes; and
- to compare a separate sample of older people at high risk of falls from another project using some of the same measures.

2. Methodology

2.1 Overview of methodology

Victorian Falls Clinics were asked to participate in a trial of a Minimum Data Set (MDS) focused on outcomes for Falls Clinic clients. This Falls Clinic MDS was an adjunct to the process indicator MDS that Falls Clinics were already required to submit to the Department of Human Services. Throughout this report 'MDS' will refer to the outcomes MDS being trialled in this project. The process indicator MDS will be referred to as the 'DHS process MDS'. Contents of the MDS are outlined in Table 1 in the Background chapter, and the specific outcome measures of the MDS are described in more detail in Table 2 below.

Table 2: Description of MDS Outcome Measures for the trial

Outcome measures	Description	Scale/ Units	Previous research and references
Number of falls	Self-report measure of number of falls	Number of falls in previous 6 months	Retrospective recall of falls underestimates true falls rates (Hill et al, 1999; Cummings et al, 1988). Prospective diaries are method of choice, but impractical for comparing pre and post Clinic interventions.
Modified Barthel Index	Observation of person performing a range of common functional activities	Score out of 100 for a 10-item scale. Lower scores indicating poorer function	High retest reliability and validity (Shah et al, 1989, Sharma et al, 2000; Caro et al, 2001) Some ceiling effects.
Frenchay Activities Index	Assesses the frequency in which domestic and community ADLs have been completed in the previous 3-6 months	15 items scored on a 4-point scale from 0-3. Score range 0-45 with high score indicating high activity levels.	Retest reliability and validity, no ceiling effects (Wade et al, 1985)

Outcome measures	Description	Scale/ Units	Previous research and references
Timed Up and Go	Performance measure of speed during several manoeuvres which potentially threaten balance	Time in seconds	Significant correlations with Berg Balance Scale, Tinetti Mobility Index and Barthel Index in older people (Berg et al, 1992)
Step Test	A test of dynamic single limb stance balance.	Number of steps in 15 seconds for each leg	High retest reliability and validity (Hill et al, 1996a)
Leg muscle strength	Functional indicator of leg muscle strength	Time in seconds taken stand up and sit down three times	(Gill et al, 1995; Salive et al, 1994; Tinetti et al, 1995)
Gait (walking speed/velocity)	Performance test of gait speed/velocity	Time taken in seconds to walk 6 metres (with usual walking aid used for indoors walking)	High retest reliability and validity (Morris et al, 1996; Goldie et al 1996, Perry et al, 1995)
Modified Falls Efficacy Scale	Self report measure of falls efficacy. Modification of original 10 item Falls Efficacy Scale (Tinetti et al, 1990).	Average score for 14 activities assessed on a 10 point scale. Score range 0-10 where 10 is high self efficacy	High retest reliability and validity (Hill et al, 1996b; Hill, 1998)
Number of medications	Number of prescription medications	Total number of prescription medications (4 or more was considered polypharmacy)	Polypharmacy is a risk factor for falls (Campbell et al, 1990; Leipzig et al, 1999)
Postural Blood Pressure	20mmHg drop in systolic blood pressure from lying to standing within 3 minutes	mmHg	Significant drops in systolic blood pressure associated with future falls (Heitterachi et al, 2002)

Although the focus of the MDS was on outcomes for Falls Clinic clients, additional information was sought to help interpret these outcomes, including demographics, risk factors, diagnosis, and an indicator of compliance. Appendix 1 includes the MDS guidelines that describe all of the variables collected in the MDS.

Data from the MDS was provided by participating Clinics to the project team in a de-identified manner over a 12-month period. The first six months of data collection involved data

submission for all initial assessments (May-October 2003). The following six months involved data submission for 6-month follow-up assessments on the same clients (November 2003-April 2004). Prior to commencing the project it was anticipated that 8 Clinics would participate and submit data on approximately 50 clients each, providing initial assessment data for 400 clients. It was also estimated that approximately one third of these clients would not return for the 6-month follow-up assessment for various reasons (e.g. death, acute health problems). This would result in follow-up data for approximately 265 clients.

2.2 Project support

A Steering Committee was developed to oversee the project and provide feedback throughout the course of the project. Feedback from Steering Committee members was sought for each aspect of the project described below, including review of the guidelines, surveys, reports and research questions.

2.3 Clinic recruitment and staff training

The response to requests for Falls Clinics to participate in the project exceeded the original expectation with all public Victorian Falls Clinics initially agreeing to participate in the MDS trial. Due to various staffing issues at the time, two Clinics ultimately were not able to participate, leaving 14 Clinics participating in the project. Those Clinics expressing interest to participate were presented with guidelines on how to use the MDS and were invited to attend a training session that outlined how to submit the data electronically, how to create and track client ID codes and the specifications of various outcome measures. The training session promoted discussion and participants also provided suggestions for altering categories on various items on the MDS form. This helped to ensure that Falls Clinic staff understood the form and that categories were meaningful and relevant to them.

2.4 Electronic data submission

The program KeyPoint Version 1 was used for electronic data submission. This program enables a web-based form to be submitted electronically. To use the program, Clinics required access to the Internet and a password, and then could submit data at any time. If Clinics did not have access to the Internet they were able to send hard copies of the assessment data to the NARI project team, who entered the data manually. Only one Clinic submitted data in hard copy format.

An advantage of the KeyPoint program is that it does not require data to be double entered by practitioners and then the research team. Once an assessment has been submitted it is

sent as an email to the project team's website. All survey emails can be opened at once and this process involves all data automatically exporting into a database within the KeyPoint program. To undertake more complex statistical analyses, the data was then exported into Excel and SPSS databases.

2.5 Ethical considerations

To ensure that client confidentiality was maintained, all data conveyed to the project team was kept anonymous. Age was entered rather than birth dates, as birth dates could enable identification of specific individuals. Clinics were asked to create unique identifying codes for all clients submitted to the MDS to facilitate client tracking at the Falls Clinic. Clinics were provided with a tracking sheet for staff to list clients names, unique code, date of initial and follow-up assessments and whether initial and follow-up assessments had been submitted. These records were kept by Clinic staff and not submitted to NARI project staff. This enabled them to allocate the same identifying code for an individual client at both initial and 6-month assessments, so that their data could be matched once data submission was complete.

Prior to commencing involvement in MDS data submission, Clinics contacted their respective Human Research and Ethics Committees (HRECs) to determine whether involvement in the project would require an ethics application. Most HRECs indicated that the project did not require an ethics application. Two HRECs, however, did require full ethics applications. These applications were approved by the relevant Ethics Committees.

2.6 Comparison Data

Comparisons were made with data obtained from a separate sample of high falls risk older people (those presenting to an Emergency Department after a fall who were discharged home). Analyses from a pilot study sample of older people presenting to a Melbourne Emergency Department after a fall indicated that this group had a similar falls risk profile to samples of Falls Clinic patients (Hill et al, 2003).

2.7 Research Questions

A series of research questions to be addressed by the evaluation were developed a priori by the project team and the project steering committee. These were:

2.7.1 Profile of clients

- ◆ What are the characteristics of clients attending Falls Clinics (initial assessment data: demographics, referral reason and source, community services used, function and mobility)?
- ◆ How does this profile compare to other comparable population samples (e.g. ED project sample, age-related norms)?

2.7.2 Effectiveness of Falls Clinics

- ◆ Have falls rates declined in the 6 months following Falls Clinic assessment compared to the 6 months prior the initial assessment?
- ◆ Have falls injuries declined?
- ◆ Have fractures declined?
- ◆ Has there been a reduction in the proportion of clients seeking medical attention as a result of a fall?
- ◆ Have there been improvements in secondary outcome measures (Barthel Index, Frenchay Index, Timed Up and Go, Step Test, leg muscle strength, gait, fear of falling, number of medications, and postural blood pressure)?

2.7.3 Compliance with recommendations

- ◆ Which recommendations were most commonly complied with?
- ◆ What is the relationship between compliance and outcomes (primary and secondary)?
- ◆ What is the relationship between compliance and client characteristics (as assessed at initial assessment, such as cognitive impairment, age, outcome measures, number of falls and injuries, living arrangements, carer availability)?

2.7.4 Sub-group analyses on primary and secondary outcomes

- ◆ What impact do specific client characteristics (such as demographics or cognitive impairment) have on primary and secondary outcomes?

2.7.5 Clinical practice

- ◆ How often are risk factors translated into relevant recommendations (e.g., identification of polypharmacy as a risk factor leading to medication reduction)?

2.8 Feedback to Clinics

To facilitate participation by Clinics in the project, and to enhance and provide feedback about their individual Clinic data collection and outcomes, the project team developed separate reports for each Clinic on two occasions:

- a) The first report was provided after completion of the initial six months of data collection, and provided a profile of the clients from the relevant Clinic as well as a profile of the total sample of clients submitted to the MDS. This enabled Clinics to compare the profile of their Clinic population with the broader population of Victorian Falls Clinic clients. It also provided response rates for all of the outcome measures for the relevant Clinic and the total sample of Clinics in the project. This gave Clinics an indication of the completeness of the data they were submitting relative to data being submitted by other Clinics. It was also anticipated that this interim report would provide encouragement for participating Clinics to continue data entry, and to reinforce that the MDS could have benefits for participating Clinics in evaluating their practice.
- b) The second report was provided at the end of the project (after the full 12 month data collection period), and included final data relevant to the specific Clinic as well as combined data for all Clinics. This report included investigation of change from initial to follow-up assessments in the rate of falls, falls injuries and the secondary outcome measures.

2.9 Evaluation of the clinical utility of the MDS

A survey was developed to obtain feedback from participating Clinics regarding the implementation of the MDS. The survey is included as Appendix 2. The survey was emailed to Clinics in March 2004 (nearing the end of the data submission period). Feedback was sought from all staff employed by participating Falls Clinics. Surveys could be completed by individual staff or a group of staff within a Clinic. The survey was 13 pages long and included the following Sections:

- A. Who completed the survey
- B. Data submission issues
- C. MDS form: Assessment Information
- D. MDS form: Demographic Information
- E. MDS form: Outcome Measures
- F. MDS form: Service Measures (compliance)
- G. Resources for completing the MDS
- H. Utility of the MDS for your Clinic
- I. General comments.

2.10 Description of participating Clinics

Table 3, over the page, reports some of the key features of the Clinics participating in the MDS study. All Clinics except Sunbury are funded by the Department of Human Services through the Metro Health and Aged Care Services Division. All Clinics were staffed by a geriatrician and a physiotherapist, except Sunbury where there was no geriatrician, and the Peter James Centre where allied health staff were accessed through the Community Rehabilitation Centre (CRC). However, the number of Clinic staff and disciplines varied across Clinics, with some only having two staff and others having up to seven disciplines including geriatrician, physiotherapist, occupational therapist, nurse, psychologist, podiatrist and secretary. Nine Clinics had an occupational therapist, seven had a nurse and six had secretarial support. The first Victorian Falls Clinic commenced operation in 1988, however, over half of the participating Clinics (57%) have commenced operation since 1999.

Table 3: Profile of participating Clinics

Clinic	Staffing	Duration	Operating since	Funded through DHS Metro Health	Review process
Angliss Health Service	<ul style="list-style-type: none"> • Geriatrician • PT • Secretary 	3 hrs per week	1999	✓	6-week review and 6-month review (in Clinic)
Ballarat Health Services: Queen Elizabeth Centre	<ul style="list-style-type: none"> • Geriatrician • PT • Nurse • Secretary 	Half day per week	1996	✓	6-week review (in Clinic) and client specific
Barwon Health	<ul style="list-style-type: none"> • Geriatrician • PT • OT • Nurse • Secretary 	4 hrs per week (+ home assessment if required)	1999	✓	6-week review and 6-month review (in Clinic)
Bendigo Health Care Group	<ul style="list-style-type: none"> • Geriatrician • PT • OT • Nurse • Exercise Therapist 	Not scheduled time. Usually 2-4 new clients assessed throughout the week (+ home assessment if required & in geographic area)	1990	✓	Follow-up reviews are scheduled on an as needed basis, usually occurring at 6-months post initial assessment
Bundoora Extended Care Centre	<ul style="list-style-type: none"> • Geriatrician • PT • OT • Nurse • Psychologist • Podiatrist • Secretary 	4 hrs per week	1998	✓	8-week review and 6-month review (in Clinic)
Peninsula Health	<ul style="list-style-type: none"> • Geriatrician • PT • OT • Dietitian • Secretary and other 	4 hrs per fortnight + home assessment (operates as part of a Falls Prevention service)	1996	✓	6-month review and client specific

Clinic	Staffing	Duration	Operating since	Funded through DHS Metro Health	Review process
Goulburn Valley	<ul style="list-style-type: none"> • Geriatrician • PT • OT • Nurse 	4 hrs per week	2002	✓	6-week review and 6-month review (in Clinic)
La Trobe Regional Hospital	<ul style="list-style-type: none"> • Geriatrician • PT • OT • Nurse 	4 hrs per week	2002	✓	Either 6-week or 6-month review
Maroondah Hospital	<ul style="list-style-type: none"> • Geriatrician • Physiotherapist 	3 hrs per week (+ home assessment if required)	2001	✓	6-week review and 6-month review (in Clinic)
Melbourne Extended Care and Rehabilitation Service	<ul style="list-style-type: none"> • Geriatrician • PT • OT • Nurse • Psychologist • Podiatrist • Secretary 	4 hours per week (+ home assessment if required)	1988	✓	6-week review and 6-month review (in Clinic) and client specific
Peter James Centre	<ul style="list-style-type: none"> • Geriatrician • PT • Access to other allied health via CRC 	2 hrs per week	2001	✓	4-month review (extended to 6-months during course of project)
St Georges Health Service	<ul style="list-style-type: none"> • Geriatrician • PT 	3 hrs per week	1999	✓	6-week review and 6-month review (in Clinic) and client specific
Sunbury CHS	<ul style="list-style-type: none"> • PT • OT • Nurse • Podiatrist 	2.5 hrs per week (+ home assessment if required)	1998	Falls prevention service provided through CHS	6-month review (in Centre)
Western Health - Sunshine Hospital	<ul style="list-style-type: none"> • Geriatrician • PT • OT 	7 hrs per week allied health 2 mornings a week geriatrician assessments (+ home assessment if required)	2002	✓	6-week review and 6-month review over telephone (Clinic visit can be arranged)

OT = Occupational Therapist; PT = Physiotherapist; CRC = Community Rehabilitation Centre; CHS = Community Health Service

3. Data Analysis

A total of 526 initial assessments and 254 (48.3%) follow-up assessments were received. The number of initial and follow-up client records recorded for each Clinic is shown in Table 4 below.

Table 4: Number of client records completed by Clinic

Clinic	Number of initial assessments	Follow-ups completed (% of initial)
1	56	25 (44.6)
2	50	18 (36.0)
3	50	20 (40.0)
4	47	36 (76.6)
5 ^A	47	33 (70.2)
6 ^B	45	0 (0)
7	42	9 (21.4)
8	36	35 (97.2)
9 ^C	34	21 (61.8)
10	33	11 (33.3)
11	28	6 (21.4)
12	25	18 (72.0)
13	21	15 (71.4)
14 ^D	12	7 (58.3)
Total	526	254 (48.3)

^A Undertake initial assessments in the home – not all clients will be referred on for specialist medical assessment.

^B Clinic does not routinely conduct follow-up sessions and therefore none completed.

^C Clinic commenced routine follow-up assessments for implementing MDS.

^D Not funded as a Falls Clinic but runs as a falls prevention program within a community health care setting.

Clinics submitted between 12 and 56 initial assessment client records and between 0 to 36 follow-up assessment client records. The proportion of follow-up assessments ranged from 0% at a Clinic where 6-month follow-up assessments were not conducted to 97%. Excluding the Clinic where follow-up assessments were not conducted (n=45) and excluding those clients with a follow-up assessment pending outside of the study period or not recommended for a review, the overall follow-up rate was 62% (see section 3.2).

3.1 Profile of clients

The following profile provides a summary of demographic and outcome measures for all 526 clients who had an initial assessment submitted to the MDS. Demographic factors (age, gender, living arrangements, informal carer availability, community service use), referral source and reason, falls risk factors identified at the first Clinic assessment, cognitive impairment and nutritional status (as assessed by the BMI), falls and falls injuries in the 6 months preceding the initial Clinic assessment as well as secondary outcome measures are described.

For some of the variables, comparison data is available from another high falls risk sample - participants involved in an ongoing randomised controlled trial of older people presenting to an Emergency Department (ED) after a fall.

The Falls Clinic sample data is also compared to scores for healthy older people on those outcome measures where this information is available.

3.1.1 Demographics

Table 5 outlines gender and age of the Falls Clinic and ED samples. The majority of clients in both samples were females. Both samples had a mean age of 77 years. There was a significant difference between the groups in the proportion of clients aged over 65, with the Falls Clinic sample having a larger proportion aged less than 65 (due to the lower age limit of 60 years for ED project participants, whereas some Falls Clinics did not have a lower age limit). The Falls Clinic group also has a larger (non-significant) proportion of clients over 85, accounting for just over one fifth of the Falls Clinic sample.

Table 5: Age and gender of Falls Clinic clients and ED sample

	Falls Clinic (n=526)	ED sample (n=174)	P value
Number of females (%)	383 (72.8)	121 (69.5)	0.404
Mean age (SD)	76.9 (10.0)	76.7 (7.5)	0.744
65 years + (%)	462 (88.8)	164 (94.3)	0.038*
85 years + (%)	111 (21.3)	26 (14.9)	0.066

*P significant at less than 0.05

Table 6 crosstabulates living arrangements and availability of an informal carer for clients at the initial Falls Clinic assessment. Almost a half of clients lived with others and had a resident carer. Just over one fifth of clients lived alone with no informal support. Another fifth lived alone with a non-resident carer. Only 5% of clients lived in either residential care or other supported accommodation. These findings are consistent with the sample of participants from the ED project. Although the questions were structured differently across the two projects, 46% of the ED sample lived alone and 54% lived with a spouse /or carer.

Table 6: Living arrangements and carer availability for Falls Clinic sample

	No carer	Non-resident carer	Resident carer	Total
Lives alone	113 (22.5)	102 (20.3)	-	215 (43.0)
Lives with others	30 (6.0)	8 (1.6)	224 (44.6)	262 (52.2)
Low level residential care	1 (0.2)	1 (0.2)	12 (2.4)	14 (2.8)
High level residential care	-	1 (0.2)	1 (0.2)	2 (0.4)
Other supported accommodation	3 (0.6)	2 (0.4)	3 (0.6)	8 (1.6)
Total	147 (29.3)	114 (22.7)	240 (48.0)	501 (100.0)

Table 7 details the community services being accessed by clients at the time of the initial Falls Clinic assessment. In total, 56% of clients were accessing at least one service, ranging from 1-7 services (median = 1). Twenty-one percent of clients accessed one service and 16% accessed two. Home care was the most commonly accessed service, being used by

just under half of all clients. Personal alarms were second most commonly accessed with around one fifth of clients having a personal alarm. Given the high level of falls risk and moderate functional impairments of the Falls Clinic sample (see section 3.1.6 and 3.1.7) the level of community service use at the time of the initial assessment was low.

Table 7: Community service use for all Falls Clinic clients

Community Service	Number of clients accessing service (% of known*)
Food services (Meals on Wheels)	74 (14.7)
Home care (domestic tasks)	226 (45.1)
Personal care	38 (7.5)
Community nurse	22 (4.4)
Home maintenance	82 (16.3)
Day centre	26 (5.2)
Community Rehabilitation Service	15 (3.0)
Respite care	15 (3.0)
Personal alarm	105 (21.2)
Package (Linkages or CACP)	33 (6.6)
Total clients accessing 1 or more community services	278 (55.9)

*staff were given an option of selecting “not known” if they did not know whether a client was receiving a particular community service. Percentage of ‘unknowns’ ranged from 2.7%-3.7% per Clinic.

3.1.2 Referral to Falls Clinics

Almost 60% of the Falls Clinic referrals were received from General Practitioners (GPs), with the remaining referrals spread across a range of referral agencies / types (Table 8). ‘Other community’ sources such as RDNS and allied health (9.5%) and Aged Care Assessment Services (ACAS) (8%) were other common referral sources.

Table 8: Referral source

Referral source	Number of clients (%)
General Practitioner	310 (59.2)
Inpatient	11 (2.1)
Outpatient (hospital departments)	22 (4.2)
Emergency Department	18 (3.4)
Medical specialist – Neurologist	13 (2.5)
Medical specialist – Orthopaedic	2 (0.4)
Medical specialist – ENT	16 (3.1)
Self / Family	16 (3.0)
Aged Care Assessment Service	42 (8.0)
Other community (e.g. allied health, RDNS)	50 (9.5)
Other*	24 (4.6)

*Includes; Community Health (CRC/CHC), podiatrist, MS Society, Medical specialist (Rheumatologist, Cardiologist), hostel, infectious disease specialist, CDAMS Clinic, case manager.

Table 9 outlines the main reasons for referral to the Falls Clinic. Clinic staff could select more than one reason (therefore, percentages add up to more than 100%). Most clients were referred due to falls, although approximately a quarter did not have falls listed as the reason for referral. Other common reasons for referral included gait disorders (21.1%) and dizziness (17.9%). Although not provided as an option, 27 staff reported poor balance or unsteadiness under 'other' and 7 reported fear of falling, and so these have been included as separate categories in the Table.

Table 9: Reasons for referral

Reason for referral*	Number of clients (%)
Falls	392 (74.5)
Gait disorder	111 (21.1)
Loss of consciousness/syncope	9 (1.7)
Dizziness	94 (17.9)
Other: Impaired balance / mobility / unsteady	31 (5.9)
Other: Fear of falling	7 (1.3)
Other**	23 (4.4)

*Clinic staff could report more than one reason for referral

**other reasons included various medical conditions (e.g. osteoporosis, Steele Richardson's syndrome, osteoarthritis), reduced strength, feet problems and home safety issues.

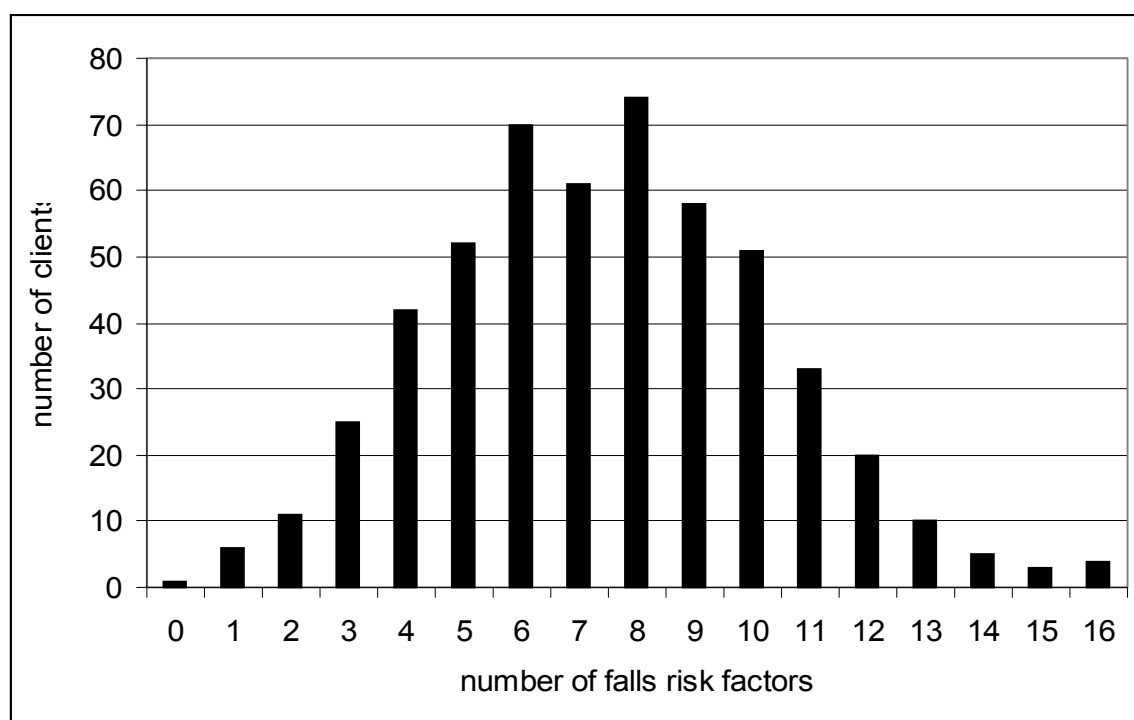
3.1.3 Falls Risk Factors

The falls risk factors identified in the initial Clinic assessment are shown in Table 10 below. Clinic staff were requested to select all risk factors that were present and then to identify up to three main risk factors for each client. The Table is ordered from most frequently identified risk factor to least. Impaired balance, muscle weakness, chronic medical conditions, unsteady gait, polypharmacy and reduced physical activity were listed as risk factors for the majority of clients. Impaired balance and chronic medical conditions were most commonly identified as main risk factors (for more than a third of clients). On average, Clinic clients had an average of 7.4 (SD=2.9; range 0-16) falls risk factors identified. Figure 1 shows the spread of the number falls risk factors across all of the Falls Clinic clients.

Table 10: Risk factors identified

	Main Risk Factor	Identified Risk Factor but not main	Total at risk
Impaired balance	217 (41.3)	181 (34.4)	398 (75.7)
Muscle weakness / deconditioning	157 (29.8)	194 (36.9)	351 (66.7)
Chronic medical conditions such as stroke, Parkinson's Disease, arthritis	204 (38.8)	134 (25.5)	338 (64.3)
Unsteady gait	100 (19.0)	181 (34.4)	281 (53.4)
Polypharmacy (more than 4 medications)	29 (5.5)	251 (47.7)	280 (53.2)
Reduced physical activity	44 (8.4)	227 (43.2)	271 (51.6)
Vision impairment/Spectacles problem	69 (13.1)	177 (33.7)	246 (46.8)
Fear of falling	73 (13.9)	167 (31.7)	240 (45.6)
Dizziness	95 (18.1)	75 (14.3)	170 (32.4)
Use of medications associated with increased falls risk	43 (8.2)	118 (22.4)	161 (30.6)
Environmental hazards – at home	19 (3.6)	120 (22.8)	139 (26.4)
Reduced functional independence	11 (2.1)	127 (24.1)	138 (26.2)
Foot problems	24 (4.6)	101 (19.2)	125 (23.8)
Cognitive impairment	42 (8.0)	76 (14.4)	118 (22.4)
Peripheral neuropathy / lower limb sensory loss	39 (7.4)	63 (12.0)	102 (19.4)
Poor footwear	6 (1.1)	94 (17.9)	100 (19.0)
Postural hypotension	34 (6.5)	60 (11.4)	94 (17.9)
Osteoporosis (low bone density)	17 (3.2)	72 (13.7)	89 (16.9)
Hazardous behaviours	26 (4.9)	51 (9.7)	77 (14.6)
Depression	17 (3.2)	54 (10.3)	71 (13.5)
Environmental hazards – away from home	7 (1.3)	35 (6.7)	42 (8.0)
Acute health problem	10 (1.9)	20 (3.8)	30 (5.7)
Under-nutrition	2 (0.4)	26 (4.9)	28 (5.3)
Syncope	7 (1.3)	7 (1.3)	14 (2.6)
Osteomalacia (low vitamin D)	1 (0.2)	10 (1.9)	11 (2.1)

Figure 1: Number of falls risk factors identified for Falls Clinic clients



3.1.4 Cognitive Impairment

Clinics were asked to report either the Mini Mental State Examination (MMSE) or the Abbreviated Mental Test Score (AMTS) depending on which tool they were currently using. Clinics not currently using these measures were requested to use the MMSE. The MMSE or AMTS cognitive tests were completed for 351 (67%) participants, with 199 (57%) of these assessments being the AMTS. Clinics have different practices in relation to assessing cognitive impairment. Four Clinics routinely assessed all clients, another 6 Clinics assessed the majority of clients and the remaining four Clinics assessed less than 40% of clients. Some Clinics reported that they only perform a formal cognitive assessment for clients who show some signs of cognitive impairment. Those not assessed, therefore, are likely to have no cognitive impairment.

Of the 351 participants who had a cognition test score, 62 (18%) were found to have low scores that suggested cognitive impairment (scored below 7 on the AMTS or below 24 on the MMSE). As shown in the Table of risk factors (Table 10), 118 (22%) participants were identified as having cognitive impairment as a risk factor for falls. There were some discrepancies between the two measures of cognitive impairment with 41 clients identified as having it as a risk factor but had an MMSE/AMTS score above the cut-off score. Another 10

participants had MMSE/AMTS scores that indicated cognitive impairment but this was not identified as a risk factor.

By including all clients identified as having cognitive impairment as a risk and/or a low MMSE/AMTS, 128 (24%) clients had some indication of cognitive impairment.

3.1.5 Body Mass Index

Table 11 shows that at the initial assessment, 23% of clients were underweight and 34% were overweight based on Body Mass Index (BMI). These figures have been calculated using a different 'acceptable weight' score for older people based on recommendations from the Committee on Diet and Health (1989, cited in Stewart, Bryce et al, 2000). These adjusted BMI scores indicate a higher proportion in the underweight category for those aged over 65 years (26%) compared to none of those aged under 65 years being categorised as underweight.

Table 11: Body Mass Index

	Under 65 years	65 years +	Total
<i>Acceptable BMI range</i>	<i>18.5-24.9</i>	<i>24-29</i>	
Number of clients with acceptable BMI	6 (15.0)	130 (47.1)	136 (43.0)
Underweight	-	72 (26.1)	72 (22.8)
Overweight	34 (85.0)	74 (26.8)	108 (34.2)

When comparing the mean BMI score for the Falls Clinic clients with that of the ED project sample, the means were similar (27.8, SD=6.2 and 27.0, SD=5.9, respectively).

3.1.6 Falls and falls injuries

Seventy-nine percent of Falls Clinic clients reported one or more falls in the 6 months prior to the initial Clinic assessment. For a small number of clients, Clinic staff did not enter a number of falls but an estimate such as 'numerous', 'multiple' or >10. To be able to complete statistical analyses these estimates were entered as conservative numbers, eg numerous or multiple became 2 falls and >10 became 10 falls. Therefore, the falls rate may be an underestimate of the total number of falls experienced.

Of those with falls recorded, 399 (79%) had one or more falls, 316 (62%) had multiple falls and 31 (6.1%) had more than 10 falls in the 6 months preceding the Clinic assessment. Excluding two clients who were reported as having 100 and 400 falls each, the average number of falls was 3.5 (SD=5.5) and the median was 2 in the preceding six months. Two hundred and seventy clients (54%) had falls that resulted in an injury with 128 (26%) having more than one injurious fall. One hundred and eighty seven (37%) clients had falls that lead them to seek medical attention with 53 (11%) having more than one fall leading to medical attention.

In total, 1746 falls were reported (excluding the two outliers) of which 546 (31%) were injurious falls and 260 (15%) led the client to seek medical attention. Bruising was the most common injury (46% of clients) with 48 clients (9%) having cuts but no stitches, 28 (6%) experiencing cuts and stitches and 59 (12%) experiencing a fracture. Twenty clients (4%) had other injuries reported such as hypothermia, sprains, torn ligaments, soft tissue injuries, dislocations and various neurological signs.

Rates of falls in community dwelling older people indicate that approximately 30% have at least one fall within a twelve month period (Lord et al, 1993). Predictably, the Falls Clinic population has a falls rate over two and half times higher in half the time (6-month period).

Comparison data with the ED sample is limited, as these participants had falls recorded for the preceding 12 months and all had at least one fall (leading to admission to the ED and subsequent request for participation). For this longer period, 108 (63%) ED participants had more than one fall, 139 (78%) had an injury requiring medical attention, 102 (59%) had bruising, 52 (31%) had cuts and 64 (37%) had a fracture. The rate of fracture was significantly higher among the ED sample and although the time period was twice as long there were three times as many fractures experienced by these ED sample participants.

3.1.7 Outcome Measures

Table 12 provides the mean score at the initial assessment on the various outcome measures. The mean scores for the Falls Clinic sample indicate that that they have considerably poorer functional status than 'healthy' older samples. For example, the TUG takes Falls Clinic clients, on average, twice as long as healthy older samples.

Where possible outcome measures were compared with the ED sample. Scores on all measures able to be compared indicated the Falls Clinic sample and the ED sample were

very similar, with the only significant difference being for the Modified Falls Efficacy Scale (MFES), and this difference (<1 on the 10 point scale) was small from a clinical perspective.

Table 12: Mean scores on initial assessment for Falls Clinic sample, ED sample and age standardised norms

	Falls Clinic Mean (SD)	ED sample Mean (SD)	Score for older people Mean (SD)
Barthel Index	93.2 (13.3)	NA	
Frenchay Index	23.4 (10.0)	NA	
Timed Up and Go (sec)	19.2 (12.9)	21.3 (19.6)	8.5 (healthy sample, mean age 75 years, Podsiadlo and Richardson, 1991) 9.1 (healthy older women, mean age 74 years, Hill et al, 1999)
Step Test (steps / 15 sec – worst leg)	7.2 (4.5)	6.4 (4.5)	17 (healthy sample, mean age 73 years, Hill et al, 1996a) 16 (healthy older females, mean age 74 years, Hill et al, 1999)
Leg strength (time for 3 stands – sec)	14.0 (7.9)	NA	9.4 (community dwelling, 72 years and older, Tinetti, 1995)
Gait (metres/ minute)	44.5 (17.9)	44.1 (19.2)	71 (mean age 73 years, Morris et al, 1996)
Modified Falls Efficacy Scale	7.6 (2.1)	6.8 (2.6)**	9.8, range 9.2 – 10 (healthy older women, mean age 74 years, Hill et al, 1999)
Medications	5.9 (3.4)	5.9 (3.6)	5.5 non fallers, 6.1 fallers (Older sample, De Rekeneire et al 2003)
Postural BP drop			22% of fallers and 6% of non fallers had postural drop in PB of \square 20mmHg at 3 minutes (community dwelling older sample, Heitterachi et al, 2002)
• Mean (SD)	7.4 (11.6)	8.1 (10.4)	
• % \square 20mmHg	18	14	

**Significant difference between the Falls Clinic and Emergency Department sample (P<0.001)
NA = not assessed

The majority of Falls Clinic clients (74%) were taking four or more prescribed medications (polypharmacy) at the initial Clinic assessment and 16% were taking 10 or more medications.

Eighteen percent of Falls Clinic clients had a postural drop in blood pressure of 20mmHg or more.

3.1.8 Recommendations made

On average, Falls Clinics recommended 5.6 (SD=2.4) interventions per client. As shown in Figure 2, the number of recommendations made ranged from no recommendations (for one client) to up to 17 recommendations.

Figure 2: Number of recommendations made following initial assessment

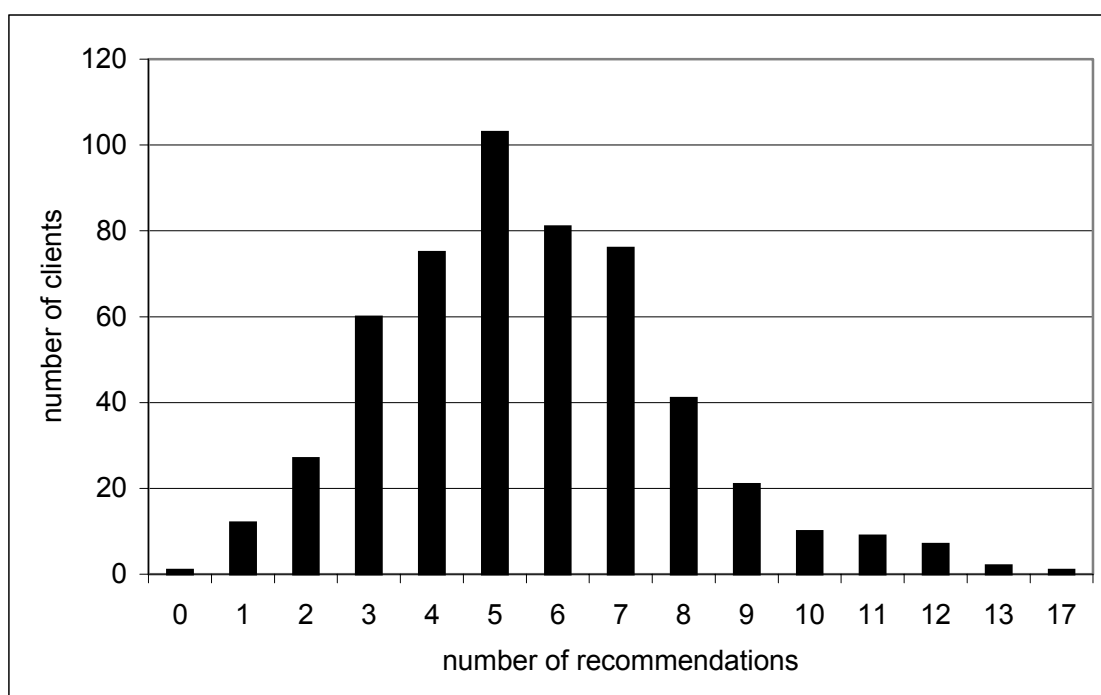


Table 13 indicates the proportion of clients recommended each type of intervention. As expected most clients were recommended for a review assessment at the Clinic, however, there was a substantial proportion (11%) who weren't. Around a third of clients were recommended further investigations or additional medical treatment of a health problem. Of the various exercises recommended, combined balance and strength exercises at home were most commonly referred, followed by group exercises. Combining all exercise together, 66% of clients were recommended one or more exercise program and 47% were recommended a home exercise program. Just under half of the clients were recommended a home visit and one-third a home aid or modification. A quarter of clients was recommended a gait aid change or adjustment. Despite the low use of community services in this client group (see section 3.1.1), less than 5% of clients were recommended to any additional home based community services. Forty percent were recommended referral to a

community health centre/community rehabilitation centre. Forty-one percent of clients were also recommended or provided with education (e.g. information brochures). Less than 20% of clients were recommended other interventions (behaviour modification, hip protectors, foot care, visual assessment / management relaxation, psychology or driving assessment).

Table 13: Types of recommendations made at the initial assessment

Recommendation	% recommended	
Review (follow-up falls clinic session has been recommended)	88.6	
MEDICAL		
Referred to medical specialist	9.9	
Investigations/treatment of health problem	31.0	
Medication reduction	15.0	
New medication	5.7	
Osteoporosis medication/ and or Vitamin D/calcium supplements	7.0	
EXERCISE		
Group exercise	25.5	
Home exercise - Balance	8.7	47.3
Home exercise - Strength	4.6	
Home exercise - combination	34.0	
Vestibular rehabilitation – Repositioning	5.7	
Vestibular rehabilitation – Desensitising exercises	7.4	
Vestibular rehabilitation – Gaze stability exercises	6.5	
ENVIRONMENT		
Home Visit	45.6	
Home aids / modifications	31.0	
Footwear change	17.3	
Gait aid change or adjustment	24.3	

Recommendation	% recommended
Personal alarm	8.0
COMMUNITY SERVICES	
Food services	0.8
Home care	3.2
Community nurse	0.4
Home maintenance	1.0
Respite care	1.1
Day hospital/Community Health Centre	40.3
Personal care	1.3
Day centre	1.7
Package (Linkages or CACP)	0.6
OTHER	
Education (provision of falls prevention information)	40.9
Behaviour modification (reduce risky behaviours)	13.7
Hip protectors	15.6
Foot care	15.6
Visual assessment / management	15.6
Relaxation	1.0
Clinical psychology intervention	6.1
Driving assessment	1.7
Other*	19.2

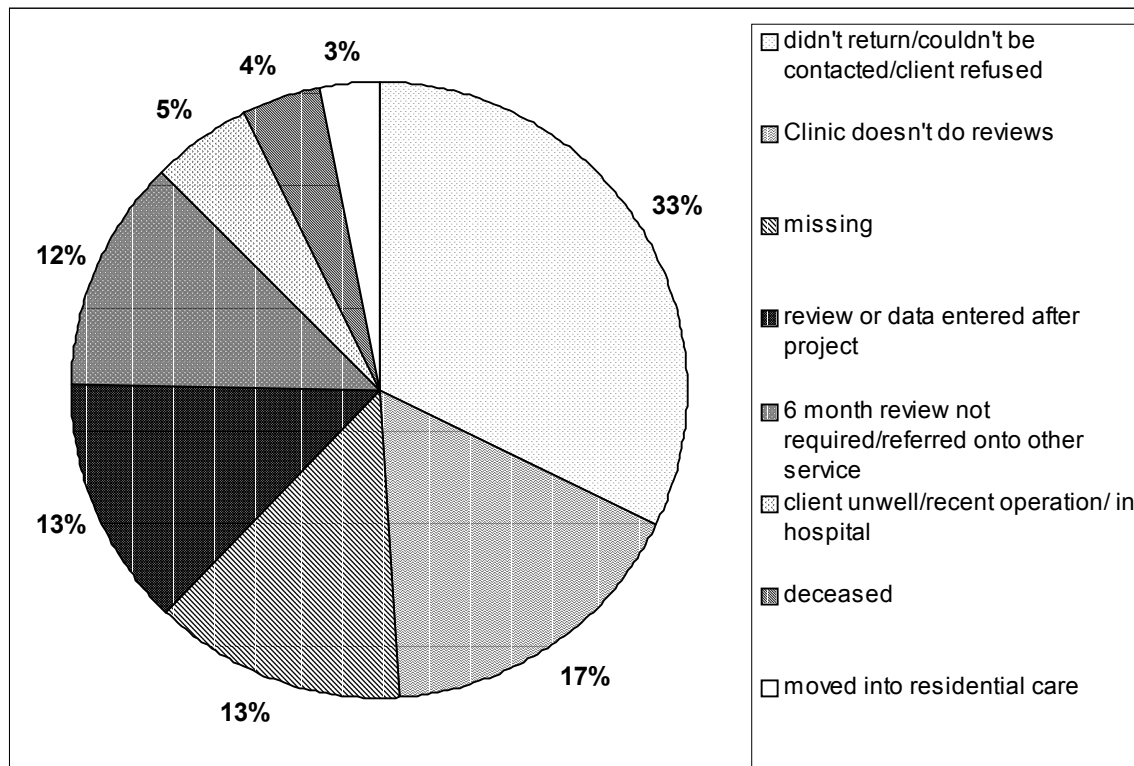
*Included; admission to hospital (10 clients), continence clinic (6 clients), dietetics (18 clients), rehab in the home (9 clients), orthotic review (5 clients), hydrotherapy (4 clients) gym program (4 clients), single allied health disciplines such as social work (9 clients).

3.2 Six-month follow-up assessment – attendees and non-attendees

Of the 526 clients who had initial assessment data recorded, 254 (48%) also had follow-up data recorded. One Clinic did not routinely complete a 6-month follow-up assessment and was not able to commence follow-ups for this project. They had 45 initial assessments recorded. Additionally, 13% of those who did not re-attend were not due for a follow-up assessment until after the project data collection period had ceased or had re-attended but Clinic staff were unable to submit data during the project timeframe. A few Clinics included a 6-week review and then 6 months after the 6-week review were asked to re-attend. For this reason the actual period of time from the initial to '6-month' follow-up was actually closer to 8 months and therefore may not have been due during the project data collection period. A small proportion of clients was also not recommended a follow-up assessment. If those clients at the Clinic which did not conduct 6-month assessments, those with their follow-up date outside of the study period, and those not required to re-attend for a review were excluded, the proportion of clients re-attending for the 6-month review was 62%.

Figure 3 outlines the various reasons for clients missing follow-up data.

Figure 3: Reasons for missing follow-up data (n=272)



One third of clients who did not have follow-up data failed to attend a follow-up assessment. Some of the reasons provided by the Clinic for clients refusing to attend a follow-up assessment included: distance to travel to a Clinic in a regional area, and client having no further falls and not feeling they needed the follow-up. Seventeen percent of non-attendees attended a Clinic where reviews were not conducted. Missing data (13% of clients) indicates where Clinics did not provide a reason for lack of follow-up data so it is unclear whether or not they returned for a review. Twelve percent of clients who did not re-attend were not required to return either due to being referred onto another service to take over care or not requiring any follow-up to be completed. Eight percent of clients were not able to re-attend due to illness, hospitalisation or moving into residential care. A further 4% of clients died before a follow-up assessment was due.

Comparisons were made on demographics, falls risk factors, falls and falls injuries and secondary outcome measures for those who returned and those who didn't return. Clients who did return were compared with clients who didn't return either due to:

- Not being able to be contacted; or
- Failing to attend the follow-up.

The full results are shown in Appendix 3. There were no significant differences between the groups on the main demographic variables including age, gender, living arrangements, cognitive impairment and BMI at initial assessment. Overall there were a small number of significant differences in the proportion of each group with specific risk factors, and on several of the outcome measures, including:

- Significantly more injurious falls and falls with bruises in the six months preceding initial assessment for non-returnees
- Significantly poorer outcomes for non-returnees on the Step Test, leg strength and gait velocity measures at initial assessment, and
- Significantly higher proportion of non-returnees with foot problems.

Overall, these results indicate that the two groups were similar on most characteristics, although on a small number outcome measures, those not re-attending the 6-month review had greater risk of falling. Clinic outcomes reported in the next section of this report therefore are generalisable only to clients who return for the follow-up assessment.

3.3 Effectiveness of Falls Clinics

Section 3.3 includes the 254 clients for whom there was initial and follow-up MDS assessment data submitted. The effectiveness of Falls Clinics was examined by evaluating changes in falls, injuries, and the various secondary outcome measures between the initial and 6-month follow-up assessment.

3.3.1 Falls and falls related injuries

Table 14 indicates that for the 254 clients who returned for a follow-up assessment, there was a significant reduction in the number of clients falling from initial to follow-up assessments. For those experiencing falls there has also been a reduction in the proportion experiencing more than one fall. There has also been a significant drop in the number of injurious falls and falls leading to clients seeking medical attention. The mean number of falls experienced by clients has also dropped significantly. These reductions have been substantial with numbers more than halving from initial to follow-up assessments.

Table 14: Falls and injurious falls at initial and follow-up assessments

	6 months pre initial Clinic assessment	6 months post initial Clinic assessment	Sig
Clients falling	190 (77.6)	92 (37.6)	P=0.000
Fallers falling more than once	142 (74.7)	53 (57.6)	P=0.004
Clients having injurious falls	123 (51.3)	55 (22.9)	P=0.000
Clients seeking medical attention after a fall	80 (33.1)	29 (12.0)	P=0.000
Mean number of falls	3.48 (7.6)	1.27 (4.9)	P=0.000
Median number of falls (range)	2 (0-100)	0 (0-70)	P=0.000

The total number of falls experienced by these clients also dropped by 64% from 864 falls prior to the Clinic assessment to 313 falls after the Clinic assessment (p=0.000). Figure 4 indicates that where only around one fifth of clients did not fall prior to the initial assessment, this rose to over 60% prior to the follow-up assessment. The number of injurious falls also dropped by 75% from 313 to 79.

Figure 4: Number of falls as a percentage of clients at initial and follow-up assessments

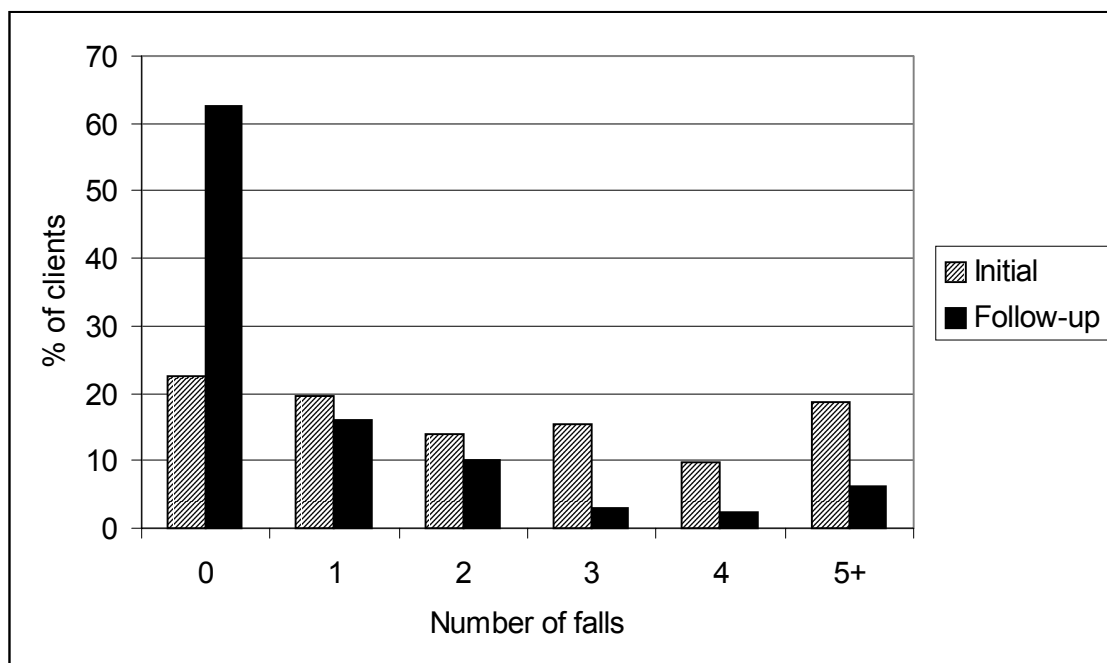


Table 15 shows the number of falls experienced by clients prior to the initial Falls Clinic assessment compared with the number of falls experienced in the following six months. Clients who had the same number of falls or a decrease in falls at the follow-up assessment are bolded. In summary, 64 (26%) clients had the same number of falls at both assessments (with 48 of these experiencing no falls at either assessment), and 155 (63%) had fewer falls at the follow-up assessment than at the initial. The remaining 26 clients (11% - those above the staircase line in the Table) had an increase in the number of falls at follow-up, including 7 clients who did not have falls prior to the initial assessment but did have a fall after the initial assessment.

Table 16 displays the injuries sustained in falls in the six months preceding initial Clinic assessment and the following six months. The injuries most commonly experienced by clients were bruises, grazes and cuts. This Table shows that the drop in injuries occurs as a result in the drop of fallers. Of those experiencing falls, there is a similar proportion experiencing injuries from initial assessment to follow-up assessment.

Table 15: Number of falls prior initial and follow-up assessments

		Number of falls at follow-up							total
		0	1	2	3	4	5-10	11+	
Number of falls pre initial Clinic assessment	0	48	6		1	-	-	-	55
	1	34	5	6	2	-	1	-	48
	2	23	3	5	1	-	1	1	34
	3	22	7	5	1	1	2	-	38
	4	5	10	5		1	3	-	24
	5-10	18	6	2	2	2	3	1	34
	11+	3	2	2		2	2	1	12
	total	153	39	25	7	6	12	3	245

NB: numbers shown in bold in box indicate clients who have had the same number or a reduction in the number of falls from initial to follow-up assessments.

Table 16: Injuries experienced (proportion of clients and fallers)

	Pre initial Clinic assessment			Post initial Clinic assessment		
	No. of clients	% of clients (n=254)	% of fallers (n=190)	No. of clients	% of clients (n=254)	% of fallers (n=92)
Bruises/ grazing	106	41.7	55.8	47	18.5	51.1
Cuts no stitches	23	9.1	12.1	8	3.2	8.7
Cuts & stitches	14	5.5	7.4	3	1.2	3.3
Fracture	24	9.4	12.6	13	5.1	14.1
Other*	11	4.3	5.8	8	3.2	8.7

*Other was a text field for staff to report other injuries. 'Other' injuries listed for initial assessments included; concussion/loss of consciousness, confusion, knocks to head/elbow, painful right hip and leg, rotator cuff tear, soft tissue injury (X 2), back pain (X 2), banged head, collapse, dislocation (shoulder, finger), hypothermia, sprain (knee, ankle, wrist X 2, finger), swelling and lack of mobility, torn ligaments. 'Other' injuries at follow-up assessments included; shoulder strain, back pain, black eye, cactus prickles, for investigation, hospital admission, punctured lung, tendon rupture.

3.3.5 Secondary outcome measures

Table 17 indicates that for all secondary outcome measures there was an overall improvement from the initial to follow-up assessment, with this improvement being significant for all measures except the Barthel Index and Frenchay Index. For this client group the Barthel Index had ceiling effects with 49% of initial assessments and 58% of follow-up assessments using the Barthel Index scoring the highest possible score of 100. The sample size was smaller for these two measures (due to some Clinics not completing these measures – see section 4.1.11) which also limited the power to identify a significant difference.

Table 17: Changes in outcome measures from initial to follow-up assessments

	N=	Initial (SD)	Follow-up (SD)	Sig	Average % improvement	% improved	% declined
Barthel	114	92.7 (14.0)	94.4 (11.1)	P=0.159	1.8	21.9	14.9
Frenchay	115	24.9 (9.4)	25.8 (9.4)	P=0.092	3.6	51.3	30.4
TUG (secs) +	181	18.0 (10.7)	16.7 (10.0)	P=0.040	7.2	59.1	28.2
Step Test (steps/ 15 secs)	185	7.5 (4.4)	8.4 (4.8)	P=0.003	12.0	55.1	25.9
Leg strength (secs) +	141	12.7 (5.9)	11.1 (5.9)	P=0.001	12.6	58.9	21.3
Gait	157	45.5 (16.6)	50.7 (17.6)	P=0.000	11.4	57.3	29.9
MFES	157	7.7 (2.1)	8.2 (2.0)	P=0.000	6.7	44.8	14.3
Medications +	216	5.6 (3.3)	5.4 (3.3)	P=0.036	3.6	32.4	23.1

+ Indicates outcome measures where a decrease in score indicates an improvement

Data for sub groups of clients who were identified as at risk in relation to particular measures were investigated further. These measures included fear of falling (MFES), number of medications and postural blood pressure.

Given that healthy older people usually score over 9 on the MFES (Hill et al, 1999), clients scoring less than 9 at the initial assessment were selected to examine improvement on the MFES for those with poorer falls self-efficacy. Of those who returned for a follow-up assessment, 96 (38%) had an MFES score of less than 9 at the initial assessment. At follow-up, 25 (26%) of these clients' scores had improved to 9 or above. The mean score for these 96 clients had also increased significantly from 6.56 (SD= 1.8) to 7.38 (SD = 2.0), $P<0.001$. A similar analysis was undertaken for those with poorer falls-efficacy scoring less than 6 on the MFES at the initial assessment. For these 31 clients, 17 (55%) at follow-up had scores of 6 or higher. Again a significant improvement was found from initial to follow-up assessments with MFES scores increasing from 4.3 (SD=1.0) to 6.3 (SD=2.2), $P<0.001$.

Polypharmacy, defined as taking more than 4 prescribed medications, is considered a risk factor for falls (Campbell et al, 1990; Leipzig et al, 1999). Of those returning for a follow-up

assessment, 114 (44.9%) clients were taking more than 4 prescribed medications at the initial assessment. There was a significant drop in the number of medications these clients were taking from initial assessment to follow-up (8.1 to 7.6, $P < 0.01$). At the follow-up assessment, 12 of these clients (10.5%) were taking fewer than 5 medications.

Nineteen clients had a postural drop in systolic blood pressure greater than 20mmHg at the initial assessment after standing for 3 minutes. At the initial assessment these clients had a mean postural drop in systolic blood pressure of 28.3 (8.7) mmHg but this had dropped to 7.7 (7.7) mmHg at the follow-up assessment ($P > 0.001$).

3.4 Compliance with recommendations

Table 18 indicates the number of clients who complied or partially complied with recommendations made at the initial assessment. The Table is grouped according to five broad categories of recommendations; medical, exercise, environment, community services and other. Overall, there was high compliance with recommendations. Across all interventions, there was an average of 64% of clients fully complying with recommendations (Figure 5).

There were no clear patterns in types of recommendations and rate of compliance. For example, community services rated from complete compliance (package) to no compliance (home maintenance). However, the numbers recommended for community services were very small. Community Health Centres/Community Rehabilitation Centres, however, were recommended to a substantial proportion of clients attending the follow-up assessment and was fully complied with by 76% of those recommended it.

When considering exercise interventions there appeared to be greater compliance with particular types of exercise. The three vestibular exercise types were fully complied with by between 65% and 89% of clients who were recommended these interventions. Home exercise programs were fully completed by around 50% of clients, with less than 10% not doing any of the recommended home exercises. Group exercise, however, was not attended at all by 31% of clients with this recommendation.

Most home visits recommended were undertaken. This may reflect greater control on behalf of the Clinic staff as these were often performed by Clinic staff, reducing reliance on other services to perform the intervention. However, compliance with implementing home modification recommendations was lower, with 60% being fully compliant. It is not possible

from the data to determine what proportion of non-compliance may have been related to refusal by the client, and what proportion was related to other factors such as cost or availability of services to perform the recommended modifications. Investigation of factors contributing to low compliance with specific recommendations warrants more detailed research and clinical focus.

Osteoporosis medication, referral to medical specialist, medical investigations and education were commonly complied with by clients. However, compliance with using a hip protector was very low with 74% of clients recommended one not using one at all. Low compliance with hip protectors has been reported elsewhere (Cameron et al, 2003), often due to perceived lack of comfort, extra effort required to wear them, urinary incontinence and physical difficulties/illness (van Schoor et al, 2002). Van Schoor and colleagues (2002) suggest that adjustments need to be made to protectors and underwear to improve compliance.

Table 18: Compliance with recommendations

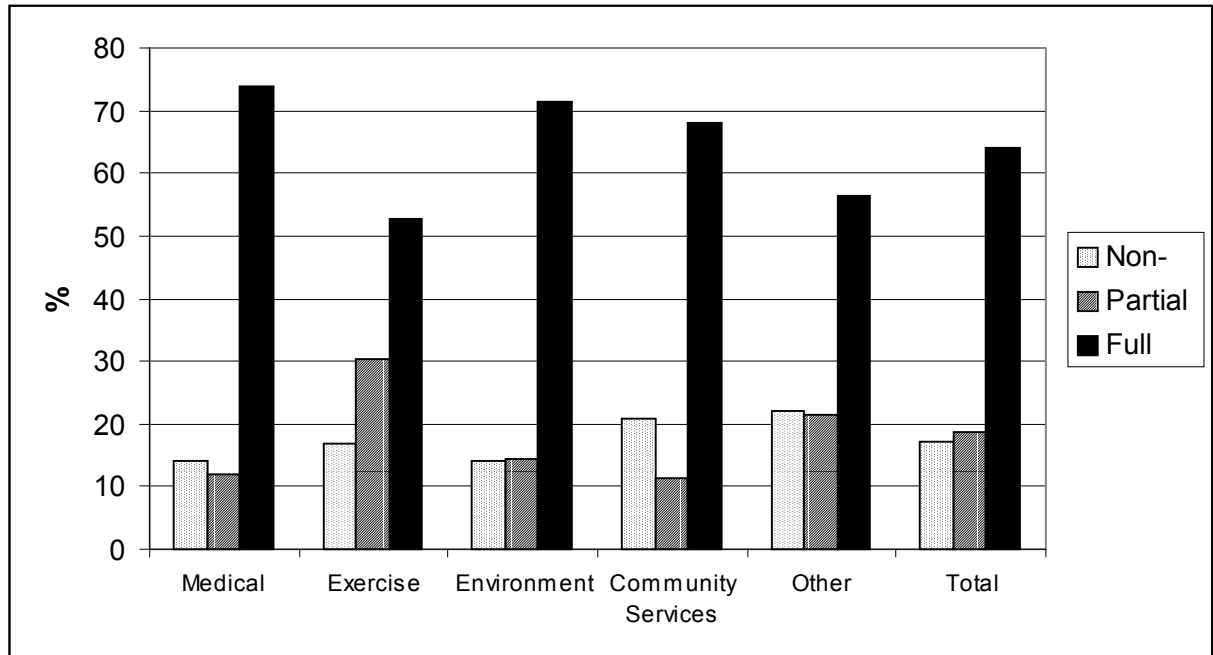
	Recommendation	Non-compliance n (%)	Partial compliance n (%)	Full compliance n (%)
Medical	Referred to medical specialist	6 (12.4)	3 (6.3)	39 (81.3)
	Investigations/treatment of health problem	9 (11.7)	8 (10.4)	60 (77.9)
	Medication reduction	7 (13.7)	11 (21.6)	33 (64.7)
	New medication	7 (24.1)	3 (10.4)	19 (65.5)
	Osteoporosis medication/Vit D / calcium	1 (16.7)	0 (0)	5 (83.3)
Total Medical		30 (14.2)	25 (11.9)	156 (73.9)
Exercise	Group exercise	25 (30.9)	19 (23.4)	37 (45.7)
	Home exercise – Balance	6 (19.4)	9 (29.0)	16 (51.6)
	Home exercise - Strength	1 (5.3)	8 (42.1)	10 (52.6)
	Home exercise - combination	9 (9.7)	37 (39.8)	47 (50.5)
	Vestibular rehabilitation – Repositioning	1 (5.9)	4 (23.5)	12 (70.6)
	Vestibular rehabilitation – Desensitising exercises	2 (11.8)	4 (23.5)	11 (64.7)
	Vestibular rehabilitation – Gaze stability exercises	1 (11.1)	0 (0)	8 (88.9)
Total Exercise		45 (16.9)	81 (30.3)	141 (52.8)
Environment	Home Visit	10 (7.5)	2 (1.5)	122 (91.0)
	Home aids / modifications	20 (16.9)	27 (22.9)	71 (60.2)
	Footwear change	6 (15.4)	9 (23.1)	24 (61.5)
	Gait aid change or adjustment	11 (19.3)	12 (21.1)	34 (59.6)
	Personal alarm	6 (24.0)	4 (16.0)	15 (60.0)
Total Environment		53 (14.2)	54 (14.5)	266 (71.3)

	Recommendation	Non-compliance n (%)	Partial compliance n (%)	Full compliance n (%)
Community Services	Food services	1 (25.0)	0 (0)	3 (75.0)
	Home care	5 (38.5)	2 (15.4)	6 (46.1)
	Community nurse	0 (0)	2 (100)	0 (0)
	Home maintenance	3 (100)	0 (0)	0 (0)
	Respite care	1 (50.0)	0 (0)	1 (50.0)
	Community Rehabilitation Centre / Community Health Centre	15 (14.7)	10 (9.8)	77 (75.5)
	Personal care	1 (33.3)	1 (33.4)	1 (33.3)
	Day centre	2 (66.7)	0 (0)	1 (33.3)
	Package (Linkages or CACP)	0 (0)	0 (0)	2 (100)
Total Community Services		28 (20.9)	15 (11.2)	91 (67.9)
Other	Education	8 (7.6)	19 (17.9)	79 (74.5)
	Behaviour modification	6 (14.6)	15 (36.6)	20 (48.8)
	Hip protectors	28 (73.7)	4 (10.5)	6 (15.8)
	Foot care	7 (18.0)	5 (12.8)	27 (69.2)
	Visual assessment / management	8 (19.5)	7 (17.1)	26 (63.4)
	Relaxation	0 (0)	1 (50.0)	1 (50.0)
	Clinical psychology	6 (54.5)	2 (18.2)	3 (27.3)
	Driving assessment	2 (33.3)	0 (0)	4 (66.7)
Total Other		65 (22.1)	63 (21.4)	166 (56.5)

The levels of compliance for the 5 main categories of interventions, as shown in Table 18, are also illustrated in Figure 5 along with compliance levels for all interventions combined. All categories had at least 50% of clients recommended an intervention achieving full compliance. Community services and 'other' interventions had the highest proportion of non-compliance. If Community Rehabilitation Centres/Community Health Centres are excluded

from the community services figure, the rate of full compliance drops from 68% to 44% and rate of non-compliance almost doubles increasing from 21% to 41%. Medical and environmental interventions appear to have the highest level of compliance.

Figure 5: Level of compliance for the 5 categories of interventions



To determine what factors may impact on compliance and to determine what impact compliance had on outcome measures, further analyses were conducted. To enable these analyses a compliance score was developed and then split into three categories. The compliance score was calculated as follows:

$$\text{Compliance score} = \frac{1 \times \text{number of recommendations fully complied with} + 0.5 \times \text{number of recommendations partially complied with} + 0 \times \text{number of recommendations not complied with}}{\text{Number of recommendations made}}$$

Using this formula, the range of possible compliance scores was from 0 to 1, which could also be expressed as a percentage. Compliance scores were calculated for 243 clients for whom this data was recorded at the 6-month follow-up (96% of clients returning for follow-up). Sixty-two clients (26%) had 100% compliance with recommendations. The mean compliance score was 74.3% (SD=23.4%) and the median was 77.8%. Four clients (1.6%) did not comply with any recommendations and 29 (11.9%) had compliance scores of less

than 50%. Compliance scores did not have a normal distribution and therefore non-parametric tests have been used for the analyses below.

Mann-Whitney U tests were used to determine whether compliance was influenced by demographic factors (age, gender, living arrangements, carer availability, cognitive impairment and nutritional status). In Table 19, a higher mean rank score indicates a higher level of compliance. The data indicates that there were no significant differences in compliance between those with and without signs of cognitive impairment and those with a healthy body weight compared to those with a BMI outside of the recommended range. There was a trend, however, for clients without cognitive impairment to have higher levels of compliance than those with cognitive impairment. The compliance score, however, was significantly influenced by the remaining demographic variables. Men had higher levels of compliance than women, younger clients had higher levels of compliance than those over 65 years of age, those living with others had higher levels of compliance than those living alone and those with a carer had higher levels of compliance than those without a carer.

Table 19: Compliance by client characteristics

		Mean Rank	P value
Age	65+ (n=220)	116.24	0.001**
	Under 65 (n=21)	170.83	
Gender	Male (n=69)	136.75	0.038*
	Female (n=174)	116.15	
Living arrangements	Lives alone (n=105)	103.89	0.024*
	Lives with others (n=123)	123.6	
Carer availability	No carer (n=76)	104.71	0.031*
	Has a carer (n=160)	125.05	
Cognitive impairment	Has cognitive impairment (n=55)	109.8	0.139
	Has no cognitive impairment (n=188)	125.6	
Nutrition: BMI	Unacceptable (n=90)	79.7	0.696
	Acceptable (n=66)	76.86	

*P significant at less than 0.05

**P significant at less than 0.01

Mann-Whitney U tests were also undertaken to examine whether there was a relationship between compliance and changes in number of falls, injurious falls and falls leading to clients seeking medical attention rates (from initial to follow-up assessments). Findings are shown in Table 20. The Table shows a trend on these measures for those with better outcomes to have higher levels of compliance, with an almost significant difference evident between change in falls injury status and compliance.

Table 20: Changes in falls, injuries and falls leading to medical attention by compliance levels.

		Mean Rank	Sig
Number of falls	Reduced (n=148)	89.29	0.427
	Increased (n=27)	80.93	
Number of falls injuries	Reduced (n=97)	64.68	0.050
	Increased (n=25)	49.18	
Number of falls leading to medical attention	Reduced (n=68)	46.58	0.070
	Increased (n=19)	34.76	

To examine the impact of compliance on the change in secondary outcome measures, Spearman's Rho correlations were conducted. Table 21 indicates that there was a small but significant positive relationship between compliance scores correlated with MFES, Step Test and gait velocity.

Table 21: Correlation (Spearman's Rho) between improvement in outcome measures and compliance score

	N	Correlation (rho)	Sig (p value)
Leg strength (secs)	135	-0.100	0.247
MFES	146	0.224	0.007**
Medications	207	0.066	0.348
Step Test (steps / 15 secs)	177	0.195	0.009**
Timed Up and Go (secs)	173	0.126	0.098
Frenchay	107	0.140	0.150
Barthel Index	106	0.003	0.976
Gait (metres/ minute)	148	0.195	0.017*
Postural drop in BP	117	0.048	0.610

*P significant at <0.05 **P significant at <0.01

3.5 Sub-group analyses on primary and secondary outcomes

Six sub-group analyses were performed to examine the influence of various client characteristics on falls and secondary outcomes. The following characteristics were compared:

- Clients under 65 years of age compared with those 65 years and over;
- Males compared with females;
- Clients living alone compared with clients living with others;
- Clients with no carer compared with those with a resident or non-resident carer;
- Clients with cognitive impairment compared with those with no cognitive impairment;
- Clients who were over or underweight compared to those with BMI within the recommended range.

The prediction was that outcomes would be poorer for those living alone, those with no carer, older clients, those with cognitive impairment and those with poorer nutritional status (as defined by BMI). Appendix 4 provides a table for each of these comparisons, showing the mean rate of improvement on each of the outcome measures for each group. The analyses

found no significant differences on any of the outcome measures for the six comparison groups. As such, outcomes did not appear to be strongly influenced by client age, gender, living arrangements, availability of a carer, cognitive impairment, or nutritional status.

3.6 Clinical practice

To examine clinical practice the number of recommendations made were compared with identified falls risk factors. For example, for all clients with poor footwear identified as a risk factor, the proportion who were recommended a change in footwear were evaluated. This may help identify areas where Clinics may need to give greater consideration when they make particular recommendations. However, one of the limitations of undertaking this analysis is that while there may be a risk factor present, there may also be an intervention in place and therefore no action required on behalf of the Falls Clinic. For instance, a client may have osteoporosis but may already taking medication for this. This gap perhaps suggests the need for another question on the MDS, or in a subsequent study, to identify whether a specific intervention is already in place. A number of risk factors also did not have a clear matching recommendation as they were probably already being managed or not under the control of the Clinic. The risk factors not compared included:

- Acute health problem
- Postural hypotension
- Chronic medical conditions
- Cognitive impairment
- Environmental hazards away from home.

Although cognitive impairment may not be a risk factor that Clinics are aiming to overcome, they do need to recognise it is as an important factor with potential influence on intervention implementation and outcomes.

Table 22 lists the remaining risk factors along with the number of clients at risk, the relevant recommendations that could be appropriate, and the proportion of at risk clients who were recommended these interventions. Some risk factors have been grouped as they are related risk factors and are likely to have related recommendations. An example was osteoporosis, which was matched with osteomalacia as the intervention can be Vitamin D supplements with calcium for either. Recommendations were also sometimes grouped together where there were multiple relevant interventions for a risk factor. For example, fear of falling may be managed through exercise and/or a clinical psychology intervention for those with a more phobic fear of falling.

The findings in Table 22 are listed from risk factors most commonly matched with an intervention to risk factors least commonly matched. Risk factors relating to strength, balance and function were commonly translated into exercise interventions. Home hazards were also commonly translated into a home visit and/or home aids/modifications. Poor footwear, dizziness, fear of falling and hazardous behaviours were also commonly translated into relevant recommendations. Medical issues, including syncope, osteoporosis, peripheral neuropathy and medication issues, appeared to be less commonly translated into recommendations. Only 30% of clients with vision as a risk factor were recommended a vision-related intervention. Although only 25% of the 28 clients with under-nutrition as a risk factor were referred to dietetic management, dietetics was not actually listed as a possible recommendation. Dietetic management therefore had to be specifically identified by the clinician completing the MDS and therefore may indicate an under-representation of the actual number of at risk clients being referred on. Stoltz et al (2001) reported a low level of referral for dietitian advice in an Adelaide Falls Clinic, despite moderate levels of malnutrition evident. Areas such as this may need a greater focus by Falls Clinic staff. For the 71 clients identified as having depression only 16% were recommended a new medication or a clinical psychology intervention.

Table 22: Interventions recommended in relation to risk factors identified.

Risk factor(s)	Risk present	Corresponding Recommendation(s)	% rec'd
Reduced functional independence	138	Any exercise (group, home-balance, strength, both, vestibular) AND/OR home visit AND/OR community service	91.3
Environmental hazards – at home	139	Home visit AND/OR Home aids / modifications	89.2
Impaired balance AND/OR Muscle weakness/deconditioning AND/OR Unsteady gait AND/OR Reduced physical activity	479	Any exercise (group, home-balance, strength, both, vestibular) AND/OR Community Rehabilitation Centre (CRC)	85.8
Poor footwear	100	Footwear change	77.0
Dizziness	170	Vestibular rehabilitation – (repositioning, desensitising exercises and gaze stability exercises) AND/OR home exercise (balance and both)	71.8
Fear of falling	240	Clinical psychology intervention AND/OR any exercise (includes all vestibular, home and group)	69.2
Hazardous behaviours	77	Behaviour modification AND/OR clinical psychology intervention AND/OR hip protectors	67.5
Foot problems	125	Foot care	47.2
Syncope	14	Investigations/treatment of health problem AND/OR referred to medical specialist	42.9
Vision impairment/Spectacles	246	Visual assessment / management	30.1
Under-nutrition	28	Dietitian (not listed as a recommendation but many have listed it under 'other')	25.0
Peripheral neuropathy / lower limb sensory loss	102	Foot care	24.5
Osteoporosis AND/OR Osteomalacia	95	Osteoporosis medication	24.2
Polypharmacy AND/OR Use of medications associated with increased falls risk	315	Medication reduction	22.2
Depression	71	Clinical psychology intervention AND/OR new medication	15.5

4. Evaluation of the clinical utility of the MDS

This chapter provides an evaluation of the items and implementation of the Minimum Data Set. It uses data from two sources; an evaluation survey completed by participating Falls Clinic staff, and data collected through the MDS, such as response rates to various items.

4.1 Evaluation Survey

Surveys were emailed to all 14 Falls Clinics participating in the MDS trial (see Appendix 2). Staff from participating Falls Clinics were invited to complete the survey individually or as a team. One survey was received from all 14 Clinics (100%) representing feedback from 31 staff including:

- 11 Physiotherapists
- 8 Occupational therapists
- 5 Medical staff
- 5 Nurses
- 1 podiatrist, and
- 1 exercise therapist.

Many comments were received suggesting modifications to the MDS, which are described below. Based on the feedback and the usefulness of individual measures in evaluation (e.g. sensitivity to change), some these suggested changes have been incorporated into a revised recommended MDS (see section 5.5).

4.1.1 Data Submission

Of the 11 respondents who were involved in entering data electronically on the website, 73% found completing the form 'very easy' and 27% found it 'somewhat easy'. Most found that the form was always available on the Internet (73%) while 2 (18%) found that they weren't able to access the form on one or two occasions and one (9%) was not able to access it on three or more occasions (being Internet linked to the NARI website, if the NARI website was unavailable due to technical problems or maintenance then agencies were unable to access the MDS data submission form). Three respondents provided comments about data entry. One indicated that it consumes time and another reported it was possible to accidentally hit enter and submit the form before it was complete. Another had difficulties if they were

interrupted half way through completing the form, as there was no way of saving the data and they had difficulties remembering whether they submitted the half completed survey or not.

4.1.2 Assessment Information

Clinic staff did not have difficulties matching unique client codes at initial and follow-up assessments. This was managed by using a single person at each Clinic keeping track of client codes on an electronic or paper based record. It was recommended that paper based records be kept electronically or photocopied in case originals were lost. One respondent indicated the importance of using the comment section, particularly when clients did not follow the usual patient flow, for example, if they were admitted to hospital or did not require a further assessment.

Some respondents indicated that the list of possible referral sources was adequate or too long and the 'other' category eliminated the need for a more extensive list. Others, however, suggested additional categories including; family members, GP at request of specialist, and emergency departments or physiotherapists. One indicated that;

“As we get a lot of allied health referrals, it would be good to separate them out from ‘other community’. Also some confusion as to whether referrals from our outpatient physiotherapy department would go under ‘outpatients’ or ‘other community’”.

It was also suggested that if medical specialities were to be separated, rheumatology should be added. Another participant suggested that medical specialist could have a 'medical specialist - other' category and that inpatient could be broken down to medical, allied health and other.

For the list of reasons for referral, four Clinics suggested adding a category for 'poor balance'. Other suggested categories included 'comprehensive assessment', 'decreasing mobility' and 'near falls' or 'at risk of falls'.

4.1.3 Demographic Information

For the demographic information the informal carer availability question was considered too broad and did not give an indication of how much care was being provided through informal networks. It was also suggested that an 'other' category be added to the living arrangement question, as there was not a suitable category for clients living in a granny flat with limited

family support. Another suggested that the various residential care options could be grouped into one 'residential care' category.

4.1.4 Community Services

For the closed response questions regarding community services, 64% of participants indicated that continuing to record community services for the MDS would require 'very little effort', 21% indicated it would take 'some effort' and 14% reported it would take a 'great deal of effort'. Forty three percent of participants indicated that it was 'very important' to routinely record community services for the MDS while another 43% indicated it was 'somewhat important'.

Comments regarding the question on community services, indicated the need to add a category on private gardening services and to reword 'day hospital' to 'Community Rehabilitation Centre (CRC)'. Other suggestions were to add a 'hostel' option as well as assistance with shopping and transport and to have an 'other' category. One Clinic reported that for clients living in residential care none of the community services were applicable, yet many services such as home care, personal care and food services are supplied to the person living in residential care (however, this applied to a very small proportion of Falls Clinic clients). It was also pointed out that clients may not be attending a CRC but may be privately seeing allied health professionals. There was no way of reporting whether clients were privately seeing a service such as podiatry, occupational therapy or physiotherapy, on the MDS.

One Clinic queried the need to collect community services information as DHS can gather information on community service use directly from community service providers.

4.1.5 Risk Factors

There was mixed feedback regarding the list of risk factors. While some indicated that the list was too lengthy, others indicated that additional categories were needed. One suggested exploring risk factors that were rarely used in the trial and to consider whether these risks rarely occurred or whether Falls Clinic staff require education about them. Table 23 lists queries regarding existing categories of risk factors and provides suggestions for changing these categories.

Table 23: Suggested changes to list of risk factors

Item No.	Item	Suggested change	Recommendation of project team
11.2	vision impairment / spectacles	'Spectacles' removed as it may be "misinterpreted to mean anyone who wears glasses is at risk".	Change wording to "vision impairment with best correction available".
11.3	Dizziness	Modify to vestibular dysfunction, e.g. BPPV or hypofunction. 'Dizziness' too broad and not always present.	Change wording to "vestibular dysfunction"
11.8	Chronic medical conditions such as stroke, Parkinson's disease, arthritis	Co-morbid conditions that contribute to falls risk	Change wording to "Chronic medical conditions that contribute to falls risk, such as stroke, Parkinson's disease and arthritis".
11.9	Osteoporosis	The inclusion of these items was queried as they are risk factors for injury rather than falling	Falls Clinics should be concerned with risk factors for injury as well as falls, therefore leave as is.
11.10	Osteomalacia		
11.11	Under-nutrition	"This has not been identified at all in our Clinic as a falls risk."	Is a risk factor for injury (Coin et al, 2000) therefore leave as is.
11.17	Muscle weakness /deconditioning	Do these questions need to be asked?	These are risk factors for falls (Lord et al, 1994; Lee et al, 2002) therefore leave as is.
11.19	Reduced physical activity		
11.25	Hazardous behaviors	What constitutes hazardous behaviour?	Change wording to "hazardous behaviours or actions that increase the individual's risk of falling".

Other suggestions for additional risk factors included:

- hearing impairment;
- obesity;
- pain;
- incontinence;
- anxiety.

There was also mixed feedback regarding the requirement to select all present falls risk factors and then select three main falls risk factors. Some reported this was useful and helped them to focus on more important risk factors. Others, however, indicated that the

process was too subjective reducing the reliability of the information, and that limiting it to three main risk factors was sometimes not “clear cut” and excluded significant factors. It was recognised, however, that three factors were better than only one (which was required for the diagnosis question). One suggestion was to identify significant factors, whether that be one factor or more. Another Clinic indicated that it was unclear as to whether suspected factors that were not yet diagnosed should be selected.

4.1.6 Diagnosis

Nine of the 14 Clinics indicated that this question was difficult to answer and limiting. No Clinics provided any support for retaining this item. Clients usually had multiple conditions that may have impacted on falls and at the first assessment it was not always clear what the most important condition was:

“Difficult sometimes to select only one diagnosis as most of the clients have multiple problems. Maybe tick box selection for falls related diagnosis may be better.”

“This was very difficult to answer given our client group tended to have multiple factors leading to falls. By limiting to one “diagnosis” other important factors were ignored.”

“Difficult in instances where the diagnosis is unclear – where we are referring on for further investigation. It should be acknowledged, in these cases, that this is not always a final diagnosis.”

4.1.7 Cognition

The majority of Clinics (64%) indicated that an assessment of cognitive impairment should only be completed for clients who show some signs of cognitive impairment. The remaining Clinics (36%) indicated that this assessment should be completed routinely for all clients on the initial assessment. Forty three percent of respondents indicated it would take very little effort to continue recording the cognitive measure for the MDS, 36% indicated it would take some effort, 7% a great deal of effort and 14% did not plan on recording it in the future. One commented that it required very little effort to continue completing and that many ACAS referrals already have it completed. Another Clinic indicated that performing a cognitive assessment in the client’s home can be difficult and that it was preferable to complete in the Clinic.

In relation to the preference for tool used, one indicated that they preferred the AMTS over the MMSE as it was a good screen and shorter. However, another indicated they had not used the AMTS. Limitations reported for the MMSE were that it was time consuming to perform, not appropriate for non-English speaking clients, could be considered intrusive, was not sensitive and has had limitations identified in research. However, there appeared to be some consensus that despite its limitations it was a useful measure for the MDS in giving an indication of the presence of cognitive impairment and was required for some memory improvement medications. The MMSE's limitations, however, should be acknowledged and, where appropriate, more detailed history sought.

4.1.8 Body Mass Index

Clinics were split in relation to the importance and ease of assessing the Body Mass Index (BMI) for the MDS. Half of the Clinics indicated that the BMI was 'very easy' to complete, 7% indicated it was 'somewhat easy' and 21% indicated it was 'somewhat difficult'. Twenty-one percent reported that they did not currently use the BMI. Forty-three percent of Clinics indicated it would take 'very little effort' to continue using the BMI for the MDS, another 7% indicated it would take 'some effort', 14% 'a great deal of effort' and 36% indicated they did not plan on recording it in the future.

Clinics were also asked to identify whether the BMI should be completed at follow-up to identify whether there had been any changes in body mass since the initial assessment. Only 15% of Clinics supported the routine use of the BMI at follow-up. The majority (54%) supported its use at follow-up for clients who were identified as underweight or overweight at the initial assessment. However, 31% of Clinics did not support its use at follow-up at all.

Comments regarding use of the BMI were consistent with the above findings, indicating mixed opinions for inclusion of the BMI in the MDS. One Clinic indicated that weight can be identified by visual observation, while others reported it should be completed routinely at initial assessment. One Clinic had difficulty completing it as they had no scales and another had difficulty completing it within the client's home. One Clinic reported that they thought it should be calculated at the follow-up assessment only if weight was identified as a significant reason for falling at the initial assessment and that weight loss or gain was part of the management plan recommended. Another suggested that the BMI was not very sensitive and that other factors need to be considered when weight was lost and appetite poor. However, this Clinic also recognised it was a "good prompt for further intervention, it is also relatively easy to administer."

4.1.9 Interventions recommended

There were a number of suggestions made in relation to the list of recommendations provided. Three Clinics did not make any suggestions indicating that the list was comprehensive and easy to complete with tick boxes. One Clinic indicated that there was nowhere to indicate whether an intervention was already in place, such as the CRC. Table 24 outlines issues and suggested changes for specific items.

Table 24: Issues and changes for interventions recommended

Item	Issue	Suggested change	Recommendation from project team
Review	Automatic so doesn't need to be specified	Delete item	There were around 10% of clients who were not recommended a further review, therefore leave as is.
Referred to medical specialist		Referred to medical specialists / or GP	Routine practice for most Clinics involves communication with GPs, so not considered necessary to change.
Vestibular rehabilitation: <ul style="list-style-type: none"> • repositioning • desensitising • gaze stability 	Confusing- we don't usually recommend exercises but refer onto a physiotherapist/CRC for vestibular rehabilitation	Vestibular rehabilitation (one category)	For Clinics involved in vestibular rehabilitation, there is value in differentiating these. Therefore, leave as is.
Home aids/modifications and Home visit	Confusing	Nil	Leave as is
Day hospital	1. Terminology 2. Not detailed	1. 'CRC' 2. Break down to specific CRC interventions such as balance work, group, and strength exercises	1. Change to Community Rehabilitation Centre 2. Too much detail for Clinics, not under control of Clinic staff, therefore leave as is.

Item	Issue	Suggested change	Recommendation from project team
Package	Usually an extensive waiting list	'Referred to a package'	Change wording to "referred to a package"
Education	"We believe education is an intrinsic part of the falls assessment process so does not need to be singled out as a specific intervention."	Delete item	Omit education
Other		Add more room in case there are multiple other referrals	Add extra space

Other suggested additions to the recommendations list:

- referral to rehabilitation in the home/GEM in the home
 - include "other rehabilitation"
- medication review
 - usually medication review occurs by the geriatrician and recommendations made, therefore leave as is.
- dietitian
 - include
- hydrotherapy
 - include
- tai chi
 - include
- inpatient admission for further investigation
 - include
- increase in carer involvement / supervision
 - relatively infrequent – option to be listed under 'other'
- continence nurse
 - add a category "other specialist Clinics" where this should fit
- ACAS
 - relatively infrequent – option to be listed under 'other'
- podiatrist
 - should be covered under recommendation for 'foot-care'

- falls prevention program (local community based)
 - should be covered under main type of intervention the community program provides (e.g. group exercise).

4.1.10 Outcome Measures: Falls and Falls Injuries

There were a number of comments and suggestions regarding recording of number of falls. Some Clinics expressed concern about the reliability of this item as client and carer recall can be poor and that it is very much a rough estimate, particularly for clients with cognitive impairment. However, it was also recognised as the most important measure to collect and that it was difficult to overcome the problem of poor recall. One Clinic reported that it was important for a falls definition/event to be consistent across Clinics and another raised whether near falls should also be recorded. One Clinic uses a specialised sheet on falls history that is completed by the client. Another Clinic indicated that because the MDS required a specific number and not a category such as '5+', they usually provided a conservative number of falls-specific falls they know have occurred. This perhaps indicates the need for a categorical indicator of falls such as '1', '2', '3', '4', '5-9' and '10+'.

Very few comments were made regarding the three questions relating to falls injury and medical attention. One Clinic indicated that injuries and medical attention were a "crucial component of assessment. We are hoping to reduce this number as a basic KPI!" Another, however, indicated that, as with number of falls, it was very much a "guesstimate". It was also recognised that it was good to identify whether the client sought medical attention because many clients do not seek it after a fall.

The question on nature of injuries was valued by one Clinic for its simplicity, however another Clinic reported this as a weakness as it did not quantify how often these injuries occurred. For example, if 'fracture' was selected did the client have one fracture, multiple fractures from one fall or multiple fractures from multiple falls? Another indicated that it was "important to gain an idea of what systems are not functioning appropriately".

4.1.11 Outcome Measures: Secondary outcome measures

Table 25 provides responses to the questions regarding ease of use of the various secondary outcome measures. Overall, findings indicate that Clinics did not find any of the secondary outcome measures 'very difficult' to complete and very few found them 'somewhat difficult'. The most difficulty appears to be related to completing the Modified Falls Efficacy Scale, although half of the Clinics found it 'somewhat easy'. The Barthel and Frenchay are

used by only a half of Clinics and those using them tend to rate them as 'somewhat easy' to complete. Those using these measures generally find them 'somewhat easy' or 'very easy'. The Timed Up and Go, Step Test, leg muscle strength and gait velocity were rated the easiest to use.

Table 25: Outcome measures - Ease of use

	Don't use	Very easy	Somewhat easy	Somewhat difficult	Very difficult
Barthel	6 (42.9)	3 (21.4)	4 (28.6)	1 (7.1)	0 (0)
Frenchay	7 (50.0)	2 (14.3)	4 (28.6)	1 (7.1)	0 (0)
Timed Up and Go	0 (0)	10 (83.3)	2 (16.7)	0 (0)	0 (0)
Step Test	0 (0)	9 (75.0)	3 (25.0)	0 (0)	0 (0)
Leg muscle strength	1 (8.3)	9 (75.0)	2 (16.7)	0 (0)	0 (0)
Gait velocity	1 (8.3)	9 (75.0)	2 (16.7)	0 (0)	0 (0)
MFES	2 (14.3)	1 (7.1)	7 (50.0)	2 (14.3)	2 (14.3)
Medications	1 (7.7)	7 (53.8)	4 (30.8)	1 (7.7)	0 (0)
Postural BP	3 (21.4)	8 (57.1)	3 (21.4)	0 (0)	0 (0)

Table 26 provides responses for the effort required to continue to complete the secondary outcome measures for the MDS. The data in Table 26 corresponds with findings from Table 25. Around a quarter of Clinics do not plan on using the Barthel or Frenchay in the future and another 15% indicate that it would require a great deal of effort to continue collecting these measures. For gait velocity, MFES and postural BP, one Clinic indicated not planning to use these measures in the future. The Timed Up and Go, Step Test, leg muscle strength and gait velocity were rated by the most Clinics as requiring very little effort to continue using.

Table 26: Outcome measures - Effort required to continue using

	Very little effort	Some effort	Great deal of effort	Do not plan using in future
Barthel	5 (38.5)	3 (23.1)	2 (15.4)	3 (23.1)
Frenchay	4 (30.8)	4 (23.1)	2 (15.4)	4 (30.8)
Timed Up and Go	10 (83.3)	2 (16.7)	0 (0)	0 (0)
Step Test	10 (83.3)	2 (16.7)	0 (0)	0 (0)
Leg muscle strength	10 (83.3)	1 (8.3)	1 (8.3)	0 (0)
Gait velocity	10 (83.3)	1 (8.3)	0 (0)	1 (8.3)
MFES	6 (46.2)	4 (30.8)	2 (15.4)	1 (7.7)
Medications	7 (58.3)	4 (33.3)	1 (8.3)	0 (0)
Postural BP	6 (50.0)	5 (41.7)	0 (0)	1 (8.3)

Table 27 provides the responses to how important the various secondary outcome measures are for inclusion in the MDS. The Barthel and Frenchay were reported by 4 Clinics (31%) as being 'not at all' or 'not very' important. All other measures were considered important by almost all Clinics, with the majority of Clinics reporting them 'very important'. The measures rated 'very important' by the largest proportion of Clinics were:

- gait velocity;
- Timed Up and Go;
- Postural BP; and
- Step Test.

Comments regarding the various outcome measures are summarised below Table 27.

Table 27: Outcome measures - Importance for inclusion in MDS

	Not at all important	Not very important	Somewhat important	Very important
Barthel	1 (7.7)	4 (30.8)	4 (30.8)	4 (30.8)
Frenchay	3 (23.1)	0 (0)	4 (30.8)	6 (46.2)
Timed Up and Go	0 (0)	0 (0)	3 (23.1)	10 (76.9)
Step Test	0 (0)	0 (0)	3 (23.1)	8 (72.7)
Leg muscle strength	0 (0)	1 (8.3)	4 (33.3)	7 (58.3)
Gait velocity	0 (0)	0 (0)	2 (18.2)	9 (81.8)
MFES	0 (0)	0 (0)	5 (41.7)	7 (58.3)
Medications	0 (0)	1 (8.3)	5 (41.7)	6 (50.0)
Postural BP	0 (0)	0 (0)	3 (25.0)	9 (75.5)

Barthel Index

The Barthel Index was described as inappropriate for the Falls Clinic client group by 9 (64%) Clinics. The main reason given was that it was not a sensitive tool as most community dwelling clients scored 100/100 and therefore improvements could not be identified. It was considered a more appropriate tool for residents in low or high level residential care. The Frenchay Index and Functional Independence Measure (FIM) were cited as more informative, however, concern about the time required to complete more comprehensive measures was also raised. The Westmead was also found to be very thorough for home visits, however, as an assessment of safety in the home it was not an appropriate measure for determining activity/function. One Clinic reported that the “scoring can be skewed if a client has suffered a recent injury which is affecting level of independence.”

Frenchay Index

Eight Clinics provided comments relating to the Frenchay Index, with most of these comments not supporting use of the Frenchay Index. Problems identified by therapists were:

- being time consuming to complete
- not very good inter-therapist reliability
- wanting to remove the item relating to reading full books
- difficult to gauge gardening and household maintenance
- not very useful

- scoring can be difficult where client responses fall between different scores
- skewed if the client has sustained a recent injury.

Two Clinics reported positive aspects of the Frenchay Index including that it was good for measuring ADL levels over time, had good sensitivity and helped prompt for alternative referrals.

Timed Up and Go

Few comments were recorded relating to the Timed Up and Go test. One Clinic reported that it was easy to complete. Queries were raised as to whether type of gait aid should be recorded and whether some conditions, such as using arms to get up from the chair, should be consistent at initial and follow-up assessments. One Clinic indicated that they complete the Timed Up and Go in the client's house and sometimes had difficulty finding an appropriate chair to use.

Step Test

Again, there were few comments regarding the Step Test. One Clinic indicated that it was informative when a balance problem was suspected and another found it easy to implement after non-slip steps had been manufactured. However, one Clinic reported that the test had a "floor effect" with lower level clients – many unable to complete due to pain/fear of falling/hip abductor weakness, rather than purely poor balance."

Leg muscle strength

Most of the comments relating to the test for leg muscle strength were negative, questioning the validity of the test in measuring strength and the preference for more thoroughly assessing strength using dynamometry - *"not sure whether this is a valid way to assess strength, especially as they are able to use their hands. Noticed a few people cheating very well!"* and *"the test used doesn't really measure leg strength! Ideally dynamometry would be used, but not all Clinics have access."* The Step Test and Sit to Stand were reported as identifying problems in this area. Another Clinic indicated that they did not use the test as they could not find a suitable chair in the client's home. Only one Clinic indicated that it was an important assessment to be completed along with length of calf.

Gait velocity

Although gait was reported as a very important outcome measure, there were some comments about the way in which gait was assessed for the MDS. One Clinic reported that possibly maximum gait velocity is of greater importance, however it was limited by its subjectivity. Another recommended including stride length and the gait aid used (if any). Another stated that they usually assessed gait pattern rather than speed.

Six metres was found to be a good length in the Clinic setting but too difficult in client's homes. It was also found to be difficult to convert to m/min for comparison to normative values. This was overcome with the use of a conversion table.

MFES

A number of Clinics indicated that clients had difficulty completing the MFES as reflected in the comments below:

"This was difficult to complete in the majority of our population. Clients simply didn't seem to understand it, and I think therapists were tending to lead them a lot of the time. I'm not familiar with a better one, but I hope there's something out there!"

"Difficult to have people answer the questions as they are intended. Many people seemed to view this as a 'test' of how well they perform with each task – despite much reminding of the need to use it as a measure of confidence."

"Most clients need prompting re the focus of questions. They confuse confidence with their ability to carry out the task."

Other difficulties described included the use of a sliding scale, it was time consuming, gave high ratings for most clients and therefore was considered not sufficiently discriminating, and was difficult for clients with cognitive impairment. It was also reported as not accommodating for clients who have modified their behaviour to reduce the risk of falling (e.g. getting dressed sitting on bed). There appeared to be some inconsistencies in use and interpretation of the MFES score in one or two Clinics.

However, it was also recognised as an important construct to assess and was reported by one Clinic as identifying significant changes. One Clinic suggested getting clients to complete the measure prior to attending the Clinic. Another reported that if they did identify fear of falling they were unable to access any psychology services for the client.

Medications

Two key comments were made in relation to the medication question. First, some Clinics indicated that it was not the number of medications but rather the number of medications associated with increased falls risk that was most important. Secondly, it was difficult to get an accurate number of medications from clients who often counted the number of tablets

they had each day rather than the total number of prescribed medications. One Clinic also considered that the number of medications was not likely to change much.

Postural BP

Comments regarding the use of postural blood pressure were mixed, with two Clinics indicating that it was an essential component and sometimes identified a postural drop without the client reporting dizziness. However, another Clinic reported that “GPs tend to be able to manage this problem themselves”. Another Clinic queried the 3-minute time frame as occasionally a marked drop occurred at 1 minute but had resolved by 3 minutes.

For the Clinic that undertakes the initial assessment at home, therapists did not feel confident assessing postural blood pressure. If the client was seen at the outpatient Falls Clinic, they had postural blood pressure assessed by the Geriatrician.

4.1.12 Compliance Measure

Clinics recognised the importance of measuring compliance with Clinic recommendations with 62% indicating it was a ‘very important’ measure and 38% indicating it was a ‘somewhat important’ measure for inclusion in the MDS. Most Clinics (54%) indicated that it would take ‘very little effort’ to continue assessing for the MDS with 39% indicating it was ‘very easy’ to complete and another 39% indicating it was ‘somewhat easy’ to complete. One Clinic, however, indicated that although it was ‘somewhat important’ to collect, it was ‘very difficult’ to measure and did not plan on using it in the future. Another also reported that it was ‘somewhat difficult’ to measure and would be ‘a great deal of effort’ to continue recording for the MDS. This Clinic indicated that; “the basic flaw is that compliance is often reliant on self reporting and requires too much time for clinicians to be double checking all compliance issues with secondary bodies.” Positive comments about the compliance measure included that it helped to “complete the picture and overall progress of the client”, and “made it easier for me as compliance was incorporated in letter of risk factors and recommendations sent to patient & GP at initial visit.” One Clinic suggested that recommendations needed to be prioritised or ranked as some are more important than others are. Another limitation of the measure was that the ‘partial’ compliance could be quite different for different clients. For example, one client may have done all of their exercises for four of the six months while another partially completed their exercises each week across the whole six months.

One suggestion raised by the Steering Committee was to separate compliance according to whether limited compliance was related to the client or was related to service provision (e.g. no transport available to get to exercise class). This would provide a better understanding of

why recommendations were completed or not completed and whether it was perhaps related to client motivation or service accessibility.

4.1.13 Resources for Completing the MDS

The implementation of the Minimum Data Set had varying levels of impact on different Clinics, reflecting different procedures currently in practice. Some Clinics reported that the implementation of the MDS has had a great impact on the Clinic workload. Additional time was required for data collection and entry and implementing new measures. A number of Clinics allocated one staff member to collect and enter all MDS data. This led to some double entry and longer team meetings as members all had to report the outcome measures to the person responsible. One Clinic commented that implementing the MDS did not take much additional effort as they were already completing most of the measures. Another Clinic indicated that they were now providing clients with a list of falls risk factors found and their compliance rating. They indicated that this process added to routine education already provided and gave “clients incentive to actively participate in Clinic processes”.

Additional measures that a number of Clinics implemented for the MDS included the Barthel, Frenchay, leg muscle strength and Body Mass Index (BMI). Some Clinics did not implement additional measures as they did not have the resources to do so. Clinics that added the BMI indicated that it was an easy measure to collect and did not require much additional time. The Clinic that undertakes assessments in the home had to supply all staff with a step, a stopwatch and a tape measure. Staff from this Clinic were also supplied with the MDS guidelines and additional training.

Alterations were also made to the way some measures had previously been reported, such as the number of falls and falls injuries and the number of minutes used for the Postural BP test. One Clinic decided to record Postural BP at 1 and 3 minutes, rather than just 3 minutes for the MDS. One Clinic introduced the Frenchay and the Barthel but ceased using the Barthel as they found the Frenchay had greater sensitivity for their client group.

Face to face follow-up assessments 6-months after the initial assessment were routinely completed by the majority, but not all Clinics. One Clinic performed a telephone follow-up at 6-months and were unable, therefore to assess all of the outcome measures. Another did not complete any follow-up assessment but indicated they could introduce this process if there was good justification for it. Another Clinic employed extra staffing to complete the 6-month reviews. Other Clinics reported general difficulty in getting some clients to re-attend for the follow-up session and that some clients did not need to return.

Clinics were asked to estimate the additional time required per client for collating and entering data for the MDS. Clinics were asked to estimate this excluding any additional time required for changes in measurement practices. Times provided ranged from 10 minutes to an hour per client, however, 10 Clinics (71%) indicated times between 15-30 minutes per client.

4.1.14 Utility of the MDS to Falls Clinics

All Clinics indicated that the MDS was important for informing and evaluating their own Clinic's practices with 57% indicating it was 'somewhat important' and 43% indicating it was 'very important'.

4.1.15 General Comments

Clinics were also asked whether they had any other general comments regarding the MDS. There were a number of positive and negative aspects of the MDS reported by Clinics. The major barrier to implementing the MDS was staff time. One Clinic suggested that the length of the MDS could be shortened to "concentrate on factors of greatest importance. In its current form there is too much of a burden on staff time." It was also reported that the already lengthy Clinic assessment became even longer with the introduction of additional paperwork for the MDS. Another indicated that:

"even though most of these things are 'easy' or 'very easy' to collect, when you add up all the time needed to enter all the data in the sheet it does become time consuming (5 mins doesn't sound like a lot, but when you are always running behind time it is!)"

One Clinic indicated that they felt that the MDS process was not flexible for different methods of service delivery. They conducted initial assessments in the client's home:

"We feel the advantage of seeing the client in their home situation outweighs the need for full MDS data collection. It would be helpful if we could submit more data later as it becomes available e.g. postural hypotension, BMI."

One Clinic reported one of the positive aspects of implementing the MDS was when data was presented to all Clinics and staff were given the opportunity to discuss differences between Clinics. It was also suggested that there should be training for all Clinics to ensure items on the MDS are being interpreted consistently by Clinics. The area of particular

concern cited by the Clinic was interpretation of the exercise intervention recommendations. The 'checklists' of risks and recommendations, however, were also cited as useful instruments when new clinicians started at the Clinic.

Another suggestion was to add the MDS form to the medical record to reduce duplication and ensure all data is recorded.

4.2 Evaluation of the MDS based on MDS data and response rates

In addition to staff perceptions of the MDS, the actual MDS data provides another source of information for evaluating the MDS. In particular, missing data can indicate limitations of the MDS and can be a reflection of:

- errors in data entry, or
- resource limitations preventing Clinics measuring the item, or
- Clinics not perceiving the item to be important/relevant to collect.

Table 28 indicates very low rates of missing data for key demographic variables including referral reasons and sources, age, gender, living arrangements and carer availability and community service use. Diagnosis was missing for 19% of clients and has been reported to be difficult to confirm at the initial assessment when sometimes further testing is required before a diagnosis can be made. Cognitive impairment measures and Body Mass Index had higher rates of missing data. Body Mass Index requires scales and a tape measure and was often not completed by Clinics prior to the implementation of the MDS. Around a third of Clinics reported in the survey (see section 4.1.8 above) that they did not find it a very useful measure and did not plan on using it in the future. As also described in the survey (see Section 4.1.7 above) 64% of Clinics reported that it was only necessary to complete a cognitive measure if there was some indication of cognitive impairment. This may indicate that the 33% of missing data reflect clients who did not show any signs of cognitive impairment.

Table 28: Missing demographic data

	Missing data (%)
Referral source	2 (0.4)
Reason for referral	6 (1.1)
Age	6 (1.1)
Gender	0 (0)
Living arrangements	5 (1.0)
Informal carer availability	21 (4.0)
Community services	Ranged from 6 (1.1) – 12 (2.3)
Diagnosis	100 (19.0)
Cognition	30 (5.7) missing + 145 (27.6) 'not tested' = 175 (33.3)
Body Mass Index	208 (39.5)

NB: Data that were missing health service or client code were excluded from the analysis (<10 cases)

BMI was counted as missing for one client who had a BMI recorded of 7 but did not have under-nutrition listed as a risk factor.

Table 29 reports the amount of missing data at initial and follow-up assessments for the various outcome measures. As key outcome measures, falls, injuries and medical attention were completed for more than 95% of clients on both assessments. For most of the remaining outcome measures there was a higher proportion of missing data for follow-up assessments than initial assessments. Number of medications at the initial assessment was the only secondary outcome measure to have less than 10% missing data. The Step Test and TUG also had reasonably low levels of missing data.

Table 29: Missing outcome data

	Missing on Initial Assessment, n=526 (%)	Missing on Follow-up Assessment, n=254 (%)
Number of falls	18 (3.4)	7 (2.8)
Number of injurious falls	25 (4.8)	10 (3.9)
Falls leading to client seeking medical attention	24 (4.6)	9 (3.5)
Barthel	190 (36.1)	125 (49.2)
Frenchay	283 (53.8)	128 (50.4)
Timed Up and Go	81 (15.4)	65 (25.6)
Step Test	63 (12.0)	61 (24.0)
Leg muscle strength	131 (24.9)	93 (36.6)
	4 (0.8) could not perform task	
Gait	124 (23.6)	93 (36.6)
Modified Falls Efficacy Scale	159 (30.2)	86 (33.9)
Number of medications	36 (6.8)	37 (14.6)
Postural Blood Pressure	122 (23.2)	118 (46.5)*

*37 clients with Postural BP missing at follow-up had no indication of a drop in Postural BP at the initial assessment. If these are excluded from the missing data there is 31.9% missing data at follow-up.

Completion of the compliance measure was another area where missing data could be measured. The extent to which the compliance measure was completed for clients who were recommended an intervention initially may indirectly provide an indication of how well Clinics followed up their recommendations. The compliance measure can also be completed for recommendations that were not initially recommended. This could indicate where another service made a recommendation but the Falls Clinic decided to assess whether it was

undertaken, or it could reflect inaccurate data recording such as filling in the wrong box or not entering in recommendations initially made. Appendix 5 provides information on each recommendation showing the proportion of clients who were recommended the intervention but did not have compliance assessed (missing compliance data) as well as the number of compliance measures assessed for interventions not initially recommended (additional compliance data). Appendix 5 shows that for a number of recommendations there are moderate proportions of both missing and additional compliance data.

4.3 Summary

The information analysed in this chapter from surveys of Falls Clinic staff about the utility and usefulness of the components of the MDS, in combination with the data related to missing data, can be used to inform final recommendations for a Falls Clinic MDS. Chapter 5 integrates this information into the final recommendations.

5. Discussion and Recommendations

5.1 Summary of Falls Clinic outcomes

A total of 526 initial assessments were completed and submitted electronically from 14 Falls Clinics. Falls Clinic clients had an average age of 76.9 years (SD 10.0), 73% of clients were female, and 43% were living at home alone. At the time of the initial Falls Clinic assessment, clients had a relatively low level of community service use, with a median of one service in place, most commonly home help. Sixty percent of clients were referred by General Practitioners. The most common reason for referral was falls (75%), although other common reasons for referral included gait disorder (21%) and dizziness (18%), with or without a history of falls. Seventy nine percent of clients reported one or more falls in the six months preceding Clinic assessment, with 79% of these reporting multiple falls in the 6-month period. Clients reported a median of two falls in the six months preceding Clinic assessment, with 54% sustaining injuries from one or more of these falls. Twelve percent of the sample had suffered a fracture as a result of one or more of their falls in the preceding 6 months. This falls and falls injury data highlights the high risk of falls and falls injury of the Falls Clinic sample.

At the initial assessment, an average of seven risk factors were identified per client, with the most common being impaired balance (76%), muscle weakness (67%), chronic medical conditions (64%), unsteady gait (53%) and polypharmacy (53%). Following assessment, individualised management plans were introduced for clients. On average, there were 5.6 recommendations made per client. The most commonly recommended interventions were home exercise programs (46%), home visits (46%) and home aids and modifications (31%), referral to a Community Rehabilitation Centre (40%), education (41%), investigations / treatment of health problem (31%) and group exercise (26%).

Follow-up assessments were recommended for 89% of clients. Follow-up data was recorded for 254 clients who had initial assessment data recorded. Excluding the centre where follow-up assessments were not performed on any clients (n=45), and those with a follow-up assessment pending outside of the study period or not recommended for a review, the overall follow-up rate was 62%. Comparison of baseline data for those who returned and those who could not be contacted or failed to attend the follow-up session indicated a small

number of significant differences between the two groups, suggesting that those who did not return for the 6-month follow-up assessment had a greater level of falls risk than those who did return. Clinic outcomes, therefore are generalisable to clients who return for the follow-up assessment.

In the six months following implementation of Falls Clinic management plans, there was a significant reduction in the number of falls (64% reduction), multiple fallers, and falls causing injuries (75% reduction) compared to the six months preceding Falls Clinic assessment. In addition, there were small but significant improvements in most of the secondary outcome measures, including balance, gait and mobility, leg strength, fear of falling, and reduced number of medications taken. In the context of a frail older group with high falls risk and many with chronic progressive disease, these outcomes are substantial.

An important factor that is likely to influence outcomes in any falls prevention program is compliance with recommended interventions. A quarter of clients fully complied with all interventions recommended by Falls Clinics. Medical interventions were the most frequently fully complied with intervention type. When community rehabilitation was excluded, community services had the lowest rate of compliance. Compliance levels were lower for people 65 years and over compared to those under 65, for females compared to males, people living alone compared to those living with others and for those without a carer compared to those with. This suggests that older and more isolated clients may need more support in undertaking Clinic recommendations. There was no significant relationship between compliance and cognitive impairment. Poor compliance was associated with poorer outcomes in relation to injurious falls, the MFES, Step Test and gait velocity.

5.1.1 Limitations

The main limitation associated with the results reported for this project was the reduced generalisability of outcome results due to the low (62%) proportion of clients returning for 6-month follow-up assessment. Comparisons of those who returned with those who didn't return due to not being able to be contacted and failing to attend identified poorer function amongst those not returning on a small number of outcome measures. This limits the extent to which outcomes can be generalised to those who do not return for follow-up assessments. It also indicates that those with poorer function at initial assessments may require additional support and follow-up to ensure recommendations are undertaken and their progress is monitored.

A further limitation relates to the diversity of practice between Falls Clinics, and the challenge in developing a Minimum Data Set that is equally useful and clinically practical across these different models of practice. This may have contributed to the amount of missing data on some of the secondary outcome measures.

5.2 Recommended MDS

Table 30, over the page, summarises some of the key findings for the falls-related and secondary outcomes assessed in this project. Missing data is included as it reflects either Clinics not considering the measure important to assess and/or Clinics not having the resources to complete the measure. Data from the Falls Clinic MDS evaluation survey is also reported including importance of the measure, effort to continue using for a MDS and general comments about the measure.

The ability of each measure to assess change is identified by the proportion of clients whose score changed (Table 30) – deteriorated or improved (refer to Table 17) and also whether a significant change was identified. One of the potential uses of items on an MDS is that they are sensitive to identifying change on domains that are considered important markers of falls risk. If no change was identified *and* there was a large proportion of missing data *and* Clinics did not find the measure important or easy to use, there appears to be little support for maintaining the measure in the MDS. A summary of the findings of the Table are included after the Table.

Table 30: Factors for consideration for including outcomes measures in a Falls Clinic MDS

	% Missing data (initial / follow-up)	% very Important	% very little effort to continue	Sig change*	% change**	Summary of comments
Falls	3.4 / 2.8	Not asked	Not asked	Yes	73.9	Some queried reliability of client recall, however, considered too important not to ask. Suggestion of providing categories
Falls injury	4.8 / 3.9	Not asked	Not asked	Yes	53.3	Very important to collect
Falls-medical attention	4.6 / 3.5	Not asked	Not asked	Yes	32.9	Important to identify as clients do not always seek medical attention after a fall
Barthel	36.1 / 49.2	30.8	38.5	No	36.8	Not sensitive for Falls Clinic population
Frenchay	53.8 / 50.4	46.2	30.8	No	81.7	Time consuming and difficult to score
TUG	15.4 / 25.6	76.9	83.3	Yes	87.3	Satisfied with TUG
Step Test	12.0 / 24.0	72.7	83.3	Yes	81.0	Satisfied with Step test
Leg strength	24.9 / 36.6	58.3	83.3	Yes	80.2	Reports that it was not very valid and dynamometry preferable. However, not all Clinics have access to dynamometry

	% Missing data (initial / follow-up)	% very Important	% very little effort to continue	Sig change*	% change**	Summary of comments
Gait velocity	23.6 / 36.6	81.8	83.3	Yes	87.2	Important to assess gait-some issues about this approach but mostly satisfied
MFES	30.2 / 33.9	58.3	46.2	Yes	59.1	Difficulty getting clients to complete independently. Important domain, needs work re administration
Medications	6.8 / 14.6	50.0	58.3	Yes	55.5	Some indicated that type was more important than number. Some difficulty getting accurate number.
Postural BP	23.2 / 46.5	75.5	50.0	Yes	59.1	Generally satisfied, suggested to report 1 and 3 minutes, some suggested GP could manage

*significant change from admission to follow-up (P<0.05).

**proportion of clients with improvement or deterioration in baseline score.

Table 30 indicates strong support for most of the measures, in particular falls, falls injuries and seeking medical attention as a result of a fall. It was questioned whether client self report was a reliable measure of previous falls. The only alternative would be use of a falls diary. However, introduction of a falls diary has been shown to increase falls reporting by approximately 20% (Cummings et al, 1988, Hill et al, 1999), which would be problematic if comparing falls diary rates after Clinic assessment with self report prior to Clinic assessment.

Evidence for inclusion in the MDS amongst secondary outcomes was strongest for the Step Test, TUG and gait velocity. However, although gait velocity was considered very important and would require little effort to continue, there was a high proportion of missing data, particularly at follow-up when over a third of clients did not have gait data entered. This may reflect some of the comments by Clinics in Chapter 4 where it was indicated that other measures of gait were used by some Clinics.

There was mixed support for the leg strength measure. Although significant changes were identified, it was considered easy to continue using and a change was identified for 80% of clients, Clinics questioned the validity of the test. Only 58% of Clinics indicated it was very important for the MDS. However, this measure of leg strength and variations of it, have been reported in a number of research studies, where it has been considered to provide an accurate and sensitive measure of general lower limb strength (Gill et al, 1995; Salive et al, 1994; Tinetti et al, 1995). The main alternative would be use of dynamometry, which is substantially more time consuming and requires expensive equipment not available in all Clinics.

Fifty-eight percent of Clinics also identified the MFES as very important for the MDS. There was a significant improvement in the MFES with the Clinic interventions, and change was identified for 55% of clients. However there were some problems with administration of the tool, with fewer than half of the Clinics indicating it would take little effort to continue using. Several Clinics indicated it was time consuming and required a staff member to work through it with the client. However, self-efficacy was also considered an important construct to assess and, unlike physical measures that can usually be assessed objectively by a clinician, psychological constructs often require more in-depth questioning and rely on self-report. Possible alternatives to the MFES include:

1. The FES (Tinetti et al, 1990) - a shorter questionnaire, but less useful in identifying mild/early levels of loss of confidence; or
2. The ABC scale (Powell & Myers, 1995) – a 16 item scale, which includes some items of limited usefulness in Australia (e.g. walking on icy footpaths).

Alternative options for measuring falls efficacy warrant exploration.

Although medications had a low proportion of data missing, only half of the Clinics reported it was very important for inclusion in the MDS and only 58% indicated it would take little effort to continue reporting for the MDS. Comments indicated that the type of medications was more important than the number and that it was sometimes difficult to get an accurate number as clients tended to report number of tablets taken rather than number of different medications. There was also a suggestion that it was difficult to change the number of medications. Despite this 55% of clients had a change in medication, with 32% of clients taking fewer medications at follow-up than initially. Research evidence also suggests that while taking certain medications such as psychotropics increases risk of falling, polypharmacy is also an important risk factor for falling (Campbell et al, 1990; Leipzig et al, 1999).

Generally, there was support for inclusion of postural blood pressure although 50% indicated it would not be very easy to continue its use and there was a high proportion of missing data at the follow-up assessment. Although at follow-up 47% of clients had missing data for the postural blood pressure (BP) measure, 15% of these clients did not have a drop in postural BP initially and therefore the Clinic may have considered it of limited value to reassess this measure at follow-up.

Of all the secondary outcome measures there was least support for the inclusion of the functional / activity measures – the Barthel Index and Frenchay Index. These measures had the highest proportion of missing data and had the lowest proportion of Clinics rating them as important or easy to continue using. Neither identified significant change, although power to identify change was limited by the smaller sample with this data. However, if one of these measures was to be included there appeared more support for the Frenchay. Although it was considered time consuming, it did not have the ceiling effect that the Barthel was criticised for and was able to identify change in over 80% of clients. Improving functional activity is an important goal of Falls Clinics, and an appropriate measure to reflect this is required. However, while the Frenchay was preferable to the Barthel, it does not appear to be an ideal measure for assessing activity by Falls Clinic staff and an alternative measure may increase compliance in completion.

5.3 Recommendations and Issues

The outcomes of this project reflect the general acceptability of an outcome related MDS by Falls Clinic staff, and its usefulness in identifying effectiveness associated with interventions. Establishing a standardised MDS for Falls Clinics has potential benefit for clients, individual services, Falls Clinics collectively, and for the funders. It provides a nucleus of a relatively small number of measures that have been previously validated, have demonstrated sensitivity to change in the Falls Clinic population, and have general support for use by Falls Clinic staff. The revised recommended Minimum Data Set for Falls Clinics is reported in section 5.5.

It is recommended that Falls Clinics consider ongoing use of the MDS as a basis for their assessment procedures. It is recognised that individual Clinics will use additional measures for their own purposes, but that this should be in addition to the MDS.

Beyond the scope of the current project, there is no long-term capacity for centralisation, analysis and interpretation of the MDS data. However, having this evidence based set of measures as the basis for data collected within each Clinic, there may be the opportunity to review individual Clinic data intermittently, or even to undertake a subsequent multi-Clinic analysis at some time in the future. Intermittent review of collective Falls Clinic data, together with specific measures related to aspects of practice (e.g. improved compliance) could continue to be used as a basis for ongoing quality improvement within Falls Clinics individually and collectively.

There are currently substantial changes occurring with the Sub-acute Ambulatory Care Service (SACS) programs in Victoria, of which Falls Clinics are part. These changes are likely to see modification to the mandatory data required from Falls Clinics by the Department of Human Services. It is likely that there will be:

- a reduction in the number and type of process measures currently reported,
- standardisation of most of the mandatory data submitted by the various services forming SACS, and
- capacity to include a small number of service / Clinic specific outcome measures (currently no outcome measures form part of the mandatory MDS for Falls Clinics).

The outcomes of the current project will help to inform any decision about Falls Clinic specific outcome measures to be used in the new mandatory data set for SACS.

The Victorian Falls Clinic Coalition has provided an effective forum to support the implementation of this project, and for reviewing the project outcomes in the context of individual Clinics as well as Clinics collectively. Opportunities to support the activity of the Falls Clinic Coalition, as well as options for future project activity to provide further basis for improved practice by Falls Clinics should be explored.

Issues from the project that warrant further discussion include:

- several of the measurement domains with low acceptability (function / activity; leg muscle strength, and falls efficacy) warrant further investigation to determine whether there are more practical measures that can be used. Each of these domains continued to be considered important to measure, so the choice of measurement for that domain is the factor to be investigated.
- Is there a need for intermittent review of Falls Clinics across the range of domains comprising the MDS? If so, decisions would need to be made as to what system would be used for data centralisation, and funding would need to be available to analyse and interpret the data.
- The data from this project has identified a number of areas that could be explored in greater detail to inform potential practice change in Falls Clinics. For example, the areas where recommendation of intervention was low despite presence of falls risk factors (e.g. presence of depression, or polypharmacy / high falls risk medications), and strategies to improve client compliance with recommended falls prevention activities warrant further evaluation. Options to obtain discrete funding for practice improvement studies such as these needs to be explored.

The Falls Clinic Coalition will provide a useful forum for progressing some of these issues. It is also recommended that the Falls Clinic Coalition Executive discuss these issues and other outcomes from the project with the Metropolitan Health and Aged Care Division of the Department of Human Services.

5.4 Conclusion

Based on the range of data available throughout this project, it is concluded:

1. that a MDS can provide useful data on profile, recommendations and outcomes for Falls Clinics;
2. that the diversity in structure and function of Victorian Falls Clinics makes it difficult for one MDS to meet all the needs equally well;

3. that the revised MDS shown overpage could be used by Clinics as an assessment tool for recording client data; and
4. that some aspects of the MDS be considered optional, perhaps of greater use to specific Clinics in reviewing their function than as specific data required to be included in a reporting module. Examples include some of the demographic information, recommended interventions, and compliance measures.

5.5 Revised Minimum Data Set (bold/italics-altered)

Domain	Categories	Baseline	Follow-up
Assessment Information			
Question 1 Health service		✓	✓
Question 2: Patient Code	-3 digit unique code	✓	✓
Question 3: Assessment	-Initial assessment -Follow-up assessment (+ months since initial)	✓	✓
Question 4: Referred by	-Local Medical Officer -Inpatient -Outpatient (hospital departments) -Emergency Department -Medical Specialist -Self / Family -ACAS (Aged Care Assessment Service) -Community allied health -Other community (e.g. RDNS) -Other (please specify)	✓	
Question 5: Reason for referral	-Falls -Gait Disorder -Loss of Consciousness/Syncope -Dizziness -Poor balance/mobility -Fear of Falling -Other (please specify)	✓	
Demographic Information			
Question 6: Age	-Age in years at initial assessment	✓	
Question 7: Gender	-Male -Female -Not recorded	✓	
Question 8: Living arrangements	-Lives alone -Lives with others -Residential care (low and high) -Other supported accommodation -Not known	✓	
Question 9: Informal Carer Availability	-No carer available -Resident carer available -Non-resident carer available	✓	
Question 10: Community services	-Food services (Meals on Wheels) -Home care (domestic tasks such as vacuuming, washing, shopping, etc) -Personal care -Community nurse -Home maintenance/gardening service -Planned Activity Group/Day Centre	✓	

Domain	Categories	Baseline	Follow-up
Question 10: Community services continued	<p>-Community Rehabilitation Centre/Community Health Centre</p> <ul style="list-style-type: none"> -Respite care -Personal alarm -Package (Linkages or CACP) 		
Question 11: Risk factors	<p>MEDICAL</p> <ul style="list-style-type: none"> -Acute health problem such as urinary tract – infection, pneumonia, delirium -Vision impairment with best correction available -Vestibular dysfunction -Peripheral neuropathy / lower limb sensory loss -Postural hypotension -Polypharmacy (more than 4 medications) -Use of medications associated with increased falls risk -Chronic medical conditions that contribute to falls risk such as stroke, Parkinson’s Disease, arthritis -Osteoporosis (low bone density) -Osteomalacia (low vitamin D) -Under-nutrition -Syncope -Incontinence <p>PSYCHOLOGICAL</p> <ul style="list-style-type: none"> -Cognitive impairment -Depression -Fear of falling/anxiety <p>MOTOR / FUNCTION</p> <ul style="list-style-type: none"> -Impaired balance -Muscle weakness / deconditioning -Unsteady gait -Reduced physical activity -Reduced functional independence <p>ENVIRONMENT</p> <ul style="list-style-type: none"> -Environmental hazards – at home -Environmental hazards – away from home -Poor footwear -Foot problems -Hazardous behaviours or actions that increase the individual’s risk of falling 	✓	
Question 13: Cognition	<p>MMSE or AMTS (Some Clinics may choose to only complete one of these measures where signs of cognitive impairment are present)</p>	✓	

Domain	Categories	Baseline	Follow-up
Question 15: Interventions recommended	<p><i>In addition to identifying if intervention is recommended, also specify if already in place</i></p> <p>REVIEW</p> <ul style="list-style-type: none"> -Review (i.e. a follow-up falls clinic session has been recommended) <p>MEDICAL</p> <ul style="list-style-type: none"> -Referred to medical specialist -Investigations/treatment of health problem -Medication reduction - -Osteoporosis medication/ and or Vitamin D/calcium supplements <p><i>-Inpatient admission for further investigation</i></p> <p><i>-Other new medication</i></p> <p>EXERCISE</p> <ul style="list-style-type: none"> -Group exercise -Home exercise - Balance -Home exercise - Strength -Home exercise - combination -Vestibular rehabilitation – Repositioning -Vestibular rehabilitation – Desensitising exercises -Vestibular rehabilitation – Gaze stability exercises <p><i>-Tai Chi</i></p> <p><i>-Hydrotherapy</i></p> <p>ENVIRONMENT</p> <ul style="list-style-type: none"> -Home Visit -Home aids / modifications -Footwear change -Gait aid change or adjustment -Personal alarm <p>COMMUNITY SERVICES:</p> <ul style="list-style-type: none"> -Food services -Home care -Community nurse -Home maintenance/<i>gardening service</i> -Respite care -Personal care -Package (Linkages or CACP) <p><i>-Planned Activity Group/Day Centre</i></p> <p><i>-Community Rehabilitation Centre/Community Health Centre</i></p> <p><i>-Other rehabilitation</i></p> <p>OTHER</p> <p><i>-Other specialist Clinics</i></p>	✓	

Domain	Categories	Baseline	Follow-up
Question 15: Interventions recommended continued	-Behaviour modification (reduce risky behaviours) -Hip protectors -Foot care / podiatry -Visual assessment / management -Relaxation -Clinical psychology intervention -Dietitian -Driving assessment -Other, please specify		
Outcome measures			
Question 16: Falls and Falls Injuries	16.1: Number of falls	✓	✓
	16.2 Number of injurious falls	✓	✓
	16.3 Medical attention	✓	✓
	16.4 Nature of injuries	✓	✓
Question 17: Functional Measure	17.1: Frenchay*	✓	✓
Question 18: Balance	18.1: Timed Up and Go	✓	✓
	18.2: Step Test	✓	✓
Question 19: Leg muscle strength		✓	✓
Question 20: Gait (walking speed/velocity)		✓	✓
Question 21: Fear of falling	Modified Falls Efficacy Scale	✓	✓
Question 22: Number of medications		✓	✓
Question 23: Postural drop in Blood Pressure	Assessed at 1 minute <u>and</u> 3 minutes	✓	✓
Service Measures			
Question 24: Compliance	-non-compliance -partial compliance -full compliance		✓
Question 25: Reason for non/partial compliance	-service not available -difficulty accessing service (eg transport difficulty) -client choosing not to undertake recommendation		✓

*Investigate an alternative measure of activity

NB: Modified Barthel Index, Diagnosis and Body Mass Index omitted

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Appendices

Appendix 1: Falls Clinic Minimum Data Set Guidelines



Guidelines for a Minimum Data Set for Victorian Falls Clinics

National Ageing Research Institute

Revised May 2003

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1. Introduction

Falls and associated injuries remain a common and costly public health problem in Australia, for both older people themselves, and the community generally, despite considerable developments in research and clinical practice in recent years. Approximately one in three people aged over 65 years living in the community fall each year (Lord et al, 1993; Dolinis et al, 1997), and the rate of falls increases with age (Campbell et al, 1981). In Australia in 1998, there were one thousand and fourteen deaths from fall related incidents for people aged over 65 (Cripps and Jarman, 2001). Forty five thousand people in this age group were hospitalised for falls related injuries, averaging 11 days of hospital care each. This resulted in a total of 486,484 hospital bed days related to falls by older people during this 12 month period (Cripps and Jarman, 2001). The direct costs to the health sector for falls in people aged over 65 has been estimated to be \$AUD406.4 million (1993/4 data) (Mathers and Penm, 1999). Furthermore, costs in Australia associated with falls related injuries such as hip fractures have been projected to escalate in coming years (Sanders et al, 1999).

Research evidence indicates that multi-factorial interventions can result in significant reduction in falls among older people (Hill et al, 2000; Feder et al, 2000, American Geriatrics Society, 2001; Tinetti, 2003), even in those at high risk of recurrent falls such as those presenting to Emergency Departments after a fall (Close et al, 1999; Lightbody et al, 2002). The approach of utilising comprehensive falls risk assessment and implementation of a multi-factorial intervention program for older people at high risk of recurrent falls is the basis of Falls Clinic operations.

Currently there is considerable diversity in the range of outcome measures used by Victorian Falls Clinics. Although there are benefits to having diversity across Falls Clinics, there are also benefits in having at least a small amount of common assessments – a Minimum Data Set (MDS). A MDS can be used to share information between Clinics, to use as a basis for ensuring best practice, and to have potential for use in multi-Clinic research.

This Minimum Data Set is considered to be a framework of minimum outcome data that should form the basis of Falls Clinic assessment, but should not be considered prescriptive or limiting to the range of measures used by Clinics. It has potential to form the basis for a more systematic analysis of Falls Clinic outcomes across all Victorian Clinics, including outcomes in terms of falls related injury, and possibly form part of an economic evaluation of Falls Clinics. It may also be useful in undertaking quality improvement activities investigating relevant issues such as client compliance with Clinic recommendations. It is important to

stress that direct comparisons of outcomes between Clinics will be limited in that different staffing, models of care, and client profiles exist in different Clinics.

Criteria for the Minimum Data Set for Falls Clinics include:

- that it should incorporate a minimum number of measures to usefully reflect outcomes for Falls Clinics;
- that it should not be considered restrictive, and that Clinics can add additional measures to meet their local needs / interests; and
- that Clinics have the capacity to conduct the measures in the Minimum Data Set without requiring additional time or equipment.

How was it developed?

The MDS for Falls Clinics was developed in a two-stage process. The first stage was conducted through a Department of Human Services funded project undertaken by the National Ageing Research Institute to evaluate Falls Clinics. All Falls Clinics were surveyed regarding the outcome measurement tools and procedures they currently use and which ones they would recommend to be included in an MDS. This information was considered in conjunction with a literature review that included review of outcome measures reported by Falls Clinics in the research literature (Hill et al, 2002).

The findings were presented to a Falls Clinic Coalition meeting, attended by representatives of the Victorian Falls Clinics for general discussion. Feedback from the Falls Clinic Coalition resulted in a series of key domains being recommended to be included in the Minimum Data Set, although on a few items there was a lack of consensus on some specific measures to be used. Ongoing dialogue occurred through the Falls Clinic Coalition executive, and relevant Falls Clinic groups to finalise the recommended Minimum Data Set.

The process used to develop the Minimum Data Set for Victorian Falls Clinics has evolved through a consensus approach, and as such should be acceptable to most, if not all, Victorian Falls Clinics.

Field testing the MDS

Although developed using a consensus approach, it is necessary for the MDS to undergo field testing in a group of Clinics to ensure that the recommended MDS will be practical and workable. It is important that field-testing is completed before consideration to issues such as modifications being required to Clinic databases.

Field-testing of baseline data will be collected for a 6-month period. Follow-up data for clients who had baseline data recorded on the MDS will also be recorded, preferably six months following the initial assessment. The full field-testing period, therefore, is planned to occur over a twelve-month period.

The Minimum Data Set, and indeed the full Falls Clinic assessment, needs to be considered in context with other assessments at entry points to the health system for older people. For example, the Initial Needs Identification (INI) is being introduced by Primary Care Partnerships, and will include some of the demographic data required. As the Minimum Data Set is field tested, strategies to identify linkages with other assessments may need to be explored.

Completing the MDS

Completing the MDS will require access to the Internet. A form is available on the following website:

http://www.nari.unimelb.edu.au/falls_form

You will need to enter the User Name: ### and the password: ###

This form is for use for one client at either initial or follow-up assessment by the Falls Clinic. Once the form is completed you simply need to click on the “submit form” button at the end of the form and the form will be automatically emailed through to Kirsten Black at NARI to add to a database of clients from all participating Falls Clinics. At any time you can click on the “reset” button at the bottom of the form to clear all responses entered.

The MDS has been set up to operate without individual identifying data being provided to the project team. Clinics will be responsible for allocating a unique identifying code for each patient. This unique identifier will be used if there is any need to follow up about the transmitted de-identified data. It will also enable NARI project staff to link initial assessment data with follow-up data that will be received six months later. Each participating Clinic will be provided a **client record sheet** to record client names, the unique identifying code, and whether initial and follow-up data has been electronically submitted. The client record sheet will also have room to record reason, if known, for non-attendance at follow-up session.

Ideally, one designated member of the Falls Clinic team should electronically submit data for the MDS. Several items of the MDS (eg major contributory factors, falls risk factors identified

and interventions implemented) should be completed at the team meeting following initial assessment. It may be easiest for this to be done on a paper-based form with transfer to the electronic form at a later stage. Clinics can submit data as frequently as they wish, although it is expected that data will be submitted at least once a month.

Complete the form online for each initial assessment completed in a 6-month period from April 2003 to September 2003. In the following 6 months from October 2003 to March 2004 all follow-up visits will be recorded using the same online form. Referral source, reason for referral and demographic data will not need to be completed at follow-up. The unique client identifying code used by each health service will be recorded at question 2 and will enable matching baseline and follow-up data to examine change over time.

Who completes the assessments

Although many of the assessments used in the MDS are usually performed by a specific professional discipline (eg Barthel Index by Occupational Therapists, balance assessments by Physiotherapists) these may be performed by any of the team who have been trained to use the test or tool.

Using this manual

The measures included in the MDS are listed in section 2 of these guidelines. The data contained within the MDS can be grouped as assessment information; demographic data, outcome measure data and service measures. Section two summarises the 25 questions that are contained within these four groups and also indicates whether the data is collected at initial or follow-up assessments or both. Instructions for completing the assessment information is included in Section 3 and the demographic data in Section 4 of these guidelines.

The outcome measures are collected at initial and follow-up assessments for the purpose of identifying changes that have occurred since the initial Falls Clinic intervention, thereby providing data to evaluate the impact of Falls Clinics. Instructions for the administration of these measures are included in Section 5 of these guidelines. The service measure identifies compliance with recommendations made at the initial assessment and is therefore only relevant at the follow-up assessment. How to complete the compliance section is described in Section 6 of these guidelines.

Please Note: Involvement in the field testing of the outcome measures MDS does not replace the need to submit data for clinical indicators currently required by the Department of Human Services.

Queries

If you have any queries about the Minimum Data Set, how to complete the form or how to access and submit the data electronically please contact one of the project staff:

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Kirsten Black (03) 8387 2666 Email: k.black@nari.unimelb.edu.au

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2. Outline of the Minimum Data Set

Domain	Measure	Collect at baseline	Collect at follow-up
Assessment Information			
Question 1 Health service		✓	✓
Question 2: Patient Code		✓	✓
Question 3: Assessment		✓	✓
Question 4: Referred by		✓	
Question 5: Reason for referral		✓	
Demographic Information			
Question 6: Age		✓	
Question 7: Gender		✓	
Question 8: Living arrangements		✓	
Question 9: Informal Carer Availability		✓	
Question 10: Community services		✓	
Question 11: Risk factors		✓	
Question 12: Diagnosis		✓	
Question 13: Cognition		✓	
Question 14: Body Mass Index		✓	
Question 15: Interventions recommended		✓	
Outcome measures			
Question 16: Falls and Falls Injuries	16.1: Number of falls	✓	✓
	16.2 Number of injurious falls?	✓	✓
	16.3 Medical attention	✓	✓
	16.4 Nature of injuries	✓	✓
Question 17: Functional Measures	17.1: Modified Barthel	✓	✓
	17.2: Frenchay	✓	✓
Question 18: Balance	18.1: Timed up and Go	✓	✓
	18.2: Step Test	✓	✓
Question 19: Leg muscle strength		✓	✓
Question 20: Gait (walking speed/velocity)		✓	✓
Question 21: Fear of falling	Modified falls efficacy scale	✓	✓
Question 22: Number of medications		✓	✓
Question 23: Postural Blood Pressure		✓	✓
Service Measures			
Question 24: Compliance	(for 28 interventions)		✓
Question 25: Comments			✓ (if reqd)

3. Assessment Information

Question 1-3 are essential for data matching purposes at both initial and follow-up assessments. Electronic surveys will not be accepted without this information entered. Questions 4 and 5 are important to enter at initial assessment only

Question 1). Name of Health Service

Select the health service where your Clinic is located.

Question 2). Patient Code Number

Each clinic is to allocate a number for each new patient entered onto the MDS. Start at 001 and work through to 999. This number will be grouped with the health service at question 1 to link admission and baseline data. Please ensure that the number used at admission is used at discharge and that this number is only used for one individual. A client record sheet will be provided to each clinic to record each client who has had MDS data submitted and the patient code allocated to them. This will enable accurate recording of the patient code when follow-up data is entered.

Question 3). Assessment

Question 3.1

Select whether the assessment is the initial assessment for the client or a follow-up assessment. If it is an initial assessment, you do not need to complete question 3.2.

Question 3.2

If it is a follow-up assessment enter the number of months since the first assessment. This would usually be a 6-month period.

If this is a follow-up assessment you won't need to complete the following referral and demographic information. Skip ahead to the outcome measurement section at Question 16.

Question 4). Referred by

Select who referred the patient to the Falls Clinic from the following list:

- Local Medical Officer
- Inpatient
- Outpatient (hospital departments)
- Emergency Department
- Medical Specialist – Neurologist
- Medical Specialist – Orthopaedic
- Medical Specialist – ENT
- Self / Family
- ACAS (Aged Care Assessment Service)
- Other community (eg allied health, RDNS)
- Other (please specify)

Question 5). Reasons for referral

Please select the main reason(s) for referral from the list provided (select all that apply):

- Falls
- Gait Disorder
- Loss of Consciousness/Syncope
- Dizziness
- Other (please specify)

4. Demographic Data

Question 6). Age

Enter the client's age (years) at the time of the initial assessment.

Question 7). Gender

- 1=Male
- 2=Female
- 3=Not recorded

Question 8). Living arrangements

Select the description that best describes the client's living arrangements. Only one option can be selected:

- Lives alone
- Lives with others
- Residential - Low level care
- Residential - High level care
- Other supported accommodation
- Not known

If the client lives in an independent living unit or a retirement village, please select "lives alone".

Question 9). Informal carer availability

Please indicate whether there is an informal carer (spouse, other family member, friend, neighbour) available to provide assistance to the client:

- No carer available
- Resident carer available
- Non-resident carer available

Question 10). Community Services in use

For each community service, indicate whether the client is currently receiving, is not currently receiving them. Use the response “unknown” if you are not sure whether or not they are accessing them. The community services listed are:

- 10.1. Food services (Meals on Wheels)
- 10.2. Home care (domestic tasks such as vacuuming, washing, shopping, etc)
- 10.3. Personal care
- 10.4. Community nurse
- 10.5. Home maintenance
- 10.6. Day Centre
- 10.7. Day Hospital
- 10.8. Respite care
- 10.9. Personal alarm
- 10.10. Package (Linkages or Community Aged Care Package)

Question 11). Risk Factors

This question aims to identify all the falls risk factors that were identified during the initial assessment. For each risk factor there is an option for indicating the risk is present as well as an option for indicating it is a main risk factor. Select all risk factors that are present in the

right hand column. In the middle column identify three of these risk factors which are having a significant contribution to falls risk. Select from the following:

MEDICAL

- 11.1. Acute health problem such as urinary tract infection, pneumonia, delirium
- 11.2. Vision impairment/Spectacles
- 11.3. Dizziness
- 11.4. Peripheral neuropathy / lower limb sensory loss
- 11.5. Postural hypotension
- 11.6. Polypharmacy (more than 4 medications)
- 11.7. Use of medications associated with increased falls risk (This includes sedatives, analgesics, psychotropic, antihypertensives, vasodilator/cardiac vasodilator, diuretics, antiparkinsonian, antidepressants, vestibular suppressant) and anticonvulsants??
- 11.8. Chronic medical conditions such as stroke, Parkinson's Disease, arthritis
- 11.9. Osteoporosis (low bone density)
- 11.10. Osteomalacia (low vitamin D)
- 11.11. Under-nutrition
- 11.12. Syncope

PSYCHOLOGICAL

- 11.13. Cognitive impairment
- 11.14. Depression
- 11.15. Fear of falling

MOTOR / FUNCTION

- 11.16. Impaired balance
- 11.17. Muscle weakness / deconditioning
- 11.18. Unsteady gait
- 11.19. Reduced physical activity
- 11.20. Reduced functional independence

ENVIRONMENT

- 11.21. Environmental hazards – at home
- 11.22. Environmental hazards – away from home
- 11.23. Poor footwear
- 11.24. Foot problems
- 11.25. Hazardous behaviours

Question 12). Disease diagnosis

Please type in the primary disease diagnosis related to the clients falls / falls risk. Please note that only one diagnosis should be recorded. If the primary falls related diagnosis is clear at the team meeting, please include in this field. If further investigations are required for diagnosis, please record "further investigations".

Question 13). Cognitive Impairment

Question 13.1

Most Clinics are currently using either the Folstein Mini-Mental State Examination (MMSE) or the Abbreviated Mental Test Score (AMTS). If you use one of these measures please indicate which tool was used. If you are not currently using one of these measures, please complete the MMSE as shown below. A third option of “formal cognition test not performed” is also available.

Mini-Mental Status Examination

	Points
Orientation	
Name: season/date/day/month/year	5 (1 for each name)
Name: hospital/floor/town/state/country	5 (1 for each name)
Registration	
Identify three objects by name and ask patient to repeat	3 (1 for each name)
Attention and calculation	
Serial 7s; subtract from 100 (e.g., 93-86-79-72-65)	5 (1 for each subtraction)
Recall	
Recall the three objects presented earlier	3 (1 for each object)
Language	
Name pencil and watch	2 (1 for each object)
Repeat “No ifs, ands, or buts”	1
Follow a 3-step command (e.g., “Take this paper, fold it in half, and place it on the table”)	3 (1 for each command)
Write “close your eyes” and ask patient to obey written command	1
Ask patient to write a sentence	1
Ask patient to copy a design (e.g., intersecting pentagons)	1
TOTAL	30

Question 13.2

Please indicate the score obtained from either the MMSE or the AMTS.

Question 14). Nutrition

Calculate the Body Mass Index and round to one decimal point:

$$= \frac{\text{weight (kg)}}{\text{height (m)}^2}$$

To ensure accuracy, height and weight should be formally measured, and not based on client's self-report.

The World Health Organisation states "For individuals, the recommendation is to maintain a BMI in the range of 18.5-24.9 kg/m² and to avoid a weight gain greater than 5kg during adult life" (WHO, 2003, 41). According to the Dietitian's Association of Australia the following BMI groupings are generally accepted:

- <18 kg/m² - underweight
- 18–25 kg/m² - healthy weight
- 25-30 kg/m² - overweight
- >30 kg/m² – obese

However, some literature suggests that a higher BMI is acceptable for people over 65 years of age, for example, a BMI range of 24 - 29 kg/m² may be acceptable for older people (Committee on Diet and Health, 1989 as cited in Stewart, Bryce et al, 2000)

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4. Stewart A., Bryce A. et al (2000) Nutrition in Aged Care Facilities: Literature Review. Report for the Well for Life project for the Department of Human Services, Victoria.

Question 15). Interventions recommended

Select all of the interventions that were recommended at the initial Falls Clinic assessment from the following list:

REVIEW

- Review (i.e. a follow-up falls clinic session has been recommended)

MEDICAL

- Referred to medical specialist
- Investigations/treatment of health problem
- Medication reduction
- New medication
- Osteoporosis medication/ and or Vitamin D/calcium supplements

EXERCISE

- Group exercise
- Home exercise - Balance
- Home exercise - Strength
- Home exercise - combination
- Vestibular rehabilitation – Repositioning
- Vestibular rehabilitation – Desensitising exercises
- Vestibular rehabilitation – Gaze stability exercises

ENVIRONMENT

- Home Visit
- Home aids / modifications
- Footwear change
- Gait aid change or adjustment
- Personal alarm

COMMUNITY SERVICES:

- Food services
- Home care
- Community nurse
- Home maintenance
- Respite care
- Day hospital/Community Health Centre
- Personal care
- Day centre

- Package (Linkages or CACP)

OTHER

- Education (provision of falls prevention information)
- Behaviour modification (reduce risky behaviours)
- Hip protector
- Foot care
- Visual assessment / management
- Relaxation
- Clinical psychological intervention
- Driving assessment
- Other, please specify: _____

5. Outcome Measures

Each of the following outcome measures are to be completed at initial and follow-up assessments.

Question 16). Falls and Falls Injuries

Definition of a fall

The definition of a fall used for this project will be a truncated version of the “Kellogg International Working Group on Prevention of Falls by the Elderly” (1987, p4):

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

If information is available or able to be sought that adds to that available from the client (eg GP letter, family member), this should be included in the reported data.

Please record retrospective data on the number of falls and falls injuries that have occurred in the past six months. If the data record is for a follow-up visit, record the number of falls since the initial assessment (for some Clinics the follow-up assessment will occur in less than six months. The length of time between initial and follow-up assessment should have been indicated in the demographic data section under “assessment information”). There is a series of questions relating to the number of falls and injuries as a result of these falls:

- 16.1)** How many times has the client fallen in the past six months or since the initial Falls Clinic assessment?
- 16.2)** How many of these falls have resulted in an injury?
- 16.3)** How many of these falls have resulted in the client seeking medical attention or going to hospital?
- 16.4)** Please indicate the nature of any injuries sustained as a result of these falls (select as many as applicable):
- Bruises, grazes
 - Cuts, no stitches
 - Cuts and stitches

- Fracture
- Other, please specify: _____

Reference

1. Kellogg International Working Group on Prevention of Falls by the Elderly (1987). "The prevention of falls in later life." Danish Medical Bulletin **34 (Supp 4)**: 1-24.

Question 17). Functional Measures

The Frenchay Activities Index and Modified Barthel Index have both been identified as key measures for use in the MDS. Although it would be useful to report both measures, it is sufficient to only report one of the measures if only one is currently used within your Clinic.

17.1 Modified Barthel Index

GENERAL GUIDELINES

- Main aim is to establish degree of independence from any help, physical or verbal, however minor and for whatever reason.
- Use as a record of what a person *does*, NOT as a record of what a person *could do*.
- The need for supervision renders the person NOT independent.
- Usually the performance over the preceding 24-72 hours is important, but occasionally longer periods will be relevant.
- Use of aids to be independent is allowed.
- Middle categories imply that person supplies 50% of the effort.
- If person refuses to undertake activity score '0', indicate refusal on score sheet.
- Unconscious patients should score '0' throughout.

Modified Barthel Score sheet

Circle the appropriate score for each item:

<i>Code</i>	1	2	3	4	5
Personal hygiene	0	1	3	4	5
Bathing self	0	1	3	4	5
Feeding	0	2	5	8	10
Toilet	0	2	5	8	10
Stairs	0	2	5	8	10
Dressing	0	2	5	8	10
Bowel control	0	2	5	8	10
Bladder control	0	2	5	8	10
Ambulation	0	3	8	12	15
Wheelchair management	0	1	3	4	5
Chair/bed transfer	0	3	8	12	15

Total ADL score

--	--

Modified Barthel: Components and operational definitions

PERSONAL HYGIENE

Wash hands & face, comb hair, clean teeth, shave/make-up application.

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Is unable to attend to personal hygiene, and is dependent in all aspects.
2	1	Assistance is required in all steps of personal hygiene.
3	3	Some assistance is required in one or more steps of personal hygiene
4	4	Is able to conduct his/her own personal hygiene, but requires minimal assistance before and/or after task.
5	5	Independent: A male may use any kind of razor, but must insert the blade or plug in the razor without help, as well as retrieve it from storage place. Female must apply her own make-up, if used, but need not braid or style her hair.

BATHING SELF

Use bath tub/shower/or a complete sponge-bathe.

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Total dependence in bathing self
2	1	Assistance is required in all aspects of bathing
3	3	Assistance is required with either transfer to shower/bath or with washing or drying: including inability to complete task because of condition or disease etc..
4	4	Supervision is required for eg; safety in adjusting water temperature, or in the transfer.
5	5	Independent: must be able to complete all steps of whichever method is employed, without another person being present.

FEEDING

From tray or table when food placed within reach.

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Dependent in all aspects and needs to be fed
2	2	Can manipulate an eating device, usually a spoon, but someone must provide active assistance during the meal.
3	5	Able to feed self with supervision. Assistance is required with associated tasks such as putting milk/sugar in tea, salt/pepper, spreading butter, turning plate or other set-up activities.
4	8	Independent in feeding from a prepared tray except meat may be cut, open milk carton, jar lid etc.. Presence of another person is not required.
5	10	Can feed self from tray/table when food placed within reach. Must put on assistive device if needed, cut the food, and if desired use salt/pepper, spread butter etc..

TOILET

Transfers, clothing management and hygiene

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Fully dependent in toileting
2	2	Assistance required in all aspects of toileting
3	5	Assistance may be required with management of clothing, transfers or washing hands.
4	8	Supervision may be required for safety with a normal toilet. A commode may be used at night, but assistance is required for emptying and cleaning.
5	10	Able to get on/off the toilet, fasten/unfasten clothes, prevent soiling of clothes and use toilet paper without help. If necessary may use a bedpan or commode or urinal at night, but must be able to empty it, and clean it.

STAIRS

The ability to go up and down 3 steps

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Unable to climb stairs
2	2	Assistance is required in all aspects of stair climbing, including assistance with walking aids
3	5	Able to ascend/descend but is unable to carry walking aids, and needs supervision or assistance.
4	8	Generally no assistance required. At times supervision is required for safety due to morning stiffness, shortness of breath etc..
5	10	Able to ascend/descend flight of stairs safely without help or supervision. Is able to use hand rails, cane or crutches when needed and is able to carry these devices independently.

DRESSING

Put on & remove appropriate clothing

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Dependent in all aspects of dressing and is unable to participate in the activity.
2	2	Able to participate to some degree, but is dependent in all aspects of dressing.
3	5	Assistance is needed in putting on, and/or removing any clothing.
4	8	Only minimal assistance is required with fastening clothing, such as buttons, zips, bra, shoes etc..
5	10	Able to put on, remove, and fasten clothing, tie shoelaces or put on, fasten/remove corset, braces as prescribed.

- Anti-embolic stockings are not assessed as part of dressing.
- Clothes may be laid out ready.

BOWEL CONTROL

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	The person is bowel incontinent.
2	2	Needs help to assume appropriate position, and with bowel movement facilitatory techniques.
3	5	Can assume appropriate position, but cannot use facilitatory techniques, or clean self without assistance and has frequent accidents. Assistance is required with incontinence aids eg; pads etc..
4	8	May require supervision with the use of suppository or enema, and has occasional accidents.
5	10	Can control bowels and has no accidents, can use suppository, or enema when necessary.

BLADDER CONTROL

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Incontinent or has indwelling catheter. Dependent in bladder management.
2	2	Incontinent but is able to assist with application of an internal or external device.
3	5	Generally dry by day, but not at night, and needs some assistance with the devices.
4	8	Generally dry by day and night, but may have an occasional accident, or need minimal assistance with internal or external devices.
5	10	Able to control bladder day and night, and/or is independent with internal or external devices.

- External device refers to condom drainage.

AMBULATION

Ability to walk: with or without aids. Aid is to be placed within reach.

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Unable. Dependent in ambulation
2	3	Constant presence of one or more assistants is required during ambulation.
3	8	Assistance is required with reaching aids and/or their manipulation. One person is required to offer assistance.
4	12	Independent in ambulation (may use aids), but unable to walk 50 metres without help, or supervision is needed for confidence or safety in hazardous situations.
5	15	Independent in ambulation for 50 metres (may use aids) without help or supervision. Must be able to wear braces if required, lock and unlock these braces, assume sitting/standing position, and place any necessary aids into position for use.

WHEELCHAIR MANAGEMENT

Only use this item if scored '1' for Ambulation, and then only if person has been trained in wheelchair management.

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Dependent in wheelchair use.
2	1	Can propel self short distances on flat surface, but assistance is required for all other steps of wheelchair management.
3	3	Presence of one person is necessary and constant assistance is required to manipulate chair to table, bed etc..
4	4	Can propel self for a reasonable duration over regularly encountered terrain. Minimal assistance may still be required in 'tight corners'.
5	5	Can propel chair 50 metres independently, negotiate corners, turn around, manoeuvre chair to a table, bed, toilet etc.

- If person is using a wheelchair on admission, but is likely to be discharged ambulating, assess both methods of mobility on admission.

CHAIR/ BED TRANSFER

Move between lying & sitting & transfer to/from chair

<i>Code</i>	<i>Score</i>	<i>Criteria</i>
1	0	Unable to participate in transfer. Two attendants required to transfer the person with or without a mechanical device.
2	3	Able to participate but maximum assistance of one other person is required in all aspects of the transfer.
3	8	Assistance of one other person may be required in any aspect of the transfer.
4	12	Presence of another person is required either as a confidence measure, or to provide supervision for safety.
5	15	Person can safely approach the bed in a wheelchair, lock brakes lift footrests, move safely to the bed, lie down, come to a sitting position on the side of the bed, change the position of the wheelchair, transfer back into it safely. The patient must be independent in all phases of this task.

References:

1. Operational definitions for Modified Barthel Index (Shah, S; Vanclay, F & Cooper, B. 1989, J.Clin.Epidemiol) and Original Barthel Index (Mahoney & Barthel, 1965)
2. J.Fricke, LaTrobe University, School of Occupational Therapy, 1995.

17.2 Frenchay Activities Index

The aim of the Frenchay Activities Index is to record activities that require some *initiative* from the person. It is important to concentrate on the person's actual frequency of activity over the recent past, not their past performance nor their potential ability.

Definitions for each Item

- 1. Prepare main meals:** Needs to play substantial part in organisation, preparation and cooking of main meal. Not just making snacks.
- 2. Wash up:** Must do it all or share equally, eg. washing, or wiping and putting away. Not just rinsing an occasional item.
- 3. Wash clothes:** Organisation of washing and drying of clothes, whether in washing machine, by hand wash, or at laundrette.
- 4. Light housework:** Dusting, polishing, tidying small objects. Anything heavier is included in '5'.
- 5. Heavy housework:** All housework including making beds, cleaning floors and fires, moving chairs etc.
- 6. Local shopping:** Playing a substantial role in organising and buying shopping, whether small or large amounts. Must go to shops and not just push a trolley.
- 7. Social outing:** Going out to clubs, church activities, cinema, theatre, drinking, to dinner with friends, etc. May be transported there, provided he or she takes an active part once arrived. The common factor is activity not travel.
- 8. Walk outside>15min:** Sustained walking for at least 15 minutes (allowed short stops for breath).About one mile. Can include walking to do shopping provided he/she goes far enough.
- 9. Pursue active interest in hobby:** Must require some 'active' participation and thought eg. propagating plants in the house, knitting, painting, games, sports. Not just watching sport on television.
- 10. Drive car/Travel on bus:** Needs to drive car (not just be a passenger in a car) or get to a bus coach and travel on it.
- 11. Outings/car rides:** Coach or rail trips, or car rides to some place for pleasure. Not for routine 'social outing' (ie: shopping, going to local friends/family). Must involve some organisation or decision-making by the person. Excludes trips organised passively by institution, unless person can choose whether to go or not. The common factor is travel for pleasure.
- 12. Gardening:** Outside: Light = occasional weeding, Moderate = regular weeding, pruning etc, Heavy = all necessary work, including heavy digging.
- 13. Household &/or car maintenance:** Light = repairing small items, Moderate = some painting or decorating, routine car maintenance, Heavy = most necessary household/car maintenance and repairs.
- 14. Reading books:** Must be full length books; not magazines, periodicals or papers.
- 15. Gainful work:** Work for which person is paid (not voluntary work).

Domestic and Community ADL (Frenchay Activities Index) – score 0-3

	<i>Score 0</i>	<i>Score 1</i>	<i>Score 2</i>	<i>Score 3</i>
Prepare main meals	<input type="radio"/> never	<input type="radio"/> 1x/week	<input type="radio"/> 1-2x/week	<input type="radio"/> most days
Wash up	<input type="radio"/> never	<input type="radio"/> 1x/week	<input type="radio"/> 1-2x/week	<input type="radio"/> most days
Wash clothes	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Light housework	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Heavy housework	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Local shopping	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Social outing	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Walk outside >15min	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Active interest in hobby	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Drives/taxi/bus	<input type="radio"/> never	<input type="radio"/> 1-2x/3month	<input type="radio"/> 3-12x3/months	<input type="radio"/> at least once weekly
Outings /car rides (6mths)	<input type="radio"/> never	<input type="radio"/> 1-2x/6month	<input type="radio"/> 3-12x6/months	<input type="radio"/> at least once weekly
Gardening	<input type="radio"/> never	<input type="radio"/> light	<input type="radio"/> moderate	<input type="radio"/> all necessary
Household and/or car maintenance	<input type="radio"/> never	<input type="radio"/> light	<input type="radio"/> moderate	<input type="radio"/> all necessary
Reading books	<input type="radio"/> none	<input type="radio"/> 1 in 6months	<input type="radio"/> 1/fortnight	<input type="radio"/> >1/fortnight
Gainful work	<input type="radio"/> none	<input type="radio"/> up to 10hr/week	<input type="radio"/> 10-30hr/week	<input type="radio"/> >30 hr/week

Total IADL score

References:

1. Bond MJ, Harris RD, Smith DS, Clark MS (1992) "An examination of the factor structure of the Frenchay Activities Index". Disability Rehabilitation, Jan-Mar :**14**(1); 27-9.
2. Turnbull JC, Kersten P, Habib M, McLellan L, Mullee MA, George S. (2000) "Validation of the Frenchay Activities Index in a general population aged 16 years and older". Archives of Physical Medicine and Rehabilitation. **81**(8): 1034-8.

Question 18). Balance measures

18.1 Timed Up and Go test

Type of measure: Performance measure which measures speed during several manoeuvres which potentially threaten balance (Podsiadlo and Richardson, 1991).

Equipment required: Chair with arms (standard height), stop watch

Time required to perform test: 10 seconds - 3 minutes.

Test procedure:

The patient is tested wearing their usual footwear, and using their normal walking aid for indoors walking. No physical assistance is given. They start seated in a standard chair - seat height 45 cm, arm height 63 cm, with their back against the back of the chair, and arms resting on the chair arms. They are instructed that on the command “go”, they are to stand up from the chair, using their arms if they wish, then to walk at a comfortable and safe pace for three metres to a line on the floor, turn, return to the chair, and then sit down. Timing using a stopwatch commences on the command “go”, and stops when the subject’s back is positioned against the back of the chair after sitting down (seconds). It is recommended that the patient perform a practice trial to ensure they are familiar with the test procedure, before performing the actual test. If the subject cannot perform the test without manual assistance, they should be rated as “999”.

Normative scores.

- healthy older people, mean age 75 years, mean of 8.5 seconds (Podsiadlo and Richardson, 1991)
- healthy older women (mean age 74 years), mean TUG 9.1 seconds (95% CI 6.6-11.6); Significant increase with increasing age (Hill et al, 1999)

References:

- 1 Hill K; Schwarz J; Flicker L et al.: Falls among healthy community dwelling older women: A prospective study of frequency, circumstances, consequences and prediction accuracy. Australian and New Zealand Journal of Public Health 1999; 23: 41-8.
- 2 Podsiadlo D; Richardson S: The timed "Up & Go": A test of basic functional mobility for frail elderly persons. Journal of the American Geriatrics Society 1991; 39: 142-8.

18.2 Step Test (Worst leg)

Type of measure: Performance measure evaluating speed of performing a dynamic single limb stance task (self generated perturbation) (Hill et al, 1996).

Equipment required: Stop watch, 3" (7.5cm) block.

Time required to perform test: 15 seconds for each leg.

Test procedure:

The subject stands unsupported with shoes removed, feet parallel and 10 cm apart, and a block 5cm directly in front of them. The rating therapist stands on one side, with one foot on the side of the top of the block to steady it in case it is knocked during the stepping procedure. Patients are advised which leg is the stepping leg, and are instructed to place the whole foot onto the block, then return it fully back down to the floor, repeatedly as fast as possible for the test duration. They are instructed not to move the opposite (supporting) foot during the test period. One completed step comprises placing the foot fully up onto, then down off the block. It is not necessary to put body weight through the foot on the block, it is only necessary to make light contact between the foot and the block. In addition to the verbal explanation, the rater demonstrates the task. Several practice steps are allowed prior to the test. The rater commences the measurement period by saying "go", starting a stopwatch at the same time, and indicates the end of the measurement period by saying "stop". The rater supervises the person being tested, but does not provide hands on support unless the subject needs steadying if balance is lost during the test. If this occurs, counting stops at the number of completed steps, and the score of completed steps is recorded. Otherwise the number of completed steps in the full test period is recorded. The same procedure is then repeated for the opposite leg stepping. For the MDS, record the lower of the scores for the two legs.

If the subject cannot perform the task at all with one or both legs, they score a zero (0) for performance on the test.

Normative scores:

- healthy older people, mean age 73 years, mean of 17 steps in 15 seconds (Hill et al, 1996).
- healthy older females (mean age 74), mean of 16 steps in 15 seconds, reduced performance with increasing age (Hill et al, 1999)

References:

1. Hill K; Bernhardt J; McGann A et al.: A new test of dynamic standing balance for stroke patients: Reliability, validity, and comparison with healthy elderly. *Physiotherapy Canada* 1996; 48: 257-62.
2. Hill K; Schwarz J; Flicker L et al.: Falls among healthy community dwelling older women: A prospective study of frequency, circumstances, consequences and prediction accuracy. *Australian and New Zealand Journal of Public Health* 1999; 23: 41-8.

Question 19). Leg Muscle Strength

Type of measure: Time (seconds) taken to stand up and sit down from a standard height (45cm) chair three times (allowed to use arms of the chair) has been selected as a functional indicator of leg muscle strength (Tinetti et al, 1995; Gill et al, 1995).

Equipment required: 45 cm high chair, with arms.

Time required to perform test: 5 seconds to greater than 1 minute.

Although this task has usually been reported in the research literature without using the arms to push up (eg arms folded across the chest, Salive et al, 1994), subjects will be allowed to push up on their arms in the sit to stand to sit manoeuvres evaluated in the MDS. The rationale for this is that a moderate proportion of clients are unable to stand from a chair without pushing up on their arms, so they would not be able to receive a strength score if this method were used. Given the importance of leg muscle weakness as a key risk factor for falls, using the arms will mean that scores should be able to be obtained for the majority of the sample.

Test procedure:

The patient starts seated in a standard chair - seat height 45 cm, arm height 63 cm, with their back against the back of the chair, and arms resting on the chair arms. They are instructed that on the command "go", they are to stand up from the chair, using their arms if they wish, straighten fully, then sit down as quickly as they can, three times, finishing with their back against the back of the chair. Timing using a stopwatch commences on the command "go", and stops when the subject's back is positioned against the back of the chair after sitting down the third time (seconds). If a subject cannot perform the task without manual assistance from the rater, they should be scored

References:

1. Gill TM, Richardson ED and Tinetti ME (1995). "Evaluating the risk of dependence in activities of daily living among community-living older adults with mild to moderate cognitive impairment." *J Gerontol A Biol Sci Med Sci* **50**(5): M235-41.
2. Salive M, Guralnik J, Glynn R, Christen W, Wallace R and Ostfeld A (1994). "Association of visual impairment with mobility and physical function." *Journal of the American Geriatrics Society* **42**: 287-92.
3. Tinetti M, Doucette J, Claus E and Marottoli R (1995). "Risk factors for serious injury during falls by older persons in the community." *Journal of the American Geriatrics Society* **43**: 1214-21.

Question 20). Gait – Walking speed/velocity

Time (seconds) taken to walk 6 metres at comfortable speed (2 metre warm up and warm down)

Type of measure: Performance measures of timing and spatial aspects of walking.

Equipment required: 10 metre walkway. Markers at 2 metres from each end of the walkway to indicate start and finish of measurement area. Stop watch.

Time required to perform test: 4 seconds up to several minutes.

Test procedure:

The patient stands at one end of the walkway, and uses their regular gait aid. They are given the following standardised instructions to “walk at your comfortable walking speed to the other end of this walkway, without stopping or talking until you reach the other end.” The therapist walks beside the patient, and starts the stopwatch, and commences counting strides as the subject crosses the 2 mt mark of the walkway. The stopwatch and counting stop as the patient crosses the mark 2 mt from the end of the walkway. Therefore, data is collected over the central section of the walkway, which avoids the period of acceleration and deceleration at the start and end of the walkway.

For a 10 metre walkway, with measurement over the central 6 metres:

velocity (m/min)= $360/t$

stride length (m) = $6/\text{number of strides}$ (NB: 1 stride = 2 steps)

cadence (steps / minute) = $\text{velocity (m/min)} / \text{step length (m)}$

Normative scores (mean age 72.5 years) (Morris et al, 1996):

- gait velocity 71 m/min
- gait stride length 1.27 m
- cadence 111 steps / minute

NB: reduced velocity and stride length reported with increasing age in both males (Blanke and Hageman, 1989), and females (Hageman and Blanke, 1986)

References:

1. Blanke D, Hageman P. Comparison of gait of young men and elderly men. *Physical Therapy* 1989; 69:144-148.
2. Hageman P, Blanke D. Comparison of gait of young women and elderly women. *Physical Therapy* 1986; 66:1382-7.
3. Morris M, Matyas T, Iansek R, Summers J. Temporal stability of gait in Parkinson's Disease. *Physical Therapy* 1996; 76:763-77.

Question 21). Fear of Falling

Modified falls efficacy scale (MFES)

Type of measure: Self report measure of falls efficacy, also commonly called fear of falling. Modification of original 10 item Falls Efficacy Scale (Tinetti et al, 1990).

Equipment required: 14 item questionnaire

Time required to perform test: Varies, 5 – 15 minutes

Test procedure:

Has been reported as interviewer administered questionnaire (Hill et al, 1996). Subject is asked to rate their confidence in performing each of 14 activities without falling on a 0 – 10 scale. An overall score is calculated by averaging the scores for all items which were rated (ie – score out of 10).

Normative scores:

- average score of 9.8 (range 9.2 – 10) for sample of healthy women (mean age 74.1 years, sd 4.0) (Hill et al, 1999)

References:

1. Hill K, Schwarz J, Kalogeropoulos A, Gibson S. Fear of falling revisited. Archives of Physical Medicine and Rehabilitation 1996; 77:1025-1029.
2. Hill K, Schwarz J, et al. Falls among healthy community dwelling older women: A prospective study of frequency, circumstances, consequences and prediction accuracy. Aust NZ J Public Health 1999; 23:41-8.
3. Tinetti M, Richman D, Powell L. Falls efficacy as a measure of fear of falling. J Geront 1990; 45:P239-43.

The Modified Falls Efficacy Scale

Adapted from Tinetti et al, 1990; Hill et al, 1996

On a scale of 0 to 10, how confident are you that you can do each of these activities without falling, with 0 meaning “not confident/not sure at all”, 5 being “fairly confident / fairly sure”, and 10 being “completely confident / completely sure”?

NOTE: ● If you have stopped doing the activity at least partly because of being afraid of falling, score a 0;

● If you have stopped an activity purely because of a physical problem, leave that item blank (these items are not included in the calculation of the average MFES score).

● If you do not currently do the activity for other reasons, please rate that item based on how you perceive you would rate if you had to do the activity today.

		Not confident at all							Fairly confident			Completely confident
		0	1	2	3	4	5	6	7	8	9	10
1.	Get dressed and undressed	0					5					10
2.	Prepare a simple meal						5					10
3.	Take a bath or a shower						5					10
4.	Get in / out of a chair						5					10
5.	Get in / out of bed						5					10
6.	Answer the door or telephone						5					10
7.	Walk around the inside of your house						5					10
8.	Reach into cabinets or closet						5					10
9.	Light housekeeping						5					10
10.	Simple shopping						5					10
11.	Using public transport						5					10
12.	Crossing roads						5					10
13.	Light gardening or hanging out the washing*						5					10
14.	Using front or rear steps at home						5					10

* rate most commonly performed of these activities

Average score / item rated = /
=

1. Hill K, Schwarz J, et al. Fear of falling revisited. Archives Phys Med Rehabil 1996; 77:1025-1029.
2. Tinetti M, Richman D, Powell L. Falls efficacy as a measure of fear of falling. J Gerontology 1990; 45:P239-43.

Question 22). Prescribed medication number

Total the number of prescription medications the client is currently taking.

Question 23). Postural blood pressure

Blood pressure is measured with the client supine after a short period lying still, then after they have been standing for 3 minutes. Postural drop in systolic blood pressure is evident with a drop in systolic blood pressure of 20mmHg or greater between the two positions (Cummings et al, 1995). Record the mmHg drop in blood pressure between the two positions.

Reference

1. Cummings S, Nevitt M, Browner W, Stone K, Fox K, Ensrud K, Cauley J, Black D and Vogt T (1995). "Risk factors for hip fracture in white women." The New England Journal of Medicine **332**: 767-73.

6. Service Measures

Question 24). Compliance

The measure of compliance is to be completed only at follow-up assessments. For each intervention in the list tick the 'recommended' if it was recommended at the initial assessment. If the intervention was recommended, indicate in the three right columns whether it was fully, partially or not complied with. For example, if an appointment had been made for the client but the appointment has not yet occurred, this would be recorded as partial compliance.

Intervention	Recommended	Non compliance	Partial compliance	Full compliance
Section A: MEDICAL				
24.1 Referred to medical specialist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.2 Investigations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.3 Medication reduction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.4 New medication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.5 Osteoporosis medication/ Vit D /Calcium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section B: EXERCISE				
24.6 Group exercise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.7 Home exercise - balance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.8 Home exercise – strength	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.9 Home exercise – combination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.10 Vestibular rehabilitation – repositioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.11 Vestibular rehabilitation – desensitising exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.12 Vestibular rehabilitation – gaze stability exercises	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section C: ENVIRONMENT				
24.13 Home visit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.14 home aids/modifications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.15 Footwear change	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.16 Gait aid change or adjustment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Intervention	Recommended	Non compliance	Partial compliance	Full compliance
24.17 Personal alarm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section D: COMMUNITY SERVICES				
24.18 Food services	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.19 Home care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.20 Community nurse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.21 Home maintenance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.22 Respite care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.23 Day hospital/Community Health Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.24 Personal care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.25 Day Centre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.26 Package (Linages or CACP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Section E: OTHER				
24.27 Education	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.28 Behaviour modification (reduce risky behaviours)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. 29 Hip protector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.30 Foot care	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.31 Visual assessment/management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.32 Relaxation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.33 Clinical psychological intervention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.34 Driving assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24.35 Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Reference

Fermo, K., Jurjevic, L., & Dorevitch, M. (2000). *Falls and Balance Service Evaluation*. Bundoora: Centre for Applied Gerontology.

Hill, K., K. Black, F. Vratsidis, M. Nihill, R. Smith and M. Dorevitch (2002). Evaluation of Falls Clinics and development of a measurement and outcome framework; and Review of Movement Disorder Clinics. Report to the Victorian Department of Human Services. Melbourne.

Question 25). Comments

This question is not mandatory to be completed at either initial or follow-up assessments. It should only be completed at the follow-up assessment if there are any additional factors considered important in the overall client outcome (eg change in accommodation). If applicable, enter these factor/s briefly in the text box.

Appendix 2: Falls Clinic MDS Evaluation Survey

Dear Falls Clinic staff

Thank you for your participation in the development and trial of an outcome measurement Minimum Data Set for Victorian Falls Clinics. Your input into this evaluation will ensure that the data set developed will be easy to use yet comprehensive enough to provide detailed information about the outcomes achieved by Falls Clinics. It will also assist Clinics in evaluating their own practices and outcomes. We would appreciate your feedback in the attached survey that investigates the utility and usefulness of the various components of the MDS. If you have any queries or would like hard copies posted please call Kirsten on (03) 8387 2666. The form can be completed electronically and emailed back or printed out and posted through the mail. Please return to Kirsten Black by **WEDNESDAY 7th APRIL** to:

Email: k.black@nari.unimelb.edu.au

Post: National Ageing Research Institute, PO Box 31, Parkville, 3052

Who completes the form?

Your Clinic can submit one survey completed by a team of Clinic staff **OR** multiple surveys each completed by individual Clinic staff. If different staff are responsible for different aspects of MDS completion it may be easier to have each section completed by the person responsible. However, we would appreciate that every section is completed by at least one staff member from each Clinic. We welcome feedback from one or more of your Falls Clinic staff. ***The survey should take approximately 20 minutes to complete.***

Contents of the form

The survey has 9 sections (A-I): The first section is about who is completing the survey, followed by Part B regarding data submission on the website. The following four sections are the same as those on the MDS: assessment and demographic information, outcome measures and service measures (compliance). Section G asks about resources used for reporting the MDS, and is followed by Section H that considers importance of the MDS for your Clinic. The last section provides an opportunity for general comments about the MDS.

Answering the questions electronically

When completing this form electronically there are two methods - one for closed category responses and one for open-ended responses. Small grey check boxes indicate closed category responses. To select a check box simply put your cursor on the box and double click. Another screen will come up and in the top right corner there will be the options of 'not checked' or 'checked'. Select 'checked' and then click OK. The open-ended questions are in text boxes. Simply click your cursor anywhere in the box and type your response. If you would like to add more detail about the MDS process generally or specific aspects of the data set please feel free to attach additional pages or contact Kirsten.

KEITH HILL AND KIRSTEN BLACK

NATIONAL AGEING RESEARCH INSTITUTE

PART A: Who is completing this survey

Number of staff involved in completing this survey

Positions represented in the completion of this survey:

- | | |
|---|---|
| <input type="checkbox"/> Administrative assistant | <input type="checkbox"/> Physiotherapist |
| <input type="checkbox"/> Dietitian | <input type="checkbox"/> Podiatrist |
| <input type="checkbox"/> Medical | <input type="checkbox"/> Psychologist |
| <input type="checkbox"/> Nurse | <input type="checkbox"/> Social Worker |
| <input type="checkbox"/> Occupational therapist | <input type="checkbox"/> Other: please specify: |
| <input type="checkbox"/> Pharmacist | |

Health Service represented:

Are you involved in assessing one or more of the outcome measures in the Minimum Data Set?

- Yes
 No

Are you involved in entering data electronically?

- Yes
 No

→

PART B: Data submission

Please indicate whether completing the Falls Clinic MDS form on the Internet was:

- Very Easy
 Somewhat easy
 Somewhat Difficult
 Very Difficult

How accessible was the Falls Clinic MDS form website?

- Always accessible
 Inaccessible once or twice
 Inaccessible on more than 3 occasions

Please add any comments about completing the form electronically or whether you have any suggestions for making the process more efficient:

PART C: MDS form - Assessment information

MDS Survey Component: Patient code

Did you have any difficulties applying and matching unique client codes at initial and follow-up assessments?

Do you have any suggestions for improving this process or any hints about how others can manage/record IDs

MDS Survey Component: Referred by

Do you have any suggestions for modifying the categories used in the list of possible referral sources?

MDS Survey Component: Reason for referral

Do you have any suggestions for modifying the categories used in the list of reasons for referral?

PART D: MDS form - Demographic information

MDS Survey Components: Age, gender, living arrangements, carer availability

Do you have any suggestions for modifying any of the questions on age, gender, living arrangements or informal carer availability?

MDS Survey Component: Community services

How much effort would be required to continue reporting community services for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on recording it in the future

How important do you consider community service use is to complete on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Did you have any comments about the community services question? Does the list need to be modified in any way?

MDS Survey Component: Risk factors

Did you think any of the risk factors on the list should be removed or modified?

Are there any other risk factors that you think should be added to the list?

Do you have any comments about the use of identifying general falls risk factors and 3 main falls risk factors?

MDS Survey Component: Diagnosis

Do you have any comments/suggestions regarding the question on disease diagnosis?

MDS Survey Component: Cognition

How much effort would be required to use the MMSE or AMTS routinely for the MDS in the future?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

Do you think that cognitive impairment should be assessed at initial assessments?

- Yes – routinely for all clients
- Yes – only for clients who show some signs of confusion/cognitive impairment
- Not at all

Do you have any comments regarding the MMSE or AMTS or a preferred alternative for screening/assessing cognitive impairment?

MDS Survey Component: Body Mass Index

How easy was the Body Mass Index to complete?

- Don't use
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue using the Body Mass Index for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

Do you think Body Mass Index should also be assessed at follow-up assessments?

- Yes – routinely for all clients
- Yes – only for clients who are underweight or overweight at the initial assessment
- Not at all

Do you have comments regarding the use of Body Mass Index in the MDS?

MDS Survey Component: Interventions recommended

Did you think any of the interventions on the list should be removed or modified?

Are there any other interventions that you think should be added to the list?

Do you have any comments about recording interventions for the MDS?

PART E: MDS form - Outcome Measures

MDS Survey Component: Falls and Falls Injuries: Number of falls

Do you have any comments regarding recording numbers of falls or any suggestions for collecting this information?

MDS Survey Component: Falls and Falls Injuries: Number of injurious falls?

Do you have any comments regarding recording numbers of injurious falls?

MDS Survey Component: Falls and Falls Injuries: Medical attention

Do you have any comments regarding the item relating to falls that have resulted in the client seeking medical attention or going to hospital?

MDS Survey Component: Falls and Falls Injuries: Nature of injuries

Do you have any comments regarding the item on nature of injuries? Do you have any suggestions for modifying the categories of injury types?

MDS Survey Component: Functional Measures: Modified Barthel

How easy was the Barthel to use?

- Don't use
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue using the Barthel for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider the Barthel or an alternative measure of mobility and self-care activities is to complete on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding the Barthel or a preferred alternative for assessing mobility and self-care activities?

MDS Survey Component: Functional Measures: Frenchay

How easy was the Frenchay to use?

- Don't use
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue using the Frenchay for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider the Frenchay or an alternative measure of domestic and community activities of daily living is to complete on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding the Frenchay or a preferred alternative for assessing community and domestic activities of daily living?

MDS Survey Component: Balance: Timed up and Go

How easy was the Timed up and Go to use?

- Don't use
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue using the Timed up and Go for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider the Timed up and Go is to measure on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding the Timed up and Go or a preferred alternative for assessing this?

MDS Survey Component: Balance: Step Test

How easy was the Step Test to use?

- Don't use
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue using the Step Test for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider the Step Test is to measure on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding the Step Test or a preferred alternative for assessing this?

MDS Survey Component: Leg muscle strength

How easy was leg muscle strength to assess?

- Don't assess
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue assessing leg muscle strength for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider leg muscle strength is to assess on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding leg muscle strength or a preferred alternative for assessing this?

MDS Survey Component: Gait (walking speed/velocity)

How easy was gait to assess?

- Don't assess
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue assessing gait for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider gait is to assess on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding the measure of gait used or a preferred alternative for assessing gait?

MDS Survey Component: Fear of falling - Modified Falls Efficacy Scale

How easy was the Modified Falls Efficacy Scale to use?

- Don't use
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue using the Modified Falls Efficacy Scale for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider falls efficacy or fear of falling is to measure on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding the Modified Falls Efficacy Scale or a preferred alternative for assessing falls efficacy or fear of falling?

MDS Survey Component: Number of medications

How easy was it to complete the question on number of medications?

- Don't complete
- Very easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue completing this question for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider this question is to record on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding the question on medication use?

MDS Survey Component: Postural Blood Pressure

How easy was Postural Blood Pressure to assess?

- Don't assess
- Very Easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue assessing Postural Blood Pressure for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider Postural Blood Pressure is to assess on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding use of Postural Blood Pressure in the MDS?

PART F: MDS form - Service Measures

MDS Survey Component: Compliance

How easy was the compliance measure to assess?

- Don't use
- Very Easy
- Somewhat easy
- Somewhat difficult
- Very difficult

How much effort would be required to continue completing the compliance measure for the MDS?

- Very little effort
- Some effort
- A great deal of effort
- Do not plan on using it in the future

How important do you consider compliance is to assess on a routine basis for the MDS?

- Not at all important
- Not very important
- Somewhat important
- Very important

Do you have any comments regarding use of the compliance measure in the MDS?

PART G: Resources for completing the MDS

Please list any changes in practice that you / you're clinic have had to implement to enable participation in the MDS trial project?

How much additional time per client was required for collating and entering data for the MDS (**excluding** any additional time for changes in measurement practices)?

Part H: Utility of the MDS for your Clinic

How important do you consider the MDS outcome data is for your informing and evaluating your Clinic's practices?

- Not at all important
- Not very important
- Somewhat important
- Very important

Part I: General comments

Do you have any other comments or suggestions regarding the outcome Minimum Data Set for Victorian Falls Clinics?

Thank you for completing this survey.

Appendix 3: Comparison of attendees and non- attendees to 6-month review

The 254 clients who did return were compared with 94 clients who didn't return either due to;

- Not being able to be contacted
- Failing to attend the follow-up.

Table 31: Comparison of attendees and non-attendees demographics

	Returned for follow-up (%)	Non-attendees	P=
Age mean (SD)	77.6 (8.4)	77.3 (10.4)	0.801
Gender (% female)	182 (71.7)	78 (81.3)	0.067
Lives alone (%)	107 (42.5)	40 (42.6)	0.518
No carer available (%)	76 (30.8)	22 (23.7)	0.197
Cognitive impairment (%)	58 (22.8)	20 (20.8)	0.688
BMI: over or underweight (%)	94 (57.7)	33 (57.9)	0.976

*P significant at less than 0.05 **P significant at less than <0.01

Table 32: Comparison of attendees and non-attendees falls and falls injuries

	Returned for follow-up (%)	Non-attendees (%)	P=
Number of clients falling	194 (77.6)	80 (84.2)	0.175
Number of clients having injurious falls	128 (51.8)	63 (67.0)	0.012*
Sought medical attention	84 (33.7)	40 (42.6)	0.129
Bruises	106 (42.4)	55 (57.9)	0.010*
Cuts, no stitches (%)	23 (9.2)	13 (13.7)	0.224
Cuts and stitches (%)	14 (5.6)	7 (7.4)	0.539
Fracture (%)	24 (9.6)	8 (8.4)	0.736

*P significant at less than 0.05

**P significant at less than <0.01

Table 33: Comparison of attendees and non-attendees secondary outcome measures

	Returned for follow-up Mean (SD)	Non-attendees Mean (SD)	P=
Barthel	93.6 (12.8)	94.0 (11.6)	0.844
Frenchay	25.0 (9.6)	22.1 (9.9)	0.093
TUG +	18.4 (12.2)	21.5 (16.2)	0.072
Step Test	7.4 (4.5)	6.0 (3.6)	0.005**
Leg strength +	12.9 (6.6)	16.0 (9.0)	0.009**
Gait	45.3 (16.1)	40.1 (16.7)	0.015*
MFES	7.6 (2.0)	7.5 (1.9)	0.662
Medications +	5.8 (3.3)	6.2 (3.8)	0.333
Postural BP	7.9 (11.5)	7.3 (10.3)	0.678

*P significant at less than 0.05 **P significant at less than <0.01

+ Indicates outcome measures where a decrease in score indicates an improvement

Table 34: Comparison of attendees and non-attendees risk factors

	Returned for follow-up	Non-attendees	P=
Acute health problem (%)	13 (5.1)	9 (9.4)	0.143
Vision impairment/Spectacles (%)	114 (44.9)	47 (49.0)	0.495
Dizziness (%)	84 (33.1)	25 (26.0)	0.205
Peripheral neuropathy / lower limb sensory loss (%)	46 (18.1)	18 (18.8)	0.890
Postural hypotension (%)	49 (19.3)	19 (19.8)	0.916
Polypharmacy (more than 4 medications) (%)	134 (52.8)	59 (61.5)	0.144
Use of medications associated with increased falls risk (%)	76 (29.9)	37 (38.5)	0.124
Chronic medical conditions such as stroke, Parkinson's Disease, arthritis (%)	167 (65.7)	70 (72.9)	0.201
Osteoporosis (low bone density) (%)	37 (14.6)	14 (14.6)	0.997
Osteomalacia (low vitamin D) (%)	1 (0.4)	1 (1.0)	0.473
Under-nutrition (%)	13 (5.1)	6 (6.3)	0.677
Syncope (%)	7 (2.8)	1 (1.0)	0.338
Cognitive impairment (%)	56 (22.0)	15 (15.6)	0.183
Depression (%)	37 (14.6)	14 (14.6)	0.997
Fear of falling (%)	115 (45.3)	47 (49.0)	0.538
Impaired balance (%)	204 (80.3)	68 (70.8)	0.057
Muscle weakness / deconditioning (%)	176 (69.3)	60 (62.5)	0.226
Unsteady gait (%)	143 (56.3)	47 (49.0)	0.219
Reduced physical activity (%)	138 (54.3)	43 (44.8)	0.111
Reduced functional independence (%)	77 (30.3)	28 (29.2)	0.834
Environmental hazards – at home (%)	75 (29.5)	33 (34.4)	0.381
Environmental hazards – away from home (%)	20 (7.9)	11 (11.5)	0.292
Poor footwear (%)	47 (18.5)	19 (19.8)	0.783
Foot problems (%)	55 (21.7)	33 (34.4)	0.014*
Hazardous behaviours (%)	42 (16.5)	17 (17.7)	0.794

*P significant at equal or less than 0.05 **P significant at less than <0.01

Appendix 4: Comparison of improvement by demographic characteristics

Table 35: Mean Improvement by gender

	Males N (%)	Females N (%)	P=
% of clients with reduction in falls	43 (62.3)	112 (63.3)	0.824
% of clients with reduction in injurious falls	25 (37.3)	77 (44.5)	0.543
% of clients with reduction in seeking medical attention	15 (22.4)	56 (32.0)	0.311
	Mean (SD): N	Mean (SD): N	
Barthel	1.8 (19.1): 39	1.6 (7.2): 75	0.950
Frenchay	0.3 (5.6): 34	1.1 (5.2): 81	0.475
TUG	0.1 (8.7): 51	1.7 (7.6): 130	0.239
Step test	1.1 (3.4): 52	0.7 (4.0): 133	0.523
Leg strength	0.6 (4.2):42	2.0 (6.2): 99	0.174
Gait	0.2 (0.9):46	0.3 (0.9): 111	0.275
MFES	0.5 (1.6): 46	0.6 (1.6): 108	0.890
Medications	0.1 (1.5): 64	0.3 (1.5): 152	0.630
Postural BP	2.2 (8.7): 36	2.1 (13.0): 88	0.983

Table 36: Mean improvement by age

	Under 65 years N (%)	65 years and over N (%)	P=
% of clients with reduction in falls	12 (57.1)	143 (64.1)	0.809
% of clients with reduction in injurious falls	8 (38.1)	94 (43.1)	0.479
% of clients with reduction in seeking medical attention	4 (19.0)	67 (30.5)	0.406
	Mean (SD): N	Mean (SD): N	
Barthel	1.0 (4.5): 12	1.8 (13.2): 101	0.844
Frenchay	-0.2 (6.2): 10	1.0 (5.3): 104	0.517
TUG	0.3 (2.7): 18	1.3 (8.3): 162	0.619
Step test	0.7 (2.5): 19	0.8 (3.9): 165	0.904
Leg strength	-0.5 (4.3): 14	1.8 (5.8): 126	0.138
Gait	0.4 (0.9): 16	0.3 (0.9): 140	0.662
MFES	0.6 (1.1): 13	0.5 (1.7): 140	0.978
Medications	0.3 (1.3): 18	0.2 (1.5): 197	0.819
Postural BP	0.1 (10.6): 14	2.5 (12.1): 109	0.481

Table 37: Mean improvement by living arrangement

	Lives alone N (%)	Lives with others* N (%)	P=
% of clients with reduction in falls	71 (67.0)	74 (59.2)	0.407
% of clients with reduction in injurious falls	45 (43.3)	51 (41.1)	0.558
% of clients with reduction in seeking medical attention	29 (27.9)	39 (31.0)	0.130
	Mean (SD): N	Mean (SD): N	
Barthel	1.9 (6.6): 47	1.7 (14.5): 61	0.945
Frenchay	0.5 (3.9): 60	0.5 (5.5): 51	0.959
TUG	2.1 (6.9): 77	0.1 (7.0): 93	0.065
Step test	0.9 (3.8): 77	0.8 (3.9): 100	0.940
Leg strength	2.0 (4.5): 58	1.1 (5.5): 74	0.346
Gait	0.3 (0.9): 66	0.3 (0.9): 80	0.724
MFES	0.7 (1.4): 73	0.3 (1.7): 71	0.225
Medications	0.3 (1.3): 92	0.2 (1.6): 110	0.732
Postural BP	1.7 (11.1): 51	2.5 (12.9): 67	0.719

*Clients living in residential care or other supported accommodation have been excluded from this table

Table 38: Mean improvement by carer availability

	Carer Available* N (%)	No carer available N (%)	P=
% of clients with reduction in falls	103 (62.8)	48 (64.9)	0.558
% of clients with reduction in injurious falls	71 (44.1)	30 (41.1)	0.797
% of clients with reduction in seeking medical attention	49 (30.1)	21 (28.8)	0.484
	Mean (SD): N	Mean (SD): N	
Barthel	1.1 (13.5): 85	3.4 (9.4): 27	0.412
Frenchay	1.0 (6.0): 70	0.5 (4.0): 44	0.653
TUG	0.8 (8.8): 115	2.1 (6.2): 60	0.300
Step test	0.8 (3.8): 118	1.1 (3.9): 60	0.591
Leg strength	1.4 (6.0): 87	1.8 (5.1): 50	0.697
Gait	0.3 (0.9): 97	0.3 (0.9): 54	0.853
MFES	0.4 (1.7): 95	0.7 (1.4): 56	0.316
Medications	0.2 (1.6): 146	0.2 (1.4): 66	0.817
Postural BP	1.2 (11.9): 80	4.0 (12.0): 42	0.221

*includes resident and non-resident informal carers

Table 39: Mean improvement by cognitive impairment

	No cognitive impairment N (%)	Cognitive impairment N (%)	P=
% of clients with reduction in falls	122 (64.2)	33 (60.0)	0.847
% of clients with reduction in injurious falls	81 (43.5)	21 (38.9)	0.679
% of clients with reduction in seeking medical attention	57 (30.6)	14 (25.0)	0.290
	Mean (SD): N	Mean (SD): N	
Barthel	1.1 (8.4): 95	4.3 (24.7): 19	0.585
Frenchay	0.9 (3.6): 92	0.6 (9.7): 23	0.888
TUG	1.6 (6.4): 156	-1.0 (14.2): 25	0.379
Step test	1.1 (3.8): 157	-0.4 (3.8): 28	0.059
Leg strength	1.3 (5.2): 122	3.2 (7.9): 19	0.186
Gait	0.3 (0.9): 139	0.3 (0.9): 18	0.984
MFES	0.6 (1.6): 131	0.1 (1.5): 23	0.170
Medications	0.2 (1.4): 169	0.2 (1.8): 47	0.809
Postural BP	1.7 (11.9): 110	5.2 (11.7): 14	0.303

Table 40: Mean improvement by body mass index

	Acceptable BMI N (%)	Over or Under weight N (%)	P=
% of clients with reduction in falls	42 (63.6)	61 (65.6)	0.965
% of clients with reduction in injurious falls	24 (36.4)	40 (44.0)	0.618
% of clients with reduction in seeking medical attention	19 (28.8)	28 (30.1)	0.754
	Mean (SD): N	Mean (SD): N	
Barthel	-0.3 (13.9): 25	4.1 (15.3): 47	0.233
Frenchay	1.5 (3.7): 27	1.1 (5.7): 55	0.724
TUG	0.4 (4.7): 36	1.8 (8.4): 81	0.337
Step test	1.0 (4.6): 35	1.4 (3.7): 78	0.556
Leg strength	1.1 (6.2): 33	2.3 (6.3): 65	0.354
Gait	0.5 (0.9): 38	0.2 (0.9): 81	0.187
MFES	0.4 (1.6): 35	0.6 (1.9): 66	0.566
Medications	0.5 (1.5): 59	0.0 (1.4): 86	0.047*
Postural BP	2.6 (12.5): 27	1.5 (11.8): 63	0.697

Appendix 5: Association of initial recommendations with compliance measure

The four columns in the table below are explained as follows:

Column 1: Initially recommended = of the 254 clients who attended the follow-up assessment this many were initially recommended this intervention.

Column 2: Compliance measure complete = Of those in column 1, how many had the compliance measure completed.

Column 3: Additional Compliance data (%) = The number of clients for whom the compliance measure was completed despite not originally being recommended this intervention. The percentage is the number of clients as a proportion of Column 2 (i.e. the proportion of additional compliance data provided).

Column 4: Missing compliance data (%) = Number of clients who were originally recommended the intervention and returned for a follow-up visit but in which the compliance measure was not recorded. The percentage is the number of clients as a proportion of Column 1

Recommendation	Initially recom'd	Compliance measure complete	Additional Compliance data (%)*	Missing compliance data (%)**
Package (Linkages or CACP)	1	2	1 (50.0)	0 (0)
Home Visit	151	134	6 (4.5)	23 (15.2)
Vestibular rehabilitation – Gaze stability exercises	13	9	2 (22.2)	6 (46.2)
Osteoporosis medication/Vit D / calcium	7	6	5 (83.3)	6 (85.7)
Referred to medical specialist	32	48	24 (50.0)	8 (25.0)
Investigations/treatment of health problem	80	77	7 (9.1)	10 (12.5)
CHC	110	102	12 (11.8)	20 (18.2)
Food services	3	4	2 (50.0)	1 (33.3)
Education	122	106	7 (6.6)	23 (18.9)
Vestibular rehabilitation – Repositioning	17	17	4 (23.5)	4 (23.5)

Recommendation	Initially recom'd	Compliance measure complete	Additional Compliance data (%)*	Missing compliance data (%)**
Foot care	41	39	8 (20.5)	10 (24.4)
Driving assessment	4	6	2 (33.3)	0 (0)
New medication	20	29	11 (37.9)	2 (10.0)
Vestibular rehabilitation – Desensitising exercises	18	17	2 (11.8)	3 (16.7)
Medication reduction	48	51	11 (21.6)	8 (16.7)
Visual assessment / management	42	41	1 (2.4)	2 (4.8)
Footwear change	43	39	12 (30.8)	16 (37.2)
Home aids / modifications	113	118	16 (13.6)	11 (9.7)
Personal alarm	25	25	8 (32.0)	8 (32.0)
Gait aid change or adjustment	58	57	10 (17.5)	11 (19.0)
Home exercise - Strength	10	19	13 (64.4)	4 (40.0)
Home exercise - Balance	20	31	16 (51.6)	5 (25.0)
Home exercise – Comb.	105	93	8 (8.6)	20 (19.1)
Relaxation	1	2	1 (50.0)	0 (0)
Respite care	2	2	1 (50.0)	1 (50.0)
Behaviour modification	47	41	9 (22.0)	15 (31.9)
Home care	12	13	2 (15.4)	1 (8.3)
Group exercise	70	81	18 (22.2)	7 (10.0)
Personal care	3	3	1 (33.3)	1 (33.3)
Day centre	5	3	1 (33.3)	3 (60.0)
Clinical psychology	16	11	0 (0)	5 (31.3)
Hip protector	40	38	4 (10.5)	6 (15.0)
Community nurse	1	2	2 (100)	1 (100.0)
Home maintenance	4	3	1 (33.3)	2 (50.0)