

Statewide Orthopaedic Clinical Network and
Rehabilitation Clinical Network

Models of Care for Orthopaedic Rehabilitation -

Fragility Fractures
General Orthopaedic Trauma
and Arthroplasty

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Executive Summary

South Australia's health system faces many challenges due to an ageing population, increasing use of health services and a decreasing workforce. Health reform is therefore essential to ensure access to high standards of health care is available for all South Australians. The release of the *SA Health Care Plan 2007-2016*¹ and establishment of Statewide Clinical Networks support this health reform.

The Statewide Orthopaedic and Rehabilitation Clinical Networks commenced in July 2007, two of the eight Networks established by the Government to provide leadership and strategic planning for clinical service development across the continuum of care and in both metropolitan and country regions of South Australia. The Clinical Networks have a strong emphasis on fostering clinician engagement in the planning of health services.

The Rehabilitation Clinical Network has developed an overarching plan for rehabilitation services in South Australia for the next ten years as outlined in the *Statewide Rehabilitation Service Plan, 2009-2017*². To support this plan detailed clinical models of rehabilitation have been developed collaboratively by the Orthopaedic and Rehabilitation Clinical Networks in the following areas:

- > Fragility Fractures
- > General Orthopaedic Trauma
- > Arthroplasty

In developing these models of care the members of the orthopaedic and rehabilitation clinical networks believed it was important that the recommendations would not be constrained by the way orthopaedic and rehabilitation services are provided in South Australia in the present healthcare environment, and the delivery of services have a client centred approach.

Key recommendations and flowcharts for each of these models are presented below with detailed information provided in each chapter as follows

Chapter 2: Fragility Fracture Rehabilitation,

Chapter 3: General Orthopaedic Trauma Rehabilitation

Chapter 4: Arthroplasty Rehabilitation.

It is important that the flowcharts and key recommendations outlined for each individual patient group are read in conjunction with each other as this will provide a clear picture of services outlined for that particular group.

Workforce, education and training, quality and research, infrastructure and information technology, partnerships and evaluation are consistent for all three orthopaedic rehabilitation models and are addressed in Chapters 5 - 11.

The implementation of these orthopaedic rehabilitation models will ensure the provision of efficient and effective services to South Australians that are equitable, accessible and sustainable across the continuum of care into the future.

Key Recommendations

Relevant to all three orthopaedic rehabilitation models

Service delivery

- > Orthopaedic rehabilitation provided by multi-disciplinary teams across the continuum including acute, post-acute inpatient, ambulatory and community
- > Multiple access points to rehabilitation, in particular ambulatory and community based rehabilitation programs, ensuring they are responsive to individual needs
- > Access back to active rehabilitation must be available across the continuum in response to the specific need of the individual
- > Any criteria for admission to rehabilitation being developed by health units, must be transparent and consistent as well as being in line with the Rehabilitation Service Plan
- > The patient journey through the system is coordinated to ensure there is a mechanism in which the flow of the individual's care and treatment occurs in an appropriate and timely fashion across the continuum

Partnerships

- > Care needs to be client centred and provided collaboratively for individuals requiring orthopaedic rehabilitation, between the family / carers, health professionals and community services
- > The establishment of partnerships between health and other government, non-government and private providers will ensure available resources are used most efficiently across the continuum
- > General practitioners are essential to the delivery of orthopaedic rehabilitation services across the continuum and hence must be involved in the individual's care

Specific populations

- > Sites providing orthopaedic rehabilitation in the country are expected to provide services as outlined in the key requirements of each of the three models. Formal links between country and metropolitan rehabilitation sites will assist in facilitating this
- > Provision of orthopaedic rehabilitation services for people from Aboriginal backgrounds and people from culturally and linguistically diverse backgrounds require specific consideration to ensure cultural appropriateness and the needs of individuals and their families / carers are met

Workforce

- > Staffing resources of inpatient rehabilitation units and ambulatory rehabilitation programs will be developed through a workforce strategy which address's workforce benchmark requirements, training and professional development
- > Care across the continuum will be provided by a multi-disciplinary team of health professionals
- > Specific workforce roles outlined in each model are supported and become part of an integrated system across the continuum
- > Allied health staff are available on a seven day a week basis so that rehabilitation can be commenced and maintained for each individual client in the appropriate timeframe in line with future projected demand informed by the benchmarks recommended by the Rehabilitation Service Development Plan.
- > Establishment of links between metropolitan and country based staff involved in the delivery of care for individuals requiring orthopaedic rehabilitation will be advantageous, especially in providing professional development support and training, sharing of skills and knowledge and promotion of work shadowing opportunities

Training and professional development

- > Availability of ongoing training and development of the workforce
- > Utilisation of a range of training opportunities and strategies to be considered for staff. These may vary depending on whether the staff are located in a metropolitan or country region

Information technology and infrastructure

- > Consideration is given to the physical infrastructure needed to support evidence based orthopaedic rehabilitation care
- > Use of information technology systems will enhance service delivery, minimise duplication and facilitate the use of innovative models of rehabilitation such as e-rehabilitation

Quality and research

- > All inpatient and ambulatory orthopaedic rehabilitation sites to report to Australasian Rehabilitation Outcomes Centre (AROC) to enable national benchmarking and comparative public reporting
- > Establishment of statewide databases for orthopaedics with a minimum data set for reporting specific to fragility fractures, arthroplasty and general orthopaedic trauma
- > Statewide quality initiatives that ensure coordination across sites promoting consistency and decreasing duplication.
- > Undertaking of further research in a range of areas directly related to the management of orthopaedic rehabilitation and recovery

Model evaluation

- > The implementation of the orthopaedic rehabilitation models of fragility fractures, general orthopaedic trauma and arthroplasty will need to be evaluated to facilitate continuous improvement with a focus on process, impact, outcome and structure

Fragility fractures: Key recommendations and model flowchart

Acute management (including hospitalisation)

- > Fragility fractures not requiring surgical intervention to be managed in the community where possible, with access to community based rehabilitation services and community support
- > Non-surgical management of fragility fractures requiring hospitalisation to occur in Acute Care of the Elderly (ACE) or Geriatric Evaluation and Management (GEM) Units
- > Individuals requiring surgical management of fragility fractures to be managed in hospital with a focus on orthogeriatric care.
- > Appointment of hospital based fragility fracture coordinators to work within the multi-disciplinary teams in development of patient care plans ensuring appropriate supports, rehabilitation and follow up is organised on discharge and secondary prevention commenced

Post-acute inpatient rehabilitation

- > Availability of inpatient rehabilitation for individuals not ready to return directly home from the acute hospital but who show potential for improvement
- > Inpatient rehabilitation to be multi-disciplinary and coordinated with goals and discharge plans set collaboratively with the individual and family / carer
- > For individuals not able to achieve a level of function and safety that allows discharge home, then options including permanent residential care and residential transition care need to be considered
- > The identification of personnel based within the hospital setting to undertake the coordination of the flow of care of the individual experiencing a fragility fracture, is required as a function within the multi-disciplinary teams in development of patient care plans ensuring appropriate supports, rehabilitation and follow up is organised on discharge and secondary prevention commenced. This could be achieved in a number of ways; as a separate role, integrating the competencies into existing roles or taken up by one of the members of the multi-disciplinary team. This would be entirely dependent on patient population and the workload requirements within a region, institution or community setting.

Community based rehabilitation and reintegration

- > Availability of ambulatory and community based rehabilitation programs (including rehabilitation in the home, centre based day rehabilitation and community programs) to facilitate function, independence and re-integration into everyday community living post fragility fracture.

Ongoing maintenance of function

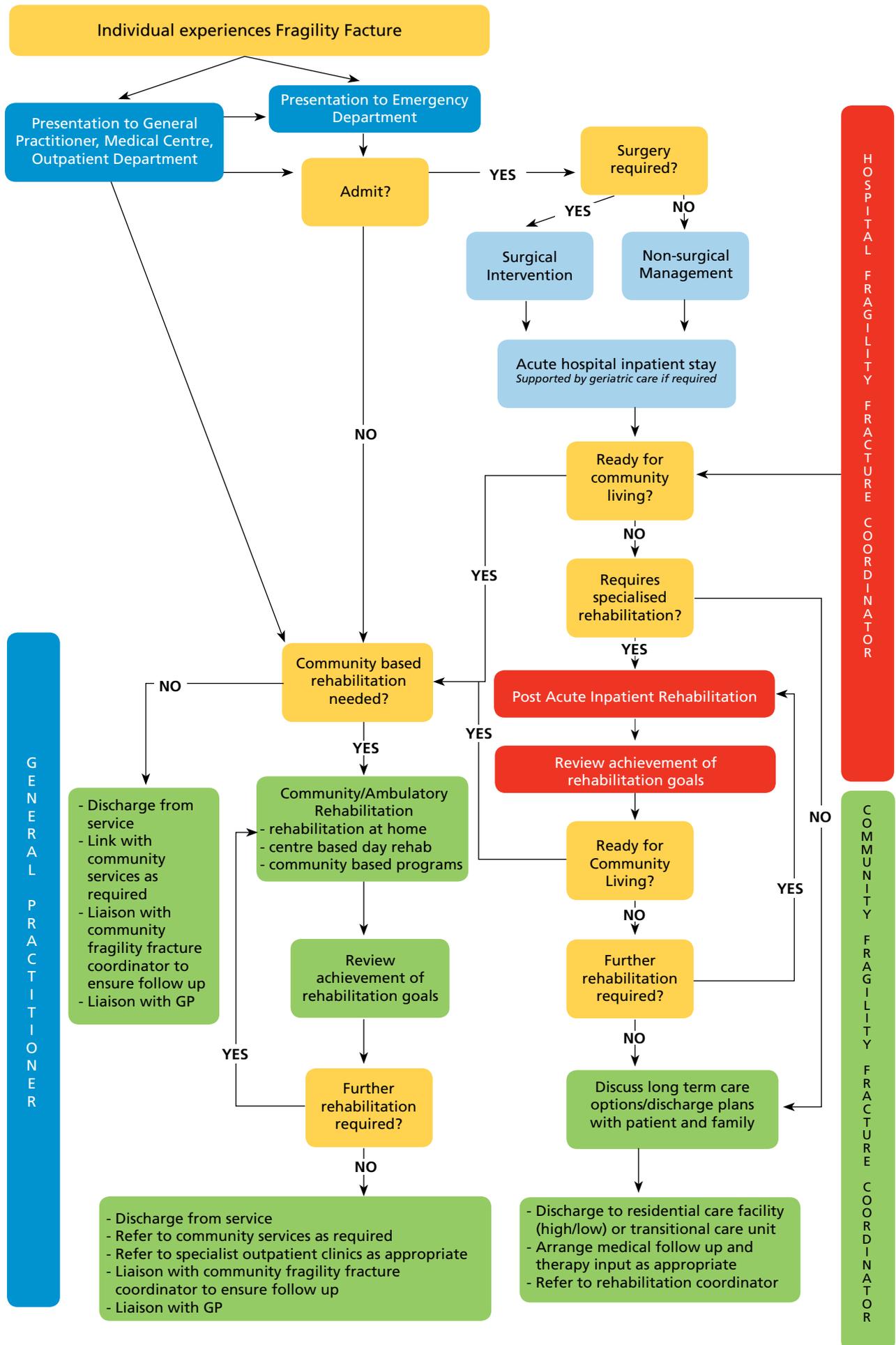
- > Access to community services, which may require partnerships with other government, non-government and private organisations following completion of an inpatient and/or community and ambulatory rehabilitation program to ensure the individual's ongoing recovery and maintenance in the community
- > Availability of therapy to individuals returning to residential care facilities who have the potential to improve, in particular regain mobility.

Secondary prevention

- > Access to specialist follow-up by geriatrician, rehabilitation specialist and /or orthopaedic surgeon depending on individual's needs
- > Risk assessment and treatment following fragility fracture to minimise further occurrence of such fractures. Intervention to be provided as per national evidence based guidelines addressing falls prevention and osteoporosis management
- > The identification of personnel based within the community setting to undertake the coordination of the flow of care of the individual experiencing a fragility fracture, is required in the initial phase following discharge, including secondary prevention, monitor implementation strategies, assist with linking to other programs / services as appropriate, provide follow up care and respond to queries of individuals / families / carers. This could be achieved in a number of ways; as a separate role, integrating the competencies into existing roles or taken up by one of the members of the multi-disciplinary team. This would be entirely dependent on patient population and the workload requirements within a region, institution or community setting.
- > Availability of specialist follow-up by geriatrician or other specialist depending on individual's needs

Specific populations

- > Secondary prevention and therapy services need to be provided to individuals living in residential aged care who experience fragility fractures
- > Younger individuals who experience fragility fractures need to have their specific needs addressed including employment, relationships and income support



General orthopaedic trauma: Key recommendations and model flowchart

Service accessibility

- > Services that individuals with general orthopaedic trauma receive, must not be limited by age group. Equity of access to services across the continuum is critical

Acute initial management

- > The general practitioner should be the first point of contact for minor orthopaedic trauma with more extensive general trauma initially being managed by hospital outpatient departments or emergency departments depending on nature and severity
- > For individuals who do not require admission for management of their orthopaedic condition access to ambulatory or community rehabilitation programs, single discipline outpatient intervention, equipment, community service supports and specialist review needs to be available
- > The identification of personnel to undertake the coordination of the flow of care of the individual experiencing general orthopaedic trauma, is required to oversee the care of these individuals in the community and linkages to appropriate services would be beneficial

Acute inpatient care

- > Surgical intervention needs to occur in a timely manner to maximise potential for recovery.
- > Rehabilitation must commence in the acute phase, provided by a multi-disciplinary team
- > Discharge directly home, with or without ongoing community supports and follow up rehabilitation, should be pursued for all individuals where at all practical.
- > Individuals not suitable for discharge directly home from the acute facility should be considered for post-acute inpatient rehabilitation
- > Rehabilitation protocols to guide clinical practice in the acute setting to be developed
- > The identification of personnel to undertake the coordination of the flow of care of the individual experiencing general orthopaedic trauma in the hospital setting is required to facilitate improved integration and transfer of care across the continuum

Post-acute inpatient management

- > To focus on maximising potential for recovery, independence and function by setting realistic goals collaboratively with the individual, family / carers and multi-disciplinary team
- > Ongoing rehabilitation in the community (ambulatory or community programs, single discipline outpatients), community support services and equipment need to be organised prior to an individual's discharge from inpatient rehabilitation
- > Individuals not able to achieve a level of function that will allow discharge to their previous accommodation will need to consider supported care options such as residential aged care
- > Rehabilitation protocols to guide general orthopaedic rehabilitation clinical practice require development

Community based rehabilitation and integration

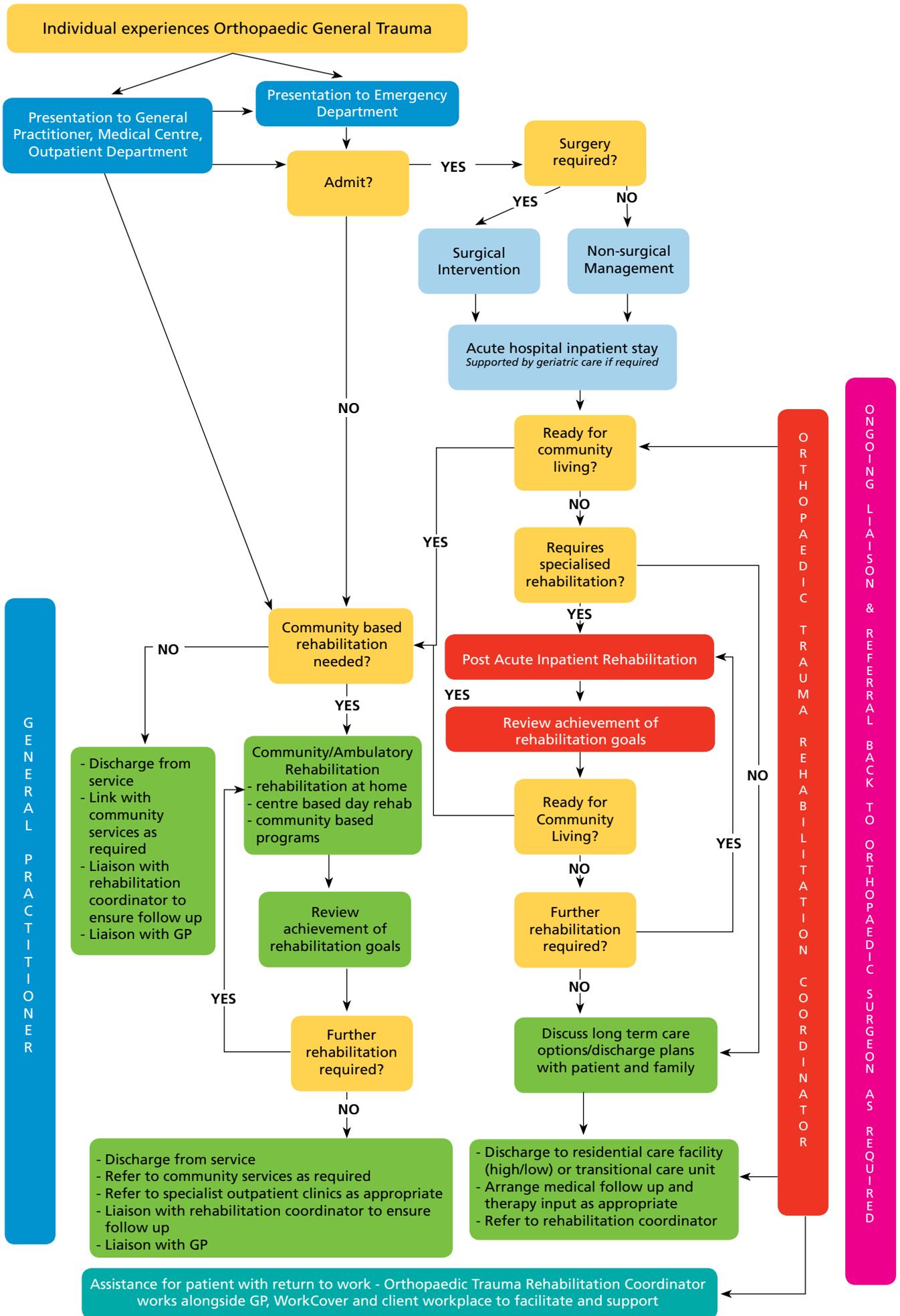
- > Ambulatory and community based rehabilitation programs that are responsive to individual needs and focus on maximising independence and community re-integration need to be available to individuals who experience general orthopaedic trauma irrespective of if they have had a hospital admission or not

Ongoing maintenance and function

- > Referral pathways are needed to ensure that individuals with general orthopaedic trauma can easily access services to sustain gains made in rehabilitation and ensure positive outcomes in the long term

Specific populations

- > Options including inpatient rehabilitation need to be available to individuals who are given a non-weight bearing status for a period of time following their general orthopaedic trauma. Availability of services must not be age dependents



GENERAL PRACTITIONER

ORTHOPAEDIC TRAUMA REHABILITATION COORDINATOR

ONGOING LIAISON & REFERRAL BACK TO ORTHOPAEDIC SURGEON AS REQUIRED

Arthroplasty rehabilitation: Key recommendations and model flowchart

Service continuum

- > The arthroplasty rehabilitation model needs to be implemented in conjunction with the Arthroplasty Demand and Management (ADAM)³ project to ensure seamless integration across the continuum

Initial management / assessment – general practitioner

- > General practitioners should refer individuals who present with reduced mobility, range of motion and pain as a result of hip / knee arthritis who may require surgical intervention for a specialist orthopaedic outpatient appointment via a standardised GP referral form

Outpatient appointment and review

- > Comprehensive outpatient assessment will occur with a multidisciplinary team including an orthopaedic specialist to determine if conservative or surgical management is required. This will occur in conjunction with triage and prehabilitation coordination.
- > If surgical management is required, the individual will be placed on the arthroplasty waiting list and the prehabilitation process immediately commenced under the direction of a prehabilitation coordinator.

Whilst on waiting list / prior to surgical intervention

- > Individuals on the waiting list will be contacted by the identified personnel undertaking the triage process every 3 months to assess change in condition and re-prioritise as appropriate
- > Individuals will be encouraged to participate in prehabilitation, self management and education programs whilst on the waiting list
- > Within 2-6 weeks of planned surgery, the individual will be required to attend a pre-admission appointment to prepare for surgery and to allow potential needs post surgery to be addressed

Acute inpatient care – admission, surgery and recovery

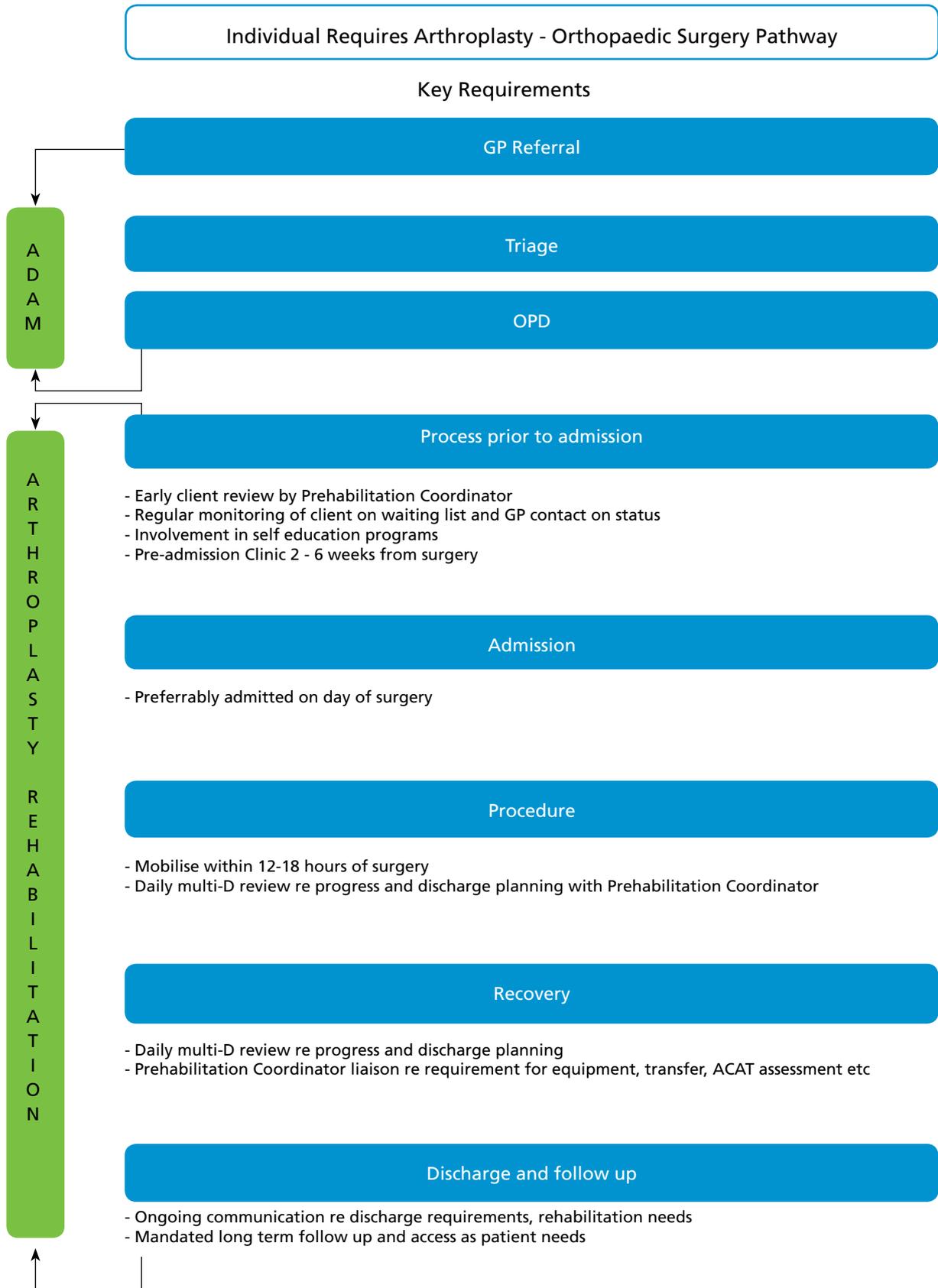
- > Admission will occur on the day of surgery
- > Rehabilitation will commence promptly after surgery, within 12-18 hours, unless there are specific contraindications
- > It is expected that the majority of individuals undergoing arthroplasty rehabilitation will be able to discharge directly home at day 3-5 post surgery with access to follow up rehabilitation and community services as required

Post-acute rehabilitation

- > Access to inpatient, ambulatory (home based and day centre based) and community (including single discipline allied health) rehabilitation programs must be available with multiple access points

Ongoing maintenance and function

- > Access to ongoing community support / services for those individuals who continue to have difficulties with mobility, functional tasks and participation in everyday activities post arthroplasty surgery need to be available. This is of particular relevance to those with co-morbidities. Multiple access points to these services are needed.
- > Ongoing orthopaedic specialist review to meet mandated long term follow up requirements of individuals undergoing arthroplasty surgery is required



Chapter 1: Introduction

Purpose and scope

This document outlines for South Australia models for the provision of orthopaedic rehabilitation to individuals across the continuum of care focusing on three specific areas:

- > Fragility fractures
- > General Orthopaedic Trauma
- > Arthroplasty

The models are client centred, sustainable and evidence based; aiming to provide improved consistency, equity and quality of service provision. The models have been designed for applicability now and into the future. It is crucial that principles of safety and quality, including effective infection control programs, are inherent in the models to ensure the provision of high quality care to the patients and a safe working environment for staff within our health care facilities.

It is expected that these models will be used to inform organisations and health professionals in the planning, development, provision and monitoring of services for individuals requiring orthopaedic rehabilitation in South Australia.

Whilst the focus of these models is on publicly provided services, the implementation of equivalent practices within the private sector, especially in acute care, would be most advantageous to the South Australian community.

Drivers for change

The release of the *SA Health Care Plan 2007-2016*¹ and establishment of Statewide Clinical Networks, both in 2007, provide a clear direction for ongoing health reform to ensure that all South Australians continue to have access to high standards of health care.

The expansion of rehabilitation services is articulated as a key priority within the *SA Health Care Plan 2007-2016* and hence the impetus for the development of this model to ensure that as services are expanded this occurs in a planned, coordinated and consistent manner, to a high standard and with the health consumer at the centre.

The Statewide Orthopaedic Clinical Network and Rehabilitation Clinical Network have a critical role in ensuring this given their focus on providing leadership and strategic planning for clinical service development across the continuum of care and across all health services - both country and metropolitan.

Health reform in South Australia is essential to maintain a viable and sustainable health service into the future due to three key reasons - an ageing population, increasing use of health services and decreasing workforce.

Policy context

In developing this model, a number of South Australian strategic plans and policies have been considered as outlined below:

- > *South Australia's Strategic Plan, 2007-2009*
- > *SA Health Strategic Plan, 2007-2009*
- > *SA Health Care Plan, 2007-2016*
- > *Strategy for Planning Country Health Services in South Australia*
- > *GP Plus Health Care Strategy, 2007*
- > *SA Health Aboriginal Health Policy, 2007*
- > *SA Health Aboriginal Cultural Respect Framework*
- > *SA Health Statewide Health Plans*
- > *Health Facility and Clinical Delineation*
- > *SA Health Safety & Quality Framework, 2008-2011*
- > *Health Service framework for Older People 2009-2016*

Key principles

The following guiding principles have been utilised in the development of this model and are consistent with the Model for Rehabilitation in South Australia (as outlined in the *Statewide Rehabilitation Service Plan, 2009-2017*)² and based on SA Health's aim to optimise patient care outcomes by providing the 'right care at the right time and in the right place first time':

- > **Right care:** ensuring the availability of staffing, skills, expertise and resources for the management of the individual's specific health care needs
- > **Right time:** ensuring the availability and access to the required services to meet the individual's needs in a timeframe that will minimise adverse outcomes and / or complications
- > **Right place:** ensuring that the individual's care is provided in a health facility that will best meet their specific needs
- > **First time:** ensuring that the required care is provided in the most appropriate place within necessary timeframes first time and that transfer to various facilities, services and personnel is not required.

'Right care, right time, right place, first time' is further enhanced by the following key principles of the Rehabilitation Model:²

Client centred

This Model places the individual, their family, carers and significant others at the centre of care. It acknowledges that individuals have the right to be treated with dignity, respect and fairness. Services are to be delivered in partnership with the patient and their family / carers and be based on their needs and preferences. The Model ensures that there is patient choice and that services are matched to patient needs.

Maximising function and independence

Central to this Model is the maintenance of an individual's independence, function and ability. Preventative strategies should be implemented to avoid loss of function both in the community and hospital. If an individual requires hospitalisation, a program of restoration and rehabilitation should be started immediately and supported by adequate levels of staffing and suitable environments.

Access and equity

Service planning is based on population need. A comprehensive range of rehabilitation services are available to maximise an individual's independence and function, recognising that not "one size fits all". This is of particular importance with regards to minority groups and people from culturally diverse backgrounds. Further, there are multiple entry points to a service and service access is based on clinical need, not based on age. Services are provided as close to an individual's home as practical.

Service consistency

There will be consistency of service across the whole system which will assist in facilitating access and equity. Within the agreed service consistency there will be scope for flexibility to meet specific population groups and individual needs.

Seamless service

Services as part of this model are seamless across the continuum of care and patients and their families are supported and easily able to identify who to contact if issues of concern arise. Services are responsive and facilitate throughput and avoid blockages within the system. Barriers to effective and seamless care due to organisational structures are not to be tolerated. Duplication of assessment is to be avoided.

Partnerships

Communication and teamwork are essential elements of this Model. Strong partnerships will be established between all key stakeholders in the patient's care including the individual themselves, government and non-government organisations, the general practitioner and specialist medical staff.

Standards of care

Ongoing monitoring of outcomes and standards of care forms an essential component of this model to ensure better health outcomes. Care will be provided based on the best evidence available to ensure high quality patient centred services with the minimisation of errors.

Support and value staff

Adequate and appropriately skilled staff are critical to the success of this Model. Staff with expertise in specialty orthopaedic rehabilitation, will require to be supported and valued in their roles. New or inexperienced staff also need to be fostered in their development and employment in these roles. A robust professional development strategy needs to be available for all staff.

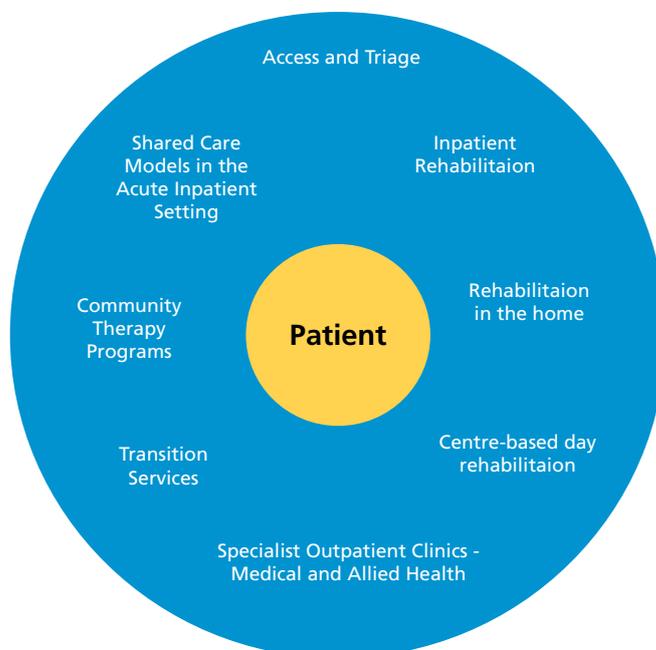
Service elements

The *Statewide Rehabilitation Service Plan, 2009-2017*² outlines the key service elements that need to be available to maximise rehabilitation across the continuum, thereby ensuring efficient patient flows, system integration and the meeting of consumer needs.

The service elements are noted below and outlined in Figure 1:

- > Assessment services – access and triage
- > Shared care models in acute inpatient setting
- > Inpatient rehabilitation
- > Rehabilitation in the home
- > Centre-based day rehabilitation
- > Specialist outpatient clinics – medical and allied health
- > Community therapy programs
- > Transition Services

Figure 1: Service elements of the Model of Rehabilitation for South Australia



More detailed information on these service elements is contained in Appendix 1

Model development

A joint committee of the Statewide Orthopaedic Clinical Network and Rehabilitation Clinical Network was established to collaboratively oversee the development of the orthopaedic rehabilitation models.

Workgroups were established to develop specific models of care for:

- > Fragility fractures
- > General Orthopaedic Trauma
- > Arthroplasty

The workgroups were multi-disciplinary consisting of individuals working in a range of areas including acute, rehabilitation and community and in public, private and non-government organisations. See Appendix 10 for membership details.

In developing the models a range of health professionals, organisations and consumers were consulted.

Chapter 2: Model for fragility fracture care in South Australia

2.1 Summary

Fragility fractures are fractures that occur in the setting of decreased bone density. Over 90% occur in the older population and are due to low impact injuries causing minimal trauma. Weight bearing bones, including the femur, pelvis, humerus, radius and vertebrae, are the bones most commonly affected by fragility fractures.

With the ageing population in South Australia fragility fracture rates are set to rise by at least ten percent every five years for at least the next 15 years. Management of these fractures have a significant cost on the health care budget with over \$1.9 billion in direct costs spent per year in Australia on hospital treatment, rehabilitation, therapy and home care (OA, 2007⁴). Hence the need to develop a model of care in this State for the management of fragility fractures across the continuum that ensures sustainability of service provision to this population group now and into the future.

This chapter outlines a model for the provision of care across the continuum for South Australians who experience a fragility fracture.

Primary prevention is an important driver in decreasing the incidence of fragility fractures however it is not covered in this model as the SA Health Primary Prevention Plan will address health promotion, prevention and at risk populations for falls and fragility fractures.

2.2 Key recommendations

Acute management (including hospitalisation)

- > Fragility fractures not requiring surgical intervention to be managed in the community where possible, with access to community based rehabilitation services and community support
- > Non-surgical management of fragility fractures requiring hospitalisation to occur in Acute Care of the Elderly (ACE) or Geriatric Evaluation and Management (GEM) Units
- > Individuals requiring surgical management of fragility fractures to be managed in hospital with a focus on ortho-geriatric care.
- > Hospital based fragility fracture coordination to occur within the multi-disciplinary teams in development of patient care plans ensuring appropriate supports, rehabilitation and follow up is organised on discharge and secondary prevention commenced

Post-acute inpatient rehabilitation

- > Availability of inpatient rehabilitation for individuals not ready to return directly home from the acute hospital but who show potential for improvement
- > Inpatient rehabilitation to be multi-disciplinary and coordinated with goals and discharge plans set collaboratively with the individual and family / carer
- > For individuals not able to achieve a level of function and safety that allows discharge home, then options including permanent residential care and residential transition care need to be considered
- > Appointment of hospital based fragility fracture coordinators to work within the multi-disciplinary teams in development of patient care plans ensuring appropriate supports, rehabilitation and follow up is organised on discharge and secondary prevention commenced

Community based rehabilitation and reintegration

- > Availability of ambulatory and community based rehabilitation programs (including rehabilitation in the home, centre based day rehabilitation and community programs) to facilitate function, independence and re-integration into everyday community living post fragility fracture.

Ongoing maintenance of function

- > Access to community services, which may require partnerships with other government, non-government and private organisations following completion of an inpatient and/or community and ambulatory rehabilitation program to ensure the individual's ongoing recovery and maintenance in the community
- > Availability of therapy to individuals returning to residential care facilities who have the potential to improve, in particular regain mobility.

Secondary prevention

- > Access to specialist follow-up by geriatrician, rehabilitation specialist and /or orthopaedic surgeon depending on individual's needs
- > Risk assessment and treatment following fragility fracture to minimise further occurrence of such fractures. Intervention to be provided as per national evidence based guidelines addressing falls prevention and osteoporosis management
- > There would be the requirement for the coordination of care of the fragility fracture patient in the community in the initial phase following discharge, including secondary prevention, monitor implementation strategies, assist with linking to other programs / services as appropriate, provide follow up care and respond to queries of individuals / families / carers
- > Availability of specialist follow-up by geriatrician or other specialist depending on individual's needs

Specific populations

- > Secondary prevention and therapy services need to be provided to individuals living in residential aged care who experience fragility fractures
- > Younger individuals who experience fragility fractures need to have their specific needs addressed including employment, relationships and income support

2.3 Background

Fragility fractures including hip, vertebral, humeral and pelvic fractures are set to rise over the next 15-25 years by as much as 15% every 5 years given Australia's ageing population (OA, 2007)⁴. Similar trends are expected in South Australia.

Ten percent of individuals with a hip fracture die within a month and one third are deceased at a year post injury, also for many others their hip fracture may be a contributor to their final illness (BOA, 2007)⁵ impacting significantly on their independence and functional ability to participate in everyday activities and life roles.

Strong evidence exists that care for individuals experiencing fragility fractures needs to be provided by a multi-disciplinary team with an orthogeriatric model of care advocated. Surgery within 24 hours is a key to maximising outcomes post fragility fractures as is the provision of rehabilitation and secondary prevention intervention.

These key factors are outlined in a range of national and international best practice guidelines and position papers.

Further detailed information, evidence and South Australian specific data on fragility fractures is contained in Appendix 2

Current services

Provision of services to individuals experiencing fragility fractures is variable across the city and between metropolitan and rural areas. Most hospitals provide initial management of fragility fractures with referral to rehabilitation services and long-term osteoporosis management on an ad hoc basis dependent on availability of knowledge of local services and referral pathways, which may be quite different.

There is a range of community services providing intervention with variability in focus, coordination, communication and consistency across the sector and the acute / community interface. The process by which individuals and primary care services access community based services can be unclear, leading to under-utilisation of these services and perceived deficiencies in meeting individual needs.

2.4 The Model

2.4.1 Organisation of services

Key requirements

- > Individuals who have experienced a fragility fracture will require varying levels of intervention, management, identification of risk and ongoing support. Some will require hospitalisation whilst others will not and may be best managed as an outpatient, by their general practitioner or an emergency presentation without admission. The required intervention will be determined by a number of variables including age, co-morbidities, cognitive status, nature and cause of fracture, social situation, availability of informal and formal supports and confidence.
- > For individuals requiring hospitalisation following a fragility fracture, services should be based on an orthogeriatric model of care – that is, collaborative care with orthopaedic and geriatric medicine services working together in the delivery of care to the individual. This model of care advocates: the orthopaedic surgeon having key responsibility for orthopaedic issues; and the geriatrician / physician being responsible for medical problems, coordinating appropriate rehabilitation and planning discharge in collaboration with the orthopaedic surgeon, multi-disciplinary team and individual / family.
- > Multi-disciplinary team structure that fosters communication, teamwork and patient outcomes is essential. The multi-disciplinary team should include geriatric / rehabilitation medicine, orthopaedic surgery, nursing, physiotherapy, occupational therapy and social work with access to other disciplines such as dietetics, on a consultative basis as required.
- > This model recognises that traditional orthopaedic care may not be optimal for older people who often have medical and psychosocial issues that may complicate their presentation, treatment and recovery.
- > In brief, the key features of an orthogeriatric model of care are:
 - care provided collaboratively by orthopaedic and geriatric medicine
 - early comprehensive assessment
 - multi-disciplinary team approach
 - rapid definitive treatment
 - early mobilisation
 - regular communication and consultation with the individual and their family re assessment, goal setting, progress and discharge planning
 - secondary prevention
- > Whilst geriatricians have traditionally provided this orthogeriatric service, other physicians with an interest in peri-operative management of older people, rehabilitation, discharge planning and osteoporosis management will have the skills to provide such a service.
- > It is essential that care is client-centred, seamless and the number of transfers within and between services an individual experiences is minimised to avoid omissions and errors resulting from inadequate handover of information impacting on continuity of care.
- > Hospital-based fragility fracture coordination within the hospital setting will assist in ensuring continuity of care within the hospital environment for individuals experiencing a fragility fracture. Similarly the requirement for the coordination of care of the fragility fracture patient in the community will ensure follow up occurs, in particular for secondary prevention strategies, for all individuals whether admitted to hospital or not.
- > Older people presenting with fragility fractures that do not require surgery but do require hospitalisation should be admitted under the care of an aged care / geriatric team, such as a Geriatric and Evaluation (GEM) Unit with consultation provided by the orthopaedic team as required.
- > Collaborative models of orthogeriatric care must be available in all metropolitan public hospitals and country general hospitals providing management of fragility fractures.
- > Access to inpatient rehabilitation needs to be available to individuals requiring this level of care at the metropolitan general hospitals and country general hospitals with designated rehabilitation units. Rehabilitation may be provided in either an orthopaedic rehabilitation unit or a GEM unit, depending on the needs of the individual to be addressed.
- > Ambulatory rehabilitation programs including home based rehabilitation and centre based day therapy for individuals after experiencing fragility fractures need to be available and easily accessible within a reasonable travelling distance. This may mean in rural areas the establishment of satellite services or outreach teams.

- > Community programs and services are essential to facilitate the fulfilment of an individual's goals, maintenance of functional gains and ongoing monitoring and implementation of secondary prevention strategies such as falls risk minimisation. To achieve this, partnerships between health and other organisations including private, non-government and Commonwealth funded services need to be established and fostered.
- > The role of general practitioners is also very important in the care of individuals experiencing fragility fractures and it is essential liaison occurs between general practitioners and others involved in the individual's care (e.g. hospital staff, community service staff, rehabilitation program staff) from an early stage to ensure continuity of care and the individual achieves the best functional outcome and recovery. The general practitioner must be contacted at least once by the treating hospital team prior to discharge and provided with an accurate written discharge summary in a timely manner summarising the salient medical issues, changes to medication and follow up arrangements including referrals to other services.
- > Coordination of the care of the individual experiencing a fragility fracture is important both in the inpatient area and in the community to ensure there is a mechanism for the flow of care and to provide initial follow up to individuals post discharge with a focus on ensuring secondary prevention recommendations are implemented.
- > The identified personnel undertaking the community based fragility fracture coordination should provide follow up to individuals discharged directly from the emergency department following presentation with a fragility fracture or those managed by their general practitioner without hospital admission.
- > It is important in the organisation of services for fragility fractures, that there are multiple points of access to the various services depending on the individual's need and that access is not based on a linear process of having to access one service before being eligible for another. There needs to be the option to re-access higher acuity care for further input post-discharge if the individual requires such input.

2.4.2 The continuum of care

There are a number of phases along the continuum that an individual who has experienced a fragility fracture may experience. This is schematically presented in Figure 2.

This is presented as a linear process across the continuum for clarity, however it is acknowledged that this does not occur in reality and that the phases an individual experiences is determined by a number of factors including severity and type of fragility fracture, need for hospitalisation, pre-morbid function, social supports, functional capacity and recovery potential; hence the need for multiple access points to services and the ability to move back and forward between services depending on the individual's specific needs. Integration of services across the continuum is the key, not how and when services are accessed.

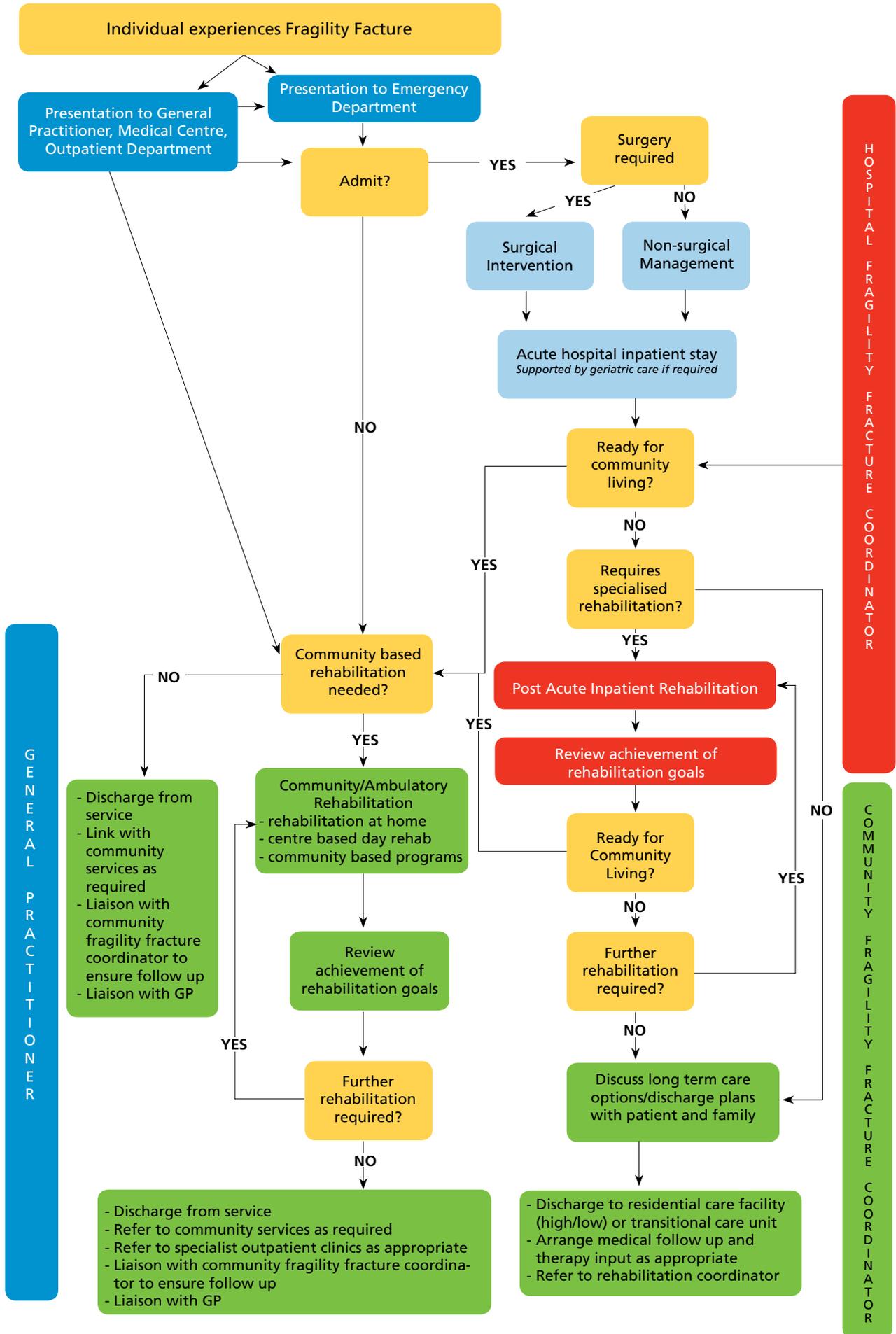
The phases addressed below are as follows:

- > Primary prevention
- > Acute management
 - By general practitioner – not requiring acute hospital input
 - By emergency department / acute hospital
 - For those requiring surgery - peri-operative care and surgical management
 - Ongoing acute inpatient care (including post-operative care for those who have surgery)
- > Post-acute inpatient rehabilitation
- > Community based rehabilitation and re-integration
- > Ongoing maintenance of function
- > Secondary prevention

Primary prevention

- > As noted above, primary prevention, i.e. identification and treatment of risk factors such as osteoporosis, falls risk and promoting a healthy lifestyle before the initial fragility fracture occurs, is outside the scope of this model and will be addressed in the SA Health Primary Prevention Plan. However the importance of primary prevention to reduce the probability of a fragility fracture is acknowledged especially for older people. The strategies for primary prevention of fragility fractures are similar, if not identical, to secondary prevention, as outlined below.

Figure 2: Fragility Fracture Continuum of Care – Possible Pathways



Acute management

Key requirements

By general practitioner – not requiring acute hospital input

- > Not all individuals experiencing a fragility fracture will require hospitalisation or present to an emergency department for assessment and management.
- > Some individuals will attend an appointment with their general practitioner due to pain, decreased mobility, function or other symptoms and subsequently be diagnosed with a fragility fracture (e.g. vertebral) following investigations. The diagnosis may even be made coincidentally following diagnosis of an asymptomatic fracture during investigation for other pathologies. The general practitioner will be able to manage the ongoing care of most of these individuals, however if given the severity of the injury this is not possible, then the general practitioner will refer the individual to the local emergency department.
- > For those individuals whose ongoing care in the community is managed by their general practitioner easy access and referral needs to be available to community based rehabilitation services (e.g. rehabilitation in the home, centre based day rehabilitation and community programs) to facilitate an individual's recovery and independence.
- > Referral to identified personnel undertaking the fragility fracture coordination in the community should also be made by the general practitioner at this time to ensure secondary prevention is addressed and any other relevant needs to support the individual's independence in the community.

By emergency department / acute hospital

- > Identification and confirmation of fragility fracture in the emergency department, usually with the use of plain x-rays, however in some instances other techniques such as nuclear medicine bone scans, CT scans or MRI may be required if uncertainty exists
- > Decision to manage fracture surgically or conservatively needs to be made promptly. To maximise an individual's rehabilitation potential and functional outcomes, surgery should occur within 24 hours of injury provided medical condition permits.
- > If fracture is to be managed non-operatively then the individual should be transferred to an Acute Care of the Elderly (ACE) or Geriatric Evaluation and Management (GEM) unit or similar if admission is required for functional reasons.
- > Some individuals may be able to be discharged directly to outpatient care, appropriate community services and general practice. If this occurs then referral to a community based fragility fracture coordinator will ensure appropriate follow up. The general practitioner must also be informed so that ongoing care in the community can be provided.
- > Transfer from the emergency department to a definitive ward should occur as soon as possible, preferably within 4 hours, to minimise complications such as pressure areas and dehydration. Key pre-disposing factors to the development of pressure areas are impaired cognitive function, immobility, inactivity and incontinence. Adequate analgesia and hydration needs to be provided whilst awaiting surgery.
- > A medical (including cognitive and nutritional), functional and psychosocial assessment should be performed. This should include risk screening of pre-morbid abilities, potential for functional decline and complexity of discharge needs (e.g. HARP screening tool) as this will assist in guiding services needed across the continuum and discharge destination. Co-morbidities are likely to be present; those of particular relevance include chronic obstructive airways disease, congestive cardiac failure, recent myocardial infarction or unstable angina and recent symptomatic stroke. The presence of dementia also needs to be determined as such individuals have a high risk of delirium in the peri-operative period. A co-morbidity of dementia will also influence potential for recovery and discharge needs.
- > Ortho-geriatric care should commence at this time. Ideally all individuals should be assessed by the orthogeriatric medical team pre-operatively, even in the emergency department when possible.

For those requiring surgery - peri-operative care and surgical management

- > In order to maximise future rehabilitation potential, the surgical management of the fragility fracture must be performed by a suitably experienced surgeon utilising current recognised and evidence based operative techniques.
- > In order to minimise the risk of peri-operative complications and consequent delay in, and impact on, functional recovery during the rehabilitation phase, the anaesthetist must be suitably qualified, utilising a current recognised and evidence based anaesthetic technique, taking into account the circumstances of the individual.

- > It is essential that the surgical, orthogeriatric and anaesthetic teams work together in the surgical management of an individual's fragility fracture. In some instances, more thorough medical assessment, including sub-specialist (eg, cardiology) involvement, may be required pre-operatively.
- > Surgery needs to occur at an appropriate time to enable the provision of pre-operative assessment and post-operative management, including adequate medical support, to the individual with a fragility fracture and also maintain normal time routines (day / night). For example surgery should not occur at 2am in the morning because this is the only time operating theatres are available.

Ongoing acute inpatient care (including post-operative care for those who have surgery)

- > Multi-disciplinary team input during this phase should focus on encouraging the physical independence of the individual including mobility, balance, transfers, feeding and continence. It is imperative that early rehabilitation commences.
- > Mobilisation should commence within 24 hours post surgical treatment of hip fracture, bearing weight as tolerated provided no restrictions are in place. This should aim for sitting out of bed initially on day 1 followed by ambulation within this specified time period. An exception is individuals who require a period of limited weight bearing, such as those with unstable trochanteric fractures. Other fracture types may require different limitations on weight bearing at the discretion of the treating surgeon however mobilisation, including sitting out of bed and within said restrictions should be attempted day 1 post surgery.
- > Adequate pain relief needs to be prescribed, with simple analgesics given regularly and supplemented by other agents if required. Specific attention needs to be given to individuals with delirium or dementia with regards to pain relief as these individuals are often under-treated with analgesics, contributing to a worsening of cognition. Validated pain scales may assist in this situation. Reduced cognition will impact on progress and participation, thus impacting on functional outcomes. Involvement of an acute pain service may be necessary.
- > Common complications need to be monitored for and appropriately managed. These include pressure areas, delirium, urinary retention, constipation, deep vein thrombosis / pulmonary embolism, respiratory tract and urinary tract infections and risk of falls. Appropriate preventative strategies should be employed. Specific evidenced based delirium prevention measures need to be implemented.
- > Poor nutritional state can impact adversely on the outcomes of frail older individuals who experience fragility fractures. Therefore it is essential that nutritional assessment of the individual is undertaken at the earliest opportunity during this phase. Protein and energy supplements may need to be provided to improve the outcomes of undernourished individuals.
- > A medication review by a suitably qualified medical practitioner or clinical pharmacist needs to be undertaken and include early prescription of secondary prevention medications plus a critical review of medications that increase falls risk and cognitive impairment
- > The identified personnel undertaking the hospital based fragility fracture coordination needs to be alerted to the individual's admission and be available as a key contact point for the individual and their family / carers and commence planning the application of appropriate secondary prevention strategies (as outlined below) and screening for falls risk in conjunction with rest of the treating team.
- > The recovery prognosis following the fragility fracture needs to be assessed for and an individualised management plan formulated by the multi-disciplinary team in consultation with the individual and their family / carers. Use of a nominated key worker or the hospital based fragility fracture coordinator may facilitate this. This will be influenced by a number of factors including the individual's pre-morbid level of function and availability of social supports.
- > The development of an individualised management plan will guide early referral and review by a post acute rehabilitation service for the provision of ongoing rehabilitation to maximise an individual's independence, safety and function.
- > Individuals who are safe with their mobility, with or without aid, (i.e. have a low risk of falling), have family / carer supports and an appropriate discharge environment given their limitation should be considered for various discharge options including:
 - selective use of early supported discharge services such as rehabilitation in the home and centre-based day rehabilitation
 - transition care (community-based)
 - community programs / services e.g. Domiciliary Care SA, Commonwealth funded Day Therapy Centres, council services such as cleaning, shopping and transport
 - single discipline interventions (e.g. physiotherapy), either public or private.

The most appropriate discharge option should be a joint decision between the individual / family and multi-disciplinary team and will be influenced by social supports, functional ability and intensity of ongoing rehabilitation required.

- > Preparation for discharge needs to include the prescription and provision of equipment including walking aids, assessment of an individual's home environment with interventions as appropriate to facilitate safe discharge; this may include home modifications, equipment and appropriate community support services such as personal care, domestic assistance, respite, transport and shopping assistance. For some aspects of this to be facilitated the requirement for a home visit to be arranged may be necessary.
- > Individuals who have limited or unsafe mobility (require assistance or have weight bearing restrictions) and/or live alone with limited supports should be considered for a range of discharge options including:
 - inpatient rehabilitation for individuals requiring this level of assistance (based on intensity of therapy required and/or level of nursing and medical care required), this may be in a designated rehabilitation unit or a Geriatric Evaluation and Management (GEM) unit
 - residential transition care
 - return to local country health services (from either metropolitan hospitals or country general hospitals)
 - those with weight-bearing restrictions may require admission to a supportive environment with a restorative focus such as a non-weight bearing program, residential transition care or residential respite for the period of weight-bearing limitation prior to referral to an appropriate inpatient or ambulatory rehabilitation service once the limitations are lifted.

Similarly it should be a joint decision between the individual / family and multi-disciplinary team when deciding on most appropriate discharge option for these individuals and will be influenced by social supports, functional ability, intensity of ongoing rehabilitation required and potential to improve.

- > New admission to permanent residential aged care may need to be considered for some individuals, in particular for those with irreversible physical and/or cognitive disability as a result of their fragility fracture and co-morbidities. Although such decisions are not always easy at this early stage, early identification of these individuals will enable early referral to the relevant assessment services such as the Aged Care Assessment Team (ACAT) and assistance, support and advice to the family re the placement process. This will require social worker and welfare / placement officer input.
- > Individuals experiencing a fragility fracture who reside in residential aged care facilities (particularly high level (nursing home) care) should usually be discharged back to their facility once medically and orthopaedically stable. Those high level care residents who were mobile pre-fracture may have the potential to regain mobility and hence should be provided with appropriate therapy services within the nursing home environment to maximise their potential of recovery.
- > Individuals from low level (hostel) care may require a period of rehabilitation to reach a level of function and safe mobility compatible with this level of support. This may include referral to an intensive rehabilitation service (inpatient or ambulatory) or transition care program (residential or community) if such rehabilitation can not be provided within the facility.
- > Patient education, consultation and emotional support to the individual and their family / carers should be provided. This is of particular importance if the individual has cognitive deficits such as dementia or delirium.
- > Prior to discharge from the acute facility, the individual's general practitioner needs to be contacted re ongoing care needs (unless discharged to another inpatient setting). A referral to the community based fragility fracture coordinator also needs to occur to ensure follow up in the community. The hospital based fragility fracture coordinator could assist with both of these processes.
- > Secondary prevention should be routinely initiated during the admission as uptake rates post-discharge have been shown to be low even with information provision to individuals and primary care practitioners. The community based fragility fracture coordinators will have a key focus in ensuring uptake of secondary prevention strategies post discharge.
- > Appropriate orthopaedic follow-up needs to be arranged prior to discharge.

Post-acute inpatient rehabilitation

Key requirements

- > The purpose of inpatient rehabilitation for an individual who has experienced a fragility fracture should be to maximise their functional potential with the aim of returning them to their usual accommodation as efficiently as possible.
- > The focus of this phase should be on achieving optimal independence in mobility, self care, continence and other activities of daily living. Interventions should focus on functional activities to facilitate regaining independence.
- > Multi-disciplinary intervention is essential and should include identification of previous function, supports and home environment, current functional ability and potential for recovery; case conferencing, goal setting, involvement of individual / family, setting of an individualised management / discharge plan and early referral to community agencies for post discharge supports / equipment
- > Individuals who progress to be safe with their mobility (with or without aid), have family / carer supports and an appropriate discharge environment despite any persisting functional limitations should be considered for various discharge options including:
 - selective use of early supported discharge services such as rehabilitation in the home and centre-based day rehabilitation
 - transition care (residential or community)
 - community programs / services e.g. Domiciliary Care SA, council services such as cleaning, shopping and transport
 - return to local country health services (from either metropolitan hospitals or country general hospitals)
 - single discipline interventions (e.g. physiotherapy), either public or private.

The most appropriate discharge option should be a joint decision between the individual / family and multi-disciplinary team and will be influenced by social supports, functional ability and intensity of ongoing rehabilitation required.

- > Individuals who make progress in their rehabilitation program but have ongoing limited mobility (require assistance or there are safety concerns) and/or live alone with limited supports are likely to need to consider the following discharge options:
 - residential transition care to allow more time for further recovery or to reach a decision about longer-term residence
 - new admission to permanent residential aged care.

Similarly this should be a joint decision between the individual / family and multi-disciplinary team when deciding on the most appropriate discharge option for these individuals.

- > Early identification of individuals who will require a new admission to residential aged care will enable early referral for assessment of residential care (such as the Aged Care Assessment Team) and assistance to the individual / family re the placement process. These individuals may have co-morbidities that impact on their recovery potential. However, need to balance the need to make an early decision against the possibility of further functional recovery.
- > Preparation for discharge needs to include the prescription and provision of equipment including walking aids, assessment of an individual's home environment with interventions as appropriate to facilitate safe discharge; this may include home modifications, equipment and appropriate community support services such as personal care, domestic assistance, respite, transport and shopping assistance. For some aspects of this to be facilitated the requirement for a home visit to be arranged may be necessary.
- > Consultation, education and emotional support to the individual and their family / carers should be provided throughout the inpatient rehabilitation stay.
- > Monitoring for medical complications needs to occur and include monitoring / evaluation for depression.
- > Prior to discharge the individual's general practitioner needs to be consulted re ongoing care needs. Referral also needs to occur to the identified personnel undertaking the community based fragility fracture coordination to ensure secondary prevention strategies and ongoing care needs are followed up on discharge.
- > During an individual's inpatient rehabilitation stay, there needs to be easy access to orthopaedic review as necessary in cases of surgical complications.. Regular orthopaedic review needs to occur with timely feedback to the inpatient rehabilitation team for individuals with weight bearing restrictions.
- > Appropriate orthopaedic follow-up needs to be arranged prior to discharge.

Community based rehabilitation and reintegration

Key requirements

- > On discharge from an acute or rehabilitation inpatient facility, individuals experiencing fragility fractures may need to be able to access ongoing rehabilitation in order to continue to improve their functional capacity and regain independence in their home and local community. Rehabilitation may take a number of forms including ambulatory rehabilitation, either home or centre-based day; and community rehabilitation programs such as those provided by Domiciliary Care SA and Commonwealth funded Day Therapy Centres.
- > Ambulatory and community based rehabilitation programs need to be responsive to the individual's needs, provide an individualised program of care to meet client goals, be responsive to changing client needs and facilitate re-integration into everyday community living.
- > Referrals to these programs should be made prior to an individual's discharge from hospital and services need to be available to clients at time of discharge or within a few days of discharge. For individuals requiring daily assistance with activities of daily living then the service should be available on the day of discharge. This will minimise the risk of re-admission, enable rehabilitation to be ongoing to achieve best outcomes and to minimise client and carer stress. Further, the individual should be provided with the contact details of services referred to at time of discharge.
- > It is acknowledged that some public, private and non-government organisations may have waiting lists for service provision. If this is the case, the individual needs to be informed of this prior to discharge and alternative arrangements made if they will not be able to manage safely at home whilst awaiting services.
- > For those individuals not admitted to hospital for management access to these programs without delay is important to ensure appropriate rehabilitation input (as also noted above).
- > Where possible the allied health and therapy staff providing the ambulatory and community based rehabilitation programs should be consistent to avoid confusion and client / carer stress from multiple agency / staff involvement.
- > Further, it is important that ambulatory and community rehabilitation programs liaise regularly with other service providers that may be involved in an individual's ongoing care in the community such as Community Aged Care Package providers and nursing services. Disability and aged care services should be able to modify their care plans as required to meet an individual's changed needs at the end of the rehabilitation process.
- > Cost should not impact on access to ambulatory and community rehabilitation programs.
- > Transport can often be a limiting factor to individuals attending a centre based rehabilitation program, this needs to be addressed to ensure that individuals are not disadvantaged in accessing a rehabilitation program if transport availability is an issue for them. Individuals should also be assisted to access transport services to attend follow up medical appointments as required.
- > Involvement of the individual's general practitioner is critical to ensure continuity of care and consistency of information provided.
- > Regular liaison with the identified personnel undertaking the community based fragility fracture coordination should also occur during and on completion of the community and ambulatory rehabilitation programs, ensuring a coordinated and continuous approach to care.
- > Patient and family / carer education, consultation and support should continue and focus on falls risk minimisation, adapting to any required lifestyle changes and participation in everyday community living activities.
- > At the completion of the ambulatory or community rehabilitation program, referrals need to occur to appropriate community agencies to meet ongoing care needs and maintain functional gains.

Ongoing maintenance of function

Key requirements

- > Varying levels of ongoing support in the community will be required by individuals experiencing fragility fractures, depending on their needs, recovery and family/carer support. The availability of community services to provide this support, depending on need, is critical to ongoing recovery and maintenance in the community.
- > A range of community services are likely to be able to meet the varying needs of individuals experiencing a fragility fracture and include Domiciliary Care SA, Community Aged Care Packages, Commonwealth funded Day Therapy Centres, single allied health disciplines such as physiotherapy and occupational therapy (private and public), exercise and balance classes, fitness classes and monitored home exercise programs. Many of these programs are limited to individuals aged over 65, equivalent services need to be accessible for those under 65 experiencing a fragility fracture.

- > Access to community services to review needs and any changes in function and the impact this has on independence, appropriateness of home environment and equipment requirements must be available to individuals. Further, individuals need to be able access episodes of rehabilitation if deterioration in their function is noted. Referral pathways need to be such that ambulatory and community programs can be accessed directly prior to a change in functional capacity to such a degree that hospitalisation is not required.
- > A focus on chronic disease self management, self directed exercise and attendance at balance, strengthening and falls prevention groups should be encouraged.
- > The general practitioner continues as a critical element in this phase providing regular monitoring of the individual who has experienced a fragility fracture to ensure their independence and functional gains achieved are maintained.
- > Specialist follow up by a geriatrician or rehabilitation specialist should be available depending on individual needs.

Secondary prevention

Key requirements

- > The identification of personnel to undertake the coordination of the flow of care of the individual experiencing a fragility fracture is required to coordinate secondary prevention, monitor implementation of strategies, assist with linking to other programs / services as appropriate, to provide follow up care / intervention and respond to queries and concerns of individuals and their families in the initial period after return to the community.
- > Risk assessment and treatment following a fragility fracture needs to occur, based on national evidenced based health professional guides, position papers and recommendations (OA, 2009)⁴. Diagnostic and treatment strategies may include:
 - Bone Mineral Density scanning by dual emission X-ray absorptiometry (DEXA) for appropriate individuals
 - Basic screen for secondary causes of osteoporosis based on individual's risk profile
 - Increasing dietary calcium and Vitamin D intake, safe sun exposure and specific calcium and vitamin D supplementation
 - specific anti-resorptive treatments in eligible individuals
 - referral to community based falls and balance exercise groups for those at low to moderate risk of injurious falls
 - referral to specialist multi-disciplinary falls assessment clinics for those at high risk of injurious falls
 - referral to tertiary outpatient services for assessment of complex osteoporosis (e.g. in young patients or secondary to other medical diagnoses)
 - encouragement to maintain a healthy, active lifestyle (including a healthy diet and moderate intensity exercise) into older age
 - consideration of hip protectors for those residing in residential care.
- > Specialist follow up by a geriatrician or rehabilitation specialist should be available depending on individual needs

2.5 Specific populations

Residential aged care - high care residents

People living in residential care / nursing homes are three times more likely to experience fragility fractures compared to the general population (BOA, 2007)⁵. Therefore it is imperative that secondary prevention measures are implemented for these individuals which may include calcium and Vitamin D supplementation falls risk assessment, hip protectors and consideration for anti-resorptive therapies in appropriate people.

Some high level care residents who were mobile pre-fracture may have the potential to regain mobility. Appropriate therapy services need to be provided within the setting of high level of care to enable such individuals to maximise their function / minimise dependency and maximise quality of life.

Younger individuals experiencing fragility fracture

Younger individuals are more likely to have an underlying medical condition as the cause of the osteoporosis leading to fragility fracture. These individuals are therefore more likely to require further investigation into cause of osteoporosis and ongoing specialist management e.g. via a metabolic bone clinic.

Issues in regards to employment, relationships, income support and access to appropriate support services need to be taken into account when managing these individuals in order to maximise their quality of life.

Individuals experiencing pathological fractures

Pathological fractures are fractures secondary to intrinsic bone pathology such as primary or metastatic malignancy, or less commonly metabolic bone diseases such as Paget's disease of the bone or infection of the bone such as osteomyelitis. The care for these individuals will be determined by the type of fracture, co-morbidities and other planned treatments with some managed as described for fragility fractures.

2.6 Workforce

The identification of personnel to undertake the coordination of care of individuals experiencing fragility fractures will ensure integration and follow up across the continuum and provide a clear pathway for these individuals to be pulled into the appropriate service stream.

NB Refer to Chapter 6 Workforce for the specific competencies related to the fragility fracture coordination role.

Chapter 3: Model for general orthopaedic trauma rehabilitation

3.1 Summary

Many individuals experience general orthopaedic trauma in South Australia each year. Some are managed by their local general practitioner or hospital outpatient department conservatively whilst others require emergency department presentation and hospitalisation which may include surgical intervention.

The intervention and management strategy will be influenced by a number of factors including the cause and severity of the trauma, existing co-morbidities that the individual may experience and potential for improvement.

This chapter describes the model for general orthopaedic trauma focusing on relatively simple orthopaedic trauma experienced by individuals to either a single limb or multiple limbs including pelvic and spinal injuries not involving the spinal cord injury, but not that which is of a complex multiple trauma nature involving other body systems. Complex multi-trauma will be addressed by the Statewide Trauma Advisory Committee and the Statewide Rehabilitation Clinical Network at a later date.

The model outlines the key requirements for the provision of care to individuals across the continuum who experience general orthopaedic trauma. Whilst there are similarities across the continuum for all age groups experiencing this trauma there are also some differences, where this is the case this is noted as specifics related to:

1. The Paediatric and under 18 year age group
2. The 18 – 65 year age group
3. The over 65 year age group

It also needs to be acknowledged that the Model for Fragility Fracture should be referred to in relevance to those aged over 65 who experience general orthopaedic trauma, in particular those with significant pre-injury frailty, who suffer high impact or multiple limb injury. These individuals will have a similar risk of medical co-morbidities as the fragility fracture group and are likely to obtain similar benefits from a multidisciplinary ortho-geriatric model of care and focused rehabilitation.

3.2 Key recommendations

Service accessibility

- > Services that individuals with general orthopaedic trauma receive must not be limited by age group. Equity of access to services across the continuum is critical

Acute initial management

- > The general practitioner should be the first point of contact for minor orthopaedic trauma with more extensive general trauma initially being managed by hospital outpatient departments or emergency departments depending on nature and severity
- > For individuals who do not require admission for management of their orthopaedic condition access to ambulatory or community rehabilitation programs, single discipline outpatient intervention, equipment, community service supports and specialist review needs to be available
- > Identification of personnel to oversee the coordination of the care of these individuals in the community and linkages to appropriate services would be beneficial

Acute inpatient care

- > Surgical intervention needs to occur in a timely manner to maximise potential for recovery.
- > Rehabilitation must commence in the acute phase, provided by a multi-disciplinary team
- > Discharge directly home, with or without ongoing community supports and follow up rehabilitation, should be pursued for all individuals where at all practical.

- > Individuals not suitable for discharge directly home from the acute facility should be considered for post-acute inpatient rehabilitation
- > Rehabilitation protocols to guide clinical practice in the acute setting to be developed
- > Identification of personnel to oversee the coordination of the care of these individuals in the hospital setting may facilitate improved integration and transfer of care across the continuum

Post-acute inpatient management

- > To focus on maximising potential for recovery, independence and function by setting realistic goals collaboratively with the individual, family / carers and multi-disciplinary team
- > Ongoing rehabilitation in the community (ambulatory or community programs, single discipline outpatients), community support services and equipment need to be organised prior to an individual's discharge from inpatient rehabilitation
- > Individuals not able to achieve a level of function that will allow discharge to their previous accommodation will need to consider supported care options such as residential aged care
- > Rehabilitation protocols to guide general orthopaedic rehabilitation clinical practice require development

Community based rehabilitation and integration

- > Ambulatory and community based rehabilitation programs that are responsive to individual needs and focus on maximising independence and community re-integration need to be available to individuals who experience general orthopaedic trauma irrespective of if they have had a hospital admission or not.

Ongoing maintenance and function

- > Referral pathways are needed to ensure that individuals with general orthopaedic trauma can easily access services to sustain gains made in rehabilitation and ensure positive outcomes in the long term
- > Referral pathways need to be structured so that all health care practitioners managing these patients have the capacity to refer directly to appropriate rehabilitation facilities, services and / or professionals

Specific populations

- > Options including inpatient rehabilitation need to be available to individuals who are given a non-weight bearing status for a period of time following their general orthopaedic trauma. Availability of services must not be age dependent.

3.3 Background

The availability of literature on the rehabilitation of individuals with general orthopaedic trauma is minimal, hence this model has been developed based on the expert clinical opinion of health professionals from medical, nursing and allied health backgrounds in South Australia who provide care to these individuals on a daily basis.

Current services

An individual with general orthopaedic trauma will usually present to one of the following:

- > General practitioner
- > Via inpatient or other specialty unit referral
- > Emergency department or
- > Outpatient department of their local acute hospital for initial management.

Services provided are variable across metropolitan and country areas.

Inpatient rehabilitation is available at public and private hospitals in metropolitan Adelaide for individuals experiencing general orthopaedic trauma, however referrals to these facilities are not consistently made and are usually dependent on local processes.

Ambulatory and community based orthopaedic rehabilitation is provided by public and private hospitals as well as community agencies such as Domiciliary Care SA and Commonwealth funded Day Therapy Centres. These services however are often limited and perceived to be deficient in meeting individual requirements.

3.4 The model

3.4.1 Organisation of services

- > Individuals who have experienced general orthopaedic trauma will require varying levels of intervention, management, identification of risk and ongoing support. It is critical that services are integrated across the continuum, have multiple access points, are client centred and able to respond to individual needs.
- > Services provided across the continuum should have a multi-disciplinary team focus that include medical, nursing and allied health, which would include but not be limited to physiotherapy, occupational therapy and social work. This will promote strong communication, teamwork, collaboration with individuals and their families / carers and quality patient outcomes.
- > Acute management will occur in a variety of settings depending on nature and severity of injury and individual circumstance. This may include management by the general practitioner, emergency department and hospital admission, or a combination of these.
- > Post-acute inpatient rehabilitation will be provided to individuals experiencing general orthopaedic trauma in designated rehabilitation units at metropolitan general hospitals and country general hospitals.
- > Easily accessible ambulatory rehabilitation programs including home based rehabilitation and centre based day therapy need to be available for all individuals experiencing general orthopaedic trauma who require this service for recovery. This includes availability in metropolitan and well as country areas.
- > Community rehabilitation programs and services are provided by a range of organisations including public (state and commonwealth), private and non-government hence it is important that health forms strong partnerships with these services to facilitate delivery of care that is seamless, client centred and minimises duplication.
- > General practitioners are an essential service link across the continuum of care in the ongoing management of an individual's general orthopaedic trauma condition, therefore other service providers must ensure open and regular communication occurs.

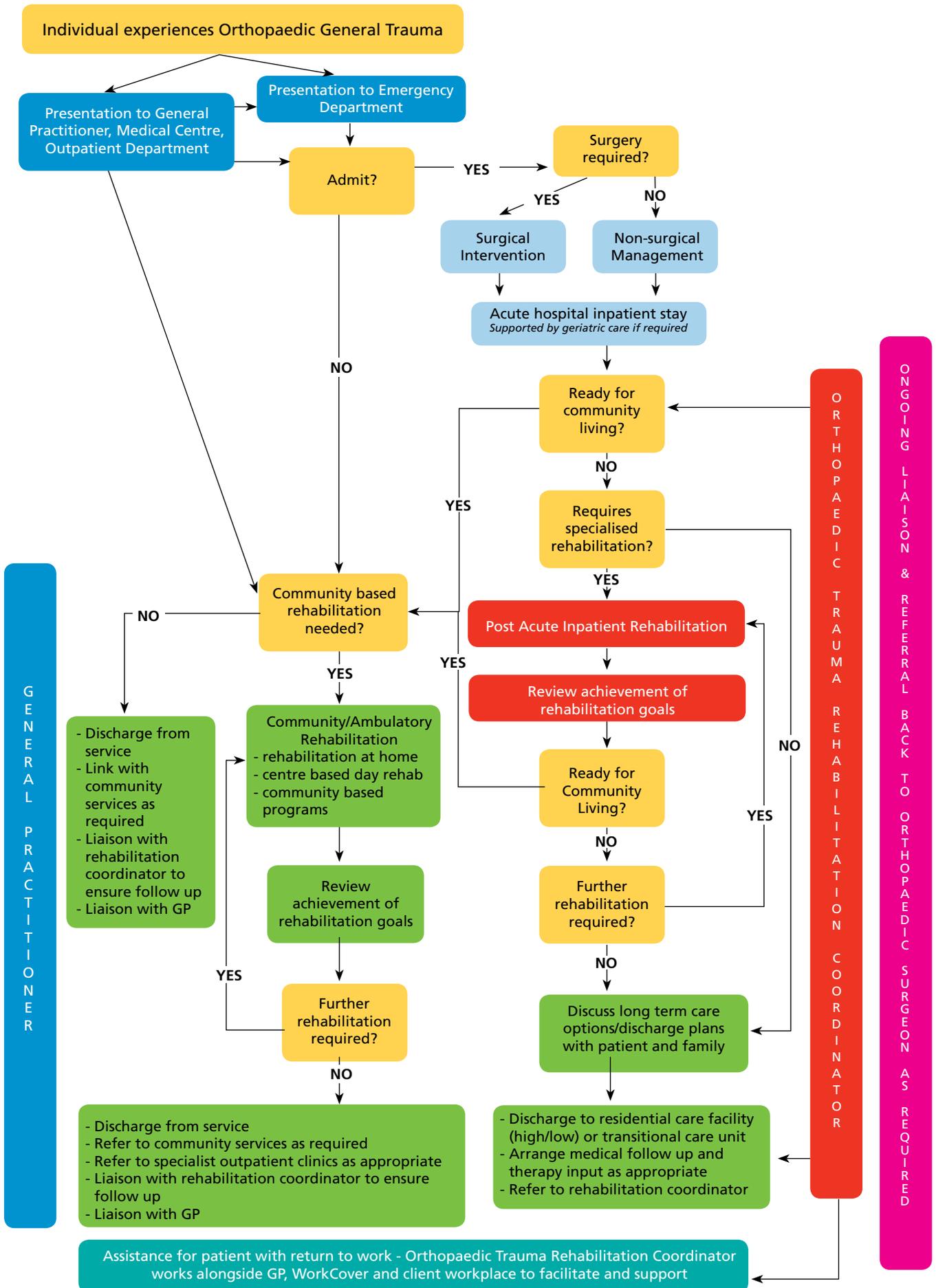
3.4.2 The continuum of care

An individual who has experienced general orthopaedic trauma is likely to encounter a number of phases along the continuum as noted below:

- > Acute initial management
- > Acute inpatient care
- > Post-acute rehabilitation
- > Community based rehabilitation and re-integration
- > Ongoing maintenance of function

The phases an individual experiences will be influenced by a number of factors including severity and type of trauma, need for hospitalisation, pre-morbid function, social supports, functional capacity and recovery potential. This model is presented as a linear process across the continuum for clarity; however it is acknowledged that this does not always occur in reality. See Figure 3

Figure 3: General Orthopaedic Trauma Continuum of Care – Possible Pathways



Acute initial management

Key requirements

By general practitioner or medical centre – not requiring acute hospital input

- > Given the vast spectrum of general orthopaedic trauma that may be experienced ranging from minor to serious, the general practitioner may be the first point of call for many orthopaedic traumas.
- > The general practitioner may be able to manage the ongoing care of many individuals who experience general orthopaedic trauma with input from radiology and other diagnostic services as required. For some individuals, consultation by or referral to an orthopaedic specialist or hospital emergency department will be required for further investigation and management of the presenting condition.
- > When the general practitioner is managing the ongoing care of an individual with an orthopaedic trauma, it is essential that they can access relevant services to assist the individual, including ambulatory and community based rehabilitation; equipment and community support services such as self care, cleaning and nursing assistance. Therefore multiple access points to services are needed.

By emergency department or outpatient department / acute hospital

- > Assessment of the orthopaedic trauma through orthopaedic evaluation, and completion of appropriate diagnostic tests including radiological investigation to confirm the diagnosis.
- > Essential information on the individual's pre-morbid function, cognitive function, social situation including supports and current function, should be gathered by medical, nursing or allied health staff at the time of the individual's initial presentation. This information coupled with the confirmation of diagnosis is essential to guide team decision regarding the most suitable plan – admission to hospital for further intervention or discharge home with follow up care as appropriate.
- > **PAEDIATRIC** - In line with Mandatory Reporting requirements, it would be necessary to investigate and exclude the possibility of non-accidental injury where a 3rd party could have been responsible for the injury incurred and referral to the appropriate service would occur if required.

Admission not required – able to be managed at home

- > For individuals who have experienced general orthopaedic trauma who are identified as being able to be discharged home, further assessment and input from the multi-disciplinary team based in the emergency or outpatient department, needs to occur.
- > The members of the multidisciplinary team must include allied health, medical and nursing. Social work involvement is likely to be particularly advantageous as is input from physiotherapy and occupational therapy to enable mobility and functional ability to be assessed to guide required follow up care needed.
- > Rehabilitation and support services that may be required on an individual's discharge from the emergency department may include:
 - Ambulatory and community based rehabilitation
 - Single discipline outpatient intervention e.g. physiotherapy (provided by public, private or non-government organisation providers)
 - Community service support such as self care, cleaning, shopping or transport assistance
 - Equipment and home modifications to facilitate safety and independence at home
 - Outpatient orthopaedic specialist review
- > To ensure continuity of care the referring health care practitioner / member of the multi-disciplinary team must liaise with the general practitioner to inform them of the individual's specific discharge plan from the emergency or outpatient department. This would include any rehabilitation or community services organised to support the individual in the community.
- > On discharge from the emergency or outpatient department, individuals and their carers / family members must be provided with appropriate information to assist them to work in partnership with services referred to, with the aim to return them to their optimal pre-morbid functional state.

Hospital admission required – for surgical or conservative management

- > Once it has been determined that an individual requires hospitalisation, transfer to the definitive inpatient ward should occur as soon as possible, this will usually be under the care of the orthopaedic team. This will ensure the minimisation of complications and early commencement of intervention from the ward based multi-disciplinary team.

Acute inpatient care

Key requirements

- > Following on from the assessment and initial management plan developed in the emergency or outpatient department, the multi-disciplinary orthopaedic team will implement the plan, whether it be conservative management or surgical intervention.
- > For those individuals requiring surgical intervention this needs to occur in a timely manner, with the expertise of orthopaedic specialists, anaesthetists and surgical staff using currently recognised operative techniques.
- > Acute inpatient care should be provided by a multi-disciplinary team consisting of medical, nursing and allied health. Physiotherapy, occupational therapy, social work and dietetics are essential members of the team, with input available from other allied health professions as required. Pharmacy input will also be beneficial to the team for many individuals.
- > A multi-disciplinary team that works well together communicates and respects the roles and contributions of others will ensure appropriate management plans and discharge options are facilitated with delays to treatment and complications minimised.
- > Rehabilitation must commence in this phase, with a focus on the individual's mobility and function in basic everyday activities including self care, toileting and feeding. This will assist in guiding the need for ongoing rehabilitation and ensure early referral to post acute rehabilitation services.
- > Development of rehabilitation protocols to guide clinical practice and rehabilitation options for individuals experiencing general orthopaedic trauma is recommended, utilising national and international guidelines where available.
- > The first option for all individuals who have experienced a general trauma related orthopaedic injury should be discharge home with access to appropriate care and rehabilitation services to ensure maximal independence is achieved as soon as possible. All individuals must have equal and timely access to the assessment of their functional requirements by all members of the multidisciplinary team.
- > Discharge options will vary depending on the individual's mobility, independence in everyday activities, informal social supports and goals. The most appropriate discharge option will be determined in partnership with the patient, their carers and family and the multi-disciplinary team.
 - Individuals who are safe with their mobility and have achieved necessary independence in activities of daily living (ADL's) (with or without aid), have appropriate family / carer supports and an appropriate discharge environment given their limitations are likely to be suitable for the following discharge options:
 - Early supported discharge services such as rehabilitation in the home and centre-based day rehabilitation
 - Transition care (community) or the equivalent available for all age groups
 - Community programs / services e.g. Domiciliary Care SA, Commonwealth funded Day Therapy Centres, council services such as cleaning, shopping and transport
 - Single discipline interventions (e.g. physiotherapy), either public, private or non-government organisations.
- > The multi-disciplinary team needs to ensure that for these individuals that equipment, home modifications and all necessary community based supports have been organised to facilitate their safe discharge home. This may include the completion of an assessment of an individual's home environment and referral to community based services including rehabilitation, personal care, transport and domestic assistance.
- > If an individual is being discharged directly home, the general practitioner needs to be informed and made aware of the suggested ongoing management plan including follow up rehabilitation and services that have been organised. This should occur within the 48 hours prior to the individual's discharge. The individual and family / carers also need to be informed of this information with relevant education provided as appropriate.
- > Individuals who have limited mobility (require assistance or have weight bearing restrictions) and / or live alone with limited supports are likely to be most appropriately discharged to one of the following:
 - Inpatient rehabilitation for patients requiring this level of assistance
 - Respite / non-weight bearing beds if required for all age groups prior to an intensive inpatient or ambulatory rehabilitation program
 - Residential transition care or the equivalent service available for all age groups
 - Return to local country health services or permanent residential aged care facility – high care (if previously resided in such facility)

- > For individuals who have limited mobility, require assistance to perform self care activities and show limited potential for recovery, it may be necessary to consider permanent residential care. This is most likely to be for the older individual aged over 65 years with other pre-existing co-morbidities.
- > Prior to discharge, appropriate orthopaedic follow up needs to be arranged.

Post-acute inpatient rehabilitation

Key requirements

- > Post acute inpatient rehabilitation should focus on optimising an individual's potential for recovery to facilitate discharge to their usual accommodation.
- > Goals to be achieved during rehabilitation should be established in partnership between the multi-disciplinary team, individual and their family / carers. Information previously gathered in the acute phase combined with further assessment by the multi-disciplinary team in post acute inpatient rehabilitation will guide goal setting.
- > Goals should be realistic and prioritised, focusing initially on independence in mobility and self care and then other functional activities that will be essential to perform on discharge such as basic meal preparation.
- > Multi-disciplinary team involvement is essential to achieve goals set for the post acute inpatient rehabilitation phase and will include medical, nursing and allied health. Team functioning and patient outcomes will be enhanced by the setting of an individualised management / discharge plan and regular communication including case conferencing.
- > Development of rehabilitation protocols to guide clinical practice and rehabilitation options for individuals experiencing general orthopaedic trauma is recommended, based on national and international guidelines.
- > As with the acute phase discharge options from post-acute inpatient rehabilitation will vary depending on the individual's mobility, independence in everyday activities, informal social supports and goals. The most appropriate discharge option will be determined in partnership with the patient, their carers and family and the multi-disciplinary team.
- > Individuals who are safe with their mobility and have achieved necessary independence in activities of daily living (ADLs) (with or without aid), have appropriate family / carer supports and an appropriate discharge environment given their limitations are likely to be suitable for the following discharge options:
 - Early supported discharge services such as rehabilitation in the home and centre-based day rehabilitation
 - Transition care (community) or the equivalent available for all age groups
 - Community programs / services e.g. Domiciliary Care SA, Commonwealth funded Day Therapy Centres, council services such as cleaning, shopping and transport
 - Single discipline interventions (e.g. physiotherapy), either public, private or non-government organisations.
- > The multi-disciplinary team needs to ensure that for these individuals, equipment, home modifications and all necessary community based supports have been organised to facilitate their safe discharge home. This may include the completion of an assessment of an individual's home environment and referral to community based services including rehabilitation, personal care, transport and domestic assistance.
- > Individuals who have participated in a post acute inpatient rehabilitation program but continue to have limited mobility (require assistance or there are safety concerns), require assistance for self care and / or live alone with limited supports are likely to be most appropriately discharged to one of the following:
 - Residential transition care or the equivalent service available for all age groups
 - New admission to residential aged care facility or similar depending on age
- > The general practitioner needs to be informed of the individual's discharge plan including follow up rehabilitation / services organised and any specific management that he/ she needs to progress. This should occur within the 48 hours prior to the individual's discharge. The individual and family / carers also need to be informed of this information with relevant education provided as appropriate.
- > Access to orthopaedic review needs to be available in the post-acute inpatient setting, in particular if there are trauma related complications. Further, regular orthopaedic review needs to occur with timely feedback to the inpatient rehabilitation team for individuals with non/partial-weight bearing restrictions.
- > Prior to discharge, appropriate orthopaedic follow up needs to be arranged.
- > **PAEDIATRIC** – It is recommended that the paediatric and adolescent patients have access to inpatient rehabilitation within the appropriate environment for their age group.

Community based rehabilitation and reintegration

Key requirements

- > Ambulatory and community based rehabilitation programs need to be:
 - Responsive to the individual's need, providing an individualised program of care to meet client goals,
 - Incorporate flexibility as client needs change to facilitate re-integration into everyday community living
- > Focused on maximising independence in mobility, self-care and everyday activities
- > These programs should be organised prior to an individual's discharge from hospital and need to be available to clients at time of discharge or within days of discharge to minimise the risk of re-admission, carer stress and ensure rehabilitation goals are achieved.
- > Individuals not admitted to hospital but referred to these programs from the emergency or outpatient department or by their general practitioner must have equal access to these rehabilitation programmes.
- > Development of rehabilitation protocols to guide ambulatory and community rehabilitation interventions for individuals experiencing general orthopaedic trauma is recommended based on national and international guidelines.
- > Staff providing the ambulatory and community based rehabilitation programs should be consistent where possible to avoid confusion and patient / carer stress from multiple agency / staff involvement.
- > Communication and liaison with all service providers involved in the patient's ongoing care in the community (e.g. Domiciliary Care SA, Disability SA, Community Aged Care Packages and Local Councils) is vital to optimise and individual's outcomes from the ambulatory and community rehabilitation programs and ensure continuity of service provision when these programs cease.
- > Transport issues that impact on attendance at centre based rehabilitation programs and outpatient medical appointments need to be addressed to ensure that the individual's recovery is not disadvantaged.
- > Regular communication needs to occur with an individual's general practitioner to ensure involvement in the person's management, consistency of approach and ongoing intervention as required.
- > To assist in any ongoing rehabilitation progress, timely review of ongoing general orthopaedic trauma related issues should occur by an orthopaedic specialist.
- > A Return to Work plan needs to be developed for those individuals where applicable. This would include but not be limited to referral to specialist services such as Commonwealth Rehabilitation Service / Work cover organisations that will assist with the return to work process.

Ongoing maintenance of function

Key requirements

- > Depending on the specific needs, recovery rate and family/carer requirements a range of levels of support in the community will be required by individual and their family/carer. These supports may be required for a short or long term period.
- > Referral pathways need to ensure that the individual has access to services through a variety of access points.
- > The availability and ease of access to these community services is critical so that the individual sustains the functional gains they have achieved through rehabilitation, contributing to positive outcomes for them, and their family and / or carers.
- > Community services that may be involved in the ongoing care of an individual who has experienced a general orthopaedic trauma include Domiciliary Care SA, Disability SA, Commonwealth funded Day Therapy Centres, single allied health disciplines such as physiotherapy and occupational therapy (private and public), exercise and balance classes and fitness classes. Services will vary depending on an individual's age and also needs as noted above.
- > The involvement of the General Practitioner in the individual's ongoing management plan including regular monitoring of sustained improvement in mobility, function and independence continues noting a need for further rehabilitation intervention if condition deteriorates.
- > Any changes in an individual trauma patient's function which impacts upon their independence, appropriateness of home environment and equipment requirements need to be addressed in an efficient and timely manner so as not to impede on their progress. This includes the individual with a general orthopaedic trauma whose level of function has temporarily deteriorated and requires rehabilitation review and possibly a short burst of rehabilitation. Further, these individuals who experience a short term disability and disruption to function must have access to funding for modifications to their home via an appropriate community stream.
- > Orthopaedic specialist review should be available if required at any time along the continuum, and direct access back to the specialist for any orthopaedic consideration should be obtainable in an appropriate timeframe.

3.5 Specific populations

Individuals who are non-weight bearing

Some individuals, following assessment and/or surgical intervention of the general orthopaedic trauma will be prescribed a non-weight bearing status by the orthopaedic specialist for a specified duration whilst the injury heals. Development of viable management plans for these individuals can be challenging.

Discharge home for some of these individuals will be possible with or without formal or informal supports. However for many individuals who have a non-weight bearing status it will not be possible for them to manage safely and independently at home during this time, hence alternative care options need to be sought.

It is important that individuals who are non-weight bearing with single or multiple orthopaedic limb trauma can access a rehabilitation program within a designated rehabilitation facility or service irrespective of their age or the severity of the limitations to weight bearing.

3.6 Workforce

NB Refer to Chapter 6 Workforce for the specific competencies related to the orthopaedic trauma rehabilitation coordination role.

Chapter 4: Model for arthroplasty rehabilitation

4.1 Summary

The need for hip and knee arthroplasty surgery is projected to double over the next decade with Australia's ageing population and demands for increased quality of life of that ageing population; hence the importance of developing a model that addresses arthroplasty management across the continuum from assessment to surgery to rehabilitation and recovery to everyday living.

There is very little literature on the arthroplasty continuum of care in its entirety, once on the waiting list for surgery and during the peri operative hospitalisation. Most studies focus on limited interventions during the inpatient episode of care, with outcomes measured against alterations in length of stay and early functional outcomes. There is good evidence that a comprehensive prehabilitation program is associated with improved patient outcomes, reduced hospital stay and reduction in post discharge rehabilitation requirement (Orthopaedic Prehabilitation Project - An optimised Discharge Planning Tool for Patients undergoing Hip and Knee Arthroplasty – development, implementation and evaluation-RGH)⁶

The Statewide Orthopaedic Clinical Network has considered the journey of individuals with arthritis of the hip and knee through triaging, initial management and prioritised selection onto the waiting list for surgery in the Arthroplasty Demand and Allocation Management proposal (ADAM)³. The model outlined in this chapter provides a seamless link with the ADAM project clearly defining the role of prehabilitation in self management, education and optimal management of co-morbidities, so that the individual is more likely to achieve a positive outcome from their arthroplasty surgery. Rehabilitation, re-integration and ongoing maintenance of function post surgery are also addressed.

This model is designed to assist in the provision of an equitable arthroplasty service across South Australia, providing services close to home where feasible and prioritisation of those clients most in need. It is expected that this model is applicable to sites providing arthroplasty surgery both in metropolitan and country areas.

4.2 Key recommendations

Service continuum

- > The arthroplasty rehabilitation model needs to be implemented in conjunction with the ADAM³ project to ensure seamless integration across the continuum

Initial management / assessment – general practitioner

- > General practitioners should refer individuals who present with reduced mobility, range of motion and pain as a result of hip / knee arthritis who may require surgical intervention for a specialist orthopaedic appointment at a hospital outpatient service via a standardised GP referral form

Outpatient appointment and review

- > Comprehensive outpatient assessment will occur with a multidisciplinary team including an orthopaedic specialist to determine if conservative or surgical management is required. This will occur in conjunction with the identified personnel undertaking triage and prehabilitation coordination.
- > If surgical management is required, the individual will be placed on the arthroplasty waiting list and the prehabilitation process immediately commenced under the direction of the identified personnel undertaking the prehabilitation coordination.

Whilst on waiting list / prior to surgical intervention

- > Individuals on the waiting list will be contacted by the identified personnel undertaking the triage coordination every 3 months to assess change in condition and re-prioritise as appropriate
- > Individuals will be encouraged to participate in prehabilitation, self management and education programs whilst on the waiting list
- > Within 2-6 weeks of planned surgery, the individual will be required to attend a pre-admission appointment to prepare for surgery and to allow potential needs post surgery to be addressed

Acute inpatient care – admission, surgery and recovery

- > Admission will occur on the day of surgery
- > Rehabilitation will commence promptly after surgery, within 12-18 hours, unless there are specific contraindications
- > It is expected that the majority of individuals undergoing arthroplasty rehabilitation will be able to discharge directly home at day 3-5 post surgery with access to follow up rehabilitation and community services as required

Post-acute rehabilitation

- > Access to inpatient, ambulatory (home based and day centre based) and community (including single discipline allied health) rehabilitation programs must be available with multiple access points
- > Service and staffing requirements are as per the Australasian Faculty of Rehabilitation Medicine guidelines

Ongoing maintenance and function

- > Access to ongoing community support / services for those individuals who continue to have difficulties with mobility, functional tasks and participation in everyday activities post arthroplasty surgery need to be available. This is of particular relevance to those with co-morbidities. Multiple access points to these services are needed.
- > Ongoing orthopaedic specialist review to meet mandated long term follow up requirements of individuals undergoing arthroplasty surgery is required

4.3 Background

With South Australia's ageing population it is anticipated that the number of arthroplasty surgeries required in the next decade will double (AOA NJRR Report, 2008)⁷ and hence this model is important to ensure that the accessibility and sustainability of services for these individuals.

There is a paucity of current literature on the complete journey for the client with arthritis of the hip and knee, from early assessment and conservative management options, through to the diagnostic and clinical decisions leading to arthroplasty surgery and finally, the implementation of a rehabilitation and long term follow up program, individualised for each client.

Most studies focus on limited interventions during the inpatient episode of care, with outcomes reported against alterations in length of stay and early functional outcomes.

This Model for Arthroplasty Rehabilitation draws upon a range of improvement projects undertaken in public hospitals in South Australia over the past 3 years, in the management of individuals with arthritis of the hip and knee with the aim to ensure integration across the continuum, optimise use of resources, promote communication between all key stakeholders and improve client outcomes. Projects include:

- > Orthopaedic Waiting List (OWL) SA Health, RGH
- > Prehabilitation Project, RGH
- > ARAC Review QEH, RGH
- > ADAM Project Phase 1, Orthopaedic Clinical Networks
- > CHSA Arthroplasty Project – 'Prehabilitation and Rehabilitation in Joint Arthroplasty'

Appendix 3 provides detailed information on South Australian statistics for hip and knee arthroplasty

Appendix 4 provides details on Waiting List Principles for hip and knee arthroplasty as defined by Arthroplasty Sub-Group of SA Clinical Networks

Current services

Orthopaedic inpatient rehabilitation services are currently available in public and private hospitals. Public hospitals providing orthopaedic rehabilitation are Hampstead Rehabilitation Centre, St Margaret's Hospital and the Repatriation General Hospital. Private hospital providers include Griffith Rehabilitation Hospital, Calvary College Grove Rehabilitation Hospital and The Memorial Hospital.

The Repatriation General Hospital provides home based and centre based services for those living within the southern suburbs of Adelaide. Hampstead Rehabilitation Centre has a Day Therapy Service that individuals living in the north can access.

Various orthopaedic outpatient and community based therapy services are provided by private providers, public hospitals, Commonwealth funded Day Therapy Centres and community organisations such as Domiciliary Care SA. Interventions include one to one, group, condition specific and falls prevention.

Perceived current service deficiencies

In reviewing current services available in South Australia for individuals who require arthroplasty, the following deficiencies were noted:

- > Limited structured pathways
- > Limited structured prehabilitation
- > Limited ongoing assessment of clients on the waiting list for surgery
- > Limited structured education program
- > Poor consistency in prediction of discharge destination and requirements
- > Poor communication/ coordination between metropolitan and country allied health services
- > Lack of consistency in service delivery across metropolitan and country hospitals

4.4 The model

4.4.1 Organisation of services

- > Given the elective nature of hip and knee arthroplasty surgery described in this model, it is imperative that as much intervention and planning has occurred prior to the individual being admitted for surgery. This will minimise potential for surgery to be cancelled, limit required hospital length of stay and ensure prompt organisation of appropriate equipment, supports and follow up rehabilitation. The identification of personnel to undertake triage and prehabilitation coordination will facilitate this.
- > Multi-disciplinary team input that fosters communication, teamwork and client outcomes across the continuum is essential. The multi-disciplinary team should include orthopaedic surgeon, anaesthetist and appropriate allied health practitioners, some of whom may be multi-tasked, especially in rural communities undertaking smaller numbers of arthroplasty interventions.
- > Early comprehensive assessment by the multidisciplinary team including an orthopaedic surgeon, identified personnel undertaking the triage and prehabilitation coordination, is essential to ensure an appropriate management plan is developed and a decision re conservative or surgical management made.
- > All individuals who are identified as requiring hip or knee arthroplasty surgery need to be able to easily access early prehabilitation and should be strongly encouraged to be involved. Consideration to how this can be best achieved in the country is required. Currently the variability in access to discharge support services across both metropolitan and country regions influences the time of engagement of individuals in prehabilitation on the waiting list for surgery, resulting in delays for discharge from hospital and in some cases, cancellation of cases due to late identification of significant co-morbidities.
- > Following surgery, early commencement of rehabilitation with a focus on mobilisation, transfers and self care is needed to maximise and individual's recovery.
- > Access to inpatient, ambulatory (home based and day centre based) and community rehabilitation (including single allied health disciplines) programs are needed for individuals post arthroplasty surgery. The type of rehabilitation needed will be dependent on the individual's needs and circumstances including previous level of function, formal and informal supports, previous place of residence, existing co-morbidities and potential for improvement.
- > Multiple access points to rehabilitation are needed, especially for individuals who experience a deterioration in mobility and/or function at a later time.
- > The team needs to be aware of community programs and services essential to facilitate the fulfilment of client goals, maintenance of functional gains and monitoring, both in the pre-operative and post operative phase.
- > Following discharge from hospital, the mandated requirement for long term follow up of individuals having undergone hip or knee arthroplasty surgery needs to be adhered to.

4.4.2 The continuum of care

The phases of the continuum for individuals requiring hip or knee arthroplasty surgery is as follows:

- > Initial management / assessment – general practitioner
- > Outpatient appointment and review
- > While on waiting list / prior to surgical intervention
- > Acute inpatient care – admission, surgery and recovery
- > Post-acute rehabilitation
- > Ongoing maintenance of function

The flowchart below (Figure 4) schematically presents the expected / anticipated process that an individual who is likely to require arthroplasty surgery of the hip and knee will follow across the continuum from assessment through to rehabilitation and reintegration into the community. A more detailed flowchart is provided in Appendix 5

This model interacts seamlessly with the ADAM project which covers the initial phases of this continuum therefore detailed information of these phases are not provided within this document.

Appendix 6 Possible outcomes following ARAC service and implication for orthopaedic outpatient clinic and other services

Appendix 7 Patient focussed booking process

Initial management / assessment – general practitioner

Key requirements

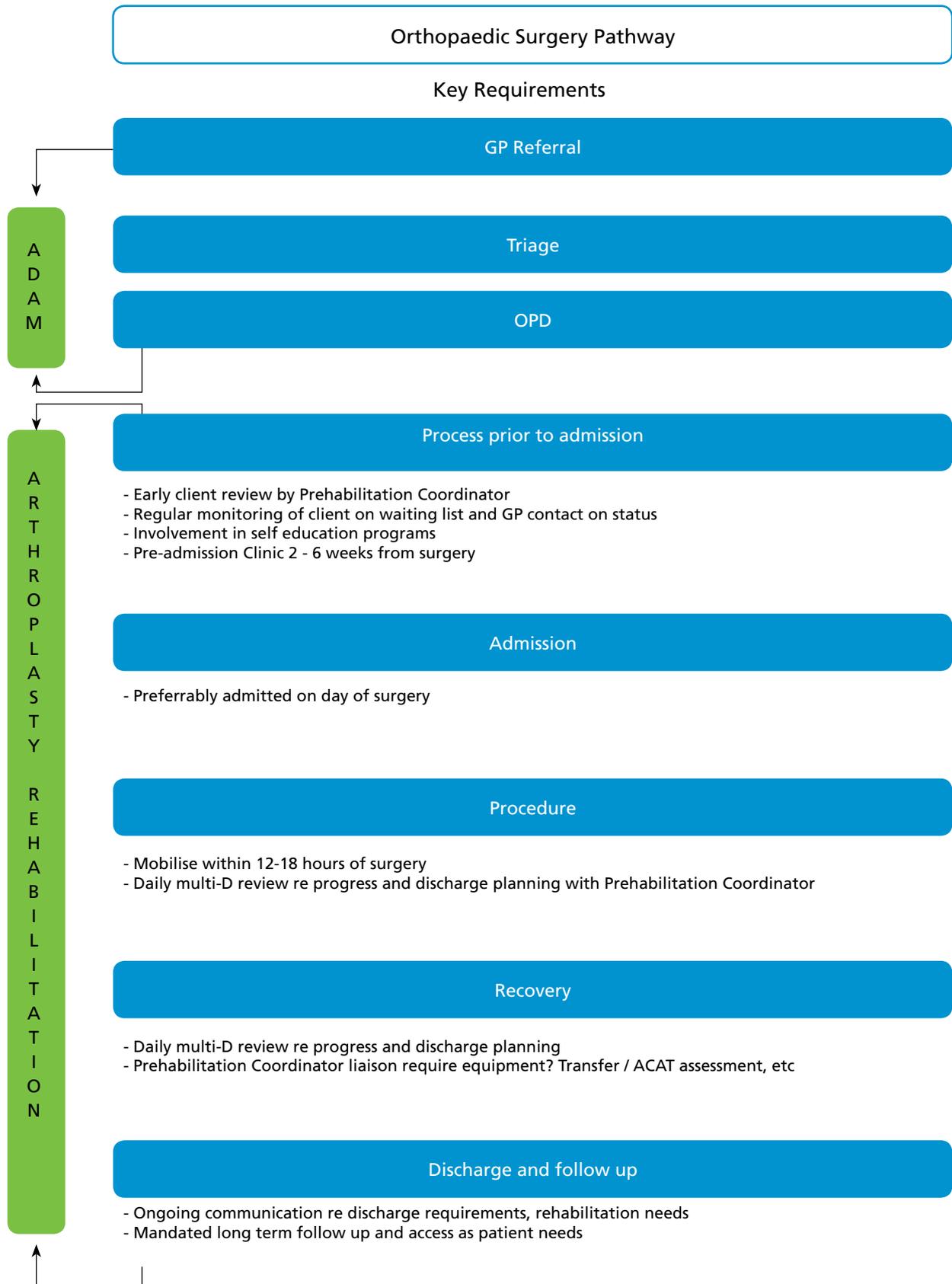
- > An individual who is experiencing difficulty with mobility, transfers and participation in everyday activities due to pain, discomfort and reduced range of motion of the hip and/or knee will usually present to a general practitioner for assessment and input.
- > If it is identified the individual's issues can be managed conservatively the general practitioner will probably make a referral for intervention from single discipline allied health professionals such as physiotherapy; to community services to provide support in managing everyday tasks (e.g. Council, Domiciliary Care SA) and; services that assist with addressing exercise, strength, balance and self management of condition (e.g. Commonwealth funded Day Therapy Centres).
- > If the general practitioner is unsure of the best management plan for the presenting condition or feels surgical intervention may be required, a referral to a hospital outpatient orthopaedic service will be made. This is covered in more detail in the ADAM project, however one key requirement is the use of a standardised GP referral form to the outpatient service to alert the service to specific needs of the individual, specific co-morbidities which may impact on discharge following arthroplasty surgery and client awareness of self management options.

Outpatient appointment and review

Key requirements

- > The orthopaedic specialist will oversee the assessment by an appropriately trained multidisciplinary team, of the individual and discuss conservative and surgical treatment options with them and their family / carers. Depending on outcome of this assessment and discussion the individual may either be referred for:
 - conservative management in the community with input from single discipline allied health (e.g. physiotherapy); community services for support and; services to address exercise, strength, balance and self management of condition.
 - surgical intervention and placed on the waiting list for this to occur.
- > The general practitioner will be informed of the recommended management plan following orthopaedic specialist review.
- > It is noted that some referrals to the orthopaedic specialist may come from sources other general practitioners such as other specialists, if this is the case the same process will be followed.
- > If surgical intervention is identified as the most appropriate treatment option, early referral to the prehabilitation coordinator will occur and a standardised arthroplasty questionnaire completed.
- > The triage practitioner will prioritise the individual on the waiting list based on the severity of their condition and the impact it is having on their mobility and participation in everyday activities. This will be communicated to the general practitioner.

Figure 4: Arthroplasty Continuum of Care – Possible Pathways



Whilst on waiting list / prior to surgical intervention

Key requirements

- > The triage practitioner will contact individuals on the waiting list every three months and use a standardised prioritisation tool to assess change in condition and need for re-prioritisation or further intervention whilst on the waiting list for surgery to facilitate optimisation of management.
- > Involvement in self management/ education programs directed to optimising physical and psychological fitness for surgery are to be encouraged whilst on the waiting list for surgery.

Within 3 months of planned surgical date:

- > The prehabilitation coordinator will contact the individual and outline the available pre-habilitation program. Prehabilitation programs must be conducted within an appropriate time frame, so that any arising medical or social aspects can be addressed in a timely manner, so that there is no impact on the planned date of surgery. In some instances, more thorough medical assessment may be required pre-operatively. This contact will also enable potential discharge destination to be identified and discussed.
- > Prehabilitation aims to enhance the functional capacity of individuals to withstand the stresses of orthopaedic surgery and optimise their recovery. Prehabilitation includes:
 - Early identification and management of co-morbidities
 - Addressing cardiovascular fitness, flexibility training and ability to undertake functional tasks
 - Self management programs
 - Identification of likely discharge needs post arthroplasty surgery and preparation for this.
- > Attendance at pre-admission clinic 2-6 weeks prior to planned date of surgery. At this appointment the individual will be reviewed by the surgical team, anaesthetists, triage coordinator at a minimum with assessment by the allied health team where possible. This will allow potential needs post surgery to be identified including mobility, equipment, community supports and need for follow up rehabilitation (inpatient, ambulatory or community program).

Acute inpatient care – admission, surgery and recovery

Key requirements

- > Given the elective nature of arthroplasty it is preferable that individuals are admitted on the day of surgery. This may vary in some instances such as if management of co-morbidities required or on the individual's usual place of residence.
- > Active coordination of admissions needs to occur to minimise cancellations.
- > In order to maximise future rehabilitation potential, the arthroplasty surgery must be performed by a suitably experienced surgeon and anaesthetist utilising current recognised and evidence based operative and anaesthetic techniques, taking into account the circumstances of the individual.
- > Ongoing multi-disciplinary review is essential on a daily basis whilst the client is an inpatient and should include medical, nursing, allied health and the prehabilitation coordinator
- > Access to an individual's support network, being family and friends remains critical to provide both psychological support and the potential for a reduced length of stay.
- > Rehabilitation must commence early in this phase, with a focus on the individual's mobility and function in basic everyday activities including self care, toileting and feeding. Mobilisation including sitting out of bed should commence within 12-18 hours of surgery
- > Early commencement of rehabilitation will assist in guiding the need for ongoing rehabilitation (inpatient, ambulatory or community) and facilitate planning of discharge to the most appropriate destination. Discharge options will vary depending on the individual's mobility, independence in everyday activities, informal social supports and goals. The most appropriate discharge option will be determined in partnership with the individual, their carers and family and the multi-disciplinary team.

- > The first option for all individuals who have undergone arthroplasty surgery should be discharge home with access to appropriate care and rehabilitation services to ensure maximal independence is achieved as soon as possible. It is expected that the majority of individuals undergoing arthroplasty surgery will be able to discharge home on day 3-5 post surgery with appropriate follow up which may include:
 - Early supported discharge services such as rehabilitation in the home and centre-based day rehabilitation
 - Transition care (community) or the equivalent available for all age groups
 - Community programs / services e.g. Domiciliary Care SA, Commonwealth funded Day Therapy Centres, council services such as cleaning, shopping and transport
 - Single discipline interventions (e.g. physiotherapy), either public, private or non-government organisations.
- > Prior to discharge the multi-disciplinary team needs to ensure that equipment, home modifications and all necessary community based supports have been organised for individuals to facilitate their safe discharge home.
- > If an individual is being discharged directly home, the general practitioner needs to be informed and made aware of the suggested ongoing management plan including follow up rehabilitation and services that have been organised. This should occur within the 48 hours prior to the individual's discharge. The individual and family / carers also need to be informed of this information with relevant education provided as appropriate.
- > Some individuals who have limited mobility and require assistance with self-care and other activities post arthroplasty surgery will not be suitable for discharge directly home and will require one of the following options depending on their needs:
 - Inpatient rehabilitation for patients requiring this level of assistance
 - Respite / non-weight bearing beds if required for all age groups prior to an intensive inpatient or ambulatory rehabilitation program
 - Residential transition care or the equivalent service available for all age groups
 - Return to local country health services or permanent residential aged care facility – high care (if previously resided in such facility).
- > In some instances a change of usual accommodation may be needed such as permanent residential care but this is likely to be rare given the elective nature of arthroplasty surgery.
- > Prior to discharge, appropriate orthopaedic follow up needs to be arranged.
- > It is important that where a client requires an up transfer, due to a specific orthopaedic complication, where possible the operating surgeon should be notified so that they can have input into that client's treatment plan.

Post-acute rehabilitation

Key requirements

- > Post acute rehabilitation whether provided as inpatient, ambulatory (home based or centre based) or community (including singled discipline allied health) needs to focus on maximising an individual's recovery following arthroplasty surgery.
- > Rehabilitation goals need to be realistic and achievable, focusing initially on independence in mobility, self care and functional tasks that will facilitate community re-integration and participation in previous life roles. Goals need to be established in partnership with the individual, their family / carers and treating health professionals.
- > In conjunction with the rehabilitation program provided to the individual, the need for community supports (such as personal care, transport and domestic assistance), equipment and home modifications to enable safety and independence in the community needs to be addressed.
- > The general practitioner needs to be kept informed of the individual's rehabilitation plans and progress.
- > Access to orthopaedic review needs to be available
- > Where applicable a Return to Work plan needs to be considered which may involved specialist agencies such as Commonwealth Rehabilitation Service to assist in this process.

Ongoing maintenance of function

Key requirements

- > Following arthroplasty surgery it is anticipated that the majority of individuals will have improved mobility, function and independence than prior to surgery and will be able to resume previous roles and activities.
- > For some however, in particular those with other co-morbidities ongoing support to optimise their function and independence may be needed. The availability and ease of access to these community services is important so that the individual sustains the functional gains they have achieved following the surgery. Referral pathways that ensure individuals have access to these services through a variety of access points are needed. Services will vary depending on an individual's age and also needs as noted above.
- > The involvement of the general practitioner in the individual's ongoing management plan post arthroplasty surgery including regular monitoring of sustained improvement in mobility, function and independence is important. Any noted deterioration in an individual's mobility or independence needs to be addressed promptly so that a burst of rehabilitation via an ambulatory or community program can be organised to prevent any further deterioration.
- > Ongoing multidisciplinary orthopaedic review will be required by all individuals undergoing arthroplasty surgery with access to an orthopaedic specialist if required.

4.5 Workforce

NB Refer to Chapter 6 Workforce for the specific competencies related to the joint replacement (Arthroplasty) coordinator role.

Chapter 5: Specific populations

(Relevant to all 3 orthopaedic-rehabilitation models)

Rural and remote

It is the expectation that orthopaedic rehabilitation will be provided in the country as outlined in the key requirements of the models above. Country sites not able to meet these requirements will need to review their ability to provide services to these individuals.

The country general hospitals will have inpatient and ambulatory rehabilitation services including orthopaedic rehabilitation. There is scope for some ambulatory rehabilitation services to be provided at local country hospital / health services.

Whether the individual is managed in a country or metropolitan hospital will depend on the nature, severity and complexity of the orthopaedic condition, if the intervention required is planned or emergency and accessibility to medical (orthopaedic surgeons and physicians), nursing and allied health staff skilled and competent in providing orthopaedic care.

For country hospitals, the recommended coordinator roles for the various models may be linked with another role such as discharge planning coordinator dependent on demand for service and workforce capacity.

The establishment of formal links between metropolitan and country rehabilitation sites as outlined in the *Statewide Rehabilitation Service Plan, 2009-2017*² will further facilitate the delivery of orthopaedic rehabilitation at country sites and support the recommended coordinator roles. These formal links will provide support re workforce, training, professional development and quality management.

Appropriate orthopaedic follow-up needs to be arranged prior to discharge. This can include remote follow-up options.

People from Aboriginal and Torres Strait Islander backgrounds

The total Aboriginal population in South Australia is small, with Aboriginals accounting for only 1.7% of the total population. However the health care needs of this population is significant and the current health system is not meeting their needs, demonstrated by a range of inequities in health outcomes.

Aboriginals have a lower life expectancy and poorer health compared to the rest of the population. Only 3.5% of the Aboriginal population in South Australia is aged over 65 years compared to just over 15% for all South Australians. Aboriginals have a 17 year lower life expectancy compared to the rest of the population with the mean age of death for Aboriginal males 42.4 years and females 47.5 years based on 2005 data.

When delivering care to Aboriginals a number of elements need to be taken into consideration to ensure delivery of culturally appropriate services that meets their needs and thereby enhance their health outcomes:

- > Working collaboratively with Aboriginal Health Workers in delivery of care.
- > Communication of health information in a manner that is acceptable and can easily be understood by Aboriginals is extremely important. Strategies to assist in engaging with Aboriginal communities include the use of visual aids (e.g. picture books, posters), story-telling, word of mouth by members respected within the community and communication in their native language.
- > Involvement of extended family in consultations with the Aboriginal individual, that allow for clear explanation of presenting condition in culturally relevant manner and patient choice re management including the use of traditional medicine and healers as appropriate. If family are not available, Aboriginal Health workers should be involved in consultations to enable culturally appropriate communication and plans to be developed.
- > Minimisation of length of stay in hospital setting with programs available to facilitate earlier supported discharge to an environment more acceptable and familiar to the Aboriginal individual.
- > Where appropriate, the use of telemedicine and other developing technologies to avoid the need for Aboriginals to have to leave their communities, especially applicable to those living in rural and remote areas (e.g. APY Lands).

- > Providing flexibility of appointments and attendance at clinics, especially when post hospital follow up care is planned.
- > Recognising that the importance of family relationships including extended family and the complexity of these relationships and home environment may influence decisions re ongoing health care.
- > Building the cultural understanding and awareness of the non-Aboriginal health workforce when working with this population.

People from culturally and linguistically diverse (CALD) backgrounds

It is important strategies to address the cultural and linguistic diversity that exists in South Australia are taken into account when developing and delivering orthopaedic rehabilitation services. The following strategies are recommended:

- > Use of interpreters in the delivery of services across the continuum.
- > Availability of education materials in a range of languages, in particular those listed above.
- > Establishment of partnerships with community organisations that provide services to individuals from specific culturally and linguistically diverse backgrounds (e.g. Ethnic Link, Italian Benevolent Fund).
- > Flexibility in service delivery to meet specific needs.
- > Workforce training to promote cultural competence in the delivery of care to individuals from a range of CALD backgrounds.

Chapter 6: Workforce requirements for orthopaedic rehabilitation

6.1 Background

Health workforce shortages facing the State and the uneven distribution of health workers between metropolitan and country areas present challenges for many areas of health care delivery and the management of orthopaedic rehabilitation is no exception.

It is essential that the workforce providing care to individuals requiring orthopaedic rehabilitation are suitably qualified, experienced and undertake ongoing professional development to maintain their skills and knowledge. This includes medical, nursing, allied health, assistant and carer staff across the continuum of care.

There are no available national or international guidelines or benchmarks on staffing requirements to provide acute orthopaedic care. However care should be provided on a team approach consisting of orthopaedic surgeons, geriatricians / general physicians, anaesthetists, nursing, physiotherapy, occupational therapy, social work and dietetic staff. Consultation from other professions such as psychology, speech pathology and clinical pharmacy should be available as needed. The availability of clinical pharmacy is particularly important for the older age group such as those experiencing fragility fractures given poly-pharmacy issues are common in these individuals.

National guidelines exist on staffing requirements for inpatient and ambulatory orthopaedic rehabilitation services as developed by the Australasian Faculty of Rehabilitation Medicine (AFRM) as outlined below in Table 1. Also shown in the table are the staffing requirements for debility as it is likely to be more suitable to staff units providing rehabilitation to those experiencing fragility fractures at these levels. It is recommended that there is rehabilitation workforce strategy to address, workforce benchmark requirements, training and professional development which is consistent with the *Statewide Rehabilitation Service Plan, 2009-2017*².

Table 1: Inpatient and Ambulatory Orthopaedic Rehabilitation Staff to Patient Ratios for 10 Patients

	Nurses	PT	OT	SP	SW	ClinPs	Prosthetist / Orthotist	Rehab Phy***
Inpatients								
Orthopaedic	11.75*	1.25	0.8		0.4	0.2		0.4
Debility	11.75*	1.25	1.0	0.2	0.6	0.2		0.4
Ambulatory								
Orthopaedic	0.3	0.7	0.3		0.2	0.2	0.2	0.1

*Includes the nurse in charge, and covers 24 hours roster cover of nursing care, hence the high FTE stated

***In addition to rehabilitation physicians, additional medical staff are required for all rehabilitation units – registrars, training medical officers and interns

Victorian Allied Health guidelines for rehabilitation also exist and are particularly helpful for professions not covered by the AFRM standards such as dietetics, recommending 0.4 dieticians per 10 inpatient orthopaedic rehabilitation beds and 0.3 dieticians per 10 ambulatory orthopaedic rehabilitation beds. The recommendation would be that these nationally endorsed guidelines are utilised in the consideration of requirements dependent on patient load and medical condition at individual institutions and regions.

Where patients require psychological assessment and or support which may be important particularly where multi factors are involved in the patients medical condition or rehabilitation then this would require factoring into the workforce of an individual institute and region.

No guidelines exist for staffing of community rehabilitation programs and services.

Establishing links between metropolitan and country based staff involved in the delivery of care to individuals requiring orthopaedic rehabilitation will be advantageous, especially in providing professional development support and training, sharing of skills and knowledge and promotion of work shadowing opportunities.

6.2 Key recommendations

- > Staffing of inpatient rehabilitation units and ambulatory rehabilitation programs is modelled with a workforce strategy to address, workforce benchmark requirements, training and professional development
- > Specific workforce resources with aligned competencies outlined in each model are supported and become part of an integrated system across the continuum to ensure effective and efficient flow of individuals through the system
- > Allied Health staff are available on a seven day a week basis so that rehabilitation can be commenced and maintained for each individual client in the appropriate timeframe in line with future projected demand informed by the benchmarks recommended by the Rehabilitation Service Development Plan
- > Care across the continuum will be provided by a multi-disciplinary team of health professionals
- > Innovative models of role redesign should be considered, including the utilisation of extended/advanced scope of practice practitioners, both nursing and allied health, as well as physician assistants, allied health assistants and lifestyle coordinators
- > Establishing links between metropolitan and country based staff involved in the delivery of care to individuals requiring orthopaedic rehabilitation will be advantageous. This will provide professional development support and training, sharing of skills and knowledge and promotion of work shadowing opportunities.

6.3 The general practitioner

6.3.1 Role

The role of the general practitioner is crucial in the care of individuals requiring rehabilitation, prehabilitation, conservative management of their orthopaedic condition or referral for Arthroplasty. It is essential liaison occurs between general practitioners and others involved in the individual's care (e.g. Specialist, hospital staff, community service staff, rehabilitation program staff) from an early stage to ensure continuity of care and the individual's achievement of the optimal outcome.

NB The general practitioners role for each individual group of clients is described in more detail in the associated chapter for that model of care

6.3.2 Links with coordinator role in service delivery

It is important that the link with the general practitioners and all the coordinator roles for individual groups or groups of patients is underpinned by the following principles

- > Early engagement of the general practitioner
- > Clear concise timely communication with the general practitioner
- > Accurate written documentation regarding the patients discharge plan or treatment plan is provided in a timely manner to the general practitioner
- > A commitment to continuity of care for the client

6.4 The coordinator / coordination role

The aim of the coordination of all aspects of the movement of the specific orthopaedic rehabilitation client through the system is to ensure flow occurs in an appropriate timeframe, and the care and treatment is affected such that effective quality management of the patient is achieved in a seamless fashion. Coordination must provide a clear pathway for all clients to follow and also to ensure that they are pulled into the service which is appropriate to them. This coordination can take place in a number ways and will be dependent on the institution, region and / or patient population and workload. The following are examples of how this can be achieved

- > Single roles which will have sole responsibility for the coordination of all orthopaedic rehabilitation clientele or only one of the areas ie Fragility Fractures, General Orthopaedic Trauma or Arthroplasty
- > The responsibility for the coordination of orthopaedic rehabilitation will be integrated into existing roles
- > The coordination of the case management of the orthopaedic rehabilitation clientele is undertaken and responsibility is given to an allocated member of the multi disciplinary team

It is extremely important that which ever model of coordination for orthopaedic rehabilitation and prehabilitation specifically for Arthroplasty, is implemented, the following competencies outlined for each of the specific areas of addressed and included so that the individual moves through the system in the most effective and efficient manner.

6.4.1 Key competencies

Fragility fracture coordinator

Fragility fracture coordinators (nursing or allied health) will cover all identified fragility fractures and not be limited to one or two conditions. The coordinators will operate in both the hospital and community settings, their roles will be similar with some differences specific to the area of work.

Projected fragility fracture volume in a health region / local area will determine how many fragility fracture coordinators are needed and if the hospital and community fragility fracture coordinators are the same or different people.

In the metropolitan areas it is likely these roles will be held by separate individuals due to the anticipated workload, however in country areas these roles may be undertaken by the same person or in combination with another hospital / community role such as discharge planner. In some regions the fragility fracture coordinators could join current teams that exist, for example the Falls Prevention and Healthy Ageing Team or a practice nurse role in a GP Practice.

Whether the hospital and community fragility fracture coordinator roles are filled by one or more people it will be essential that there is strong communication and collaboration between all parties to ensure continuity of care, clear implementation of plans and minimisation of duplication. If the hospital and community roles are combined and delivered by the one person, some caution needs to occur to ensure that conflicting priorities do not result and that the hospital role is not prioritised over the community role or vice versa as both are equally important in achieving the desired outcomes in fragility fracture management.

Hospital based fragility fracture coordinators will work with the multi-disciplinary ward teams in development of patient care plans, ensure appropriate supports, rehabilitation and follow up is organised for discharge and commence addressing secondary prevention. The hospital coordinators will also link with the community based fragility fracture coordinators at the time of an individual's discharge to ensure appropriate follow up in the community occurs, in particular implementation of recommended secondary prevention strategies.

Community based fragility fracture coordinators will be responsible for the initial follow up of every person in the community who has experienced a fragility fracture to ensure appropriate services are in place to support the individual at home and to address secondary prevention. This will include identifying risk factors for future fragility fractures; assessing need for calcium, Vitamin D and anti-resorptive therapy in consultation with the general practitioner or specialist including clinical pharmacy review facilitation if required; organising falls prevention strategies such as exercise classes and assessment of home environment; education re healthy living; and linking with self management programs.

Community based fragility fracture coordinators will be alerted to people being discharged from hospital post fragility fracture by the hospital based fragility fracture coordinators and provide continuity in implementation of agreed care plan including secondary prevention strategies.

For individuals who present to emergency departments with fragility fracture and are discharged directly home following management, emergency department staff will be responsible for alerting the community based fragility fracture coordinator so follow up can be activated.

Other sources of referral to the community based fragility fracture coordinator will include hospital outpatient fracture clinics, general practitioners and South Australian Ambulance Service. Links with public and private radiology providers who identify asymptomatic fragility fractures should be established, perhaps using novel electronic information technology approaches.

Community based fragility fracture coordinators will not provide ongoing case management and support to individuals with fragility fractures, rather they are a point of coordination and initial follow up post fragility fracture, referring on to other community services for provision of services and case management in the longer term as required.

In implementing the fragility fracture coordinators, health regions should give consideration to having some funds available to coordinators to purchase services (e.g. private physiotherapy at home) if publicly available services are not available or long waiting lists exist and that the services are required to promote an individual's recovery, rehabilitation and independence and also likely to minimise the need for hospitalisation.

The fragility fracture coordinators are not discipline specific but rather appointed based on the skills an individual needs to undertake the role. The developing roles of advanced / extended scope nursing and allied health professionals and nurse practitioners may be well suited to filling these positions.

It is expected that the fragility fracture coordinator roles will be evaluated using key performance indicators. The following could be considered - percentage of people experiencing a fragility fracture referred to a fragility fracture coordinator, percentage of individuals referred for appropriate secondary prevention treatment, percentage of individuals experiencing fragility fracture referred to community programs and the re-admission rate of these individuals for either another fracture or fall related incident.

Orthopaedic trauma rehabilitation coordinator

Appointment of coordinators as the central contact for the care of individuals with general orthopaedic trauma across the continuum is recommended, especially to support those individuals who do not require hospital admission and are managed in the community by general practitioner, hospital outpatient department or emergency department.

This role could exist as a stand alone role depending on the activity of the hospital, or combined with another hospital / community role such as discharge planner or other orthopaedic coordinator role or the hospital or community based fragility fracture coordinator.

This role could also be implemented in a team approach ensuring that there is someone appointed to coordinate the activities for the patient along the continuum of care

This role will monitor the implementation of the treatment plan for each individual patient in conjunction with the multi disciplinary team, assist with linking to other programs / services as appropriate, provide initial follow up care and respond to queries of individuals / families / carers.

Joint replacement coordinator

The establishment of roles to specifically manage and coordinate the arthroplasty process and individuals requiring arthroplasty surgery is recommended. Two specific roles have been identified:

- > A triage practitioner role; and
- > A prehabilitation coordinator role

It is acknowledged that smaller facilities, especially country health service units performing arthroplasty may combine these roles depending on local service demand.

It needs to be acknowledged that these specific roles are two separate functions which are rolled into the joint replacement (arthroplasty) coordinator role and it is crucial that this is reflected in how the job and person specification is outlined and delivered in each individual health service unit.

Triage practitioner

The triage practitioner role would undertake the following functions:

- > Review and ensure complete, referrals from general practitioner requesting assessment of clients with arthritis of the hip and knee.
- > Prioritise clients, based on the severity of their condition, so as to treat as many as possible when resources are insufficient for all to be treated.
- > Assist and direct clients with arthritis, but not severe enough to warrant surgery, towards community programs. These may include self management education and/or exercise based programs.
- > Liaise with general practitioners on client status
- > Continue to review and prioritise clients across the transition to surgery, including promotion of chronic disease self management, counselling and client education.

It is expected that the triage practitioner would have sound knowledge and skills in:

- > Common orthopaedic conditions that may lead to the need for hip and knee arthroplasty surgery.
- > Musculoskeletal and cardiovascular anatomy and physiology.
- > The progressive pathophysiology of arthritis of the hip and knee.
- > Holistic model of health and concepts of conservative management of arthritis of the hip and knee programs, treatments and resources available locally, at a state and national level.
- > Identification of risks that may impact on surgery outcomes.
- > The impact of co-morbidities on prehabilitation, surgery and rehabilitation.

- > Implementation and usage of prioritisation tools in the assessment of patient morbidity from hip and knee arthritis.
- > Assessment of impact of hip and knee arthritis on a client's psychosocial, social and functional ability.
- > Communicating effectively with individuals, their carers and other health workers.
- > Cultural diversity and how this may impact on assessment/ intervention.

Prehabilitation coordinator

The prehabilitation coordinator role would incorporate the following:

- > Provide and apply arthroplasty Surgical Bookings Questionnaire', as the client is placed on the waiting list for hip and knee Arthroplasty surgery to provide early identification of co-morbidities that may delay surgery or social issues that may delay discharge from hospital
- > Promote self management and early referral to general practitioner for treatment of co-morbidities
- > Communicate identified issues to relevant hospital personnel to promote early referral for discharge supports
- > Participate in multi-disciplinary daily ward management meetings during the client's hospitalisation, to optimise discharge planning and client well being

The prehabilitation coordinator would be able to demonstrate knowledge and skills in:

- > Common orthopaedic conditions that may lead to the need for hip and knee arthroplasty surgery
- > Musculoskeletal and cardiovascular anatomy and physiology
- > The progressive pathophysiology of arthritis of the hip and knee
- > Identification of risks that may impact on surgery outcomes
- > The impact of co-morbidities on prehabilitation, surgery and rehabilitation
- > Communicating effectively with individuals, their carers and other health workers
- > The principles of self management, particularly chronic condition self management and assessment of an individual's self management abilities
- > Cultural / linguistic diversity and how this may impact on assessment/ intervention and an awareness of:
- > Types of programs, treatments, resources available locally, at a state and national level that may benefit an individual undergoing joint arthroplasty
- > Discharge planning principles and how to determine when an individual is ready for discharge from a functional perspective
- > When to refer to other disciplines such as occupational therapy, physiotherapy and social work

6.4.2 Integration of the coordinator role into service delivery

The above information gives an outline the competencies which are essential to undertake the delivery of all the individual coordinator roles for each of the specific groups of clients.

It is acknowledged that smaller facilities, especially country health service units which deliver and support orthopaedic rehabilitation and prehabilitation as well as arthroplasty surgery may combine these coordinator roles depending on local service demand. There may be a variety of innovative ways in which these roles are carried out in different health service units, but it is imperative that all of the competencies required to deliver a service to each of the individual groups of patients is not omitted for any of these service delivery models as all are critical to the effective and optimum outcome for the client. It is important that each of the coordinator roles for the individual groups of clients are easily identified within health service units, and the professional responsibility for the role being fulfilled has clear accountability.

Education and training would need to be facilitated to ensure that the personnel undertaking these roles obtain these competencies. In some health service units and rural and remote areas the general practitioner and / or community health services may facilitate these activities.

The coordinator roles are not discipline specific but rather appointed based on the skills an individual needs to undertake the role. The developing roles of advanced / extended scope nursing and allied health professionals and nurse practitioners may be well suited to filling these positions however there is scope for the appropriate integration and alignment of these roles with others already in existence in health service units.

These coordinator roles need to be established in such a way that they are sustainable, and succession planning is supported and maintained within the structure. They should be seen as an integral part of the multidisciplinary care team, not extra or separate to the team.

Chapter 7: Training and professional development

Ongoing training and professional development of the workforce is an essential element of providing effective and efficient high quality services to consumers.

Education and training opportunities specific to orthopaedic care and rehabilitation need to be available to staff working in a range of areas (hospital and community) and from varying backgrounds including medical, nursing, allied health, assistant staff and carers.

A range of opportunities for ongoing professional development and training of the current workforce need to be considered and should include:

- > Provision of work shadowing, peer support and specialists advice to staff to increase their knowledge, skills and abilities to work with individuals requiring orthopaedic rehabilitation and input
- > Rotation of staff / staff exchanges between work settings across the continuum of care to facilitate and increase understanding of various work areas and key requirements at various phases
- > Linking metropolitan and country sites to assist in providing professional development, mentoring and building country workforce capacity
- > Use of web based educational modules, teleconferencing and other innovative, technology-based resources
- > Financial support for staff to participate in professional development activities

The Australasian Faculty of Rehabilitation Medicine guidelines recommend that a minimum of 3% of effective full-time hours is allocated for formal in-service training and development at no cost to staff, for medical, nursing and allied health staff. This recommendation should apply to all staff providing services to individuals receiving orthopaedic rehabilitation.

Strong links need to be formed with universities to ensure relevancy of information taught in regards to the acute and ongoing management of individuals requiring orthopaedic rehabilitation. Links with universities are also likely to assist in the collaborative provision of education to the current workforce.

Provision of student clinical placements will also assist in preparing the future workforce to provide best practice orthopaedic rehabilitation.

Chapter 8: Partnerships

Patient / carer and family

It is important that health professionals work as a team in providing care to individuals who require intervention for an orthopaedic condition and that the individual and their family are seen as part of this team.

Services provided to these individuals need to be client-centred and sensitive to their needs. Individuals and their families need to be actively involved in their rehabilitation, setting of realistic goals and in optimising their recovery and lifestyle. Education, emotional support and counselling are essential components to facilitate the achievement of this.

Family and carers also need to be supported through this process. Carer support services such as respite, domestic assistance, personal care, social support and counselling should be readily available to carers of individuals recovering from an orthopaedic condition to ease carer stress, in particular in the early discharge period.

With organisations

Client-centred, sustainable, seamless and evidence based services to individuals experiencing orthopaedic conditions across the continuum can only be achieved through the combined efforts of a range of organisations, agencies and individuals including health services, community agencies, non-government organisations, general practitioners, private providers and aged care services.

The linking and forming of partnerships with currently established services within health regions and other non-government, government and private providers will be essential for implementation of these orthopaedic rehabilitation models and to maximise the effective and efficient use of available resources.

Communication between providers is also critical to ensure continuity of care, seamless linkages and integration across the continuum.

Chapter 9: Information technology and infrastructure

Consideration to the physical infrastructure to support the delivery of evidence based orthopaedic rehabilitation care is needed including information technology. This may require new building or redevelopment of existing facilities to support requirements.

Infrastructure that supports access to after hours medical cover; facilitates access and ease of diagnostics being undertaken; and enables early commencement of rehabilitation are important.

A robust statewide information technology network is essential for the successful and smooth management of the individual across the continuum of care. The following would be enhanced and /or achievable with improved information technology systems:

- > Timely accurate communication between health care providers
- > The reduction in unnecessary duplication of services
- > The reduction in omissions in treatment
- > The ability to share accurate images and medical records
- > Telemedicine for follow up of individuals close to home avoiding the necessity to travel
- > E-Rehabilitation for review of in home rehabilitation

Chapter 10: Quality and research

Measuring and monitoring performance and quality is essential to ensure that services delivered are of a high quality, efficient and comparable to national outcomes and benchmarks. It should focus on outcomes, not just processes of care.

All inpatient and ambulatory rehabilitation sites providing orthopaedic rehabilitation must report to AROC (Australasian Rehabilitation Outcomes Centre). This allows national benchmarking and comparative public reporting to occur on a range of factors including timeliness of transfer to rehabilitation, average length of stay, functional improvement during episode of care, demographics such as age and discharge destination. AROC reporting is consistent with the *Statewide Rehabilitation Service Plan, 2009-2017*² recommendation re quality reporting.

A statewide database with a minimum data set for reporting appropriate to each specific population group described in the three models should be established to enable monitoring. This is particularly important for fragility fractures and arthroplasty. These could include but not be limited to demographic information, timeliness of surgery, complications experienced, intervention strategies implemented and specific patient outcomes.

Additionally, statewide quality initiatives need to occur ensuring coordination across sites and across the continuum of care, promote consistency of practice and decrease duplication.

It is essential the delivery of services and management across the continuum for all these groups of individuals is based on the best available evidence.

Provision of quality services for individuals requiring orthopaedic rehabilitation will be further supported by research. It is important that research initiatives link with currently established research networks / centres to maximise funding opportunities, multi-centre research activities and linkage of researchers interested in common topics. These include the South Australian Health and Medical Research Institute, all Universities and the Statewide Rehabilitation Clinical Network Research Workgroup.

Further research is needed in a variety of areas relating to orthopaedic rehabilitation and will be supported by the development of databases relating to the specific groups of individuals as noted above. Research needs to occur in a range of areas including but not limited to the following: peri-operative management, innovative models of care and novel approaches to rehabilitation. Specific to fragility fractures, research into the uptake and benefits of secondary prevention strategies would be beneficial.

Additional staffing and resources will be needed to achieve quality and performance monitoring and research activities on a statewide level.

Chapter 11: Model evaluation

The orthopaedic rehabilitation models require ongoing evaluation after implementation to demonstrate the *relevance*, *efficiency*, *effectiveness*, and *equity* to ensure ongoing sustainability. Evaluation will need to incorporate continuous improvement with a focus on the *process*, *impact*, *outcome* and *structure*.

Process evaluation

This assesses how closely the model, as it was envisaged and described, is implemented. Deviations from the model are reviewed by evaluating the outcome, rather than assigning an error to an individual. The intention is to improve the process. This approach increases the potential for change, new learning, and ultimately for achieving the program goals.

An example of a process indicator for the orthopaedic rehabilitation models is:

- > Percentage of health professional staff who followed the model.

Impact evaluation

Impact evaluation informs how the Model influences those involved. Responses to surveys and focus groups leads to feedback and occasionally to changes to the model. Stakeholders are diverse and require different approaches. Rehabilitation units may need ongoing, onsite, one to one assessment, whilst patients and GPs need a 'case by case' phone call or survey.

The tools to assess impact of the Model include:

- > stakeholder 'buy-in' assessment
- > client satisfaction surveys
- > GP surveys
- > patient quality of life outcomes
- > satisfaction survey of key health professionals.

Outcome evaluation

The key requirements of the three orthopaedic rehabilitation models described, inform standards of care and identify data required to assess outcomes. The systematic collection and analysis of evidence-based indicators forms the mainstay of the outcome assessment.

The data for these indicators includes:

- > average acute length of stay
- > patient indicators including quality of life activities of daily living and morbidity and mortality
- > cost effectiveness of the orthopaedic rehabilitation models.

Structural evaluation

The structural evaluation assesses the essential elements required to put the orthopaedic rehabilitation models into action and maintain them. This includes assessments of:

- > Stakeholder Buy-in.
- > Budgetary review
- > Staff participation in ongoing education.

Further details on evaluation specifics for each of the three orthopaedic rehabilitation models is provided in Appendix 8, with arthroplasty as an example.

Appendices

Appendix 1: Service elements

The following service elements are consistent with those described in the *Statewide Rehabilitation Service Plan, 2009-2017*².

Access and equity

Service planning is based on population need. A comprehensive range of rehabilitation services are available to maximise an individual's independence and function, recognising that not "one size fits all". This is of particular importance for minority groups and people from culturally diverse backgrounds. Further, there are multiple entry points to a service and service access is based on clinical need not based on age. Services are provided as close to an individual's home as practical. Various elements are more important for some clinical priority areas than others. For example, access to care awaiting placement for older people.

Access and triage

Multiple access points into rehabilitation and streaming of patients into the most suitable

pathway / service following comprehensive assessment is needed. This will ensure the suite of available rehabilitation services work successfully and alignment with the key principles of this rehabilitation model.

Early assessment, screening and identification of a person's rehabilitation needs and risk of functional decline should be undertaken as soon as practicable following presentation to hospital. The timing will be dependent on the individual's medical status but may be possible within the emergency department. This process will be assisted by the availability of a multi-disciplinary rehabilitation team, including access to a medical specialist, to triage referrals to inpatient, ambulatory and outpatient rehabilitation.

Shared care models in the acute setting

Individuals, especially older people, admitted to hospital for an acute episode are at high risk of loss of function and independence due to periods of inactivity, immobility and prolonged bed rest. This is further impacted by individuals who have multiple co-morbidities, experience complications and/or require lengthy periods in intensive care.

Interventions that either prevent decline or maximise function should start immediately on admission to hospital for most patients over 65 and those with neurological and orthopaedic conditions such as stroke, brain injury and hip fracture - if there are no medical contraindications for this to occur. This may facilitate direct discharge home with early supported discharge and ambulatory rehabilitation services.

Shared care models suitable for acute settings include integrated pathways where specialist rehabilitation teams work with physicians and surgeons (e.g. stroke, brain injury); and early consultation and transfer to specialised wards and services (e.g. spinal cord injury, young complex disability).

Inpatient rehabilitation

Inpatient rehabilitation is the most intense level of care which provides an interdisciplinary team approach to enhance and restore an individual's function following a disabling injury, illness or surgical intervention.

Individuals in inpatient rehabilitation require a goal orientated program of medical and therapy interventions to regain independence, confidence and optimum function.

The program of rehabilitation will vary for each patient depending on presenting condition and subsequent cognitive and physical deficit. The individual's goals also form a rehabilitation variable. This will influence the health professionals involved in the program and intensity of therapy.

Suitable environments and staffing need to be available for inpatient rehabilitation as per the Australasian Faculty of Medicine Standards 2005: Adult Rehabilitation Medicine Services in Public & Private Hospitals. Requirements vary depending on medical condition⁸.

Rehabilitation in the home

Rehabilitation in the home is provided in an individual's own home, with the goal of maximising independence and function. A skilled multidisciplinary team provides therapy with intensity varying depending on individual need. Medical specialists need to form part of this team and be available to undertake home based assessments and interventions as needed and work closely with the individual's general practitioner.

Adequate social supports, suitable and safe environment and availability of required equipment are essential elements that must be considered if an individual is to receive rehabilitation at home.

There must be multiple access points to rehabilitation in the home to minimise hospital inpatient stays and avoid admissions. Access into the program needs to be coordinated by a program manager with referrals accepted from emergency, inpatient care, community teams and general practitioners.

Centre-based day rehabilitation

Day Rehabilitation provides low to moderate therapy, depending on individual patient needs in a non-inpatient setting. The patient attends the Day Rehabilitation program 2-5 times / week for approximately half a day at a time for a program of rehabilitation to maximise independence and function. The length of time a patient attends a Day Rehabilitation program is time limited and usually ranges from between 6-12 weeks.

The patient resides at home when not attending the Day Rehabilitation program and therefore must have a suitable environment and social supports to facilitate this.

An interdisciplinary rehabilitation program, including medical, nursing and allied health input is provided to individuals attending a Day Rehabilitation program.

The lack of available transport options can often impact on an individual's ability to access ambulatory rehabilitation services. The availability of transport options that are accessible and cost efficient needs to form a part of all ambulatory and community based rehabilitation services.

Specialist outpatient clinics – medical and allied health

Outpatient clinics provide individuals with the opportunity to access specialist medical assessment and review and therapy interventions to improve and maintain their independence and function. These clinics are usually most suited to individuals who only require a single discipline intervention or have a specific medical condition requiring intervention.

Development of outpatient clinics that are interdisciplinary including medical, nursing and allied health that focus on specific areas requiring rehabilitation post injury or illness such as driving, swallowing and spasticity is important.

Community therapy programs

Centre based (e.g. Day Therapy Centres) and home based community therapy programs provide therapy based interventions to facilitate an individual to maintain, rehabilitate or recover a level of independence that allows them to remain living at home in the community.

These programs are provided by either a single discipline or a multi-disciplinary team, such as occupational therapists, physiotherapists and speech pathologists and are goal orientated with a care plan developed in consultation with the patient, family or significant others.

Transport needs to be considered as an essential component of community therapy programs to ensure individuals are able to successfully access these programs to facilitate their independence and improvement.

Transition services

Transition services provide accommodation and / or support services to patients requiring complex planning and organisation or 'phased' discharge options from rehabilitation services into the community. Transition services should:

- > have shared care arrangements with community organisations such as Disability SA,
- > be based on explicit shared risk frameworks between SA Health, patient, carers and involved community organisations
- > be time-limited.

Appendix 2: Fragility fracture background information and data

Key facts and current evidence

Health care costs for fragility fractures are high and rising as fracture incidence rises, consistent with Australia's ageing demographics and this trend is set to continue over the coming years, with a 15% increase projected every five years in hip fracture until 2026 (OA, 2007)⁴. Of note, previous projections have underestimated the actual incidence of hip fractures by 15% (OA, 2007)⁴. Other fragility fractures are also set to rise with vertebral, humeral and pelvic fractures increasing by 12% every five years and Colles' fractures by 10% every five years until 2036 (OA, 2007)⁴.

Over \$1.9 billion is spent each year in Australia on direct costs alone for care of individuals experiencing fragility fracture. This includes hospital treatment, rehabilitation, therapy and home care (OA, 2007)⁴.

Around 64,000 hospital separations in Australia each year are as a result of bone fractures in people aged over 55, with hip fracture the most common followed by fractures of the forearm and lower leg (OA, 2007)⁴.

Fragility fractures are a growing issue for the older person. Nearly all individuals who suffer a fragility fracture as a result of a fall are suffering from at least one geriatric syndrome (falls, gait instability) and often more (continence, cognitive impairment, iatrogenic disease, osteoporosis). Whilst definitive surgical management of the fracture is essential, fragility fractures are as much a disease of the brain as the bone, given the high incidence of dementia, delirium and gait abnormalities. A holistic approach exemplified by an orthogeriatrics model of care will address such issues.

Fragility fractures are commonly the combined result of minimal trauma, often related to a fall, and underlying osteoporosis (BOA, 2007)⁵. Fragility fractures and resultant disability (Cripps, 2008)⁹ can have a significant impact on an individual's morbidity, quality of life and risk of institutionalisation. Whilst most research has been conducted on hip fractures, other fragility fractures including of the humerus, radius, pelvis and vertebrae will impact on an individual's continued independence, recovery and quality of life to varying degrees (Cripps, 2008)⁹.

Ten percent of individuals with a hip fracture die within a month and one third are deceased at a year post injury, also for many others their hip fracture may be a contributor to their final illness (BOA, 2007)⁵. Research shows that many individuals do not return to their pre-fracture lifestyle (Hall, 2000; Cripps, 2008)^{9, 10}. Of individuals surviving post hip fracture, 50% require long term help with routine activities and can not walk unaided with 25% requiring full time nursing home care (OA, 2007)⁴.

European studies have shown that the Disability Adjusted Life Years (DALYs) lost as a result of fragility fractures due to osteoporosis are greater than common cancers (including breast, colon, stomach and prostate) and chronic diseases such as asthma, heart disease and migraines (OA, 2007)⁴.

Australian data has shown that after any low trauma fracture, mortality is increased for at least 5 years post-fracture and for those with hip fracture, mortality is increased for up to 10 years. A subsequent fracture increases the risk for a further five years (Bliuc, 2009)¹¹.

It is clear from the available research that prompt, effective, multidisciplinary management and secondary prevention can improve quality, reduce risk of subsequent fractures and at the same time reduce costs for fragility fractures and in particular hip fracture care. Key elements of good care include: prompt orthopaedic assessment and care; rapid comprehensive assessment (medical, surgical and anaesthetic), minimal delay to surgery, accurate and well performed surgery, prompt mobilisation, early multidisciplinary rehabilitation, early supported discharge with ongoing community rehabilitation and secondary prevention. This is not only better care but is also less costly care (BOA, 2007)⁵.

Orthogeriatric model of care

The Orthogeriatric model of care was originally developed in the 1950's in the United Kingdom by Devas and colleagues and has evolved further since then. It is care provided to older people with orthopaedic conditions collaboratively by orthopaedic services and services specialising in the care of the older person. Key aspects of this model include rapid definitive treatment; multi-disciplinary input from an early stage; and strong communication between all members of the team, the individual and his/her family / carers to facilitate best outcomes (ANZSGM, 2005)¹².

The orthogeriatric model of care has demonstrated improved outcomes in medical care, length of stay (Elliot, 1996)¹³, improved management of perioperative medical complications, better coordination of multi-disciplinary team work, reduced adverse events (BOA, 2007)⁵, decreased inpatient mortality and improved return of the individual to his/her pre-morbid accommodation. (Thwaites, 2005)¹⁴.

Surgery

In order to maximise an individual's rehabilitation potential and opportunity for recovery, surgery following a fragility fracture should occur within 24 hours provided their medical condition allows (SIGN 111, 2009)¹⁵. Research indicates that a delay of more than 24 hours between admission and operation for individuals experiencing hip fracture is associated with increased mortality; increased risk of complications such as pulmonary embolism and deep vein thrombosis (SIGN 111, 2009)¹⁵; and an increased length of hospital stay (Orosz, 2004)¹⁶. Further, surgical treatment for fragility fracture should occur during daytime hours as surgery conducted at night time has been shown to increase mortality (SIGN 111, 2007)¹⁷. Delay to surgery is common and is most often as a result of organisational factors such as difficulty accessing operating theatres rather than reasons of medical instability (Tha, 2008)¹⁸.

Rehabilitation

Rehabilitation after a fragility fracture is important. Active rehabilitation of individuals following hip fracture has been shown to reduce hospital length of stay, improve physical independence and lower need for supported accommodation after discharge (Cameron, 1993)¹⁹.

Secondary prevention

The strongest predictor of a future fragility fracture is having had one already, therefore it is vital that secondary prevention strategies are instituted post fracture to prevent further fragility fractures. Sustaining a fragility fracture at least doubles the risk of future fractures (BOA, 2007)⁵

Osteoporosis is predictable, preventable and the most common bone disease affecting humans. It is described as a long term condition of asymptomatic onset and lifelong duration, that is treatable but often left untreated, leading to exacerbations in the form of fragility fractures, a major and increasing cause of morbidity (BOA, 2007)⁵.

As a result osteoporosis is an Australian national health priority (OA, 2007)⁴. Falls are associated with over 80% of osteoporotic fractures (Sambrook et al, 2007)²⁰. Studies have found that the majority of individuals who have fragility fractures are not assessed for osteoporosis and offered secondary prevention management despite its proven value, Appropriate secondary prevention is likely to moderate overall fragility fracture costs (BOA, 2007; Harrington, 2002)^{5 21}.

The first key element of secondary prevention includes assessment and intervention to preserve or improve bone strength. Treatments need to include calcium and Vitamin D supplements (Thwaites, 2005; BOA 2007; SIGN 111, 2007)^{5 14 17} and anti-resorptive therapy. (BOA 2007; SIGN 111, 2007 Scottish, 2002)^{5 17 22}.

The second key element of secondary prevention includes assessment and intervention to reduce risk of falling. Effective falls prevention includes multi-factorial falls prevention programs including such interventions as medication review, balance and strength re-training, improving vision, management of dizziness, continence and modifications of environmental risk factors (Cochrane, 2008; BOA 2007; SIGN 111, 2007)^{5 17 23}.

Osteoporosis Australia recommends that fracture coordinators should be appointed in both the hospital and community to redress the inconsistent provision of secondary prevention, thereby attempting to reduce the increasing numbers of individuals experiencing fragility fractures and expected to in the future (OA, 2007)⁴.

Hospital fracture coordinators should identify individuals suitable for anti-osteoporotic therapy and ongoing care requirements which may include organising bone mineral density testing, screening tests for secondary causes of osteoporosis, liaison with general practitioners and screening and referral to multifactorial falls prevention programs. These roles have proven effective in a recent study referred to by Osteoporosis Australia, 2007.

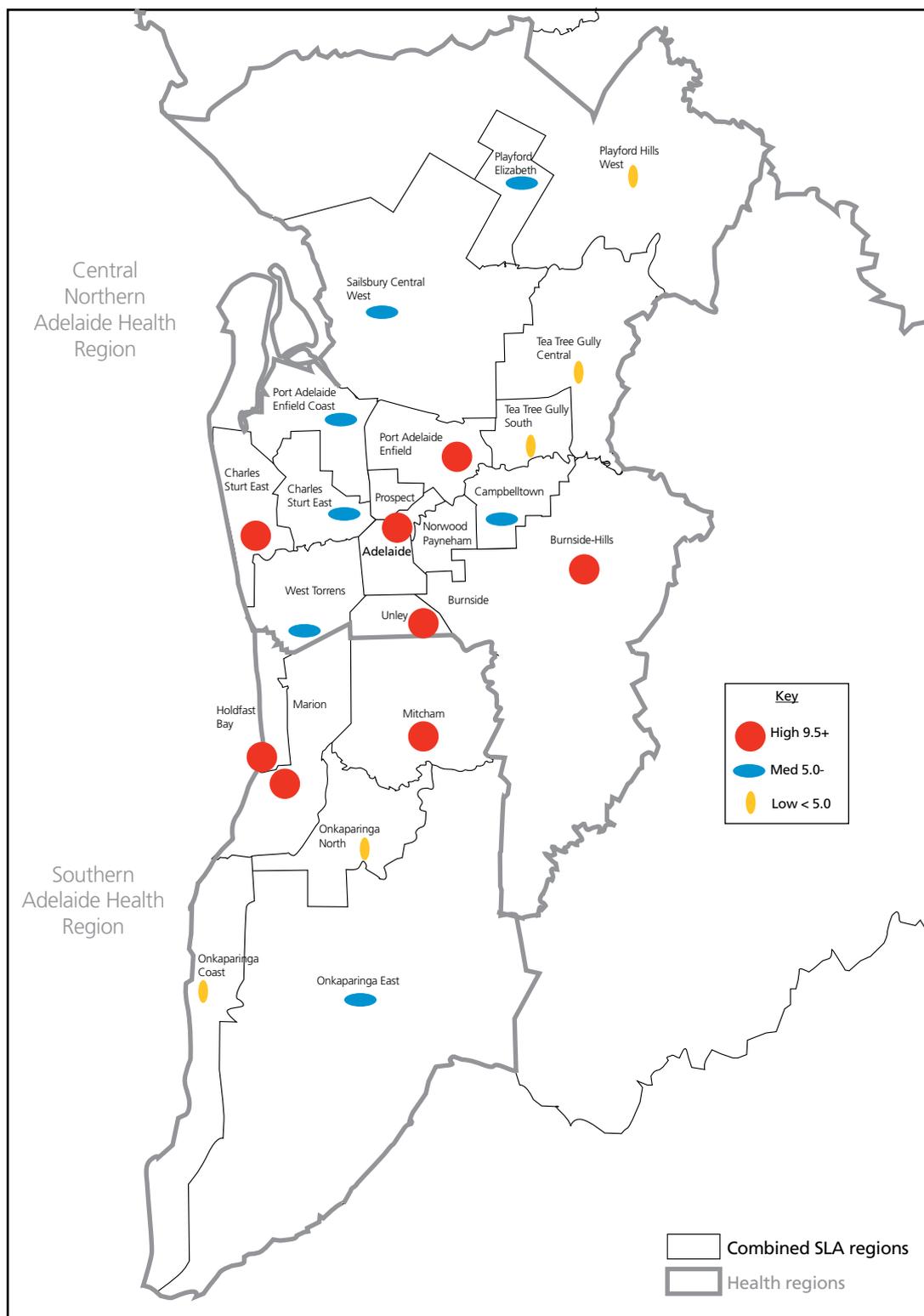
With regards to community management, area health services across Australia should provide follow up to every individual who has sustained his/her first fragility fracture (OA, 2007)⁴. This is further supported by the British Orthopaedic Association, which recommends fracture liaison services should be available to ensure follow-up of secondary prevention and implementation of recommended strategies, thereby reducing future resource and cost demand on health services (BOA, 2007)⁵.

Guidelines

There are a number of best practice guidelines and position papers that can be utilised when providing care to individuals who have had fragility fractures, thereby ensuring care is provided based on the best evidence. These include:

- > Australian and New Zealand Society for Geriatric Medicine - Position Statement No 5: Orthogeriatric Care, 2005¹²
- > British Orthopaedic Association – 111 The Care of Patients with Fragility Fractures, 2007⁵
- > Scottish Intercollegiate Guidelines Network (SIGN) - Prevention and Management of Hip Fracture in Older People: A national clinical guideline, 2002²²

Figure 5: Crude incidence of fractured neck of femur in metropolitan South Australia, July 2001-June 2006, based on matched acute and rehabilitation admissions



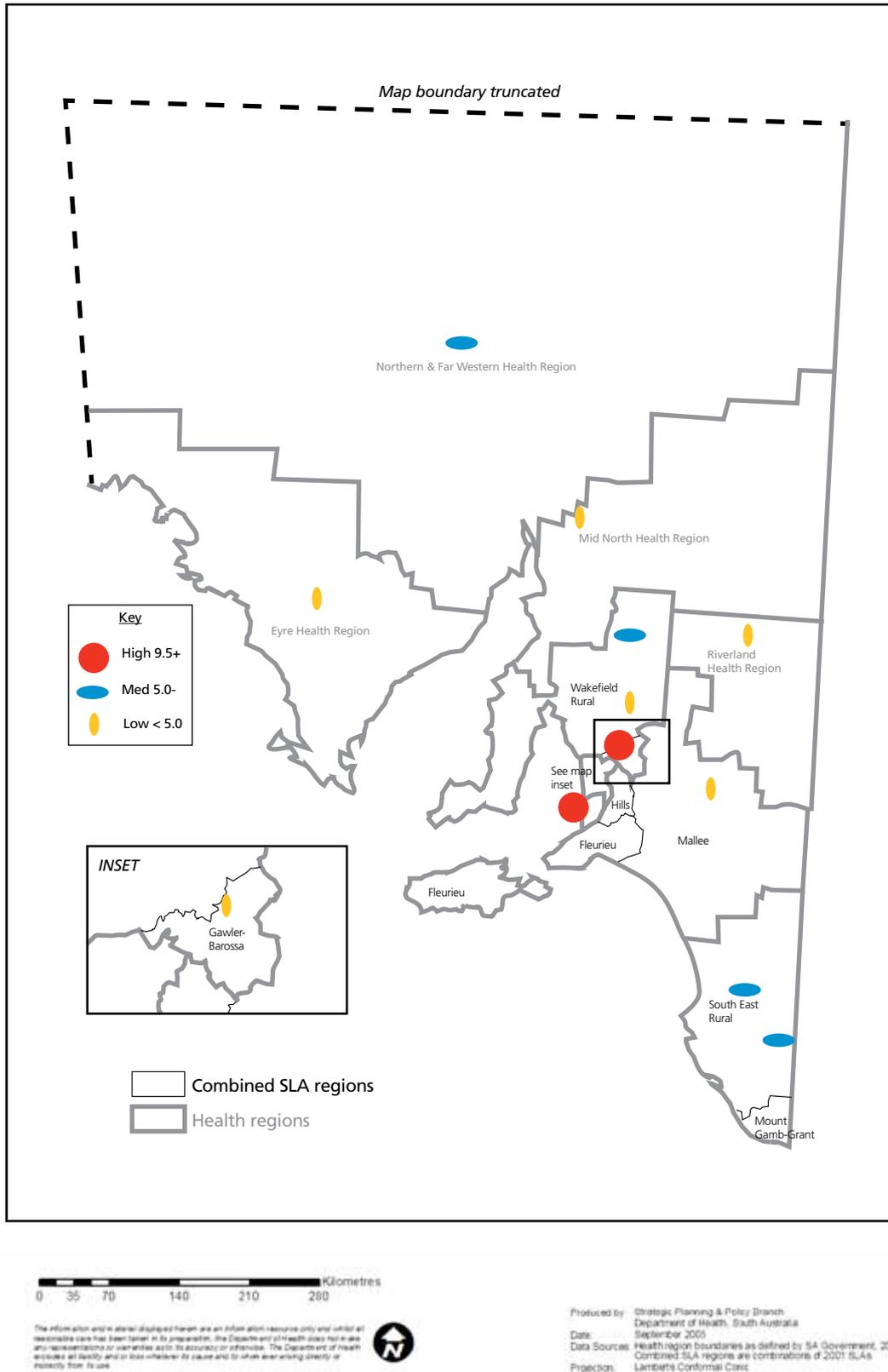
0 2.5 5 10 15 20 Kilometres

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Produced by: Strategic Planning & Policy Branch
 Department of Health, South Australia
 Date: September 2006
 Data Sources: Health region boundaries as defined by SA Government, 2004
 Combined SLA regions are combinations of 2001 SLAs
 Projection: Lamberts Conformal Conic

Figure 6: Crude incidence of fractured neck of femur in country South Australia, July 2001- June 2006, based on matched acute and rehabilitation admissions



- > Australian and New Zealand Society for Geriatric Medicine – Position Statement No 14: The management of older patients in the emergency department, 2008²⁴
- > Australian Commission for Safety and Quality in Health Care – Preventing Falls and Harm from Falls in Older People: Resources suite for Australian hospitals and residential aged care facilities, 2005²⁵.

Key South Australian statistics

The data presented in this section has been obtained from SA Health databases for the periods as specified.

Fractured Neck of Femur

Approximately two thirds of individuals experiencing a fractured neck of femur in South Australia are female with the occurrence of fracture neck of femur increasing with age.

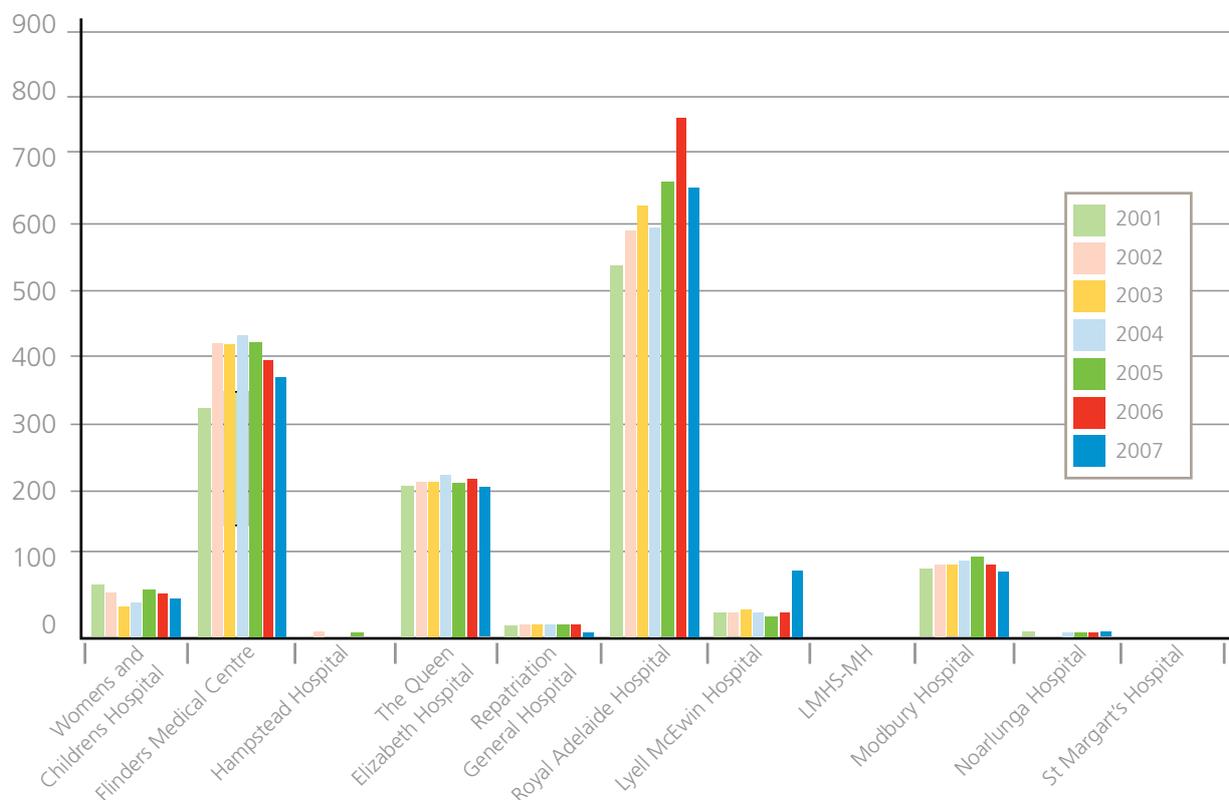
The geographic spread of the incidence of fractured neck of femur is clearly age related as can be seen in figure 5 and 6. In rural areas the Adelaide Hills and Fleurieu have the highest incidence of fractured neck of femur.

The proportion of the population who are indigenous experiencing a fractured neck of femur is very low, at just 1% for the period 2001-2007 given the estimated indigenous South Australian population in 2006 of 1.7%.

In metropolitan Adelaide the majority of individuals experiencing a fractured neck of femur are admitted to Royal Adelaide Hospital, followed by Flinders Medical Centre and The Queen Elizabeth Hospital, as shown in figure 7.

The average length of acute stay for individuals admitted with a fractured neck of femur in 2007 was 10.57 days, this is an improvement from 2005 when it peaked at 14.75 days. The combined acute and rehabilitation stay for 2007 was an average of 35 days.

Figure 7: # NOF, By Metro Hospital, 2001-2007



Data linkage of acute and rehabilitation admissions undertaken from 2001-2007 indicates that of acute admissions to hospitals for a fractured neck of femur, 21% were discharged to rehabilitation. A further 5.5% were administrative discharges and it is probable that the majority of these were discharges to rehabilitation type care.

Mortality data provided by SA Health indicates that almost 9% of individuals experiencing a fractured neck of femur die within 30 days of initial admission for the condition. At one year post initial admission only 73% of individuals who have fractured their neck of femur are alive.

Table 2: Mortality data for fractured neck of femur, July 2001-June 2007

	Valid Percent	Cumulative Percent
Died between 0-30 days of initial admission for condition	8.8	8.8
Died between 31-90 days of initial admission for condition	6.8	15.6
Died between 91-365 days of initial admission for condition	11.2	26.8
Surviving at 1 year following initial admission for condition	73.2	100.0
Total numbers of individuals based on	N = 2,532	

There has been a significant change in the number of fractured neck of femur separations occurring in public and private South Australian hospitals over the past seven years. As shown in the table below, from 2001 to 2007 the number of fractured neck of femur separations increased by 17.4% in public hospitals and decreased by 24.7% in private hospitals.

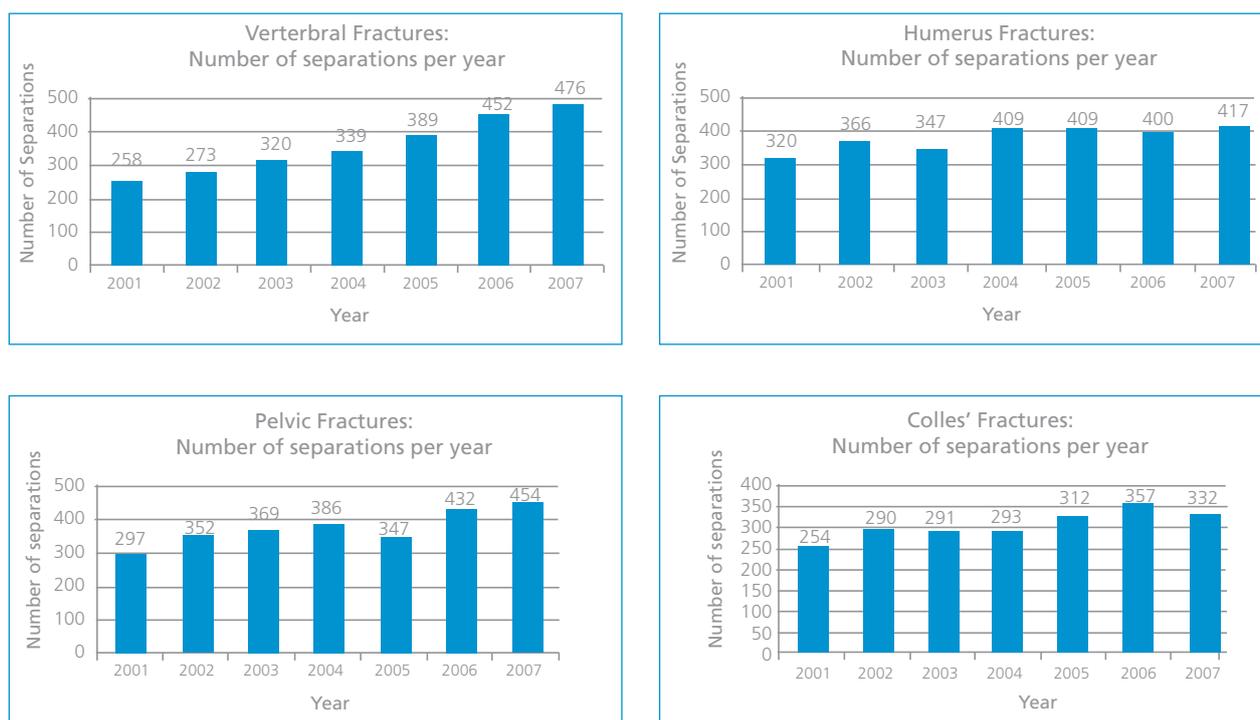
Table 3: Separations for fractured neck of femur in South Australian public and private hospitals, 2001-2007, principal diagnosis only.

Year	SA Public Hospitals	SA Private Hospitals
2001	1583	667
2002	1767	558
2003	1818	511
2004	1765	400
2005	1811	455
2006	1963	460
2007	1858	502
% change from 2001 to 2007	+ 17.4% (increase)	-24.7% (decrease)

Other fragility fractures (vertebral, pelvic, humeral and Colles')

Whilst there are not as many public hospital separations for vertebral, pelvic, Colles' (distal radius) and humeral fractures as fractured neck of femurs they still constitute a significant number of hospitalised injuries in the over 55 year age group, especially when totalled. On average there are over 1500 public hospital separations per year for individuals who have experienced a vertebral, pelvic, Colles' or humeral fracture as seen in figure 8. Pelvic and vertebral fractures have increased in number over the past 2 years.

Figure 8: Number of hospital separations for vertebral, pelvic, Colles' and humeral fractures, 2001-2007.



Individuals experiencing a vertebral, pelvic, humeral or Colles' fracture in metropolitan Adelaide are most likely to be admitted to Royal Adelaide Hospital, Flinders Medical Centre or The Queen Elizabeth Hospital. This is consistent with individuals experiencing fractured neck of femur.

In addition to those who are admitted for management of these fractures, there are also many individuals who experience these fractures who are discharged directly from emergency departments following treatment or managed by general practitioners. SA Health data for these individuals is not available. However a Victorian study by Boufous et al, 2007 focused on people aged 50 years or older and reports 67.8 – 82.6% of individuals experiencing a pelvic fracture are admitted to hospital with only 26.2-28.9% of those experiencing a fractured wrist admitted to hospital. Hospitalisation is more likely to occur with increased age.

Admissions for Colles', pelvic and humeral fractures are more common in females than males, in particular the upper limb fractures of humerus and Colles'. These fragility fractures are most often experienced by individuals aged between 75 and 89 years of age.

The average length of stay in acute care for individuals admitted to hospital with fragility fractures other than fractured neck of femur is variable. Those experiencing pelvic fractures stay the longest, with an average length of stay of 16.9 days, followed by vertebral fractures at 12.9 days, humeral fractures at 11.8 days and the shortest length of stay is for Colles' fractures at 4.5 days. More detail is provided in figure 8.

The majority of individuals experiencing vertebral, humeral, pelvic or Colles' fractures are discharged directly home (52.56%). Transfers to rehabilitation are likely to be approximately 20%.

Appendix 3: Arthroplasty background information and data

Given one in six people or 15% of South Australia's population are aged 65 years or over, the highest proportion of older people in the nation, it is anticipated that the number of arthroplasty surgeries required in the next decade will double (AOA NJRR Report, 2008)⁷.

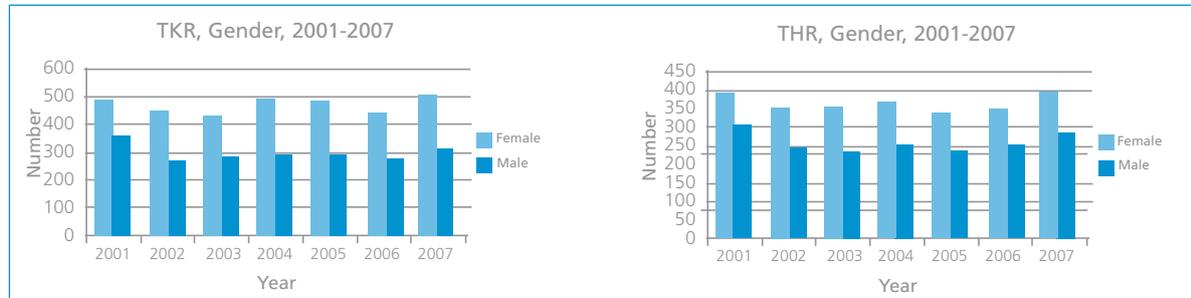
Over 6,500 hip and knee arthroplasty surgeries were performed in South Australia in 2007-08 with 1,735 of these surgeries performed in public hospitals, hence a significant number performed within private hospitals.

Of the 1,735 arthroplasty surgeries performed in public hospitals in 2007/08 there were 740 who had country South Australia postcodes with only 58% (428 individuals) receiving their arthroplasty surgery in the country.

Of the 740 country clients, 150 were down transferred to a country hospital or were provided with inpatient 'rehabilitation'

More females than males are receiving hip and knee arthroplasty surgery as shown in Figures 9 below.

Figure 9:

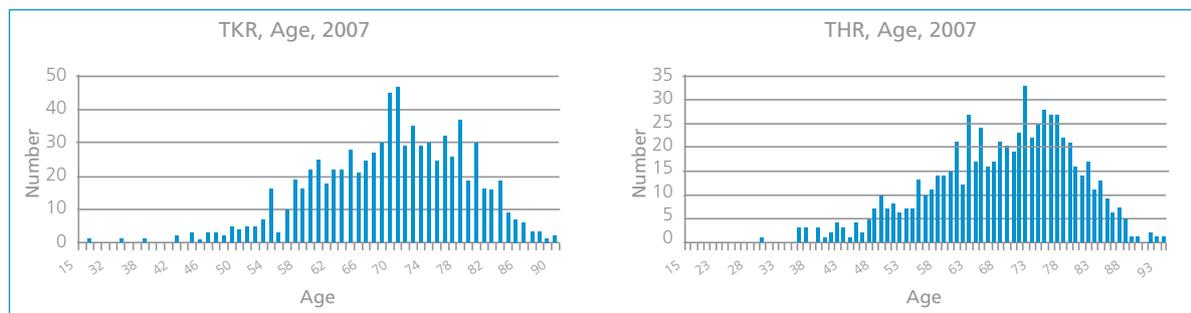


According to Australian Orthopaedic Association (AOA) national Joint Replacement registry (NJRR) figures, the number of hip and knee arthroplasty surgeries performed across Australia and in South Australia has doubled in the last decade and is anticipated to double in the next decade.

It is of note that the number of hip and knee arthroplasties undertaken in South Australian public hospitals in the last decade has not substantially changed, despite the doubling of the absolute numbers within the state, with the increased demand being absorbed by the private sector.

The majority of individuals who have hip or knee arthroplasty surgery are aged over 65, peaking at 70 years of age for knee arthroplasty and 72 years of age for hip arthroplasty based on 2007 data, as outlined in Figures 10.

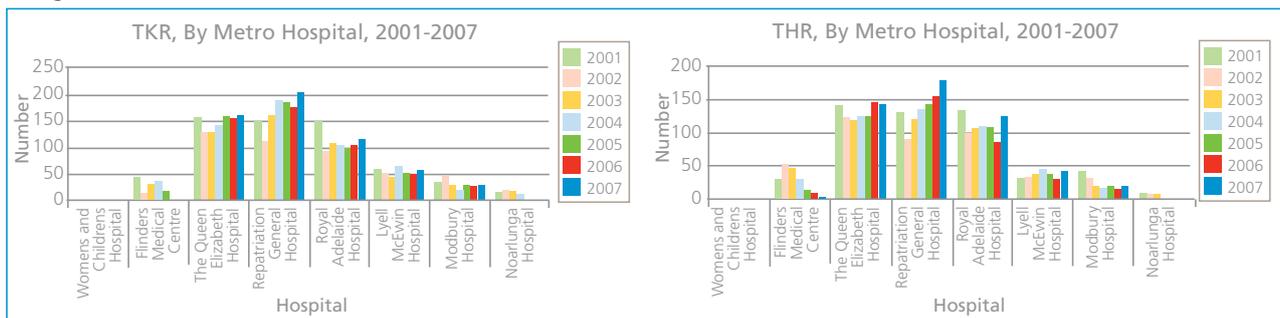
Figure 10:



For hip arthroplasties 1% of those having surgery are Aboriginal and for knee arthroplasties just 0.2% are Aboriginal for the period 2001-2007. This is extremely low when compared to the total indigenous population in South Australia, which was estimated at 1.7% of the total population in 2006.

In metropolitan Adelaide the majority of hip and knee arthroplasty surgeries occur at Repatriation General Hospital, The Queen Elizabeth Hospital and Royal Adelaide Hospital as shown in Figures 11.

Figure 11:



In country South Australia the five hospitals that undertake the most hip and knee arthroplasty surgeries are Mt Gambier, Whyalla, Mt Barker, Murray Bridge and the Riverland, based on 2001-2007 data. Figures 12 demonstrate this.

Figure 12:



The average length of stay for hip and knee arthroplasty surgery has decreased over the past nine years. In 2001 the average length of stay in acute care for knee arthroplasty surgery was 7.02 days decreasing to 6.04 days in 2009. Similarly hip arthroplasty surgery had an average length of stay of 7.56 days in acute care in 2001 decreasing to 6.98 days in 2009 as shown in Figures 13. Further the average length of stay in a public hospital for country South Australians undergoing primary joint arthroplasty in 2007/08 was approximately 7.5 days as opposed to metropolitan public hospital clients with an average discharge time of 5 days.

Figure 13: Average length of stay for hip and knee replacements, 2001-2009 (Note: years are financial July to June)



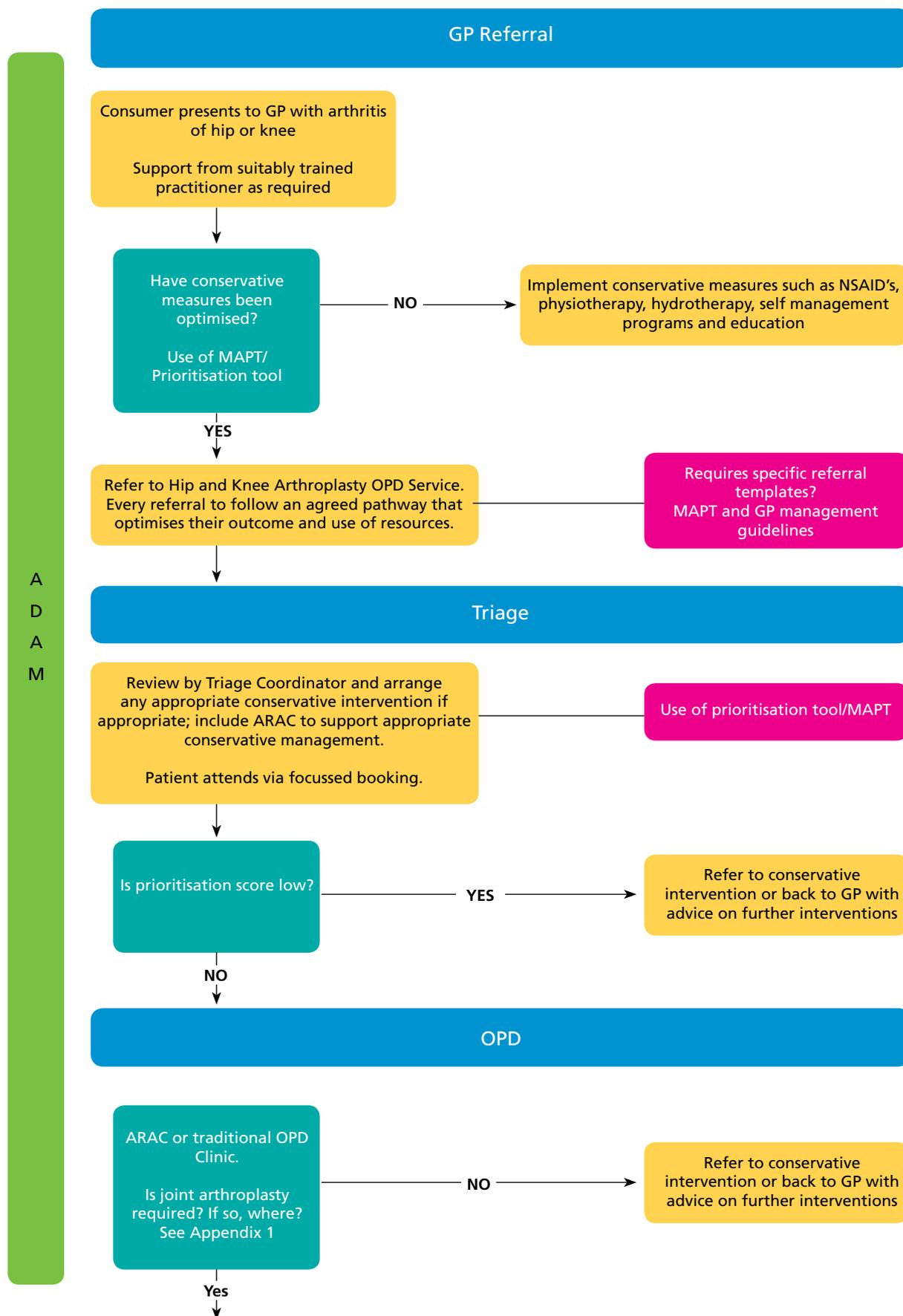
The majority of individuals who undergo hip or knee surgery are discharged directly home from acute care; 66% who have primary hip replacements in metropolitan public hospitals and 77% who undergo primary knee replacements in public metropolitan hospitals. The next most significant discharge destination is administrative discharge / down transfer which would normally indicate transfer to rehabilitation. This is consistent for discharge destinations from both metropolitan and country hospitals.

It is of note that early results from active pre-habilitation programs are already impacting on discharge to home statistics, with 91% discharging directly home (Orthopaedic Prehabilitation Project An optimised Discharge Planning Tool for Patients undergoing Hip and Knee Arthroplasty – development, implementation and evaluation-RGH)⁶.

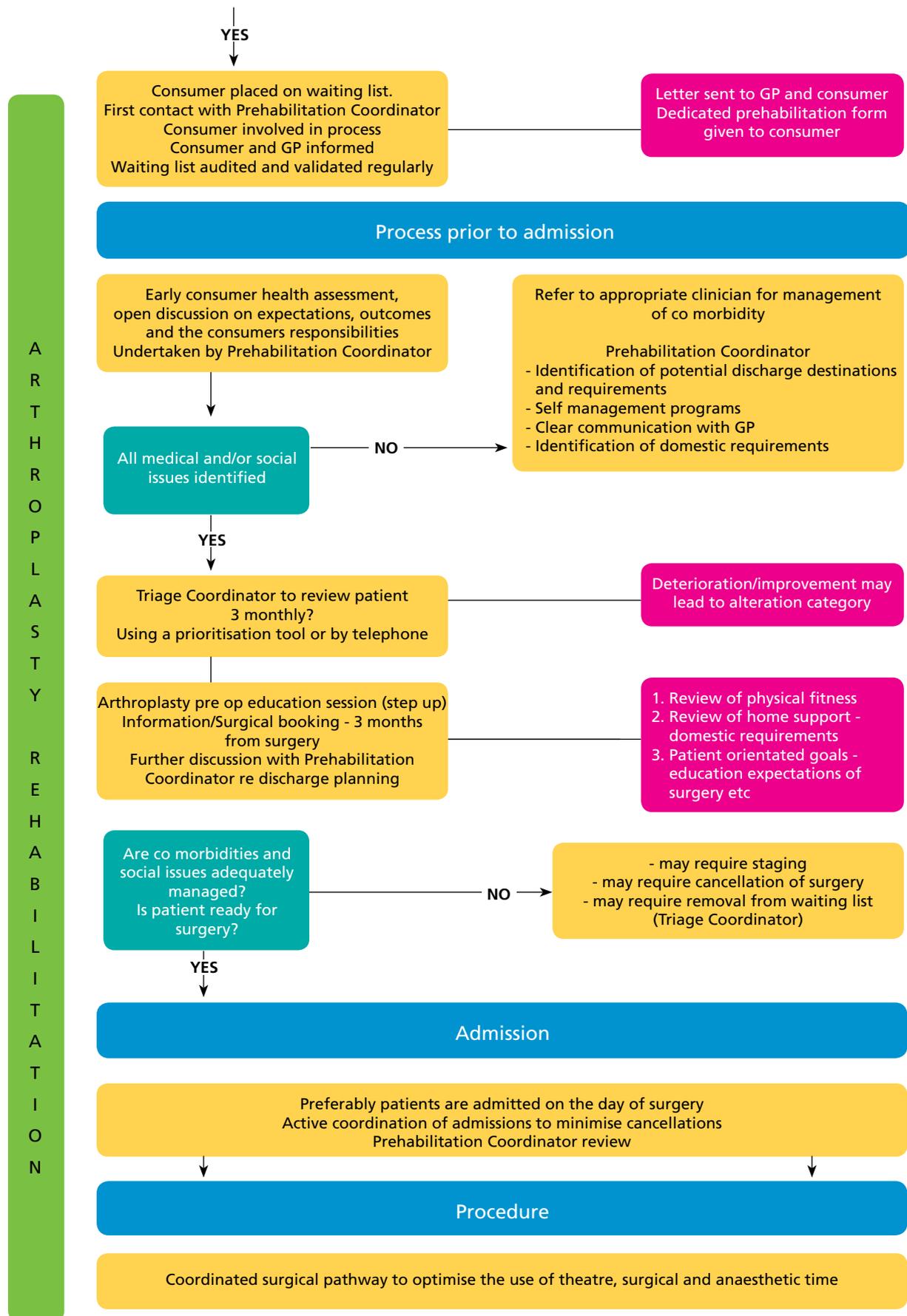
Appendix 4: Principles of waiting list management

1. Patient to retain the right to choose their hospital – waiting list time, geography of hospital, nearest hospital
2. Participating hospitals should maintain a minimum of 40 cases per annum.
3. Maximum waiting time for ARACs (Arthritis Review and Assessment Clinic) should be 3 months.
4. Patients undergoing surgery in any hospital must be followed up in that hospital for a minimum of twelve months.
5. Surgeons to have final choice of patient selection, prosthetic choice and ruling on prioritisation.
6. All surgeons will be required to be involved in that state-wide communal waiting list strategy.
7. All patients to be reviewed by operating surgeon 2 months prior to surgery, ie approximately 6 weeks before Pre-Admission Clinic.
8. Optimal waiting time for elective hip and knee surgery should be less than 12 months.
9. Patients will be removed from the waiting list, all things being equal, in the order that they are put on, co-morbidities and complexity of surgery may compromise that principle.
10. Adequate conservative management for patients with arthritis not on the waiting list. This could be community based.

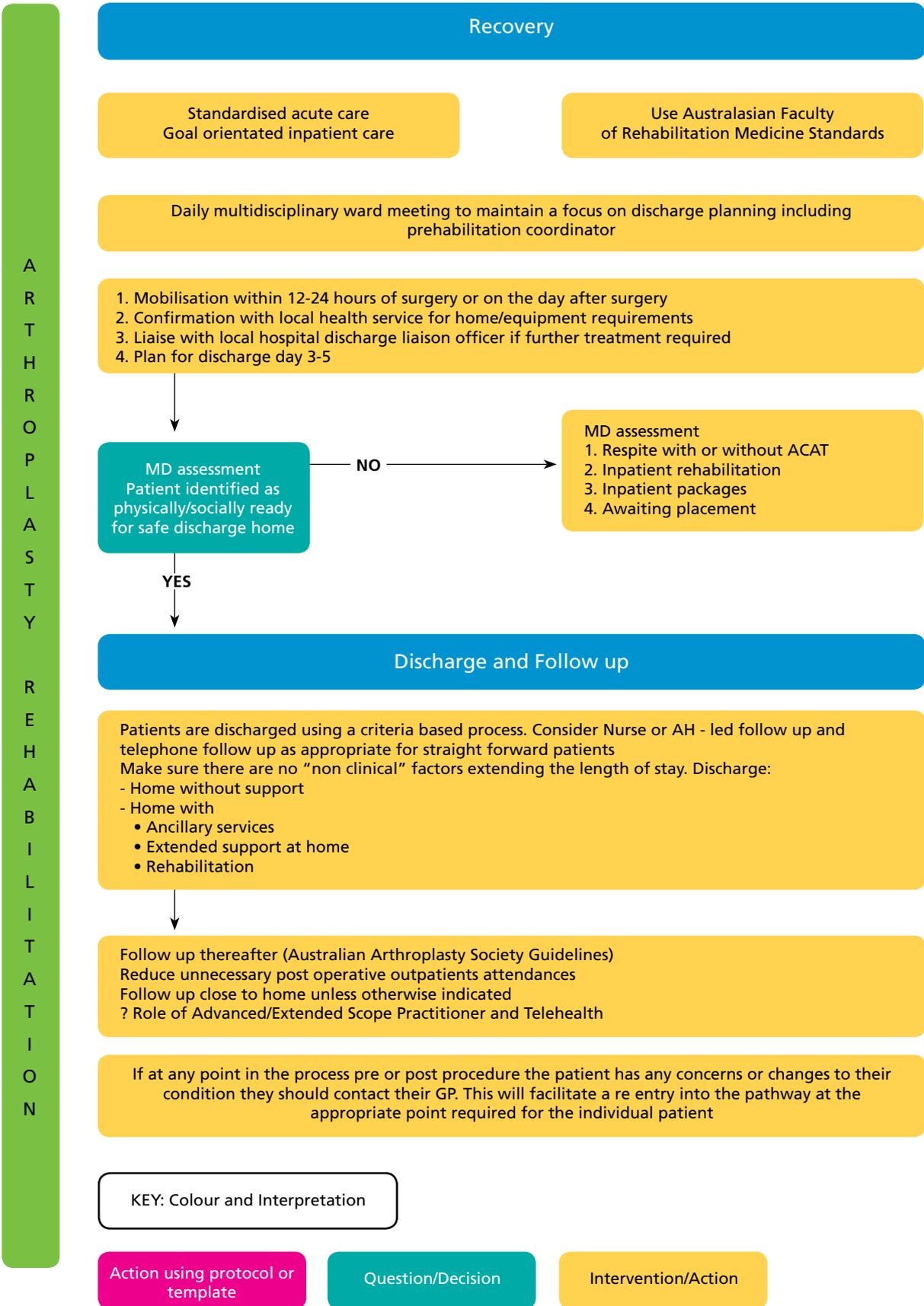
Appendix 5: Orthopaedic surgery pathway



Continued



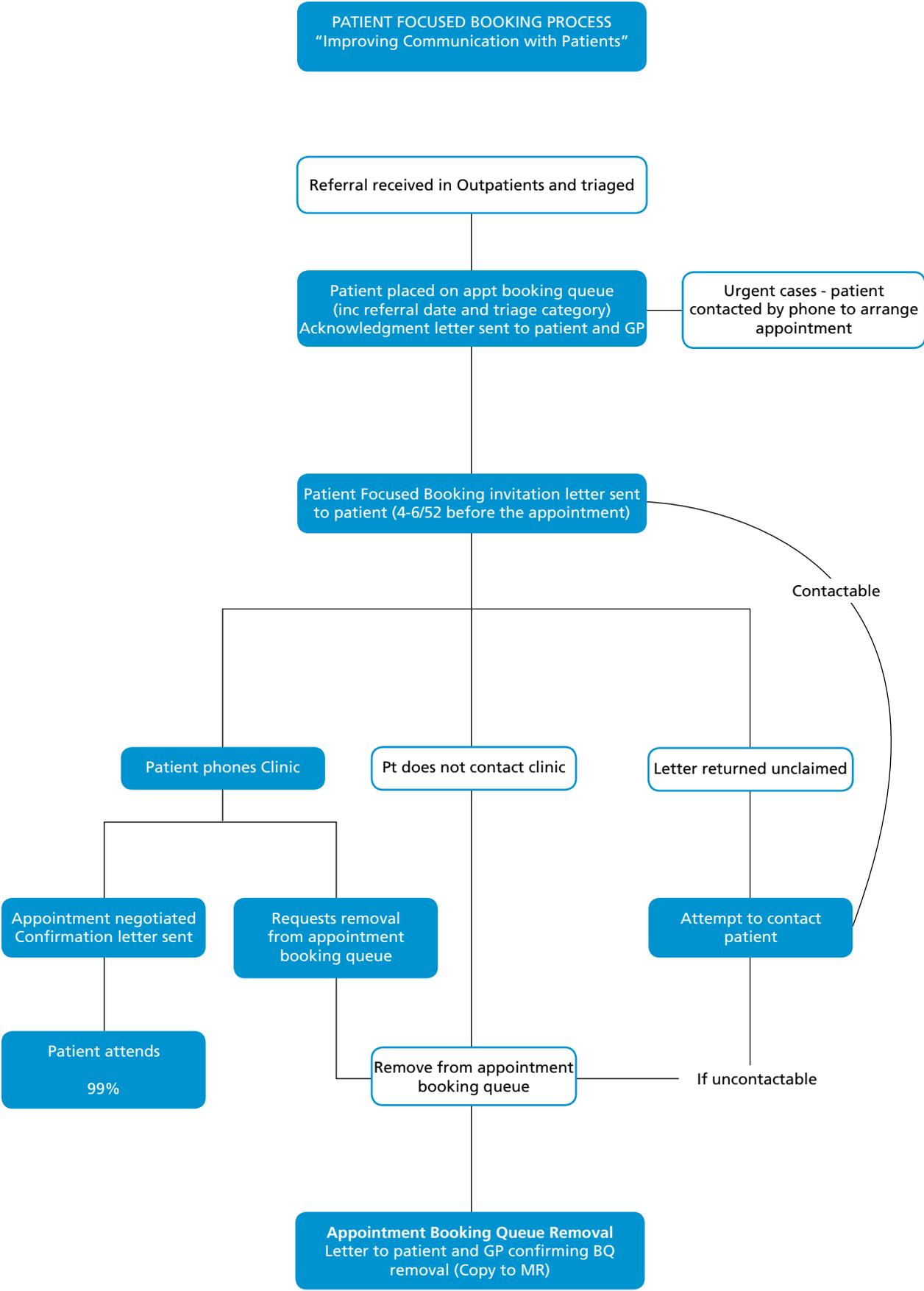
Continued



Appendix 6: Possible patient outcomes following ARAC service and implications for orthopaedic outpatient clinic and other services



Appendix 7: Patient focussed booking process



Appendix 8: Model evaluation

Possible evaluation components to consider for the arthroplasty rehabilitation model are provided below as an example. Fragility fracture and general orthopaedic trauma evaluation components based on process, impact and outcome require further consideration and development prior to model implementation.

Process evaluation

- > percentage of staff who followed the model, particularly the prehabilitation assessment and its sequelae.
- > percentage of clients receiving a prehabilitation assessment.
- > percentage of clients who received equipment/home environment needs prior to surgery and had equipment/services in situ on planned discharge day.

Impact evaluation

The tools to assess impact of the model include:

- > stakeholder 'buy-in' assessment
- > client satisfaction surveys
- > GP survey of communication about, knowledge of and satisfaction with their clients undergoing arthroplasty surgery of the hip and knee
- > client quality of life outcomes and satisfaction with their hip or knee arthroplasty surgery
- > satisfaction survey of key health professionals who provide prehabilitation and rehabilitation services about access to supervision and training and to assess staff retention issues

Outcome evaluation

The data for these indicators includes:

- > average length of time between each stage of the model - referral, being assessed, being placed on the waiting list for hip or knee arthroplasty, having a prehabilitation assessment, being admitted and undergoing the arthroplasty
- > average acute length of stay
- > percentage of individuals achieving planned discharge destination, assessed and managed 'close to home', and cancellations at a late stage and the reasons
- > patient indicators including quality of life activities of daily living and morbidity and mortality
- > the cost effectiveness of the model at each public hospital arthroplasty site
- > potential voids in service delivery of the model at each public hospital arthroplasty site and through the divisions of general practice
- > the use and functionality of the prioritisation tool

Structural evaluation

Possible areas for assessment and evaluation include:

- > stakeholder Buy-in.
- > budgetary review
- > staff participation in ongoing education.

Appendix 9: Membership of orthopaedic rehabilitation steering committee

Orthopaedic rehabilitation steering committee

Name	Organisation
Elaine Ashworth	Senior Allied Health Advisor, CHSA
Matthew Beard	Lead Physiotherapist, Spinal Assessment Clinics, Royal Adelaide Hospital
Maree Braithwaite	Senior Occupational Therapist, St Margaret's Hospital
Chris Cain	Chair, Statewide Orthopaedic Clinical Network
Nancy Cullen	Orthopaedic Surgeon
Owen Davies	Senior Consultant Geriatrician, Repatriation General Hospital
Karen Dixon	Coordinator – Patient Journey, CHSA
Pat Griske	Consumer Representative
Tony Hewitt (Chair)	Director, Physiotherapy, Repatriation General Hospital
Vicki Hume	Senior Occupational Therapist, Hampstead Rehabilitation Centre
Joe Levy	General Practitioner
Graham Mercer	Orthopaedic Surgeon, Repatriation General Hospital
Nigel Quadros	Rehabilitation Specialist, The Queen Elizabeth Hospital and St Margaret's Hospital
Michael Shanahan	Rheumatologist, Repatriation General Hospital
Judy Smith	Chair, Statewide Rehabilitation Clinical Network
Matt Sutton	Senior Physiotherapist, Royal Adelaide Hospital
Anita Taylor	Orthopaedic Liaison Clinical Practice Consultant, Royal Adelaide Hospital
Belinda O'Malley	Network Development Manager, Orthopaedic Clinical Network
Karen Brown	Network Development Manager, Rehabilitation Clinical Network
Carlie Hopkins	Acting Network Development Manager, Rehabilitation Clinical Network from November 2009

Appendix 10: Membership of orthopaedic rehabilitation workgroups

Fragility fracture rehabilitation workgroup

Name	Organisation
Maree Braithwaite	Senior Occupational Therapist, St Margaret's Hospital
Vicky Caputo	Senior Physiotherapist / Rehabilitation Program Coordinator, Domiciliary Care SA
Mellick Chehade	Orthopaedic Surgeon, Royal Adelaide Hospital
Owen Davies (Chair)	Senior Consultant Geriatrician, Repatriation General Hospital
Linda Ferris	Orthopaedic Surgeon, Modbury Hospital
John Forward	Director Ageing and Intermediate Care, CNAHS
Anita Taylor	Orthopaedic Liaison Clinical Practice Consultant, Royal Adelaide Hospital
Emma Millstead	Senior Occupational Therapist, ACH Group
Michele Sutherland	Fall Prevention Program Manager, SA Health
Lynne Wakefield	Manager, Physiotherapy, The Queen Elizabeth Hospital
Andrew Wilkinson	Rehabilitation registrar, Repatriation General Hospital
Belinda O'Malley	Network Development Manager, Orthopaedic Clinical Network
Karen Brown	Network Development Manager, Rehabilitation Clinical Network

Orthopaedic trauma rehabilitation workgroup

Name	Organisation
Heather Banham	GP liaison, Queen Elizabeth Hospital
Mellick Chehade	Orthopaedic Surgeon, Royal Adelaide Hospital
Louise Giles	Senior Occupational Therapist, Hampstead Rehabilitation Centre
Julie Harding	Rehabilitation Coordinator, Repatriation General hospital
Vicki Hume	Senior Occupational Therapist, Hampstead Rehabilitation Centre
Christabel Jesudason	Senior Physiotherapist, Royal Adelaide Hospital
Cheryl Kimber (Chair)	Nurse Practitioner Orthopaedics, Flinders Medical Centre
Marilyn Pascoe	Extended Practice Nurse Orthopaedics, Flinders Medical Centre
Brian Simpson	Senior Physiotherapist, Flinders Medical Centre
Peter Tamblyn	Orthopaedic Surgeon, Flinders Medical Centre
Debbie Thompson	Senior Physiotherapist, Women's and Children's Hospital
Adrian Winsor	Staff Specialist, Hampstead Rehabilitation Centre
Tanya Wolf	Director of Nursing, Ceduna District Hospital
Belinda O'Malley	Network Development Manager, Orthopaedic Clinical Network
Karen Brown	Network Development Manager, Rehabilitation Clinical Network

Arthroplasty rehabilitation workgroup

Name	Organisation
Hayley Allen	Senior Occupational Therapist, Repatriation General Hospital
Wendy Bampton	Senior Physiotherapist,
John Camens	Senior Physiotherapist, Sportsmed
Carly Clarke	Occupational Therapist, Project Officer, CHSA Arthroplasty Project
Chris Flavel	Exercise Physiologist, Whyalla Health Service
Tony Hewitt	Director, Physiotherapy, Repatriation General Hospital
Graham Mercer (Chair)	Orthopaedic Surgeon, Repatriation General Hospital
Tim Morris	Senior Physiotherapist, Repatriation General Hospital
Nigel Quadros	Rehabilitation Specialist, The Queen Elizabeth Hospital and St Margaret's Hospital
Dawn Skidmore	Physiotherapist, Allied Scientific Health Office, SA Health
Simon Spedding	General Practitioner
Angela Standen	Arthroplasty Clinical Practice Consultant, Royal Adelaide Hospital
Jennie Sturm	Senior Physiotherapist, Noarlunga Health Service
Matt Sutton	Senior Physiotherapist, Queen Elizabeth Hospital
Lesley Thomas	Orthopaedic Clinical Practice Consultant, Queen Elizabeth Hospital
Belinda O'Malley	Network Development Manager, Orthopaedic Clinical Network
Karen Brown	Network Development Manager, Rehabilitation Clinical Network

Appendix 11: Statewide consultation work shop

A statewide consultation Work Shop was held on the 27th October 2009 to view and comment on the work undertaken by the individual work groups on the document which incorporated the three Models of Care for Orthopaedic Rehabilitation. More than 70 participants representing SA Health including all the SA Health regions, General Practitioners, Clinicians across the health sector and health consumers attended the Work Shop.

The questions posed for each of the three individual Models of Care were

- > Key positive initiatives
- > Key priority areas for action
- > Key issues and gaps you believe have not been addressed
- > Any other suggestions
- > Where to from here

Work shop attendees

Andrews, Justin	Alyson Dymott	Philcox, Paul
Anstey, Claire	Ferris, Dr Linda	Phillips, Professor Paddy
Bailey, Larissa	Flavel, Chris	Potter, Anne
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Appendix 12: Glossary (of selected terms) and abbreviations

Aboriginal	The term Aboriginal has been used to refer to people of Aboriginal and Torres Strait Islander descent.
ACE – Acute Care of the Elderly	Acute Care of the Elderly (ACE) Units are short stay units within acute tertiary hospitals providing acutely unwell older people with multi-disciplinary comprehensive assessment and intervention with a focus on maintaining function, independence and confidence throughout the duration of their admission, aiming to return them to their usual place of residence at the time of discharge. These units target geriatric syndromes such as falls and delirium.
ADAM – Arthroplasty Demand and Allocation Management	Arthroplasty Demand and Allocation Management – Project of the Statewide Orthopaedic Network which is being undertaken at present outlining recommendations for the management of those patients requiring Hip and Knee Arthroplasty.
ADL	Activities of Daily Living
AFRM – Australian Faculty of Rehabilitation Medicine	Australian Faculty of Rehabilitation Medicine.
Anti-resorptive therapy	Anti-resorptive therapy aims to prevent further or even reverse bone mineral density loss. Anti-resorptive therapies include oral and parenteral bisphosphonates, strontium and parathyroid hormone analogues.
AQoL – Assessment of Quality of Life Instrument	The Assessment of Quality of Life Instrument - is a 15 point questionnaire. The Australian Quality of Life (AQoL) Project was undertaken to construct and validate a health-related quality of life instrument which would: a) be a psychometrically appropriate instrument for the evaluation of a range of health interventions, from the medical and pharmacological treatment of acute illness through to health promotion activities; and b) enable the economic evaluation of programs through the computation of utilities before and after health-related interventions.
ARAC – Arthroplasty Review and Assessment Clinic	Arthroplasty Review and Assessment Clinics – Recommendation from the ADAM Proposal where patients are assessed for their requirement for an Arthroplasty using a number of criteria. The patients are given a priority rating for surgery and/or are referred for conservative management.
AROC – Australasian Rehabilitation Outcomes Centre	The Australasian Rehabilitation Outcomes Centre (AROC) is a joint initiative of the Australian rehabilitation sector (providers, funders, regulators and consumers). It facilitates a national benchmarking system to improve clinical rehabilitation outcomes in both the public and private sectors.
Arthroplasty	Primary arthroplasty surgery of the hip and knee is surgery to artificially replace the surfaces of the joint to relieve pain and restore function by realigning and/or reconstructing a dysfunctional joint.
CHSA	Country Health South Australia
CNAHS	Central Northern Adelaide Health Service
Colles' Fracture	Fracture of the lower end of the radius, the lower fragment being displaced backward; if the lower fragment is displaced forward, it is a reverse Colles', or Smith's fracture.
CT scan	CT scan stands for computerised tomography scan. This scan takes pictures of structures within the body that are processed by a computer. The data from multiple X-ray images are shown as "slices" on a screen. The CT scan can reveal some soft-tissue and other structures that cannot be seen in conventional X-rays.

Day Therapy Centres – Commonwealth funded	Commonwealth funded Day Therapy Centres provide a wide range of therapies such as physiotherapy, occupational therapy, speech therapy and podiatry to frail older people living in the community and to residents of Commonwealth-funded residential aged care facilities.
DEXA testing	DEXA means Dual Energy X-ray Absorptometry. This imaging system is used to assess bone mineral density. It is commonly used to evaluate individuals with osteoporosis or metabolic diseases affecting the skeleton and monitor treatment and progression of osteoporosis.
Disability Adjusted Life Years	The Disability Adjusted Life Year (DALY) is a health gap measure that extends the concept of potential years of life lost due to premature death to include equivalent years of 'healthy life' lost by virtue of being in states of poor health or disability. The DALY combines in one measure the time lived with disability and the time lost due to premature mortality. One DALY can be thought of as one lost year of 'healthy life' and the burden of disease as a measurement of the gap between current health status and an ideal situation where everyone lives into old age free of disease and disability.
Evidence Based Practice	Clinical decision making based on systematic review of the scientific evidence of the risks, benefits and costs of alternative forms of diagnosis and treatment.
Fragility Fractures	Fragility fractures are fractures that occur in the setting of decreased bone density. They usually involve weight bearing bones such as the femoral neck, femoral shaft, pubic rami, tibia, ankle, distal radius, humerus, rib and vertebrae in the setting of decreased bone density. Over 90% occur in the older population and are due to low impact injuries causing minimal trauma.
GEM - Geriatric Evaluation and Management Unit	The aim of the Geriatric Evaluation and Management (GEM) unit is to provide comprehensive and responsive assessment and care planning by an experienced multi-disciplinary team in consultation with the patient, family, carer and current community services involved in the patient's care, facilitating the older person's return home with an optimal level of health and independence. During an individual's stay in the unit there is a strong focus on minimising loss of function, independence and confidence. Compensatory strategies and community supports are utilised to assist as appropriate.
HARP – Hospital Admission Risk Profile	Hospital Admission Risk Profile - is a tool used to assess the risk of functional decline in older adults after admission to an acute care setting.
Maintenance Therapy	Involves periodic therapy (not necessarily interdisciplinary), to maintain a certain level of function once the optimal level of function has been achieved and prevent further deterioration. The relationship between rehabilitation and maintenance is complementary. Periodic maintenance can not only prevent the significant loss of function which precipitates a need for rehabilitation, but may also be required to sustain the functional gains achieved as a result of a rehabilitation program (Milne, 2001 & Statewide Rehabilitation Service Plan, 2009-2016).
MAPT – Multi-attribute Prioritisation Tool	Multi-Attribute Prioritisation Tool is an assessment tool developed by the Victorian Department of Human Services in conjunction with Melbourne Health and the University of Melbourne primarily to assist prioritisation of orthopaedic outpatient appointments and prioritisation for joint replacement surgery. It has been developed in conjunction with orthopaedic surgeons and validated against known standards.

MRI – Magnetic resonance Imaging	MRI stands for magnetic resonance imaging. MRI uses magnetic signals, rather than X-rays to create image “slices” of the human body. An MRI is often used to study nerves, muscles, ligaments, bones, and other tissues in the body; the detail of the images can be very specific.
Multi-disciplinary	Comprehensive care provided by a team of various health professionals, using a care team approach and tailored to decision making regarding diagnosis, treatment planning and other aspects of care for an individual.
Neck of Femur Fracture	A neck of femur fracture (commonly referred to as ‘hip fracture’ or ‘NOF’) is a fracture in the proximal end of the femur (the long bone running through the thigh), near the hip joint.
Orthopaedic Trauma	Orthopaedic trauma is defined as any injury or disruption that occurs to the musculoskeletal system as a result of an incident/accident which involves direct or indirect force. This encompasses the complete spectrum from minor to severe force. The musculoskeletal system includes muscles, bones, joints and surrounding connective tissue. The injury impacts on the function of that individual’s limb or limbs as well as their level of mobility and independence with their usual activities.
Osteoporosis	Thinning of the bones with reduction in bone mass and density due to depletion of calcium and bone protein. Osteoporosis predisposes a person to fractures, which are often slow to heal and heal poorly.
OWL- Orthopaedic Waiting List	Orthopaedic Waiting List Project. A pilot project funded by the Dept of Health and Ageing in 2007-8 to test the usefulness of a Hip and Knee Arthroplasty Referral Guide for GPs and also to establish to what degree they could be engaged in the management of this cohort of patients. The term OWL in this context refers to the Orthopaedic Waiting List.
Patient focussed booking	A system which integrates appointment scheduling processes and appointment queues, allowing appointments to be partially booked.
Pelvic Fracture	A pelvic fracture is a break in one or more bones of the pelvis, often of the pubic rami (ring).
Prehabilitation	<p>The process of enhancing functional capacity of the individual to enable him or her to withstand the stresses of orthopaedic surgery and the associated inactivity.</p> <ul style="list-style-type: none"> > Prehabilitation can be further described as:- > Early identification and optimising management of co-morbidities > The learning and practising of functional tasks, cardiovascular fitness and flexibility training > Optimisation of self management programs > Discharge planning including domestic resource analysis
Primary prevention	Primary prevention aims to preclude the development of a disease and includes the promotion of health, early diagnosis of disease or disability, and prevention of disease.
QEH	Queen Elizabeth Hospital
Quality of Life	The overall status of a combination of factors including a person’s health, symptoms and level of physical and social functioning.

Rehabilitation	Rehabilitation aims to achieve optimal functioning and minimise the experience of developmental delay or loss of function and ability from any cause. This is usually achieved through physical and psychological methods, using medical, social, educational and vocational services, evidenced by a multi-disciplinary rehabilitation plan comprising negotiated goals and indicative timeframes that are periodically evaluated using outcome measures.
Rehabilitation Service	<p>Such a service is an organised system comprised of clinicians from a variety of disciplines focused on functional improvement with the aim of the patient achieving the optimal level of function, thereby reducing the prevalence of disability and handicap in the community.</p> <p>Key features of an effective rehabilitation system include:</p> <ul style="list-style-type: none"> > Consultative links between rehabilitation and acute hospital services > Close working arrangements with Aged Care Services > Sound admission and discharge planning > Some flexibility of staffing across settings > The ability to provide individual rehabilitation plans and service options > Access to aids, equipment and a range of other community based services, e.g. home modifications and personal care assistance, to support discharge > Close links with general practice, aged care and disability services > An adequate supply of post-discharge services > Follow up for an appropriate length of time - at least three months, probably 6-9 months depending on the impairment - to monitor progress (Statewide Rehabilitation Service Plan, 2009-2017).
RACF - Residential Aged Care Facilities	Residential aged care facilities are for older people who can no longer live at home. Australian Government-subsidised places are provided in aged care homes that are owned and operated by organisations that have the approval of the Australian Government to care for their residents.
RGH	<p>Repatriation General Hospital</p> <p>High-level care is for people who need 24-hour nursing care. This may be because they are physically unable to move around and care for themselves, or because they have a severe dementia-type illness or other behavioural problems. Low-level care places are for people who need some help. Mostly, people in low-level care can walk or move about on their own. Low-level care focuses on personal care services (help with dressing, eating, bathing etc.), accommodation and support services (cleaning, laundry and meals). Nursing care can be given when required.</p>
Secondary prevention	Secondary prevention aims to manage the early symptoms of a disease and preclude the development of possible irreparable medical conditions.
TCP – Transitional Care Program	The Transition Care Program offers alternatives to extended periods of hospitalisation or permanent move into residential care by providing older Australians with rehabilitation and support services. It is goal oriented, time limited and targets older people at the conclusion of a public hospital episode who require more time and support in a non-hospital environment to complete their restorative process, optimise their functional capacity and finalise longer term care arrangements.
Vertebral Fracture	A vertebral fracture occurs when the bones of the spine become broken usually due to trauma. In older people, especially those with osteoporosis this can occur with little or no force.

Appendix 13: References

- ¹ Department of Health. *South Australia's Health Care Plan, 2007-2016*. Government of South Australia: Department of Health, Adelaide. 2007.
- ² SA Health. *Statewide Rehabilitation Service Plan, 2009-2017*. South Australia. 2009.
- ³ ADAM Proposal – Arthroplasty Demand and Management Proposal; Statewide Orthopaedic Clinical Network, SA Health, 2008
- ⁴ Osteoporosis Australia. Website: www.osteoporosis.org.au Accessed July 2009 for health professional guidelines, position papers and recommendations.
- ⁵ British Orthopaedic Association. *The care of patients with fragility fracture*. British Orthopaedic Association: London, England. 2007.
- ⁶ Orthopaedic. Prehabilitation Project - An optimised Discharge Planning Tool for Patients undergoing Hip and Knee Arthroplasty – development, implementation and evaluation - RGH
- ⁷ Australian Orthopaedic Association National Joint Registry Report 2008
- ⁸ AFRM. *Standards 2005: Adult Rehabilitation Medicine Services in Public and Private Hospitals*. Australasian Faculty of Rehabilitation Medicine: Sydney, Australia. 2005.
- ⁹ Cripps RA, Harrison JE. *Injury as a chronic health issue in Australia*. Australian Institute of Health and Welfare: Canberra, Australia. 2008.
- ¹⁰ Hall SE, Williams JA, Senior JA et al. *Hip fracture outcomes: Quality of life and functional status in older adults living in the community*. Australian New Zealand Journal of Medicine. 2000; 30:327-32.
- ¹¹ Bliuc D, Nguyen ND, Milch VE, Nguyen TV, Eisman JA, Center JR. *Mortality risk associated with low-trauma osteoporotic fracture and subsequent fracture in men and women*. JAMA. 2009; 302(5): 512-521.
- ¹² ANZSGM. *Position statement No. 5: Orthogeriatric*. Australian and New Zealand Society for Geriatric Medicine: Sydney, Australia. 2005.
- ¹³ Elliot JR, Wilkinson TJ, Hanger HC et al. *The added effectiveness of early geriatrician involvement on acute orthopaedic wards to orthogeriatric rehabilitation*. New Zealand Medical Journal. 1996; 109: 72-3.
- ¹⁴ Thwaites J, Mann F, Gilchrist N, Frampton C, Rothwell A, Sainsbury R. *Shared care between geriatricians and orthopaedic surgeons as a model of care for older patients with hip fractures*. New Zealand Medical Journal. 2005;118 (1214).
- ¹⁵ SIGN. *Prevention and management of hip fracture in older people: A national clinical guideline*. Scottish Intercollegiate Guidelines Network: Edinburgh, Scotland. 2009.
- ¹⁶ Orosz GM, Magaziner J, Hannan EL. *Association of timing of surgery for hip fracture and patient outcomes*. Journal of the American Medical Association. 2004; 291:1738-43.
- ¹⁷ SIGN. *Prevention and management of hip fracture in older people: A national clinical guideline*. Scottish Intercollegiate Guidelines Network: Edinburgh, Scotland. 2007.
- ¹⁸ Tha HS, Armstrong D, Broad J, Paul S, Wood P. *Hip fracture in Auckland: Contrasting models of care in two major hospitals*. Internal Medicine Journal. 2008; 39:89-94.
- ¹⁹ Cameron ID, Lyle DM, Quine S. *Accelerated rehabilitation after proximal femoral fracture: A randomised control trial*. Disability & Rehabilitation. 1993; 15:29-34.
- ²⁰ Sambrook PN, Cameron ID, Chen JS, Cumming RG, Lord SR, March LM, Schwarz J, Seibel MJ, Simpson JM. *Influence of fall related factors and bone strength on fracture risk in the frail elderly*. Osteoporosis International. 2007; 18(5): 603-10.
- ²¹ Harrington JT, Broy SB, Derosa AM, Licata AA, Shewmon DA. *Hip fracture patients are not treated for osteoporosis: A call to action*. Arthritis & Rheumatics. 2002; 47:651-4.
- ²² SIGN. *Prevention and management of hip fracture in older people: A national clinical guideline*. Scottish Intercollegiate Guidelines Network: Edinburgh, Scotland. 2002.

²³ Cochrane 2008

²⁴ ANZSGM. *Position statement No. 14: The management of older patients in the emergency department* Australian and New Zealand Society for Geriatric Medicine: Sydney, Australia. 2008.

²⁵ Australian Commission for Safety and Quality in Health Care. *Preventing falls and harm from falls in older people: Resource suite for Australian hospitals and residential aged care facilities*. 2005.

Fragility fracture: Non cited references

AFRM. *Submission to the National Health and Hospitals Reform Committee: Beyond the blame game*. www.nhhrc.org.au Accessed August 2008.

Boufous S, Finch C, Close J, Day L, Lord S. *Hospital admissions following presentations to emergency departments for a fracture in older people*. *Injury Prevention*. 2007; 13: 211-214.

Magaziner J, Simonsick EM, Kashner M et al. *Predictors of functional recovery one year following hospital discharge for hip fracture: A prospective study*. *Journal of Gerontology*. 1990; 45: M101-7.

Milne P. *South Australian Rehabilitation Services Review Report*. Government of South Australia: Department of Health. 2001.

SA Health. *South Australia: Our Health and Health Services*. Government of South Australia: South Australia Health. 2008.

Torgerson DJ, Dolan P. *Prescribing by general practitioners after an osteoporotic fracture*. *Annals of the Rheumatic Diseases*. 1998; 57: 378-9.

University of Melbourne. *The burden of brittle bones: Epidemiology, costs & burden of osteoporosis in Australia - 2007*. Osteoporosis Australia: Sydney, Australia. 2007.

American Geriatrics Society, British Geriatrics Society and American Academy of Orthopaedic Surgeons Panel on Falls Prevention. *Guideline for the prevention of falls in older persons*. *Journal of the American Geriatric Society*. 2001; 49: 664-672.

Auron-Gomez A et al. *Medical management of hip fracture*. *Clin Geriatr Med*. 2008.; 24: 701-719

Avenell A et al. *Nutritional supplementation for hip fracture aftercare in older people*. *Cochrane database of systematic reviews*. 2006(4).

Beaupre LA et al. *Best practices for elderly hip fracture patients*. A systematic review of the evidence. *J Gen Intern Med*. 2005; 20: 1019-1025.

British Geriatrics Society. *Orthogeriatric models of care*. 2007

Cameron ID et al. *Geriatric rehabilitation following fractures in older people: a systematic review*. *HTA*. 2000; 4(2).

Cameron ID et al. *Co-ordinated multidisciplinary approaches for inpatient rehabilitation of older patients after proximal femoral fractures*. *Cochrane database of systematic reviews*. 2001(3).

Chilov MN et al. *Evidence-based guidelines for fixing broken hips: an update*. *MJA*. 2003; 179: 489-493

GMCT. *Orthogeriatric care – a collaborative model of care*

Inderjeeth et al. *Study of osteoporosis awareness, investigation and treatment of patients discharged from a tertiary public teaching hospital*. *Internal medicine Journal*. 2008; 36: 547-551.

Levinson et al. *Barriers to the implementation of evidence in osteoporosis treatment in hip fracture*. *IMJ*. 2009; 37: 199-202.

Miura LN et al. *Effects of a geriatrician-led hip fracture program: improvements in clinical and economic outcomes*. *JAGS*. 2009; 57: 159-167

Morrison RS et al. *Medical consultation for patients with hip fracture*. *UpToDate*. 2008

NZ Guidelines Group. *Acute management and immediate rehabilitation after hip fracture amongst people aged 65 years and over*. 2003 Wellington, NZ

Oliver D et al. *Hip fracture*. *BMJ Clinical Evidence*. 2007; 10: 1110.

Parker M et al. *Hip fracture*. *BMJ*. 2006; 333: 27-30.

Tinetti et al. *Home-based multicomponent rehabilitation program for older persons after hip fracture: a randomized trial*. Arch Phys Med Rehabil. 1999; 80: 916-922.

WA Dept of Health. *Orthogeriatric model of care*. Perth: Aged Care Network, Dept of Health, WA; 2008

West J. *GAPN postacute care coordination improves hip fracture outcomes*. Western Journal of Nursing Research. 2007; 29: 523-544.

Arthroplasty: Non cited references

OWL Project – Orthopaedic Waiting List Project

AQoL- Assessment of Quality of Life

Osborne DA Fisher, B. Dierckman, MR Watts, K Davis. *Looks good but feels bad: factors that contribute to poor results after total knee arthroplasty*. The Journal of Arthroplasty Vol 22 No.6 Suppl. 2 2007

Lingard EA, Katz JN, Wright EN, Sledge CB. *Predicting the outcome of total knee arthroplasty*. JBJS Vol. 86-A Number 10, October 2004

Kapstad H, Rustoen T, Hanestad B, Moum T, Langeland N, Staven K. *Changes in pain, stiffness and physical function in patients with osteoarthritis waiting for hip and knee replacement surgery*. Osteoarthritis and Cartilage, 2007, Vol 15, Issue 7, Pages 837-843

Mahon JL, Bourne RB, Rorabeck CH, Feeny DH, Stitt L, Webster-Bogaert S. *Health related quality of life and mobility of patients awaiting elective total hip arthroplasty; a prospective study*. Can. Med. Assoc. J. Nov 2002: 167: 1115-1121

Ostendorf M, Buskens E, van Stel H. *Waiting for total hip arthroplasty. Avoidable loss in quality time and preventable deterioration*. The Journal of Arthroplasty, Vol 19, Issue 3, Pages 302-309

Fielden J, Cumming J, Horne J, Devane P, Gallagher L. *Waiting for Hip Arthroplasty. Economic Costs and Health Outcomes*. The Journal of Arthroplasty, Vol 20, Issue 8, Pages 990-997

AFRM. *Standards 2005: Adult Rehabilitation Medicine Services in Public and Private Hospitals*. Australasian Faculty of Rehabilitation Medicine: Sydney, Australia. 2005.

AFRM. *Submission to the National Health and Hospitals Reform Committee: Beyond the blame game*. www.nhhrc.org.au Accessed August 2008.

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